



February 19, 2022

BY EMAIL

Julie Akins, Mayor
Ashland, Oregon
julie@council.ashland.or.us

Re: The LED Fraud

Dear Julie Akins,

My life has been turned upside down since the invention of high-powered LED light beams, as LED light beams are intolerable for me. There is no medicine I can take or special glasses that I can wear to protect myself from LED light beams, so I spend nearly every minute of my life now finding ways to avoid the panic attacks that are induced by LED light beams. Therefore, when you let me know that the City of Ashland has heard my concerns, I finally felt hope that my life could return to normal. Thank you for providing this opportunity to explain to you and the Council why LED light beams are toxic, hazardous, discriminatory, and fail to provide energy savings.

Spherical vs. Flat Surface Emitters

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 involved, including council, city staff, and the public before we can begin to discuss solutions to the glare, light trespass, health hazards, and discrimination of LED light beams.

The left side of Figure 1 shows light from a spherical emitter. The light is uniformly spread and follows the well-known Inverse Square Law.¹

¹ https://en.wikipedia.org/wiki/Inverse-square_law

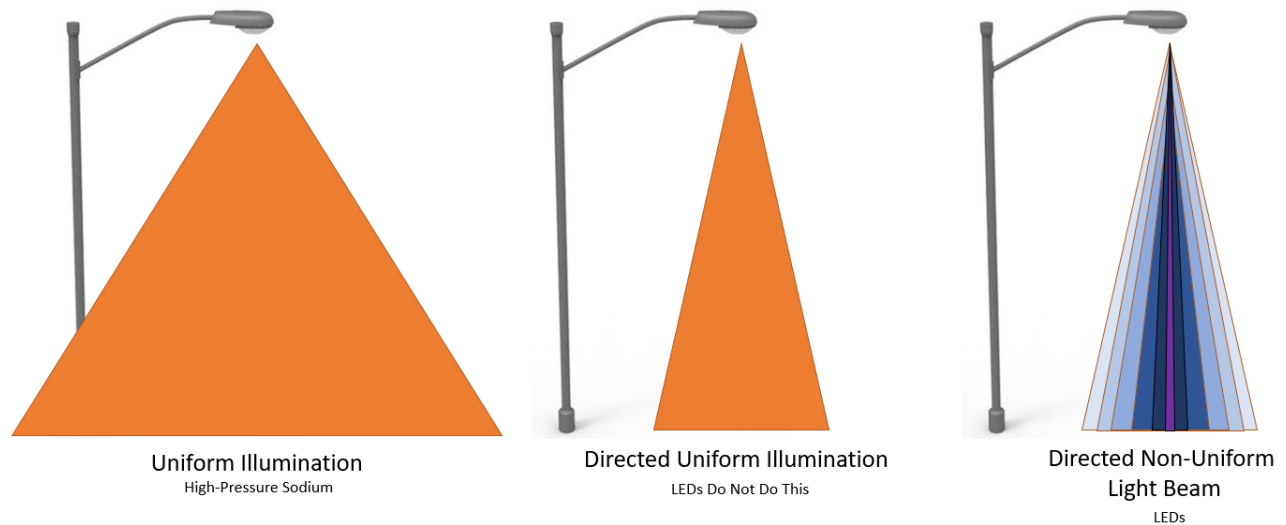


Figure 1 - Streetlight Comparison

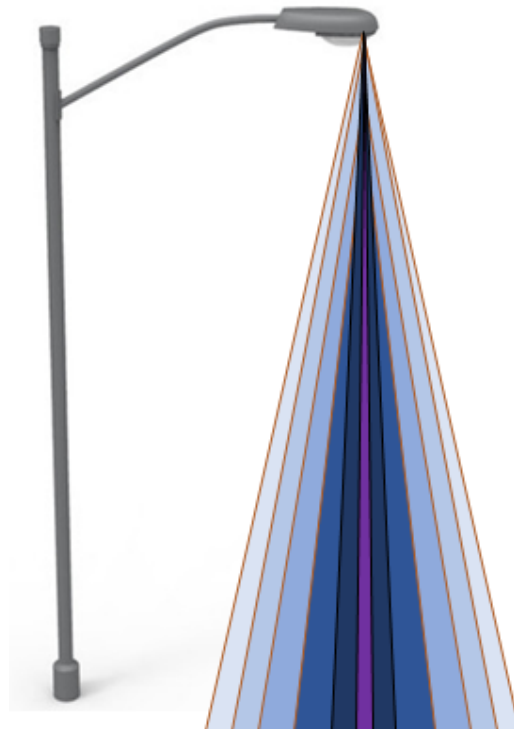
Flat surface emitters do not emit uniform light. Flat surface emitters emit directed light beams, but those light beams are not uniform. The City of Ashland was likely told that LED light is like the middle image of Figure 1, but this is not true. The middle image in Figure 1 is **not** LED light.

The true shape of light from a flat surface is shown on the right in Figure 1. 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.² 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 2 highlights the issue of flat surface emitters 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 2 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.

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



Directed Non-Uniform Light Beam LEDs

Figure 2 - Directed Non-Uniform Light Beam

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 spherical emitters. LED streetlights do not comply with any standards, and this is a major safety and liability issue for Ashland.

Ashland was likely told 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.³ Since flat surface emitters don’t provide the uniform illumination that the previous technology provided, flat surface emitters cannot be compared to spherical emitters in terms of energy use. Spherical emitters and flat surface emitters are simply two different products, just like lemons and lemon-scented soap are two different products.

LED streetlights above about 2200K color temperature produce dangerous glare because of the large spike of 450 nanometer blue wavelength light. When we combine the non-uniform spectral properties and non-uniform spatial properties of LED light beams, we have a very dangerous type of light that puts drivers and pedestrians at high risk because they can neither see nor be seen properly.

³ https://www.energystar.gov/about/about_energy_efficiency

The only way to provide safe illumination is to use spherical emitters such as incandescent or High-Pressure Sodium.

The idea that streetlights provide safety is a myth. Nearly all research studies on the subject have concluded that streetlights, and especially LED streetlights, do not increase safety and do not reduce crime.⁴ If the natural night were so dangerous, then how do Dark Sky parks exist and why are they such a tourist draw? Wouldn't these areas designated as Dark Sky friendly be unsafe if they don't have LED streetlights? The answer is that the natural night is not inherently dangerous, nor unsafe and adding artificial light pollution does not make a location safer.

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?

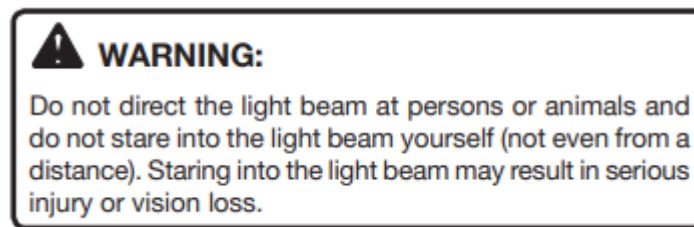


Figure 3 - Flashing Warning

Discrimination

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 of how the widespread installation of LEDs have destroyed lives are posted on our website [here](#). LED lights are discriminatory because they interfere with a person's major life functions such as seeing, thinking, and concentrating. Consider these quotes:⁵

- **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.*

⁴ <http://www.softlights.org/crime-and-safety/>

⁵ <http://www.softlights.org/stories/>

- **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.*

LED Flashing Lights

Figure 4 is a diagram showing why LED flashing light beams are so intense and dangerous. The peak luminance of an LED can be hundreds of thousands or even hundreds of millions of nits, far exceeding human thresholds, and the non-uniform shape interferes with the human nervous system.

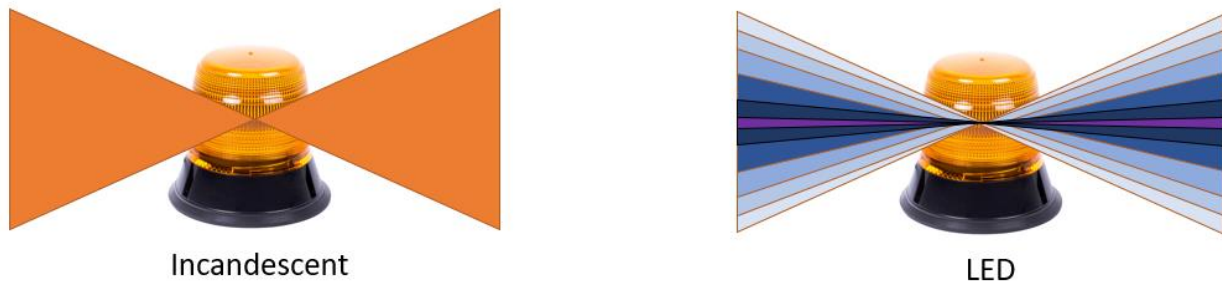


Figure 4 - Incandescent vs. LED Flashing Lights

An example of a device called a Rectangular Rapid Flashing Beacon is shown in Figure 5. A video example of an RRFB is here: <https://youtu.be/KBltx0Argag> Ashland has installed several of these RRFBs, and these devices are torture for me. When I drive on Siskiyou Blvd. and one of these devices starts rapidly flashing, it is terrifying. I am forced to look at my lap and slow down or come to a stop to avoid the pain and to avoid the full panic attack. People with photosensitive epilepsy will suffer seizures and people with migraines will suffer migraine headaches, often hours after exposure. There have been no medical studies of these devices showing that they are safe for the human eye or nervous system.



Figure 5 – RRFB

An example of LED flashing lights on a vehicle is shown in Figure 6. The video is available here: https://youtu.be/910_J5xhrTk This is video that I took personally, just before suffering a full-blown panic attack due to the extreme energy emitted by these LED flashing lights. I wrote about my experience [here](#). The panic attack involved me leaping out of the car, screaming at the firemen to stop assaulting me and rolling around on the ground.



Figure 6 - Fire Engine

The research going at least as far back as 1955, continuously concludes that flashing lights provide no value, only harm. Why does society continue to use these devices that provide no benefit, but do cause injury?

December 27, 1955 – [Siren, Light Removal Makes Police Unhappy](#) - "Removal of the sirens and red lights has materially reduced accidents involving police cars rushing to other smashups or speeding to the scene of a crime."

August 5, 2001 - [Rear Lighting Configurations for Winter Maintenance Vehicles](#) This study concludes that flashing lights are less effective than static lights for safety.

October 2010 – [A Ten-point Toolkit for Effective Warning Lights](#) – This article on ambulance lights concludes that "fewer lights, flashing slower & less brightly are more effective."

June 1, 2016 - [National Institutes of Health – Psychological Factors in Exceptional, Extreme and Torturous Environments](#) This scientific research shows that strobing LED lights are instruments of torture.

June 5, 2016 - [Why Running Lights and Sirens is Dangerous](#) – Flashing Lights and Sirens may save a few minutes, but does not change the outcome of the event. There is no value to using them, but there is harm.

2018 – [Police Vehicle Warning Signals – An Innovative Approach to Officer Safety](#) – This article in Police Chief Magazine discusses the dangers of overly intense flashing lights.

2019 – [Situational Based Emergency Lights](#) – Photos showing the difference between high-glare and low-glare LED police lights, with article.

2019 – [Massachusetts State Police](#) – Compilation video showing high luminance strobe lights on MSP vehicles.

April 2, 2019 - [Impacts of Emergency Flashing Lights and Vehicle-Mounted Illumination on Driver Visibility and Glare](#) – This study concludes that strobing LED lights are dangerous.

June 11, 2019 - [Stroboscopic light effects during electronic dance music festivals and photosensitive epilepsy: a cohort study and case report](#) – The connection between strobe lights and seizures.

2021- [California Highway Patrol](#) – Video of CHP vehicle on roadway with high luminance LED flashing lights.

December 2021 – [Effects of Emergency Vehicle Lighting Characteristics on Driver Perception and Behavior](#) – This study funded by the Emergency Responder Safety Institute is severely flawed because it doesn't account for LED luminance, but despite its flaws, the conclusion is that flashing lights put lives in danger.

There are no government regulations for LED flashing lights, despite the research showing that these devices are dangerous, and showing that a soft, static light is the safest method of protecting first responders and the public. LED flashing lights are dangerous, toxic, act as assault weapons and must never be used in a civil society.

Natural Night

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

Ashland Queries

You requested response to three questions. I wish to let you know how thankful I am that you have asked these questions and allowed me the opportunity to explain what the city of Ashland can do to ensure my safety and the safety of everyone.

- 1) Where are the LED lights you are most concerned about?

⁶ <http://www.softlights.org/human-health/>

- 2) What remedies might the city employ, were it to take this matter up?
- 3) What types of lights should the city consider that would also address power usage?

RRFBs

LED flashing lights on RRFBs and other signs are a major safety hazard and liability for the city. These rapidly flashing, high intensity lights reduce driver vision and there have been zero medical studies showing that they are safe for the eyes. The warning labels on the LED flashlights make it clear that LED light beams are dangerous for the eyes. LED flashing lights are known to cause seizures, migraines, and panic attacks and their use leads to Complex PTSD.

I'm sure it's hard for me to convey the fear I now have of seeing the bare-diode LEDs in any device, knowing that they may turn on at any instant and assault me, but exposure to LED flashing lights has a cumulative effect such that even a brief exposure of less than a second will trigger a neurological overload, and now the fear itself of being assaulted can lead to panic attack.

Therefore, the RRFBs that have been installed should be turned off and covered with a tarp to hide the bare-diode LEDs to prevent the panic attacks for those of us who have been assaulted too many times by LED flashing lights. The residents of Ashland should be alerted that the RRFBs have been shown to be dangerous and discriminatory and therefore they will be permanently removed.

To protect pedestrians while crossing Siskiyou Blvd. without assaulting drivers or other pedestrians with LED flashing lights, Ashland should look to other methods such as those already used in Ashland, those used in Europe and those advocated by Strong Towns.⁷ Ashland has done a wonderful job of keeping the speed limits on Siskiyou Blvd. very low and these low speed limits should continue. The lower the speed, the less likely that a crash will cause injury or death.

Strong Towns recommends "empowering pedestrians". This idea has already been implemented by Ashland in the downtown area, with curb extensions and low speed limits. I have used this pedestrian empowerment idea myself when crossing Siskiyou Blvd. in the downtown area and I have seen others, locals and tourists alike, use it as well. There is no need for a high intensity LED flashing light that assaults people and damages their eyes. Ashland should configure the crossing areas around Southern Oregon University in the same way as downtown Ashland is configured.

Vehicle LED Flashing Lights

LED flashing lights on city police cars, fire trucks, ambulances, and utility vehicles are dangerous, as detailed in the research studies listed above. The article [Why Running Lights and Sirens is Dangerous](https://www.strongtowns.org/journal/2016/7/12/ways-to-make-streets-safer-pedestrians) is just one of many studies showing that flashing lights and sirens are dangerous. One of the key ideas from this article is that, while the police car or ambulance may arrive at its destination 2 minutes faster than without lights and sirens, the **outcome is unchanged**. For example, if there was a patient with a heart attack, the patient survived or didn't survive regardless of the use of the flashing lights and deafening sirens.

⁷ <https://www.strongtowns.org/journal/2016/7/12/ways-to-make-streets-safer-pedestrians>

Really the only reason that all these vehicles have unregulated, dangerous, discriminatory flashing lights and unbearably loud sirens is because there are companies and salespeople selling these products. That's it. There is no actual reason to have these devices.

Therefore, to protect the lives of first responders and the public, and to vastly improve the quality of life for residents and tourists, the city of Ashland should prohibit the use of LED flashing lights on police cars, ambulances, fire trucks, and utility vehicles. In addition, the deafening sirens should be prohibited as well. Neither the LED flashing lights, nor the sirens provide any safety benefit, but do cause stress, anxiety, eye and hearing damage, and are discriminatory.

We must remember that there are many objects to look at while walking or driving, so an LED flashing light will be a distraction, reducing our ability to see, think and concentrate on the entire scene. A dog or child darting across the street will not be noticed when the driver is inundated by high intensity light beams from a utility truck on the side of the road. I frequently read about crashes involving first responders who are run over despite (because of) their use of LED flashing lights. For safety, we must understand the entire scope of issue, and not just focus on the vehicle that wishes to be noticed. The research articles provided above provide many ideas for replacements for flashing lights.

Streetlights

Ashland switched from High-Pressure Sodium to LED streetlights with good intentions. The idea was to save energy, reduce costs, and lower the carbon footprint. Unfortunately, the entire world has been defrauded by the energy efficiency myths promoted by what I call The LED Cartel. We have documented some of the key historical actions that led to this fraud on our website.⁸

As detailed earlier, an LED streetlight is not more energy efficient than an HPS streetlight because an LED streetlight doesn't provide safe uniform illumination. An LED streetlight emits a non-uniform beam that doesn't comply with any standards, reduces vision, and causes epileptic seizures, migraines, and panic attacks.

The LED Cartel has perpetrated their fraud by only using the metric luminous efficacy, measured in lumens per watt, and by ignoring the requirement to provide the same service. The LED Cartel claims that LED streetlights have an efficiency of 120 lumens/watt, while HPS is only 90 lumens per watt. Yet, when we really look at the details, HPS can be as high as 150 lumens/watt. In addition, what the LED Cartel doesn't talk about is how HPS streetlights might typically be rated at 100-Watts, so if a city wanted to reduce their energy use by 50%, why not continue using the safe, uniform illumination provided by HPS, but switch to a 50-Watt light? There is no loss of safety, and the reduced amount of light will improve contrast between the nighttime dark and the artificial light.

An example of reducing the amount of light is shown in Figure 7. At a 50% reduction, the difference to the human eye is negligible. At 80% reduction, there is still more than enough light to see by. Human rod cells for nighttime vision are approximately 7 times more efficient than cone cells, so reducing the amount of light also increases the efficiency of our vision. So, if we really think about it deeply, if we want to be more energy efficient, then the most effective way to increase efficiency is to activate our rod cells instead of our cone cells, which means using less light, not more.

⁸ <http://www.softlights.org/how-did-the-led-fraud-start/>



Figure 7 - Reducing Luminous Flux

Consider this statement on a website selling LED streetlights. Quote: “Energy saving is more than 60%.”⁹ This claim of 60%, 70%, 80% energy savings is total fraud, and yet this claim is everywhere. I invite the council and staff to review the energy analysis that we did for the city of Pittsburgh [here](#). The Pittsburgh analysis provides in-depth analysis of how LED streetlights do not save energy and that the only benefit of switching to LEDs is to increase utility company profits.

The 450-nanometer blue wavelength light of LEDs is highly toxic, interrupting circadian rhythms, devastating insect populations, and greatly increasing light pollution due to the high energy of the blue wavelength. LED streetlights in Ashland are only “full cutoff”, not “fully shielded”. The use of the phrase “full cutoff” is another of the marketing phrases that the LED industry has used to deceitfully make cities think they are doing the right thing.

Consider the fully shielded light in Figure 8. Notice how the light has limited or no blue wavelength light, which means that the light is low-energy, and that the light is tucked into the luminaire, thereby directing the uniform light only onto the ground and not into the sky. The low energy of the light means that not much of it will bounce off the pavement and into the sky, in contrast to the high energy blue wavelength light emitted by LED streetlights. Also notice the soft, uniform glow that provides light for wayfinding, while keeping the contrast low.

⁹ <https://tachyonlight.com/led-street-light-vs-hps-street-lights/>



Figure 8 - Shielded Streetlight

Another important consideration is when to turn the light on. We all know to turn off the faucet or hose when not in use, so why do we have a different standard for streetlighting? While the lighting in Figure 8 is warm and attractive and useful, there is nobody on the street using that light. It should be off, which would save energy, save money, reduce the carbon footprint, protect insects and other nocturnal creatures, and improve human health.

Summary

- 1) LEDs are flat surface emitters and the Council, city staff, and the public must be educated about the spatial, spectral, and temporal properties of LED light beams and why it is such a different product than light from spherical emitters.
- 2) LED light beams interfere with human nerve communication, leading to epileptic seizures, migraines, and panic attacks. LED light beams are discriminatory and violate the Americans with Disabilities Act.
- 3) LED flashing lights are dangerous for first responders and the public. Any product that rapidly flashes LED light is a dangerous product and a liability. LED flashing lights are discriminatory. No medical studies have been performed to evaluate the thermal and chemical eye damage caused by LED flashing lights.
- 4) The natural night is a critical resource that must be protected. Adding artificial light pollutes the natural night resource, leading to significant increases in cancer, premature births, and mood disorders.
- 5) LED streetlights do not save energy as claimed by the LED Cartel. There was never a reason to switch to LED streetlights, as LED streetlights increase light pollution, damage the natural night resource, emit a dangerous type of low quality, non-uniform light, and are discriminatory.

I became an activist to protect myself and others from the toxicity of LED light beams not by choice, but out of necessity. Once LED lights appeared everywhere, I was no longer able to function

normally within the LED environment and was forced to quit my job as a middle school math teacher. I now spend my time avoiding LED light beams, researching, and writing letters. I founded and operate the Soft Lights Foundation and, along with Lightaware.org in the United Kingdom, are the primary sources of information documenting the toxicity and fraud of LED lights.

Ashland, Oregon is now my home. I wish to be able to navigate and enjoy Ashland without being assaulted by LED light beams. I wish to live in an environment where I don't have to live in fear or with discrimination. I am available to discuss and justify any of the content in this letter and I pray that the Council will act to protect me and everyone from LED lights.

Sincerely,

A handwritten signature in cursive script that reads "Mark Baker".

Mark Baker
President

Soft Lights Foundation
mbaker@softlights.org