DARK SKY COMPLIANCE

SHOULD YOU BE WORRIED?

Light pollution has become a major issue for communities across North America. Regulations and guidelines have been established, or are being considered that limit the amount of light that can be used for outdoor areas. These regulations and guidelines are called "Dark Sky" rules and regulations… pertaining to the level of "darkness" that is preserved or protected by ordinances. What started out with good intentions has become a nightmare for many businesses that rely upon nighttime lighting. This is because there is very little, if any "grandfathering" provisions that permit existing installations to continue operating without Dark Sky compliance.

For ski areas, the glare and reflective pollution has become a major issue. Ski area managers want to maintain a sufficient level of light to accommodate customer needs with adequate enjoyment and safety, but traditional metal halide (MH) and high pressure sodium (HPS) lighting cannot provide enough usable light at lower powers (wattages) to comply with most Dark Sky provisions. Depending upon specific Dark Sky ordinances that may be adopted or in place, snow venues could be forced to eliminate existing night lighting.

LEDs provide a way to reduce wattage and save energy when retrofitting from MH or HPS, but the LED spectrum has a very high blue bias and significant glare. The usual LED spectrum bounces off the white snow surface into the sky which causes problems with compliance under many of the ordinances in place or being proposed. Equally important, LEDs cannot be effectively pointed uphill or at shallow angles to the snow. This is because direct viewing of unshielded LED elements can be extremely harmful and dangerous to the eye.

SNOW-BRIGHT™

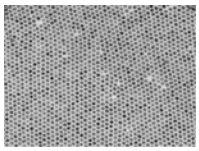
Snow-Bright™ lighting has been specifically designed to comply with Dark Sky guidelines while providing an enhanced visual experience for skiers and riders. Using a specially tuned spectrum, Snow-Bright™ maximizes Visually Effective Lumens (VELs) while lowering overall lux and power consumption. The Snow-Bright™ spectrum actually ***refracts*** through the snow surface to provide exceptional clarity and visually acuity without glare and "bounce" associated with MH, HPS, and even new LEDs.

The effect is quite astounding. Although Snow-Bright™ appears less bright than conventional lighting from *a distance* from the snow surface, the clarity within the "visual field" is actually **2.77 times the lux** of MH and HPS. That means that a 300W Snow-Bright™ fixture will represent the equivalent of 831W for a white MH lamp *without diffusion considerations*. Since

HPS is monochromatic (orange), the equivalence is more than 1,000W. Equally important, a Snow-Bright™ bulb has a large footprint compared with MH, HPS, and LED. This lowers the source intensity at the surface which reduces glare and increases viewing safety. Thus, Snow-Bright™ lighting can be pointed at any angle and direction toward the snow surface… including uphill.

Bulb footprint disperses light

Equally important, Snow-Bright™ uses proprietary nano-reflector technology that diffuses light from the source. Unlike conventional flood lighting that shines a defined beam, Snow-Bright™ fixtures uniformly spread light from the source to eliminate "hot spots" and avoid excessive pupil adjustments when traveling from more intensely lit areas to darker sections. This is extremely important for racing and freestyle. Excessive brightness can cause night blinding when the contrast off the snow surface is overly intense relative to the unlit background. In other words, "Less bright equals more sight!" In particular, standard MH, HPS, and LED lighting patterns fail to comply with ordinances that restrict the amount of reflective light generated from the slope surface. Typically, conventional floods cut a sharp contrasted pattern in the snow as seen in the picture. Notice the "V" of the orange HPS lamp compared with the uniform lighting in the foreground. The picture was taken at Mt. Peter in Warwick, NY during their retrofit from MH and HPS to Snow-Bright™ on their race hill.



Nano-reflector has millions of tiny particles with a reflective index > 97%.

Passing Inspection

Snow-Bright™ lighting is installed at Snowy Range in Wyoming, just 20 miles from the Wyoming University Observatory. The observatory was concerned that the lighting would adversely impact sky viewing. After the install, there was no measurable difference against general background light levels. Light levels were a concern at the Snow King installation in Jackson Hole, WY. Snow-Bright™ was acceptable in meeting National Forest Service Dark Sky compliance. Stars are viewable on the slopes of Steamboat Springs Ski Resort in Colorado where racers have clocked over 80mph.

The low glare and high contrast of Snow-Bright™ lighting has passed every Dark Sky challenge for installations throughout the United States. This is an important consideration because outdoor lighting is being challenged by zoning and planning boards at increasing rates. There have even been stop-work orders for new LED projects that were deemed too bright for Dark Sky compliance.

There are enough challenges for ski area managers without dealing with the potential shut-down of nighttime operations due to new Dark Sky rules and regulations. Only Snow-Bright™ slope lighting has been designed with this in mind while also saving 75% or more in electricity consumption and up to 600% in maintenance. Snow-Bright™ fixtures have a 100,000 hour lifecycle rating… that's eleven years running 24 hours x 365 days. For a slope, it's almost forever! Find out more.

Contact: Wes Bishop, Reliable Racing, (518) 793-5677, 643 Upper Glen St, Queensbury, NY 12804