

SCENIC AMERICA

Digital Billboards & the Proliferation of Artificial Light at Night

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For most human history, the night sky was a shared natural resource — a source of cultural meaning and scenic beauty. Today, artificial light at night (ALAN) from digital billboards have diminished darkness and commercialized the night sky. It is estimated that 83% of the world's population lives under light-polluted skies.

New research shows that lighting from billboards is more pervasive than streetlights, and, unlike streetlights or building illumination, billboard lighting has no societal benefit.

The LED Problem

The rapid transition to LED lighting has been widely celebrated as an environmental win as LEDs consume less energy and last longer. Unfortunately, LED technology, including the high-brightness displays used in digital billboards, emits blue light that has outsized biological effects on both humans and wildlife. Human and animal photoreceptors are particularly sensitive to blue light which drives melatonin suppression and circadian disruption.



Understanding Light Pollution: Key Terms

Discussions of light pollution and billboard regulation involve technical language that can obscure straightforward concepts. The following definitions are intended to equip policymakers with the vocabulary needed to evaluate industry claims and craft effective regulations.

- **Illuminance:** The amount of light falling on a surface, measured in lux. This is what a person or animal actually experiences at ground level. Billboard regulations that set illuminance limits control how much light reaches surrounding areas, including homes, roads, and natural habitat. This is the most community-relevant metric and the most difficult for the billboard industry to argue away, as it captures actual impact regardless of where the sign is aimed.

- **Luminance:** The intensity of light emitted or reflected from a surface, measured in candelas per square meter (cd/m^2). This is the brightness of the billboard face itself and is what a driver or pedestrian sees when looking at the sign. High luminance is the primary source of glare and visual disruption. The billboard industry tends to favor luminance-only regulations, as they can argue that a bright sign face is still "directed" and contained.

- **Skyglow:** The diffuse brightening of the night sky over populated areas, caused by light scattering of atmospheric particles. Billboard lighting contributes to skyglow both directly through upward-emitted light and indirectly through reflection and scatter. Skyglow is visible from miles away and affects ecosystems and communities far beyond the immediate billboard location.

- **Light Spectrum / Color Temperature:** Light Spectrum / Color Temperature: LED billboards emit broad-spectrum ALAN, which may have adverse effects on regional wildlife and other ecosystems. The most widely used proxy for white light spectrum is correlated color temperature (CCT). Measured in kelvin (K), cooler CCTs (e.g., 4000 K) typically have more short-wavelength (blue) emissions than warmer CCT's (2200 K).

Billboards Are a Measurable, Significant Source of Light Pollution

Light pollution is often discussed as a diffuse, systemic problem, and an inevitable byproduct of urbanization. But research shows that private light sources are a major and underappreciated contributor:

- A 2025 citizen science study of nearly 250,000 sites found that in German city centers, more total light sources are used for advertising and aesthetic purposes than for street lighting. (Team Nachtlichter 2025)

- A remote sensing study in Tucson, Arizona found that city-operated streetlights accounted for only 13% of total radiance detected from space after midnight — meaning the vast majority of nighttime light emissions come from private sources including advertising, sports lighting, and commercial facilities. (Kyba et al. 2020)

- An aerial survey of Berlin found that advertising lights in street areas were among the largest contributors to upward-directed light, alongside automobile headlights and building facades. (Kuechly et al. 2012)

These findings point to an urgent need to expand outdoor lighting policy beyond streetlights to include commercial and advertising sources.



Image above: Digital billboard advertising at Times Square in New York City, NY.



Image above: Artificial lighting from a commercial Burger King facility.

Taking Action

Scenic America supports policies that treat billboard-generated light pollution as the environmental and scenic disaster it is. Effective tools include brightness caps tied to ambient light conditions, mandatory nighttime dimming, moratoriums on new digital billboards, and the incorporation of ALAN impacts into environmental review processes. Scenic America is available to provide technical assistance and model policy language.