LED lighting Panel

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Moderated by: Adam Quinn (E3, LED Solutions)

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Green Proving Ground – LED Lighting Study

• How many Federal Employees does it take to change a light bulb?
Green Proving Ground leverages GSA’s real estate portfolio to evaluate innovative sustainable building technologies.
GSA Fosters Outstanding Building Performance

GSA buildings are 42%* more efficient than typical U.S. commercial buildings.

*September 2015, GSA Average EUI = 54 kBTU/GSF/yr
How Does GPG Work?

1. Identify promising technologies at the edge of commercialization
2. Pilot technology installations within GSA's real estate portfolio
3. Partner with Department of Energy national laboratories to objectively evaluate real-world performance
4. Recommend technologies with broad deployment potential
Test Bed Site Objectives

Primary Objective

• Outcomes from this project aim to shape ESCO procurement nationwide

Key Tasks

• Track energy usage, system costs, installation process and challenges, and operation and maintenance.

• Evaluate user acceptance.

• Track installation and operating expenses and establish payback.
Photometrics
Proposed EM&V Plan
# How Will Success be Measured?

<table>
<thead>
<tr>
<th>QUANTITATIVE OBJECTIVES</th>
<th>METRICS &amp; DATA REQUIREMENTS</th>
<th>SUCCESS CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce Energy Usage</td>
<td>Real-time energy metering pre and post installation plus comparison with current standard practice lighting and P-100 requirements</td>
<td>Energy savings compared to standard expected GSA facility lighting</td>
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<tr>
<td>Reduce Costs</td>
<td>Cost comparison of current technology and LED replacements including initial and life costs (UCC)</td>
<td>Favorable energy savings (SPB, SIR) over expected lives of the lighting systems</td>
</tr>
<tr>
<td>Reduce GHG Emissions</td>
<td>Reduction factors based on energy savings</td>
<td>Reduction from typical current fluorescent systems</td>
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## QUALITATIVE OBJECTIVES

<table>
<thead>
<tr>
<th>Easy Installation</th>
<th>Installer survey</th>
<th>No issues identified that would raise safety or excessive labor concerns</th>
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<tbody>
<tr>
<td>Reduce Maintenance</td>
<td>Installer survey plus operator survey plus equipment specifications</td>
<td>Lower calculated maintenance needs compared to fluorescent system</td>
</tr>
<tr>
<td>Increase Occupant</td>
<td>Occupant Survey</td>
<td>70% of occupants expressing no issues with the system that would result in dissatisfaction in terms of light levels or function of the system in performance of tasks</td>
</tr>
<tr>
<td>Satisfaction/Comfort</td>
<td></td>
<td></td>
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Occupant Surveys

• Why Survey Occupants?
  • GSA has strong interest in customer satisfaction
  • Identifies opportunities for future installations
  • Will not accept energy savings if quality of workspace is not acceptable
• Will conduct both Pre and Post Installation Surveys
• Surveys – complete and mail back in postage paid envelopes.
# Installation Timeline

<table>
<thead>
<tr>
<th>Month</th>
<th>Task</th>
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<tbody>
<tr>
<td>May</td>
<td>Begin procurement construction contractor</td>
</tr>
<tr>
<td>May</td>
<td>Occupant Pre-installation Survey</td>
</tr>
<tr>
<td>July</td>
<td>Deliver technology to the site</td>
</tr>
<tr>
<td>October</td>
<td>Installation</td>
</tr>
<tr>
<td>November</td>
<td>Post install measurement</td>
</tr>
<tr>
<td>December</td>
<td>Occupant Post-Installation Survey</td>
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So, how many Federal Employees does it take to change a light bulb?
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