

Lighting Innovations for Today

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Agenda



- Why Lighting Innovation
- Elements of Lighting Innovation
- The Time is Right
- New Installations vs. Retrofit
- Buyers Beware
- Good Applications for Today & Tomorrow
- A Closer Look at Lunera Lighting

Why Lighting Innovation



- The best efficiency dollar you can spend
- Applicable to existing and new buildings
- Spend a little or a lot
- Value beyond efficiency

Elements of Lighting Innovation: Lighting Sources

- LED
- Ceramic Metal Halide
- High Efficiency Halogen



Elements of Lighting Innovation: New Approaches to Lighting

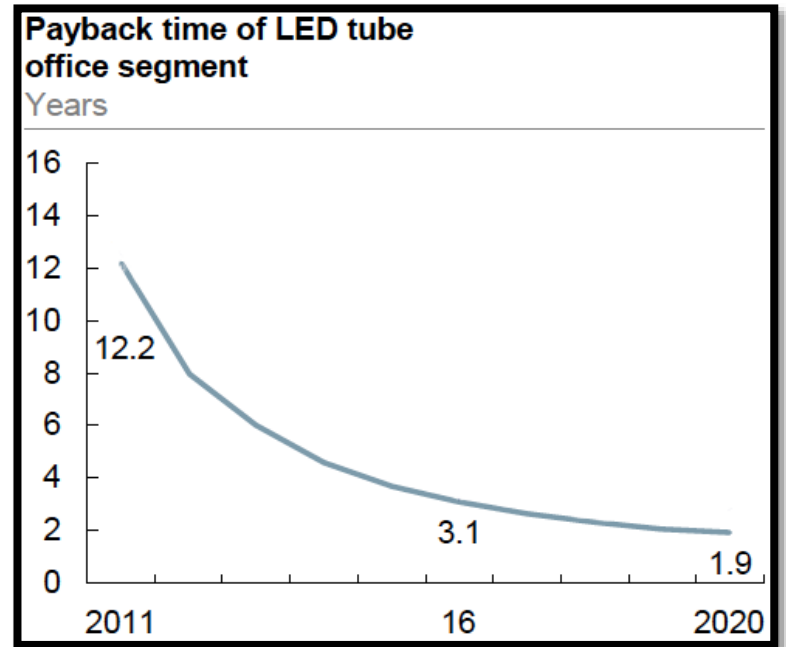
- Lighting panels and forms (OLED)
- Advanced Lighting Controls
- Integrated Buildings



The Time is Right



- The LED market is stabilizing, with regards to chipsets and price
- LED adoption rates continue to grow
- LED efficiency payback periods continue to decrease and may be cost neutral or advantaged at initial Bill of Material and magnified with labor and controls also considered
- Lighting continues to be the greatest energy use in commercial buildings, averaging 38%, and LED is the quickest most cost effective way to achieve energy savings and sustainability goals



Considerations for Lighting Innovations



New Construction Projects

- Unlimited possibilities
- Employ latest technologies at lowest installed cost
 - architectural lighting
 - advanced controls
 - demand response

Retrofit Installations

- Many plug-and-play opportunities
- Potentially lowest cost of ownership, short and long-term
- Continued flexibility to upgrade in the future
- Use savings to buy more savings

Buyers Beware



- Time to start thinking about lighting innovations across traditional grades: good, better, best or contractor, spec, architectural
 - just because product is being sold, doesn't mean it is a good product
 - just because it saves energy doesn't mean it is a good product
- Consider total cost of ownership, when choosing desired lighting innovation
 - product safety
 - impact on the space function & people
 - product cost
 - install labor
 - product complexity
 - what happens when the technology chosen breaks or is no longer available

Considerations for Applications Today



- LED lamps
 - equivalent or better light
 - energy savings
 - color accuracy
 - maintenance savings
 - do not bypass ballasts

- LED fixtures
 - equivalent or better light
 - energy savings
 - color accuracy
 - dimming
 - maintenance savings/req.

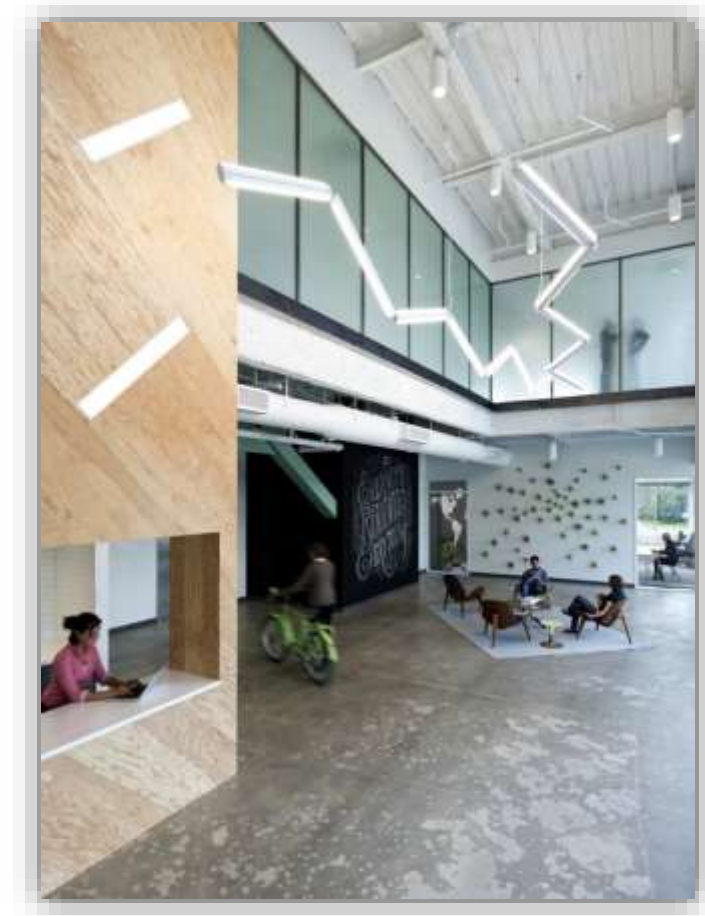
- Sensor controls
 - impact on space and people
 - performance characteristics
 - installation required
 - system integration today/future



Considerations for Applications Tomorrow



- The Future of General Lighting
 - light becomes integral to design
 - highest light efficiency without compromising space design
 - constant color and intensity tuning enhances ambiance and productivity
- Low Voltage Lighting Networks
 - more efficiency through controls
 - lower installation costs
 - ultimate space flexibility
 - simplifies controls architecture
 - share sensors across systems
- Automated Demand Response
 - response opportunities across enterprise holdings
 - truly integrated building systems
 - dynamic building commissioning



A Closer Look at Lunera Lighting

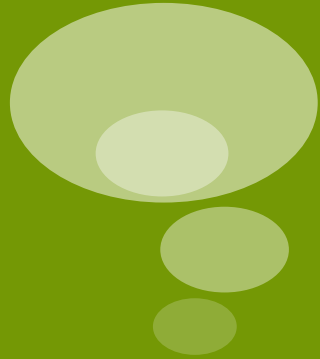


Lunera Lighting is...

- Simple to Install
- Reliable to Operate
- Valuable to Own

- Founded in 2008 and commercialized the first LED lighting in 2009
- Exclusively LED technology for commercial interior general lighting
- Innovative Designs, BallastLED™ Technology
- Engineering and product development in Silicon Valley, CA
- 500+ project installations across 15M ft²
- Quick Delivery





Questions?

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