LED Lighting Costs

When considering a new technology, cost is naturally the main topic of interest. Not only should one consider up-front costs, but also the accumulative operational costs associated with powering a lighting system. It is very important for business owners to understand that investing in LED lighting does not result in immediate savings, but does promote significant savings over time. A specific metal halide bulb, commonly used in gas station canopy lighting, dissipates 400 watts of total power. A custom LED product designed to substitute this metal halide, dissipates an amazing 60 watts of total power. Over an extended period, it is obvious how the 60 watt LED product will result in dramatic energy savings.

Metal Halide Operation

Metal halides contain a mixture of gasses within the bulb. As the device operates, the internal temperature and pressure begins to increase. Unlike metal halides, LED lights do not feature a gas, operating under extreme pressures, at very high temperatures. Instead, the LED lights contain a solid state lighting element, eliminating several risk factors associated with high pressure gases. Solid state lighting has advanced dramatically over the past several years, and has become the industry standard for a variety of lighting applications.

Lighting Start-Up and Cool-Down

During initial start-up, the metal halide will fail to operate at the maximum luminous output. The pressure and temperature within the interior arc chamber may require up to five minutes to achieve the necessary state for optimal performance. During this warm-up period, the metal halide may exhibit numerous colors as a result of vaporization occurring within the arc chamber. In the event of a brief power failure, the arc will extinguish. A cooling period as long as 12 minutes may be required prior to restart. Unlike the metal halide, LED lights respond instantly, and do not require a warm-up period. In the event of a momentary power failure, the LEDs will resume normal operation the moment that power is restored.

Metal Halide and LED Life Span

A specific metal halide features a 20,000 hour life, according to the manufacturer's data sheets. Improper bulb orientation can actually reduce the life by 5,000 hours. Near the end of life, the bulb will begin to exhibit "cycling". As the lamp ages, the required voltage increases beyond the available source voltage. With increasing internal temperature, the lamp will fail. After a brief cooling period, the lamp will re-start. This process will then repeat on a continuing basis. Aging LED lights do not exhibit similar behavior! An LED fixture designed to replace metal halides in gas station canopies, can provide up to, or in excess of 50,000 hours of life. The LED lights may remain operational for as long as 100,000 hours, at a decreased luminous output.

LED Lighting Heat Dissipation

LED lights generate significantly less heat when compared to the metal halide bulb. Not only do the LEDs generate less heat, but they also dissipate their thermal energy back into the mounting fixture. Most traditional light bulbs tend to dissipate heat from the front of the bulb, and out into the surrounding atmosphere. This can make thermal management a challenge in certain applications where the direction of heat dissipation becomes critical.

LED Beam Angle

Due to the directional characteristics of traditional metal halides, the bulb produces mass amounts of wasted light from the top and sides of the lens. Not only does this result in a lower system efficiency, but also contributes to environmental "light pollution". In rural areas, metal halides can illuminate the night sky, causing an eye-sore for nearby residents. However, LED lights feature superior directional characteristics, and can dramatically reduce night sky pollution. The narrow beam angle featured on many LED lights provides illumination within the intended areas only. Not only does this reduce light pollution, but also promotes higher overall system efficien