



# LED lighting Panel

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# LED Streetlight Upgrade - Arlington

- Project Manager: Mindy Carmichael, P.E.
  - Director of Public Works and Transportation
- Project: Retrofit high wattage HPS to low wattage LED streetlights
- Goal: Generate significant energy savings and reduce carbon footprint



# Existing Streetlight System

- Arlington owns its streetlight system
  - 21,478 High Pressure Sodium (HPS) streetlights
- Arlington streetlights are not metered. Cost is based on assumed average kWh usage per month per specific wattage in accordance with Oncor Electric Schedule D Tariff
- Rates set by REP and Oncor



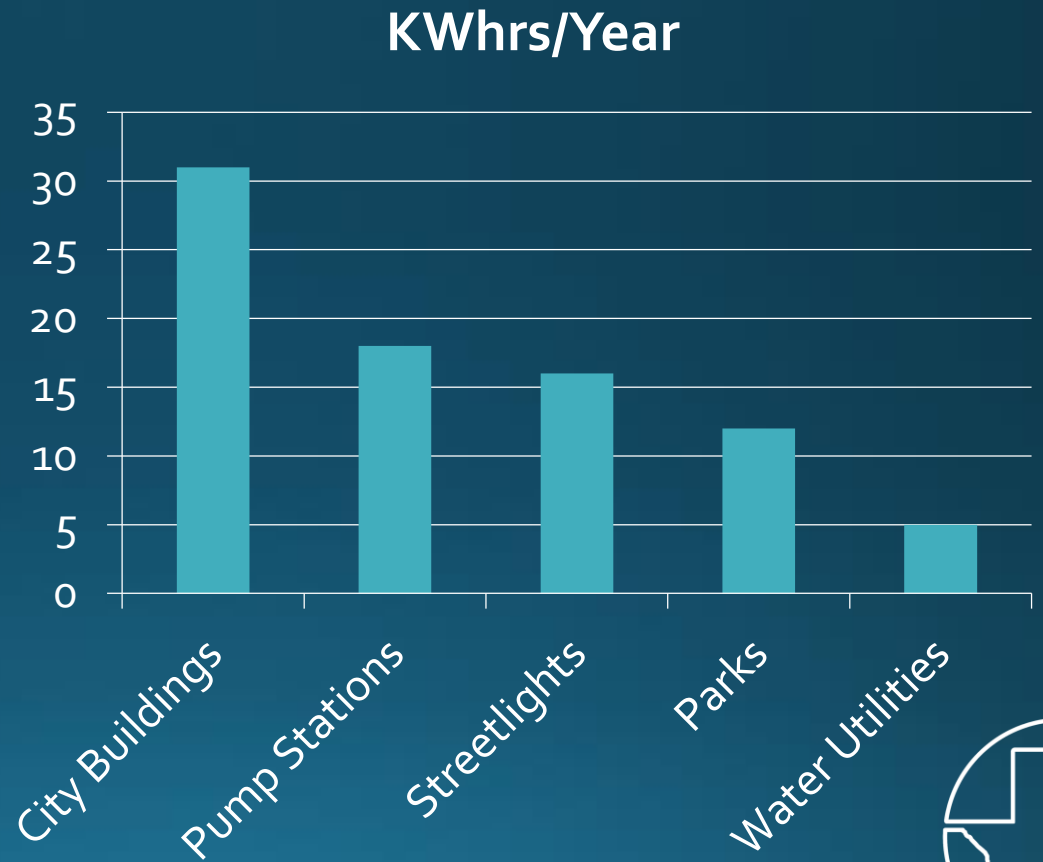
# Goals and Objectives

- Plan, Manage, and Maintain Infrastructure
  - Objective: Optimize Effectiveness and Efficiency of Existing Transportation System
  - Objective: Complete Construction Projects in a Timely Manner
- Optimize – Reduce energy and maintenance costs
- Optimize – Improve streetlight reliability
- Convert over 20,000 City owned streetlights to LED



# Streetlight Background

- Streetlights consumed 20% of citywide electricity
  - \$1.6 million per year
  - 3<sup>rd</sup> largest consumer
- Limited Maintenance Resources
  - \$800 thousand per year to keep lights working



# Where do you go from here?

- Early streetlight pilots
- Focused solution investigation began May 2014
- Partnered with OpTerra Energy Services (formerly Chevron Energy Solutions)



# Solution Development

- Solicitation of RFP
- Score cards for seven vendors
  - 0-5 score
  - Total cost of ownership, initial investment, warranty, photometrics, efficiency, range of wattages, made/assembled in America, references, years in service, quantity of installations
- Team selection to shortlist of three
  - Pilot demonstration / photometrics
  - Oral presentation
  - Final selection
- Phased implementation to accommodate tariff constraints



# Implementation

- **PHASE I (2015):** Retrofit approx. 10,500 cobra heads (150W - 200W to 95W LED)
  - Tariff friendly streetlights; 49% of 21,474 total count
  - 7-pin receptacle for future control technologies
  - Update streetlight database with pole locations & new fixture info
  - Inventory survey conducted during installation
- **PHASE II (2016):** Retrofit approx. 320 Entertainment District lights, 310 cobra heads (250W), and 210 high mast fixtures.
  - Not tariff friendly streetlights
  - Required metering to generate savings





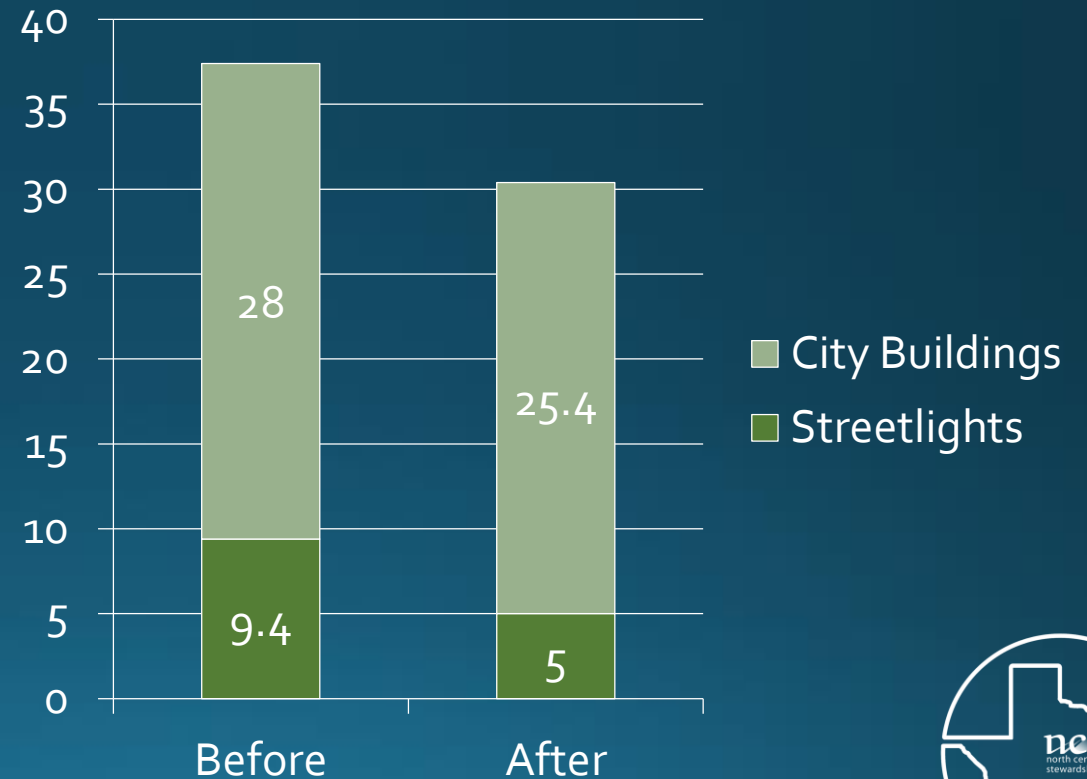
# Investment

- Streetlights bundled with other major component replacements at 21 City buildings
- Combined program – leverage streetlight savings to upgrade other city components
  - Total amount of improvements = \$10,520,980 (\$4,875,000 LED)
  - Financed at 2.5% over 15 years
  - Total first year savings - \$754,400 (\$445,000 LED)
    - \$711,000 in utility costs (\$430,000 LED)
    - \$43,000 in operational costs (\$15,000 LED)
    - Saves more than **\$14,000,000** over 15 years



# Total Project Results

- Reduced kWh by 47%
- Reduced streetlight maintenance costs
  - \$15,000 estimated materials savings
  - Increases life cycle from less than 25,000 hours to 100,000 hours
- Reduced carbon footprint
  - CO<sub>2</sub> down 2,383 tons
  - SO<sub>2</sub> down 5.2 tons
  - NO<sub>x</sub> down 4.7 tons
  - Equivalent to removing nearly 385 passenger vehicles from the road per year or planting over 46,919 tree seedlings

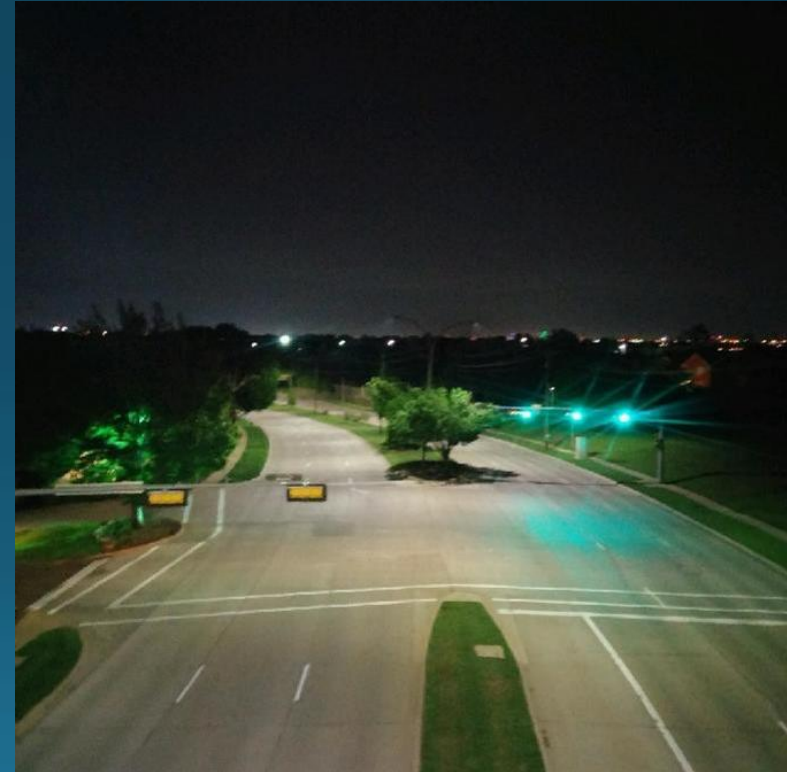


# Green Oaks Boulevard

Before

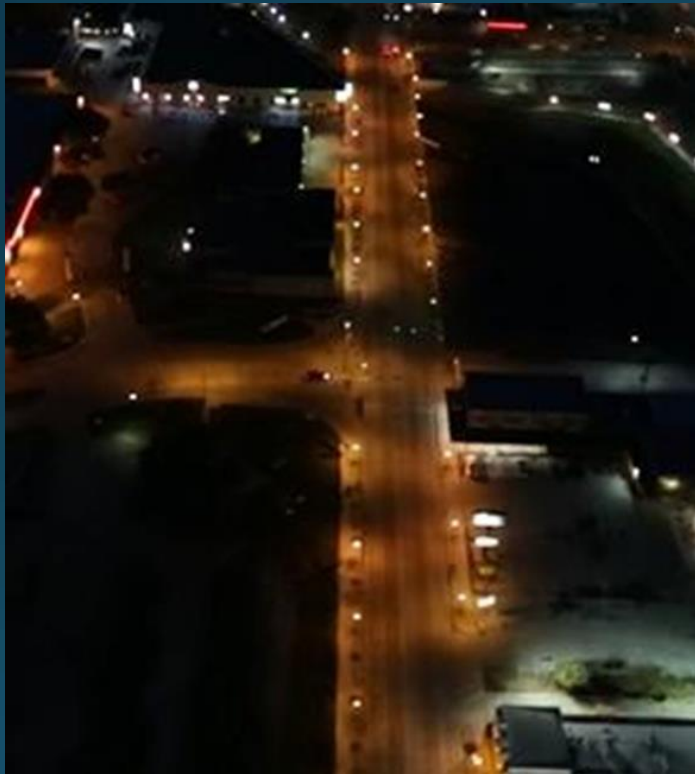


After



# Green Oaks Boulevard

Before



After



# Contemplated Next Steps

- **Retrofit remaining streetlights 10,400+**
  - Coordinate friendly tariff with ONCOR
  - 100W residential streetlights
  - Include decorative fixtures
- Energy savings + capital improvement = Win+Win





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