

# Lighting Technologies and Lumen Output

## Lighting Technologies

- **HID** (High Intensity Discharge) = Sodium Vapor, Mercury Vapor, Metal Halide
  - **HPS or SV** = Sodium Vapor (High Pressure Sodium Vapor)
  - **MV** = Mercury Vapor
  - **MH** = Metal Halide
- **LED** (Light Emitting Diode)

## Lumen Output Explanation

- For **HID** lighting, the lumen rating is based on '**source**' lumens, which is the amount of lumens produced by the bulb. The light output is then refracted and reflected, and pushed toward the target (ground, parking lot, roadway, etc). The amount of lumens that reach the target is significantly less than the lumen rating for the fixture. The amount of lumen loss varies per fixture style.
  - As an example, a sodium vapor fixture with an 8000 lumen rating may have less than 5000 lumens when reaching the target.
  - There are other factors to consider for HID lighting, such as lumen depreciation. HID fixtures experience a lumen depreciation over the course of the fixture's lifespan.
    - As an example, a sodium vapor fixture with an 8000 lumen rating may have less than 5000 lumens when reaching the target upon initial installation, and will have less lumens reaching the target year after year.
- For **LED** lighting, the lumen rating is based on '**delivered**' lumens, which is the amount of lumens that actually reach the target. The diodes provide a directional light, and there is a negligible amount of lumen loss in the delivered light output.
  - As an example, an LED fixture with an 8000 lumen rating will deliver approximately 8000 lumens to the target.
  - While there is lumen depreciation over the life of an LED fixture, the rate of depreciation is significantly less than what is experienced with HID fixtures. The amount of depreciation will vary per fixture style, but most LED fixtures will still deliver approximately 70% of the original lumen rating after 20 years.
- Dominion Energy has developed **HID to LED Luminaire Crossover** charts, as a guideline for customers when determining the appropriate LED fixture for conversions and new installations.
  - As an example: A sodium vapor fixture with an 8000 lumen rating may be suggested for conversion to an LED fixture with a 5000 lumen rating.
  - The HID to LED Luminaire Crossover charts can be found in the Reference section of the Outdoor Lighting webpage, in the link "**MV/HPS/MH Conversion Charts**"