

**Where were we?
Where are we now?
Trends in LED Lighting**



Presented By

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Technology Comparison

Measure	2014	Today
Lumens / Watt	>50	140 – 180+
Price / Fixture (Interior Troffer)	\$150 - 200	\$80 - 125
Price / Fixture (Exterior Parking)	\$900 – 1500	\$600 -1000
Payback (Midwest, no rebates)	>4 Years	2-4 Years
Features	0-10V Dimming, Step Dimming	0-10V, Step Dimming, Color Tuning, Circadian Rhythm, Daylight Harvesting
Rated Life	35,000 – 50,000 Hours	50,000 – 150,000+ Hours



Project Highlight – Hallmark Cards



- 1000+ Fixtures Installed
- \$300k+ Saved to Date!
- 150,000+ Hour Fixtures, ZERO Maintenance



New Trends in LED Tech

- Color Tuning
 - **Dim to warm** is the capability of reducing the color temperature of a light source in proportion to the intensity. This mimics the color shift of incandescent lamps as they are dimmed to a lower intensity (warmer color temperature at lower light levels, cooler color temperature at higher light levels).
 - **Tunable white** is the capability of achieving any color temperature at any intensity of a light source, within specified parameters.
 - **Full color tuning** is the capability to change the relative mixture of multiple independent base colors (such as red, green, and blue) within a single source of a fixture.



New Trends in LED Tech

- Circadian Rhythm

- Custom tune fixtures to change color throughout the day matching the bodies circadian rhythm

- Human Centric Lighting

- Focusing attention based on lighting patterns (classrooms, nursing homes etc.)
- Creating "scenes"



Circadian Rhythm Video Example

<https://www.youtube.com/watch?v=-m7gHFdtfLc>



New Trends in LED Tech

- IoT Ready Lighting
 - The Internet of Things, allows everyday items such as light fixtures to be made “Smart” by installing on-board IoT chips and microprocessors
- IoT Applications in Lighting
 - Wireless control of fixtures
 - Wi-Fi (imagine if every light fixture in the world was Wi-Fi enabled?)
 - Integrated building controls (allow for light fixtures to communicate with other building management systems)
 - GPS Tracking (typically tracking stops at the entrance to the building, now light fixtures could continue to track a device down to 3-5 foot accuracy inside the building)



Roadway, Site Lighting

- Increased ability to handle heat
 - The worst thing for LED's has always been heat, increased performance in the chips and increased heat sync capabilities allow for a longer term solution for roadways
- Better Optics / Photometric Dispersion
 - Lighting design has improved tremendously through the development of dozens of different optics tailored for specific areas / applications
 - Type 5 Optic, Frontline Optic etc.



Lightfair International Highlights



Lightfair International Highlights



Ease of Installation = Reduction in Labor Costs



To The Future!

- LED's will continue to become more efficient, but the cost curve is slowing tremendously and the additional cost to be more efficient doesn't pencil.
- Efficacy levels are leveling out.
- Versatility and design will continue to grow.
- Increase quality of light, eliminate lighting maintenance and save \$\$\$ today!!!

THANK YOU!!!

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QUESTIONS??