

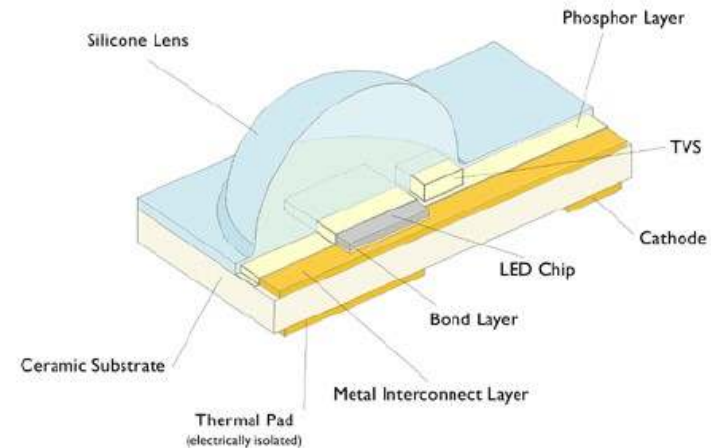
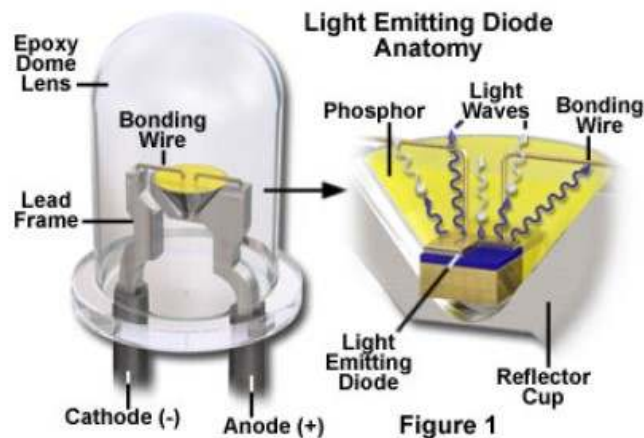
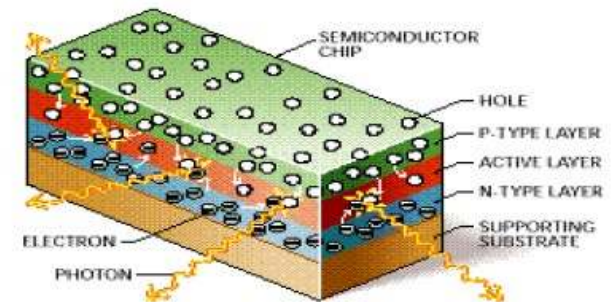
The Power Of Green



Lighting Up The World With The
Power Of LED's

What is an LED?

A light emitting diode is semiconductor light source. LED's are based on the semiconductor diode. When the diode is forward biased (switched on), electrons are able to recombine with holes and energy is released in the form of light.



White light is generated by using a phosphor material to convert monochromatic light from a blue or UV LED to broad-spectrum white light, much in the same way a fluorescent light bulb works.

Retail Display Lighting Key customer needs

Setting industry trends

Many items can be important to you...

Greater visual appeal

Increased energy savings

Reduced maintenance costs

Environmentally responsible

...Display Case LED's meets those needs

Appearance

Energy

Maintenance

Environment

Greater visual appeal

Significant glare reduction

Unique optical designs eliminates distracting glare by hiding the view of the light source.

LED lighting efficiently directs the light onto the shelves, removing wasteful light that spills out onto the floor and case doors.



Fluorescent Lighting



Refrigerated LED Lighting

Appearance

Energy

Maintenance

Environment

Why use the LED Area Lights in your parking lot?

Save energy

- Less site wattage due to uniformity
- Instant re-strike and dimmable
- Lower LPD (better utilization)

Reduce maintenance

- Fewer lamps to replace & dispose

Be a good neighbor

- Less light trespass with reduced shielding
- No uplight (dark skies friendly)
- Reduce wasted light

Improve visibility

- Smoother visual transition due to uniformity
- Better vertical illuminance

Environmentally conscientious

- Reduce hazardous waste
- Reduce energy consumption



LEDs reduce site energy



	<u>MH 400W</u>	<u>LED</u>
Site Wattage	16.8 kW	5.6 kW
LPD <small>(lighting power density)</small>	0.086 W/sq ft	0.029 W/sq ft

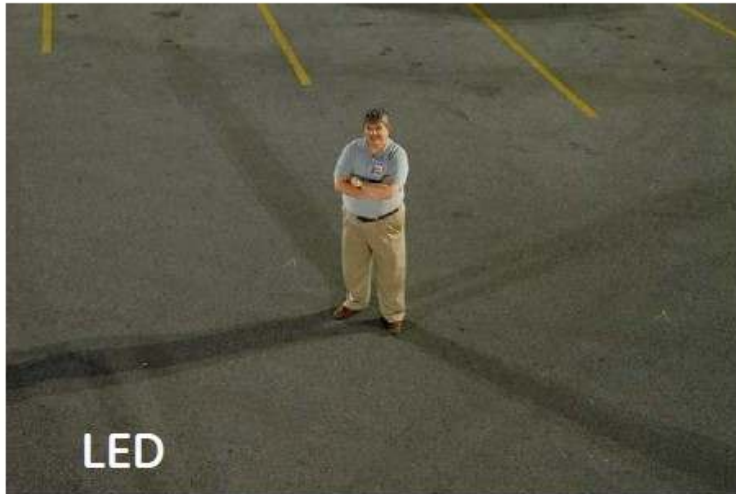
>65% reduction in site energy saving \$4,900/yr*

LEDs more efficiently address perimeter lighting requirements



LED is a great solution for tight local ordinances and trespass control

Vertical illuminance improves with LEDs



Security evaluated performance via security cameras.

Why use LED traffic signals?

When compared to halogen light sources, LED technology offers:

- **Savings of up to 90% on energy costs**
- **Substantial reductions in maintenance costs because of longer product life**
- **Better visibility (monochromatic light)**

LED's in Transportation ...

1. Unmet Customer Need



Retrofit entire state – 70K signals

Up to 90% energy savings

Save \$1.7MM per year on energy

Save \$1.5MM per year on maintenance

2. Products and Application Development

LED Traffic Signal applications...

LED Full Balls



LED Arrows



LED Pedestrian Signals



Savings example

Energy Savings on a set of 3 aspects

	Incandescent Light	LED Signal
Duty cycle (at least one lamp is on at all times)	100%	100%
Hours on per year	8760 hours	8760 hours
Power consumption per hour	100 W	8 W
Total consumption	876 kWh	70 kWh
Electricity cost	\$0.06 / kWh	\$0.06 / kWh
Annual Cost	\$52	\$4

Immediate savings of \$48 per year per signal head