LIGHTING = CASH + CODE

Presenter: Keith Schafer
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BENEFITS OF LED Technology
Advantages & Benefits

- Significantly lower wattages
- Longer Life of Lamp/Maintenance Savings
- Superior Light Output
- Safer Material
- HVAC Savings
Advantages & Benefits

SUPERIOR LIGHTING

• Light quality
  • High Color Rendering Index
• Wide range of Kelvin temperatures (2700K – 6500K)
• Higher Efficiency/Higher Lumen to Watt Ratio
• Instant on/off with no degradation of lamp life
• No UV light generated
 Longer Life of Lamps

Traditional Lighting

• 60W Incandescent
  – Avg Life 5,000hrs

• 13W CFL E27
  – Avg Life 8,000hrs

• 4’ 32W Linear Fluorescent
  – Avg Life 10,000hrs

• 250W Metal Halide
  – Avg Life 10,000hrs

LED Replacements

• 9W A19 LED Bulb
  – Avg Life 40,000hrs

• 7W A19 LED Bulb
  – Avg Life 40,000hrs

• 15W 4ft Linear LED Tube
  – Avg Life 50,000hrs

• 60W LED Metal Halide Wallpack
  – Avg Life 50,000hrs
Significant Wattage Reduction

Traditional Lighting

- 60W Incandescent
- 13W CFL E27
- 4’ 32W Linear Fluorescent
- 250W Metal Halide

LED Replacements

- 9W A19 LED Bulb — 85% Reduction
- 7W A19 LED Bulb — 46% Reduction
- 15W 4ft Linear LED Tube — 53% Reduction
- 60W LED Metal Halide Wallpack — 76% Reduction
Examples of LED Technology
LED Tubes

- Direct Replacement of Linear Fluorescent
- Internal vs External Drivers
  - Internal Drivers – NO BALLASTS
  - External Drivers – WORK WITH FLUORESCENT BALLASTS
- Options
  - Various K temperatures
  - Clear and milky lenses
  - 2-8 foot versions
  - Multivoltage
- Applications
  - Stairwells
  - Maintenance Areas
  - Office Spaces
Retrofit LED Lamps

• Screw-in lamps for all applications
  – PARs & Spotlights
  – Household & High Power
  – Decorative

• Many options
  – K temperatures
  – Beams angles
  – Wattages
  – Voltages and base types
**LED Interior Fixtures**

- Sconces
- Ceiling lights
- Lay-in troffers
- Energy Star/UL Listings
- Typically comes with a 5 year warranty
- Provides solutions for a number of applications:
  - PL-based CFL fixtures
  - Customer w/ UL requirements
  - New construction projects
**LED Exterior Fixtures**

- Building Mounted Fixtures
- Cobraheads
- Wall Washers
- 5 - 7 year warranty
- New exterior fixtures, rather than retrofits, often provide highest value for customers
Underwriter’s Laboratories (UL)
Relevant Parties and Standards

• Independent product safety certification from Underwriters Laboratories
• Tests the following:
  • Product
  • Materials
  • Components
  • Assemblies
  • Tools
  • Equipment
• Considered the leader in product safety and certification in the world
DesignLights Consortium (DLC)
Relevant Parties and Standards

• Collaboration of utilities & efficiency organizations committed to raising awareness of benefits of efficient lighting for commercial consumers

• Qualified Products List
  • Rebate eligibility through high-quality, high-performance, tested & verified LED products

• DLC listing is REQUIRED for all utility rebates
Other Standards

Relevant Parties and Standards

• **ETL**: Proof of Product Compliance from Intertek’s *Edison Testing Labs*

• **CE**: Mandatory mark for products placed on the market in the European Economic Area

• **Energy Star**: International standard for energy efficient consumer product originated in the U.S.
  • 6,000 hr. evaluation period
NYC LED Lighting Rebate programs
NYC LED Lighting Rebate Programs

• In NYC, there are two separate rebate programs available to commercial/industrial customers
  – *NYSERDA*
  – *Local Utility (CON ED)*

• These programs provide REBATES for LED Lighting. These rebates cover:
  • Materials
  • Installation
  • Disposal

• These LED rebates are given both prescriptively & on a custom basis.
NYSERDA

- Rebates are available to owners through the “Existing Facilities Program” under the Lighting Retrofit category
- What kind of LED upgrades qualify for rebates?
  - Fixture Replacements
  - Screw-ins
  - Downlights
- All products must be new as well as Energy Star or DLC Approved
Con ED Lighting Rebate Programs

- Con Ed offers three different rebate incentive programs
  1. Commercial Industrial Program
  2. Multi-Family Program
  3. Demand Management Program
Con Ed Commercial Industrial

• This program is offered to commercial buildings or multi-family buildings with over 75 units.

• Most interior and exterior lights and fixture replacements qualify for rebates.

• All products must be either Energy Star or DLC approved in order to qualify for rebates.
Con Ed Multi-Family

- This program is offered to multi-family buildings with 5-75 units.
- The rebates only apply to lighting upgrades in common areas.
- Eligible lights include tube lights, screw-ins, new interior fixture replacements, exterior fixture replacements and garage fixture replacements.
- Added incentives are offered for lighting controls for these buildings as well.
Con Ed Demand Management

- This program is based on the reduction in energy consumption that will be achieved by converting existing lighting to more efficient LED’s.
- Incentives are given in the form of a fixed amount for every kWh reduction your building will consume by converting to LED’s
- Bonus incentives are offered for projects with a drop in usage that exceeds 500 kWh.
- Incentives Capped at 50% of the total project
## Case Study #1 – Small Apt Building

<table>
<thead>
<tr>
<th></th>
<th>Current Lighting</th>
<th>LED Conversion</th>
<th>Savings by Year</th>
<th>Percent Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Used for LIGHTING this year</td>
<td>10,072 kwh</td>
<td>4,713 kwh</td>
<td>5,358 kwh</td>
<td>53%</td>
</tr>
<tr>
<td>Electric Cost for LIGHTING this year</td>
<td>$1,732.00</td>
<td>$810.00</td>
<td>$922.00</td>
<td>53%</td>
</tr>
<tr>
<td>Maintenance (bulb and ballast replacement &amp; MAN HOURS)</td>
<td>$233.00</td>
<td>$111.00</td>
<td>$122.00</td>
<td>52%</td>
</tr>
<tr>
<td>Yearly Electric &amp; Maintenance Cost per year for LIGHTING</td>
<td>$1,966.00</td>
<td>$922.00</td>
<td>$1,044.00</td>
<td>53%</td>
</tr>
</tbody>
</table>

**Total Cost:** $2,302.00  
**Con Ed Rebate:** $1,450.00  
**Net Cost of Project:** $870.00  
**Return on Investment:** 10 months
# Case Study #2 – Large Apt Building

<table>
<thead>
<tr>
<th></th>
<th>Current Lighting</th>
<th>LED Conversion</th>
<th>Savings by Year</th>
<th>Percent Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electric Used for LIGHTING this year</strong></td>
<td>293,106 kwh</td>
<td>135,917 kwh</td>
<td>157,189 kwh</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Electric Cost for LIGHTING this year</strong></td>
<td>$47,041.00</td>
<td>$21,813.00</td>
<td>$25,228.00</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Maintenance (bulb and ballast replacement &amp; MAN HOURS)</strong></td>
<td>$7,704.00</td>
<td>$3,705.00</td>
<td>$3,999.00</td>
<td>52%</td>
</tr>
<tr>
<td><strong>Yearly Electric &amp; Maintenance Cost per year for LIGHTING</strong></td>
<td>$54,746.00</td>
<td>$25,519.00</td>
<td>$29,227.00</td>
<td>53%</td>
</tr>
</tbody>
</table>

**Total Cost:** $87,577.00  
**Con Ed Rebate (C&I):** $13,211.00  
**Net Cost of Project:** $74,366.00  
**Return on Investment:** 2.5 years
## Case Study #3 – Office Building

<table>
<thead>
<tr>
<th></th>
<th>Current Lighting</th>
<th>LED Conversion</th>
<th>Savings by Year</th>
<th>Percent Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Used for LIGHTING this year</td>
<td>299,396 kwh</td>
<td>68,593 kwh</td>
<td>230,802 kwh</td>
<td>77%</td>
</tr>
<tr>
<td>Electric Cost for LIGHTING this year</td>
<td>$65,867.00</td>
<td>$15,090.00</td>
<td>$50,777.00</td>
<td>77%</td>
</tr>
<tr>
<td>Maintenance (bulb and ballast replacement &amp; MAN HOURS)</td>
<td>$3,105.00</td>
<td>$463.00</td>
<td>$2,642.00</td>
<td>85%</td>
</tr>
<tr>
<td>Yearly Electric &amp; Maintenance Cost per year for LIGHTING</td>
<td>$68,972.00</td>
<td>$15,553.00</td>
<td>$53,419.00</td>
<td>77%</td>
</tr>
</tbody>
</table>

Total Cost: $98,744.00  
Con Ed Rebate (C&I): $28,870.00  
Net Cost of Project: $69,875.00  
Return on Investment: 1.3 years
# Case Study #4 – Nursing Home

<table>
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<tr>
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<th>Current Lighting</th>
<th>LED Conversion</th>
<th>Savings by Year</th>
<th>Percent Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Used for LIGHTING this year</td>
<td>1,139,365 kwh</td>
<td>417,005 kwh</td>
<td>722,360 kwh</td>
<td>63%</td>
</tr>
<tr>
<td>Electric Cost for LIGHTING this year</td>
<td>$172,044.00</td>
<td>$62,967.00</td>
<td>$109,076.00</td>
<td>63%</td>
</tr>
<tr>
<td>Maintenance (bulb and ballast replacement ONLY; NO LABOR INCLUDED)</td>
<td>$49,480.00</td>
<td>$1,887.00</td>
<td>$47,593.00</td>
<td>96%</td>
</tr>
<tr>
<td>Yearly Electric &amp; Maintenance Cost per year for LIGHTING</td>
<td>$221,525.00</td>
<td>$64,855.00</td>
<td>$156,669.00</td>
<td>70%</td>
</tr>
</tbody>
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**Total Cost:** $386,261.00  
**Con Ed Rebate (DM):** $142,541.00  
**Net Cost of Project:** $243,720.00  
**Return on Investment:** 1.6 years