City of Takoma Park
Maryland

LED Streetlight Replacement
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Overview

• Streetlight Details
  Before Conversion
  Key Account Details

• Benefits of LED

• Conversion Options
  Option 1 – Retrofit through Utility
  Option 2a – City Purchase and Replace
  Option 2b – Performance Contract Option

• Photos of Installed LEDs

• Lessons Learned

• Available Resources from MEA
Takoma Park

- 2.2 square miles suburb of Washington DC, established in 1890

- A mix of historic homes, post-WWII homes and apartment buildings

- The streetlight mix included:
  - HPS wattages 70 – 250 W,
  - Incandescent 92 and 189W
  - Mercury Vapor 175 W
Key Streetlight Account Details

- Streetlights are utility owned – Pepco
- Annual costs are $180,000 in utility fees and $53,000 for electricity - $233,000/yr
- Utility fees include a distribution charge and a maintenance charge:
  - $6 - $12/month per fixture for incandescent
  - $7 - $10/month for HPS
- The City purchases renewable electricity from a third party as part of a County-wide purchasing group
The Before: Streetlights in Takoma Park
Got To Love GPS!

Majority of streetlights 70 watt HPS - residential
Wide disparity in number of lights per block

Wide Variety of Fixture Types
1,243 high pressure sodium, 247 incandescent, 15 Mercury Vapor, 70 LED
Benefits of LED

- Improved light quality/visibility
- Greater reliability/50K to 100K hours (11 to 20 years)
- Significant reduction in energy use—expect 30% to 50%
- Reduced maintenance and maintenance costs—est >40%
- Ability to direct light to the ground
- Use lower wattage equivalent due to brighter appearance
- Consistent light output over life
- Fixtures can be remotely monitored & controlled
- Low maintenance cost
Conversion Options Considered

- Retrofit with the Utility
- Buy Out the Utility and replace
  - City Purchase
  - Third Party purchase and retrofit through a Performance Contract model
Option 1 - Retrofit Through The Utility

- Pepco added LED fixtures to State approved tariff in 2014
- Difficult to determine price per LED fixture
  - Price estimates fluctuated from $2,300 per fixture to $1,200 per fixture
- Benefits of this option:
  - Simplicity, entire process managed by others
  - Potential Empower MD rebate ($150 - $250 per fixture)
  - Pepco financing ($7 per fixture/monthly, 16 years term
- Negatives of this option:
  - Limited fixture offered
  - No ability to negotiate price
Option 2a - City Buy & Replace

- Terms outlined in Master Sales Agreement
- Conditions for Purchase:
  - City required to audit existing fixtures ($25 per light)
  - City required to buy old fixtures (est. $440 each)
  - City to post surety bond to cover cost of light removal ($500/light)
  - Poles would remain the property of Pepco, no guarantee on use of pole
  - Pepco must approve new fixtures
  - City must establish 24/7 outage reporting center
  - Maintenance contract with Pepco approved vendor only
Option 2b - Performance Contract Option

- City was approached by Performance companies
- Projected cost $2,000,000 – 15 year payback
- Project Development Agreement ($55-$60K if project not pursued).
- Contract term 15 years, then - ?
- All project costs to be covered by savings in utility charges
- City expenditures would remain at current levels over the 15 year period
- Drawbacks of this option:
  - fixture selection driven by cost reduction
  - operating and maintenance costs for Year 16 and beyond
  - adding major infrastructure responsibility to City
  - poles would still be owned by Utility
Utility Retrofit Option Selected

• City Council approved moving forward with Pepco in October, 2016
• City requested that replacement lights be:
  ✓ Minimum wattage to meet need
  ✓ 3000 Kelvin (light temperature)
  ✓ International Dark Sky Certified
  ✓ Able to be remotely controlled
• Pepco completed inventory of existing poles
• Pepco agreed to purchase LED lights to City’s request
• Conversion began in December, 2018, completion in June, 2019
Examples of LED Installed
Lessons Learned

1. Pilot lights before selecting
   - Critical to get neighborhood opinion
   - We found that wattage needed was lower than expected
   - LED lights appear to be brighter than similar light level HPS

2. Color Temperature Debate
   - 3000 Kelvin versus 2700 Kelvin
   - AMA guidance created some misinformation & health concern

3. Select fixture that can be shielded
   - Proximity of houses to streetlights, some will experience light glare

4. Expect to do a lot of public education
   - Set up webpage with as much background information as possible
Light Output Comparison

Blue = HPS
Yellow = LED

70 W HPS to 35 W LED
70 W HPS to 24 W LED
70 W HPS to 19 W LED

Note – color reversed
Color Temperature – Kelvin Issue

- 3000 Kelvin
- 2700 Kelvin
Shield Example

Snap-on Front Side Shield (FSS)

Snap-on House Side Shield (HSS)

GCJ Type 2 Light Distribution with FSS

GCJ Type 2 Light Distribution with HSS
Resources To Assist Municipalities considering LED Streetlight Replacement

- Street lighting Technical Assistance Program - available through the Maryland Energy Administration and Clean Energy Solutions

Parties to DOE State Energy Program Competitive Grant
Questions?

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