46th Street Pilot Street Lighting Project

A Joint Venture:
Hennepin County & City of Minneapolis
Lighting Project Objectives

- Improve street lighting for pedestrians, bicyclists, and vehicles using 46th Street and accessing LRT station
- Monitor street light performance from a safety point of view
- Analyze lighting products by:
  - Energy usage
  - Illumination levels (Compared to City Standards)
  - On-going operations and maintenance costs
  - Capital costs
  - Public and Jurisdictional acceptance
Lighting Project – Potential Benefits

- Aesthetics
- Cost savings – energy and maintenance
- Environmental benefits
- Improved, consistent lighting
- Improved neighborhood walkability
- Maintenance performance
- Safety enhancements
Lighting Project Specifics

- 43 LED streetlights from 6 manufacturers
- 12 induction streetlights from 3 manufacturers
- Project area divided into segments for each manufacturer
- Allows for side-by-side evaluation of light brands
- Light fixtures selected to maintain uniformity with similar light styles in area
- City identified Lyndale Avenue S (46th Street to 48th Street) as standard high-pressure sodium (HPS) lighting comparison corridor
The Technology: LED Lights

- Less power needed to achieve HPS light levels
- LED compensation – When one LED burns out, remaining LED’s compensate for loss
- LED light can be focused by arranging light modules
- LED lights have low to non-existent heat outputs
- LED lights are designed to last up to four times the lifespan of HPS
- Typical 5-Year warranty
- Dark sky friendly
- Proven use in traffic signal lights
- Minimal light loss over time
The Technology: Induction Lights

- Better efficacy – Less lumens/watt needed to achieve HPS light levels
- Electrodeless bulb – Only small mercury tip is environmentally harmful
- Induction lights have low to non-existent heat outputs
- Induction lights are designed to last up to three times the lifespan of HPS
- 10-Year warranty
- Dark sky friendly
- Minimal light loss over time
<table>
<thead>
<tr>
<th>Light Type</th>
<th>High Pressure Sodium (HPS)</th>
<th>Induction</th>
<th>Light Emitting Diode (LED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Cost</td>
<td>$</td>
<td>$$</td>
<td>$$$</td>
</tr>
<tr>
<td>Maintenance Needs</td>
<td>![Tool Icon]</td>
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<td>![Tool Icon]</td>
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<td>Energy Used</td>
<td>![Lightning Bolt Icon]</td>
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<td>![Lightning Bolt Icon]</td>
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<tr>
<td>Light Color</td>
<td>Yellow</td>
<td>White</td>
<td>White</td>
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<tr>
<td>Lamp Life</td>
<td>![Light Bulb Icon]</td>
<td>![Light Bulb Icon]</td>
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<tr>
<td>Light Delivery (getting light where you want it)</td>
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</tbody>
</table>
Lighting Project Location

- 46th St - Hiawatha Ave to 46th Ave (43 LED streetlights)
- 46th St - 34th Ave to Hiawatha Ave (12 induction streetlights)
- 36th Ave - 46th St to Minnehaha Creek (preliminary planning)
Street Light Layout

- **LED**
  - Categorization: Pedestrian
  - Layout: Soldier – Alt. 30’ High Level & 15’ Low Level

- **Induction**
  - Categorization: Residential
  - Layout: Staggered 15’ Low Level

30’ High Level (Mod. Shoebox)

15’ Low Level (Acorn)
Funding

- $375,000 Hennepin County – Capital Bonds
- $50,000 City of Minneapolis – Energy Conservation and Emission Program
- $50,000 Local Road Research Board (LRRB)
LRRB Research Project

Requirements

- Provide direct comparison, field test of Induction vs. LED vs. HPS – Every 6 months
- Quantify actual Induction and LED lifetime costs vs. tested HPS lifetime costs
- Identify quality products by testing multiple manufacturers
LRRB Research Project

Benefits

Provide data on:

- Operational characteristics
- Life-cycle costs
- Public perception and acceptance

....so that the study information can be used by the state, counties, and cities to evaluate use of these technologies in their jurisdictions
Lighting Project Schedule

- Streetlights turned on – April, 2010
- Nov. 8, 2010 - Streetlight event/celebration
- Dec. 6, 2010 - Field test & LRRB Report #1
- May 26, 2011 - Field test & LRRB Report #2
- Nov. 26, 2011 - Amperage reading
- Jan. 30, 2012 - Field test & LRRB Report #3
- Jun. 2012 - Final field test & LRRB Report
Outreach – So Far

- Neighborhood meetings
- Resident mail surveys – before and after
- Newspaper articles
- Streetlight event/celebration
- Miscellaneous presentations
- Streetlight information signs
Lighting Comparisons

HPS vs. LED

HPS Block

Induction Block

LED Block
Findings – So Far

- Energy payback calculations (Electricity & Maintenance)
  - LED – 10 to 13 years
  - Induction – 3 to 4 years

- Energy use (Amperage & Wattage)
  - LED – Approx. 2x less energy
  - Induction – Approx. 2x times less energy
Findings – So Far

- Light Outputs (Footcandles)
  - LED – Low level more than HPS/high level less than HPS
  - Induction – Similar to HPS
- Dispersal of light is much better with LED
- Have not experienced maintenance-free operation (4 light failures – 1 to car wreck)
Findings – So Far

- Light quality varies greatly by product
- Majority of induction lights (2 of 3 manufacturers) unimpressive
- Have not experienced severe cold weather impact
- Streetlights have been generally accepted by the community as an improvement
Findings – So Far

- Product lines are constantly changing
  - Have been contacted about several “upgrade” products throughout life of project
- Some vendors have abandoned support of products
Questions

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