League of MN Cities 2014 Annual Conference

LED Street Lights: Better Light, More Savings

Thursday June 19, 2014
John Paulson
Environmental Specialist

Photo courtesy of Holophane
Are You Ready For New Street Lights?

Questions???????...?
Are You Ready For New Street Lights?

What...

- Kind of fixtures do we have
  - MH, MV, PSMH, HPS, LPS, Induction, LED
- Is the maintenance frequency
- Is CU, CRI, CCT, Efficacy, Lumen, etc.
- Are Photometric Reports, Luminaires, etc.
Are You Ready For New Street Lights?

Who...

- Owns the lights/poles
- Pays for the electricity
- Can provide technical guidance
- Has money to make it possible
- Is the right product supplier
Are You Ready For New Street Lights?

Where...

- Are the tools to help me make decisions
- Are the street lights located
- Do we start/stop
- Can I get more information
Are You Ready For New Street Lights?

? When...
? Does it make sense to move forward
? Does it not
? Can we start
? Do fixture warranties expire
? Should we replace new rather than retrofit
Are You Ready For New Street Lights?

? Why...
? Should we replace street lights
? NOT?
? Are LEDs better
? Should we care
Are You Ready For New Street Lights?

? And the all important HOW...
  ? Can we hit a fast moving target
  ? Do stakeholders feel about it
  ? Can the utility help
  ? Do we pay for it
  ? DO WE KNOW WE ARE MAKING THE RIGHT DECISION?!?!?!
Special Thanks To:

COST-BENEFIT ANALYSIS
OF ENERGY EFFICIENT
TECHNOLOGIES AVAILABLE FOR
USE IN ROADWAY LIGHTING

Prepared for: Minnesota Department of Commerce, Division of Energy Resources
Prepared by: Energy Management Solutions, Inc.

DECEMBER 2012
OES-04042011-36352
Checklist of Completed Steps when Considering a Switch to LED Roadway Lighting

✓ Become acquainted with terminology, technology, and major manufacturers.
✓ Use a CCT and CRI suitable for the roadway lighting application.
✓ Check Ingress Protection (IP) ratings and choose appropriately for application.
✓ Establish whether a RoHS compliant device is preferred.
✓ Determine roadway lighting distribution classification and recommended illuminance levels.
✓ Complete as much of the “LED Roadway Lighting Specification” form as possible.
✓ Send form to manufacturers.
✓ Request and examine operating temperature data and how it is used in luminaire efficacy and lumen depreciation calculations.
✓ Request and examine AGi32 simulations and photometric reports.
✓ Ask about detailed luminaire warranty (three to five years on parts is deemed reasonable for roadway lighting).
✓ Inquire about control systems and compatibility.
✓ Contact electricity provider and inquire about rebates for energy-efficient roadway lighting projects.
✓ Conduct an economic payback and life-cycle cost analysis.
✓ Obtain at least two working samples of each luminaire under consideration and install on adjacent poles to verify performance.
✓ Assess glare and compare to currently installed technology.
### 2014 Street Light Inventory in Use

<table>
<thead>
<tr>
<th>Fixture Type and Wattage</th>
<th>Input Wattage</th>
<th>Average Hours of Use per Day</th>
<th>Days per Year</th>
<th>Total Number of Units</th>
<th>Total O &amp; M Cost (Annual)</th>
<th>Total Street Light Energy Cost (Annual)</th>
<th>Total Annual Cost for Street Lighting</th>
<th>Total kWh for Roadway Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 HPS</td>
<td>0.113</td>
<td>12</td>
<td>365</td>
<td>98</td>
<td>$3,155.40</td>
<td>$2,633.62</td>
<td>$5,789.22</td>
<td>50650.32</td>
</tr>
<tr>
<td>150 HPS</td>
<td>0.179</td>
<td>12</td>
<td>365</td>
<td>1690</td>
<td>$54,587.00</td>
<td>$68,899.68</td>
<td>$123,486.68</td>
<td>132493.8</td>
</tr>
<tr>
<td>250 HPS</td>
<td>0.295</td>
<td>12</td>
<td>365</td>
<td>116</td>
<td>$3,746.80</td>
<td>$7,793.56</td>
<td>$11,540.75</td>
<td>149933.6</td>
</tr>
<tr>
<td>400 HPS</td>
<td>0.465</td>
<td>12</td>
<td>365</td>
<td>2</td>
<td>$64.60</td>
<td>$211.62</td>
<td>$276.42</td>
<td>4073.4</td>
</tr>
<tr>
<td>175 MV</td>
<td>0.214</td>
<td>12</td>
<td>365</td>
<td>5</td>
<td>$161.50</td>
<td>$243.70</td>
<td>$405.20</td>
<td>4696.6</td>
</tr>
<tr>
<td>250 MV</td>
<td>0.294</td>
<td>12</td>
<td>365</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>400 MV</td>
<td>0.459</td>
<td>12</td>
<td>365</td>
<td>1</td>
<td>$32.30</td>
<td>$104.54</td>
<td>$136.84</td>
<td>2010.42</td>
</tr>
<tr>
<td><strong>Total Costs for Lighting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$58,592.20</td>
<td>$77,253.69</td>
<td>$135,845.89</td>
<td>1536290.14</td>
</tr>
</tbody>
</table>

**Energy Cost per kWh:** $0.0520

**Annual O & M cost per unit, based on RW Beck Study:** This includes the carrying cost for inventory: $32.30

### Rate Schedule for Lighting, per unit, per month

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy Charge</th>
<th>O &amp; M Charge</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 HPS</td>
<td>$3.64</td>
<td>$2.69</td>
<td>$6.33</td>
</tr>
<tr>
<td>250 HPS</td>
<td>$6.00</td>
<td>$2.69</td>
<td>$8.69</td>
</tr>
<tr>
<td>400 HPS</td>
<td>$9.45</td>
<td>$2.69</td>
<td>$12.14</td>
</tr>
<tr>
<td>175 MV</td>
<td>$4.35</td>
<td>$2.69</td>
<td>$7.04</td>
</tr>
<tr>
<td>250 MV</td>
<td>$5.98</td>
<td>$2.69</td>
<td>$8.67</td>
</tr>
<tr>
<td>400 MV</td>
<td>$9.33</td>
<td>$2.69</td>
<td>$12.02</td>
</tr>
</tbody>
</table>

### Signal Light Energy Usage

<table>
<thead>
<tr>
<th>Month</th>
<th>Total kWh Us</th>
<th>Total kWh for Security Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>6718</td>
<td>62150 HPS</td>
</tr>
<tr>
<td>Feb</td>
<td>6303</td>
<td>21250 HPS</td>
</tr>
<tr>
<td>Mar</td>
<td>5614</td>
<td>4400 HPS</td>
</tr>
<tr>
<td>Apr</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Jul</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Sept</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Nov</td>
<td>5343</td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td>5343</td>
<td></td>
</tr>
</tbody>
</table>

**Total kWh for Signal Lighting, Roadway Lighting, and Security Lighting:** 1650543.28

**Total for Security Lighting:** $85,828,250.6