

November 21, 2021

To:

Angelos Vlasopolous, CEO
Realterm Energy
201 West Street
Annapolis, Maryland 21401
avlasopoulos@realtermenergy.com

Re: Spatially Anisotropic Visible Radiation

Dear Angelos Vlasopolous,

We wish to alert Realterm Energy to liability issues related to spatially anisotropic radiation from Light Emitting Diodes. Figure 1 shows LEDs streetlights ostensibly installed by Realterm Energy that subject persons in the area to toxic, hazardous, and discriminatory radiation from LED streetlights and are severely polluting the natural night resource. As is clear from the photo, citizen's civil rights are being violated because the radiation is being directed into their eyes and damaging the natural night resource that is fundamental to the proper functioning of all biological systems.

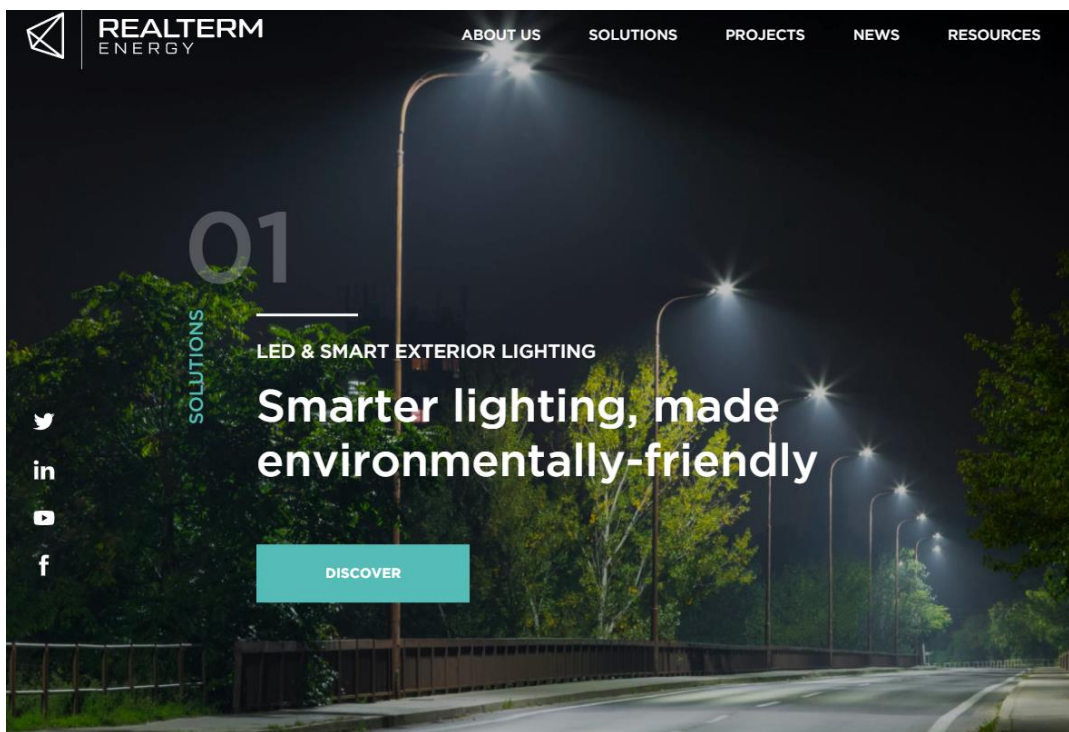


Figure 1 - Realterm Energy Website

Figure 2 is a diagram showing the categorization of radiation. As we can see in the chart, candles, incandescent light bulbs, and High-Pressure Sodium lamps are all spatially isotropic radiation sources. LEDs, on the other hand, emit spatially anisotropic radiation.

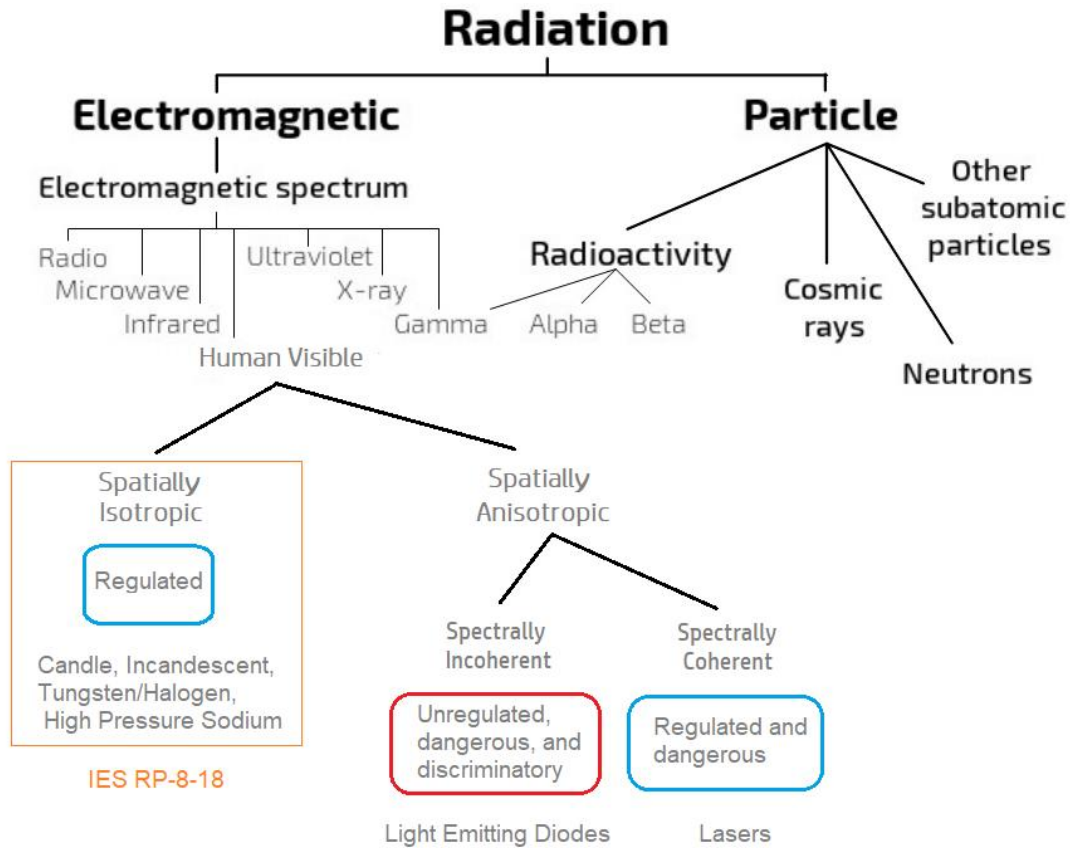


Figure 2 - Radiation Types

The Illuminating Engineering Society Recommended Practice for Design and Maintenance for Roadway Parking Facility Lighting (IES RP-8-18) is the de-facto standard for outdoor lighting for streets and parking lots. The references to “light” in IES RP-8-18 are for *spatially isotropic radiation in the visible portion of the electromagnetic spectrum*. The word “light” in IES RP-8-18 does not refer to microwaves, laser beams, or spatially anisotropic, spectrally incoherent radiation such as LEDs.

The reason this is important is because Realterm Energy has installed or is planning to install LED streetlights that do not comply with existing standards, emit dangerous radiation, discriminate against persons with light sensitivity disabilities and have unregulated spatial, temporal, and spectral characteristics. LED lights have been shown to cause pain, sickness, eye damage, seizures, migraines, emotional trauma, and thoughts of suicide.

The Illuminating Engineering Society does not guarantee their own standards and disclaims any liability for the use of their standards. Thus, if Realterm Energy claims that they followed standards for LED streetlighting and are therefore not liable for the harms caused by LED lighting, Realterm Energy’s

claim will fail, both because IES RP-8-18 is not applicable to LED streetlights, and because IES has warned that their standards are not trustworthy enough to be guaranteed or relied on.

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To our knowledge, there are no ocular exposure standards for LEDs. In his 2009 presentation, Senior Engineer Michael Shulman of Underwriters Laboratories wrote, "Currently, neither the U.S. nor Canada have mandatory standards or regulations for ocular exposure to LEDs emitting incoherent visible light."¹ In the research article, titled Light Emitting Diode Induced Retinal Damage² the authors state, "*Excessive LED light exposure presents a potential hazard to retinal function.*" In other research, those in Risk Group 3 (those with epilepsy, autism, migraines, photophobia, etc.) are often purposely ignored during the research, invalidating results that might have shown that LEDs are safe.

LEDs are not "energy efficient" as claimed by Realterm Energy³. To be energy efficient, a technology must provide the same quality of service and perform the same task as the previous technology⁴. The task in this situation is to provide *uniform illumination without harm*. Since LED radiation does not provide uniform illumination, and since the LED radiation is sending people to the hospital, causing eye damage, and violating civil rights, LED radiation is not energy efficient and therefore should not be used for the purpose of illumination. The claim of "energy efficiency" by Realterm Energy is fraudulent and Realterm is liable for harms caused by LED radiation.

¹ http://www.softlights.org/wp-content/uploads/2021/10/MichaelShulman_LEDFireElectricalSafety.pdf

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5313540/>

³ https://www.realtermenergy.com/wp-content/uploads/2019/12/RTE_LED_Streetlights-and-Human-Health_White-Paper.pdf

⁴ https://www.energystar.gov/about/about_energy_efficiency

As an example of how dangerous LED radiation is, consider this warning shown in Figure 3 from the company Gear Light. We found no such warnings on Realterm Energy's website or White Papers, even though LED streetlights are likely to be more powerful and dangerous than an LED flashlight.

WARNING: To avoid eye injury, do not stare directly into the light beam or shine the beam directly into anyone's eyes. This product is not designed, intended, or recommended for children or hazardous environments.



Figure 3 - LED Flashlight

The fact that LEDs are unregulated and lack standards, cause sickness and eye damage, interfere with the human nervous system, and discriminate against people with light sensitivity disabilities makes Realterm Energy liable for the harm and discrimination they cause because Realterm Energy sells, installs and/or operates LED radiation devices.

To protect human health and reduce liability, Realterm Energy must protect the natural night resource and limit visible radiation. Any lighting must be fully shielded (not just full cutoff) and use *only spatially isotropic* radiation with a Correlated Color Temperature of 2700 Kelvin or less, with 2000K preferred to protect the natural night resource.

Sincerely,

Mark Baker

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President

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