Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Oncor LED Streetlight Pilot & Technical Evaluation Update

ONCOR

March 15, 2012

Michael Navarro

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Michael D. Navarro
Manager Streetlight Maintenance
Oncor Electric Delivery
mdn@oncor.com
214.486.4142
1616 Woodall Rodgers Suite 5L-001
Dallas, Texas 75202

- LED Pilot Program, Key Milestones and Pilot Chronology
- LED Pilot Program Summary
- Post Top LED Streetlight Technical Evaluation
- Future Evaluation & Analysis
- Questions

Key LED Pilot Milestones

August 2009
Request for Information (RFI) sent to 28 potential suppliers. Supplier RFI submittals were evaluated on price, business and technical attributes, and supplier diversity.

December 2009
Nine suppliers were selected and received the Request for Proposal (RFP), including two Diversity Suppliers.

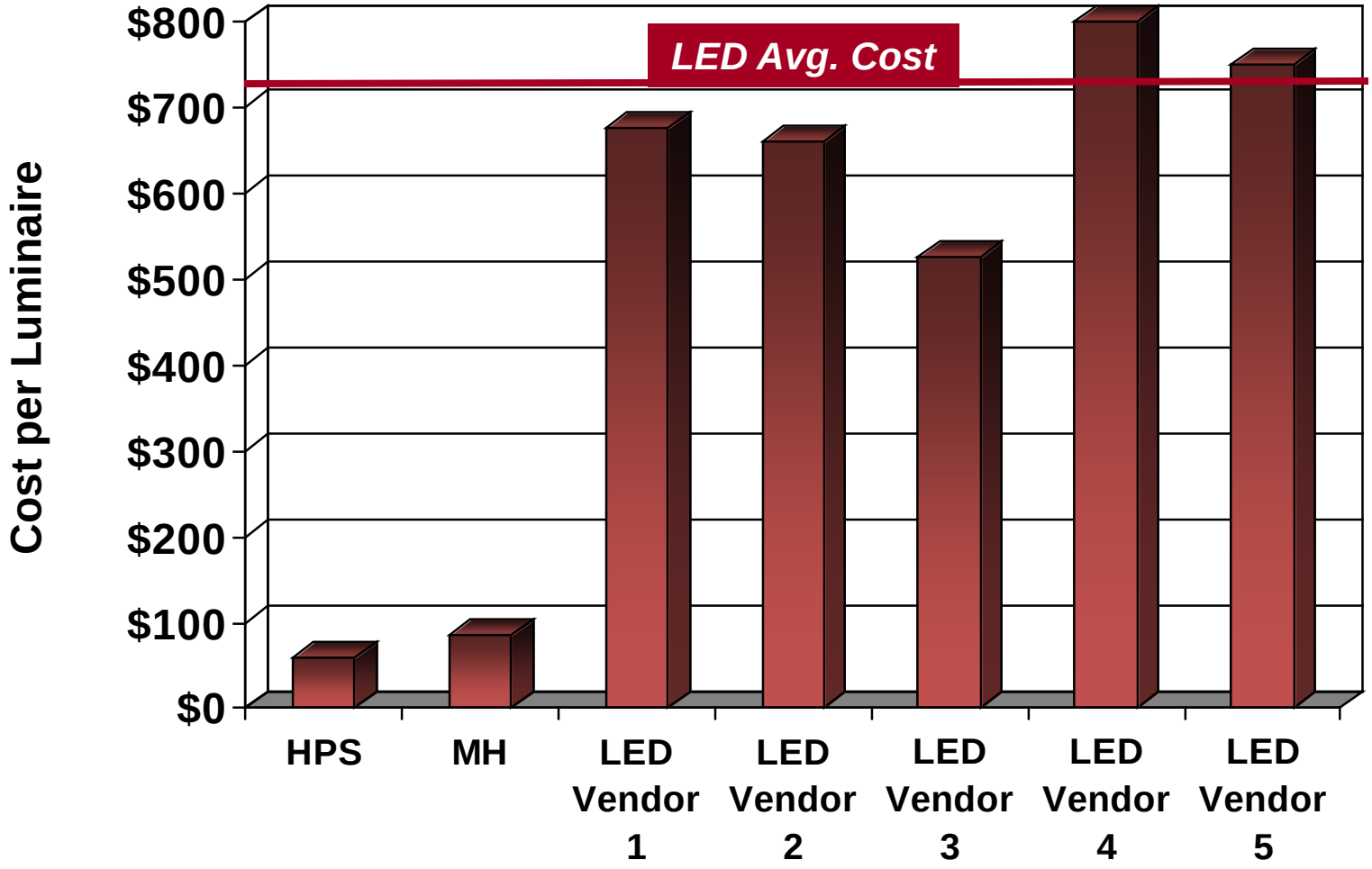
March 2010
Notifications sent to all RFP participants. Three suppliers had successful RFP submittals. Worked with two other suppliers to resolve RF emission and other concerns. Five vendors selected for pilot.

May 2010
Five cities, six locations selected and Pilot agreements executed with cities. Total 506 LED streetlights (Dallas, Plano, North Richland Hills, Cedar Hill, Grand Prairie)

July 2010
Procured third party validation testing agreement with Frontier Associates LLC

September 2010
Pilot Project deployment completed

LED prices are significantly higher than existing luminaires…Start of Pilot



Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Sample LED Fixtures

Frontier Associates LLC validation testing

Lighting Installations

- Three conditions were measured, photographed and modeled with computer lighting modeling software for comparison:
  1. High Pressure Sodium: Oncor replaced the 4 selected luminaires identified by Frontier with new luminaires.
  2. Selected LED product burned for 100 hours: Oncor installed new LED products on the same poles at each site.
  3. Same LED product burned for 6,000 hours: after 6,000 hours of burn time Frontier took measurements again at each site.

Computer Modeling

- Computer models were performed for HPS, LED at 100 hours, and LED at 6,000 hours. The models calculate the following metrics: Illuminance averages, minimums, and maximums were compared to the site measured values.

Power Monitoring:

- Oncor placed power meters at each site to measure power consumed by each product.

Streetlight Monitoring & Outage Notification System

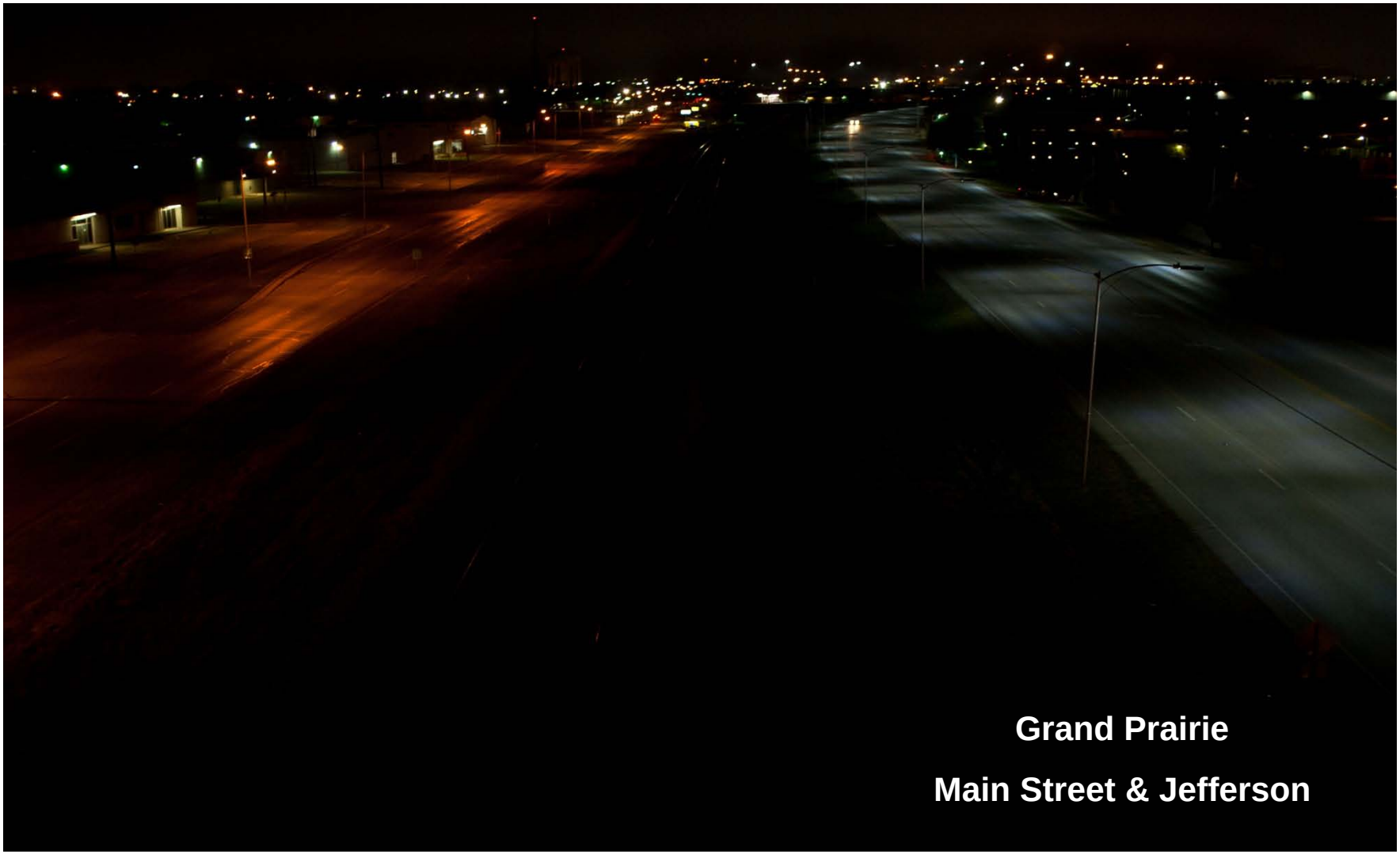
Installed ROAM monitoring system on LED Pilot Locations

ROAM installation

- 546 Nodes
- 7 Gateways

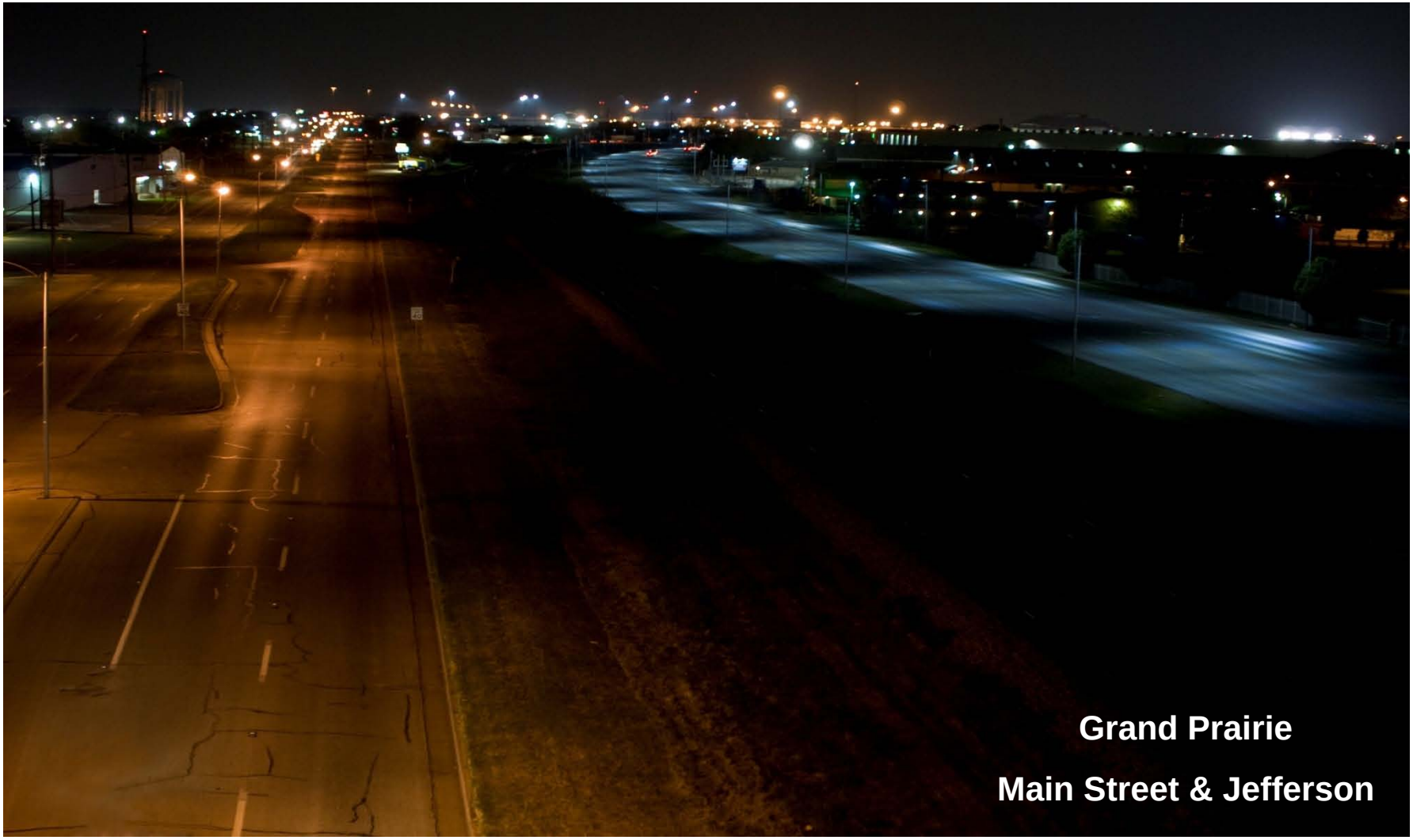
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



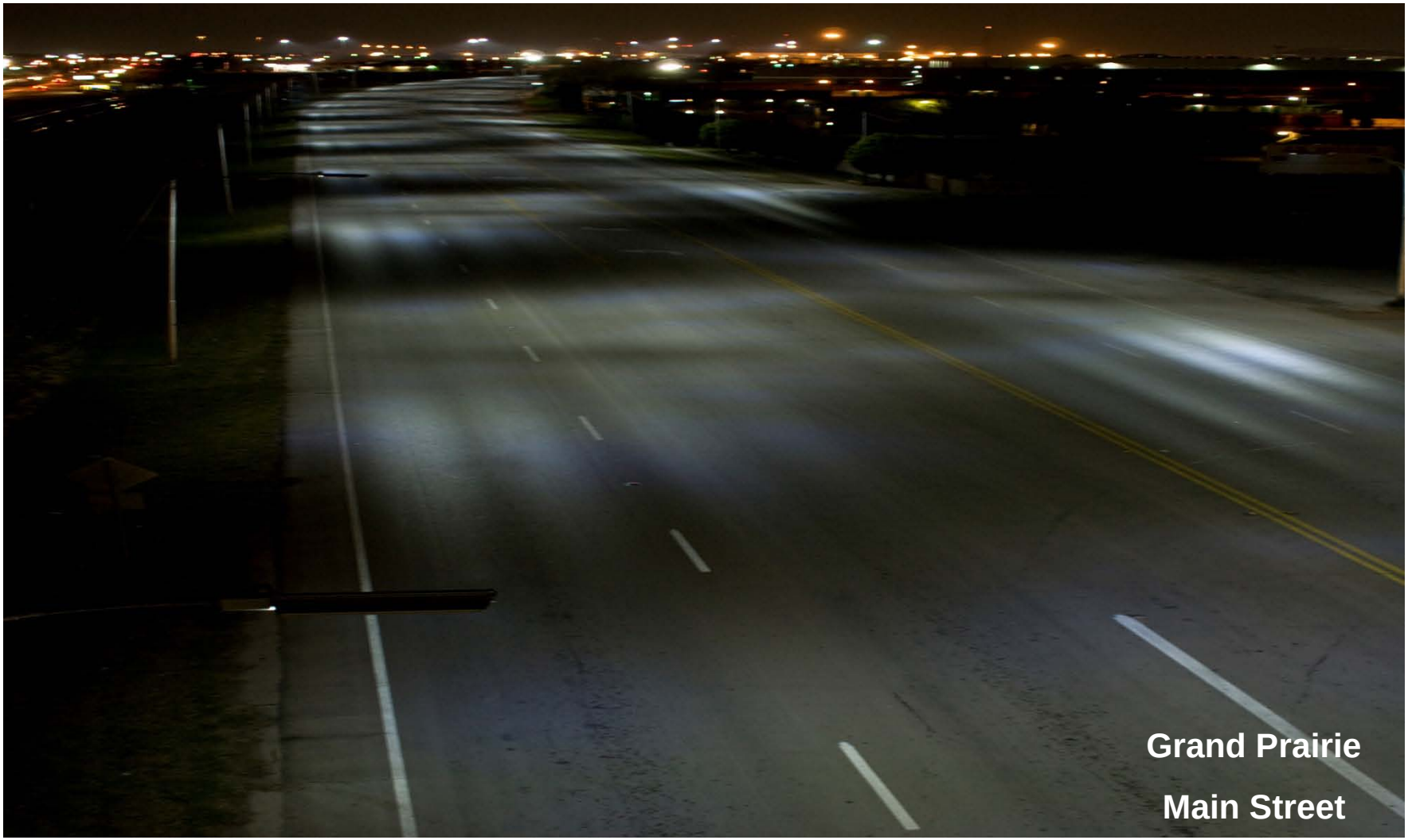
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



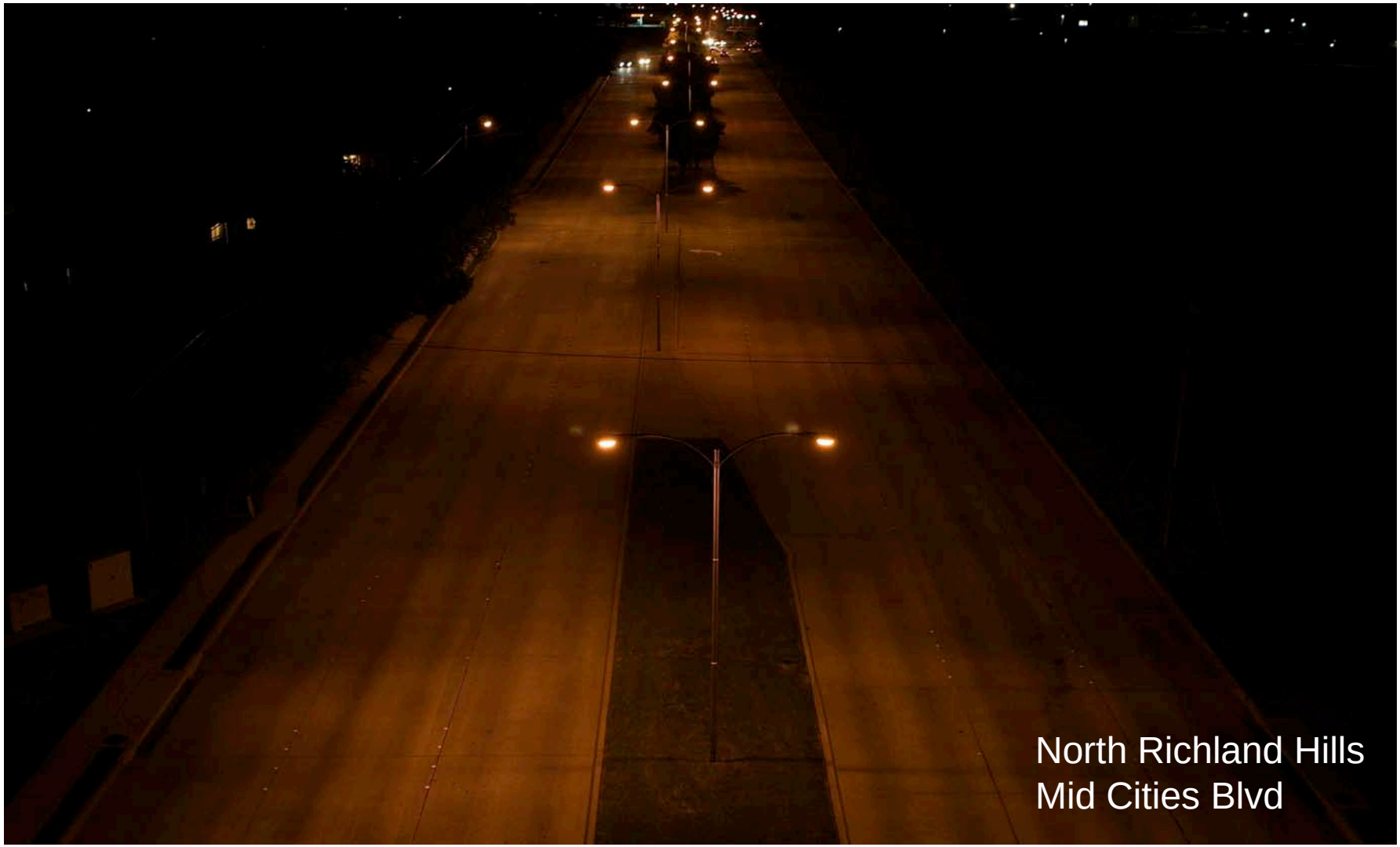
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



North Richland Hills
Mid Cities Blvd

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Pilot Summary - LED Lights

Prior to implementation, there were concerns regarding the ability of the LED products to withstand our extreme Texas temperatures, both cold and hot. In addition, there were concerns regarding our severe thunderstorms; lightning and associated fault current.

- **43 fixtures failed through February 2012. This equates to a 8.53% failure rate**
- **Conventional lighting failure rate (HPS) is 7.25% through February 2012**

Seasonal Breakdown of Failures

15	Fall	(September – November)
7	Winter	(December – February)
17	Spring	(March - May)
4	Summer	(June – August)

- **Percentage of degradation of LED by average of illumination (foot candles) = 11.66%** (includes dirt depreciation)

Pilot Summary - LED Lights

- Provide good quality lighting
- Used less energy compared to the HPS lights
- Are not yet as reliable as HPS lights
- Projected energy savings alone does not off-set high initial costs
- Almost no industry standardization
- Pilot cities have had a favorable response to the lights and would like to have as an option once a suitable price point can be established

LED Post Top Evaluation

- Installed 36 lights in Colleyville in November 2011
- Residential Subdivision
- 3 Manufacturers
- Replaced mixture of 100 watt HPS & 175 watt Mercury Vapor with 57, 78, & 86 watt LEDs
- ROAM System installed
- No LED failures reported to date

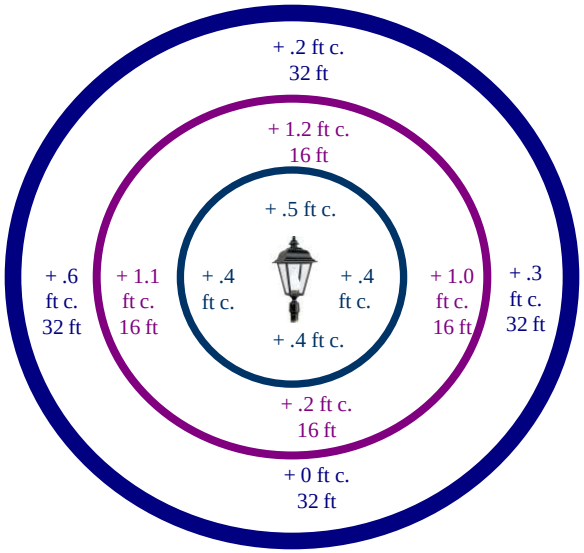
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

High Pressure Sodium (HPS)

Mfg Watts: **100**

Street side

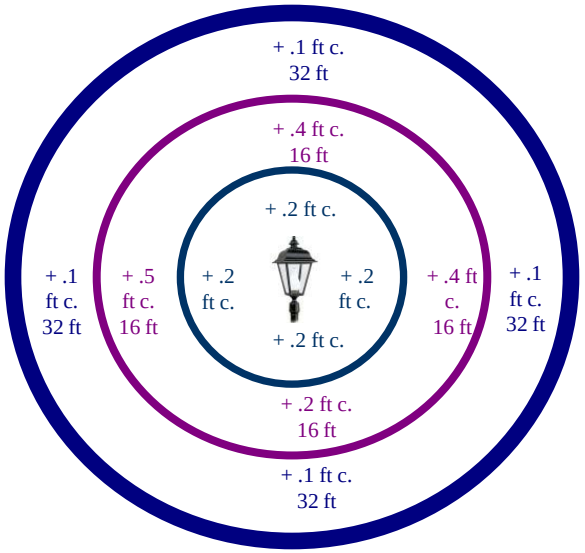


House side

Mercury Vapor (MV)

Mfg Watts: **175**

Street side



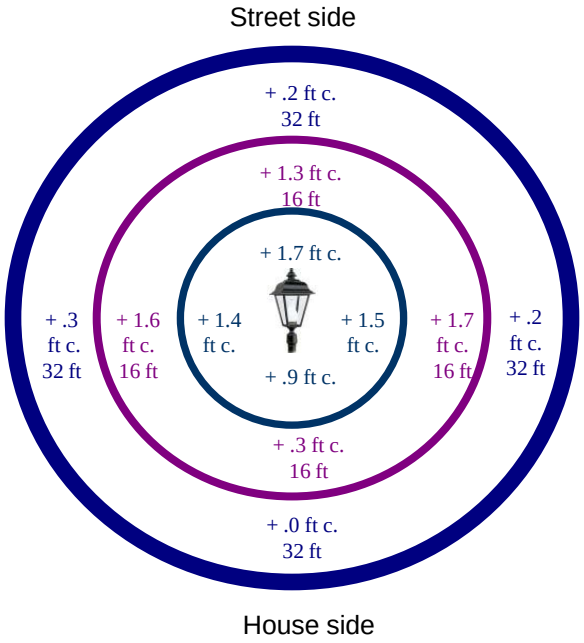
House side

Note: Mercury Vapor not an available option currently being phased out

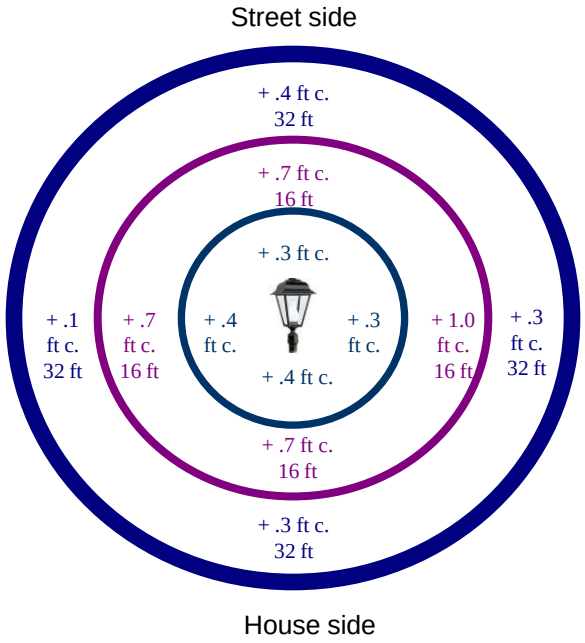
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

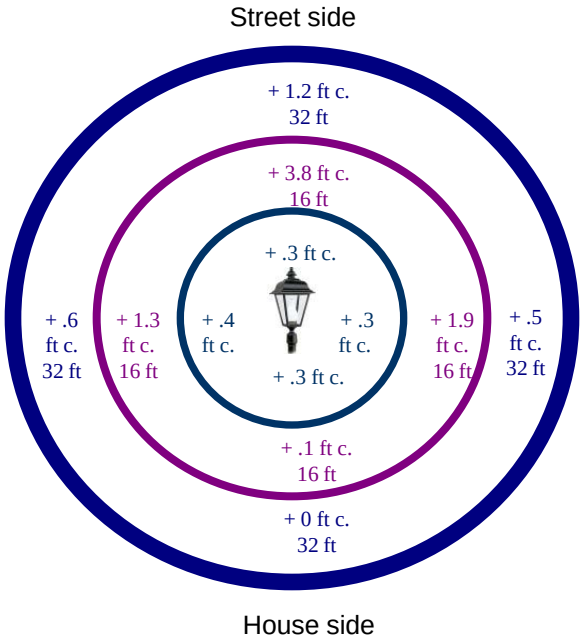
MFG: **A**
Type III



MFG: **B**
Type II

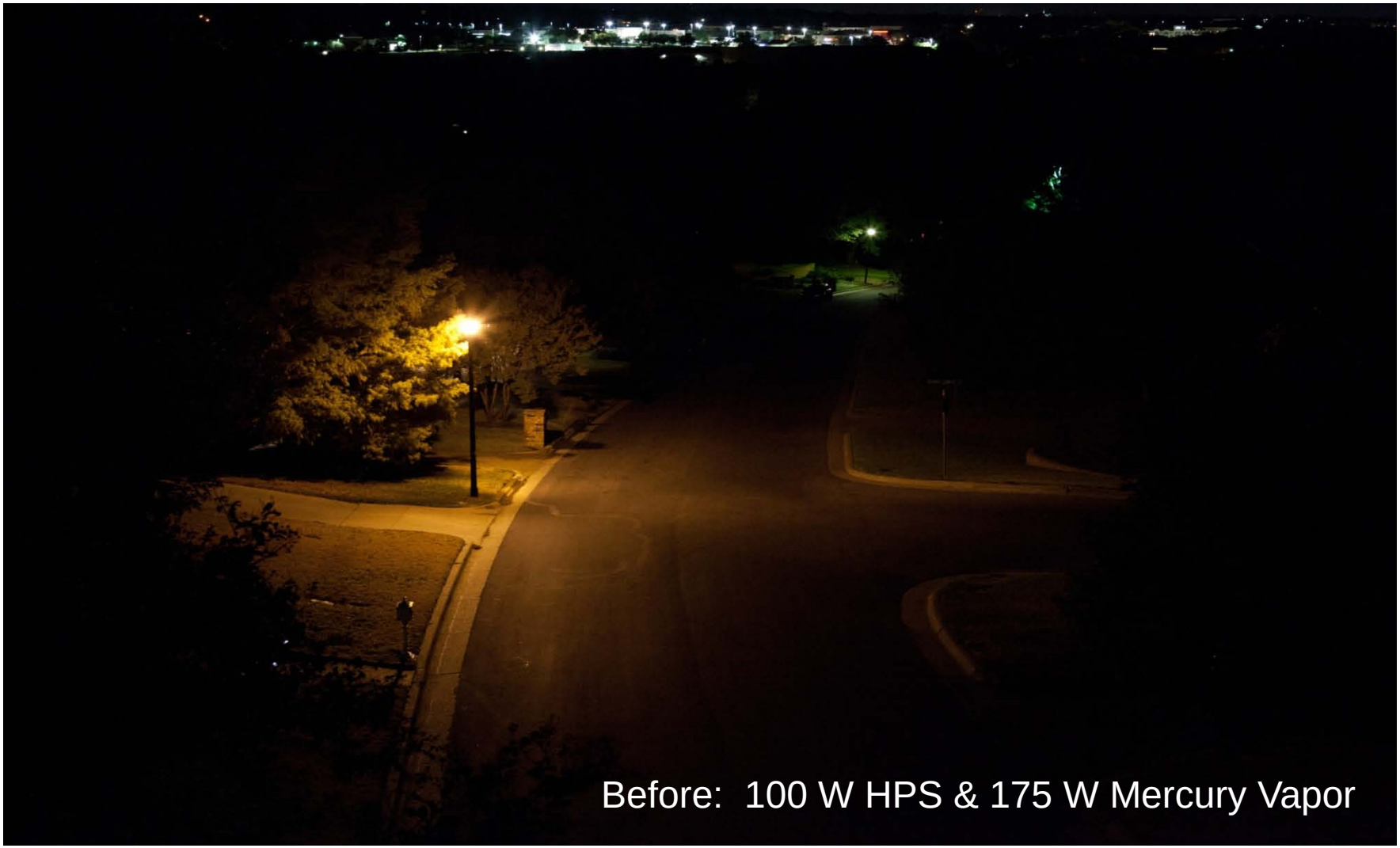


MFG: **C**
Type III



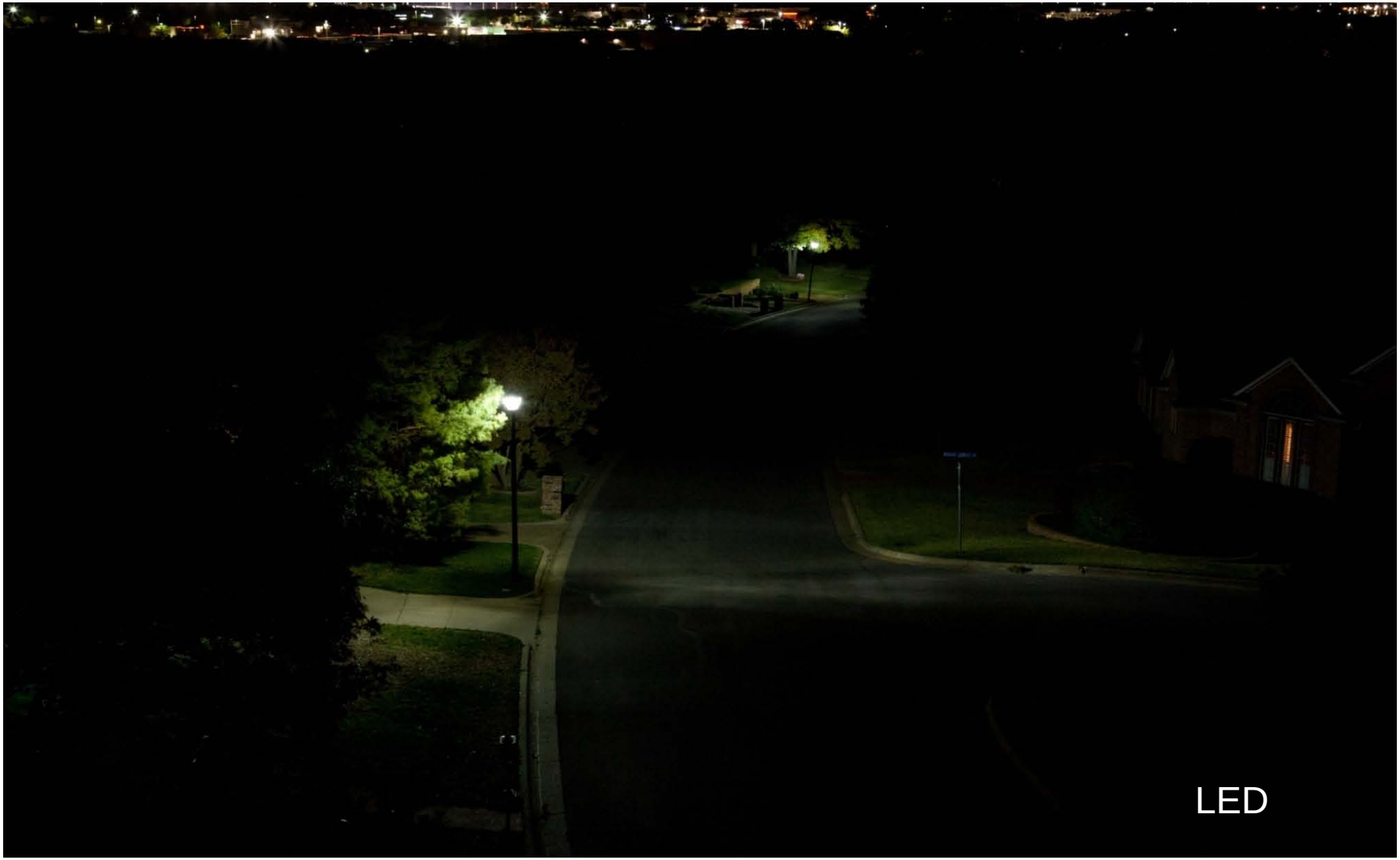
Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy



Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

Sponsored by the U.S. Department of Energy

Future Evaluation & Analysis

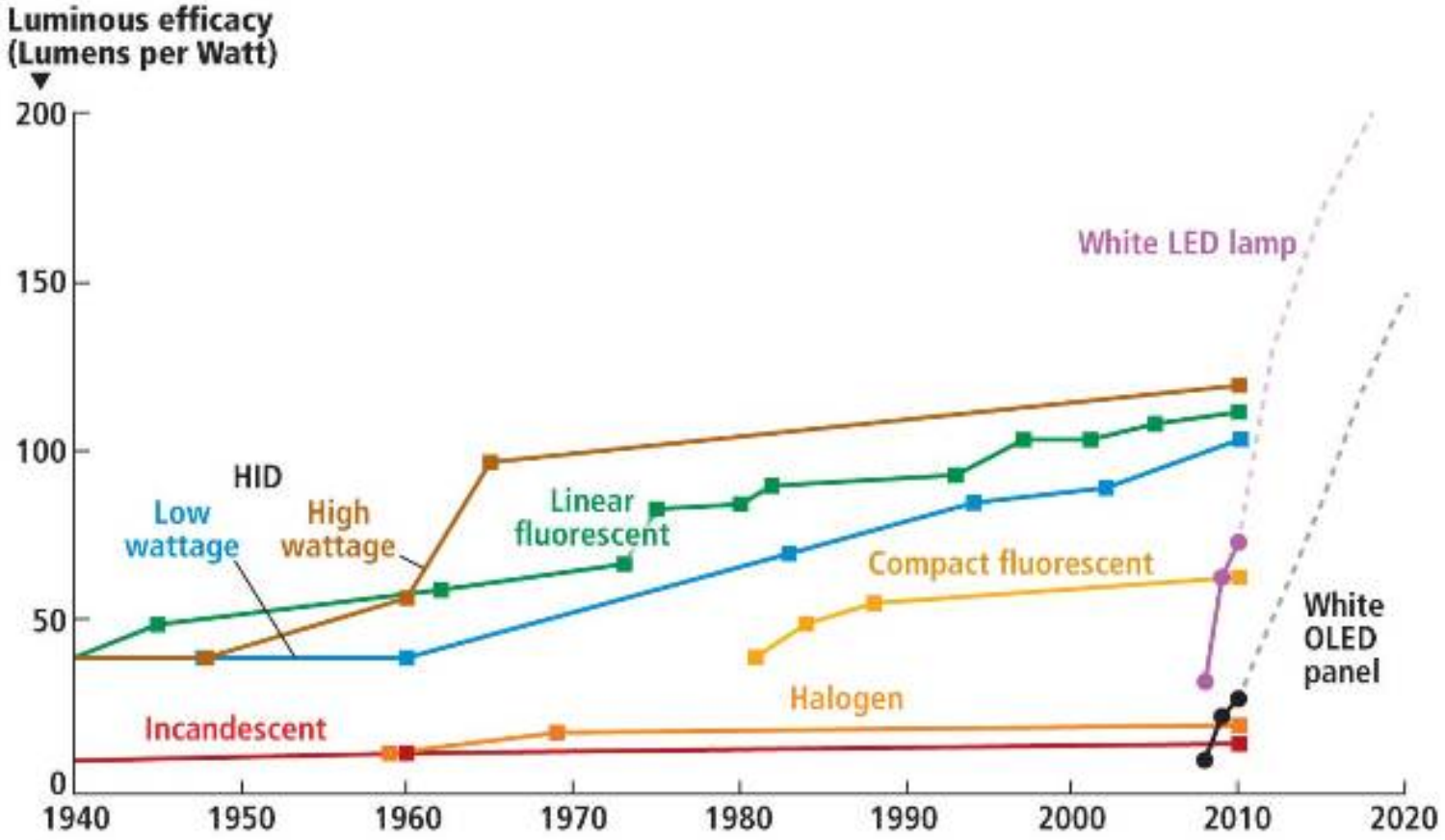


FIG. 1. LED system efficacy is on a steep ramp (courtesy of US DOE).

Future Evaluation & Analysis, cont.

- Continue to evaluate the performance of LED luminaires to determine viability and proper "jumping in point"
- Evaluate feasibility of creating LED street lighting tariff and offering LED street lighting options to municipalities
- Financials
    - January 2008 average LED fixture cost $975
    - June 2010 average LED fixture cost $687 (30% decrease)
    - December 2011 LED fixture cost $425 (56% decrease)
- Standardization of LED street lighting products

Questions?

ONCOR

March 15, 2012