



CITY OF KNOXVILLE LED PROJECT

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KNOXVILLE: BASIC INFO

Project Objective: Retrofit the City's ~29,500 high pressure sodium (HPS) streetlights to LED technology.

Background

- Currently, KUB fully operates & maintains the system (including lamps, wiring, poles, and cables)
 - For all intents and purposes, they “own” the system (and pay PILOTs on its value)

KNOXVILLE: CURRENT ANNUAL BILL

Current Annual Bill (from KUB)		
Energy Charge	\$1,995,484	27,305,476 kWh @ \$0.07308/kWh
Facilities Charge	\$1,993,407	\$13,795,205 * 14.45%
Total	\$3,988,891	

Gross Book
Value of Existing
System
(Installed Cost)

Adjustable Rate
Set by KUB to
Recover Costs

LED retrofit reduces annual bill while shifting from antiquated billing model.

KNOXVILLE: ADVANTAGES TO LEDs

- Improved light quality/visibility/aesthetics
- Fewer outages – greater reliability
- Greater control capabilities
- Improved customer satisfaction
- No disposal hazards
- Greenhouse gas emissions savings
 - Achieves 20% by 2020 municipal emission reduction goal

KNOXVILLE: LOOKING AHEAD

- Pay off stranded costs – a necessary 1st step
 - Estimated cost of \$4.8M
- Procure turn-key retrofit contract
 - Includes audit, design, material procurement & install
 - Estimated cost of \$10M - \$14M
- Establish long-term maintenance plan and contract
 - Cost of this is major variable in projecting annual savings

KNOXVILLE: KEY CHALLENGES

■ Financing

- Scale of project means interest rates, loan amounts have major impact on net annual savings
- Pros and cons to internal and external financing options

■ Ownership

- Are we ready and willing to take on ~30,000 new assets?

■ Maintenance

- What is the expected cost of maintenance long-term?
- LED fixtures warrantied for 10 years, but what about broader system (poles, wires, etc.)?

KNOXVILLE PILOT DEMONSTRATION

- Partnership led by TVA, EPRI, and KUB
 - City assisted with site selection and publicity
- Replaced 10 High Pressure Sodium (HPS) overhead lights with LED
 - 8 street lights, 2 decorative lights
 - 250W HPS (318 w/ballast) → 99W LED
- Measured and reported savings & performance

COMPARISON

High Pressure Sodium



LED's



Wall Avenue Looking East from Market Square

Disclaimer: Colors are approximate.
Source: EPRI, 2010

COMPARISON

High Pressure Sodium



LED's



Wall Ave Looking West (Entrance to Market Square on the Left)

Disclaimer: Colors are approximate.

Source: EPRI, 2010

COMPARISON

High Pressure Sodium



LED's



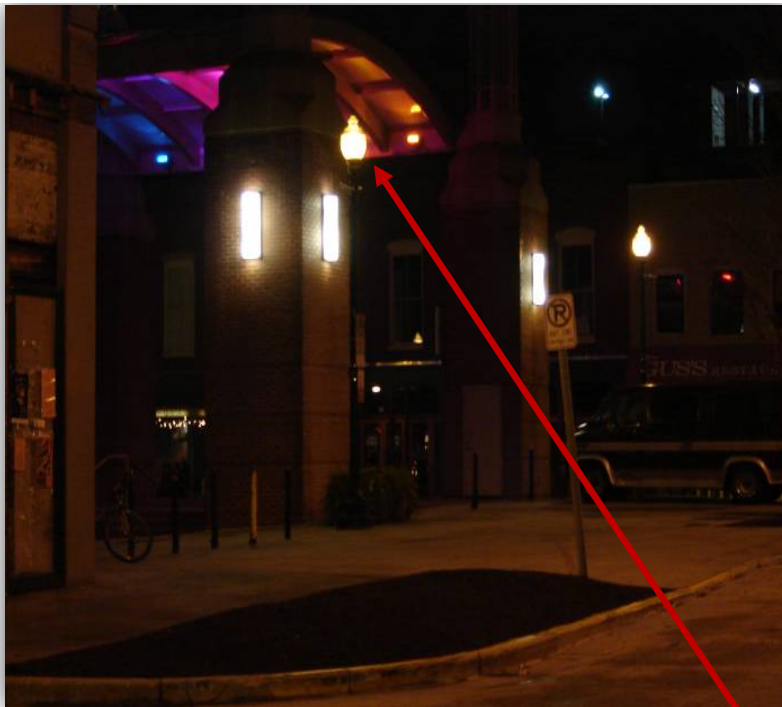
Photo Taken from the top of the Market Square Garage

Disclaimer: Colors are approximate.

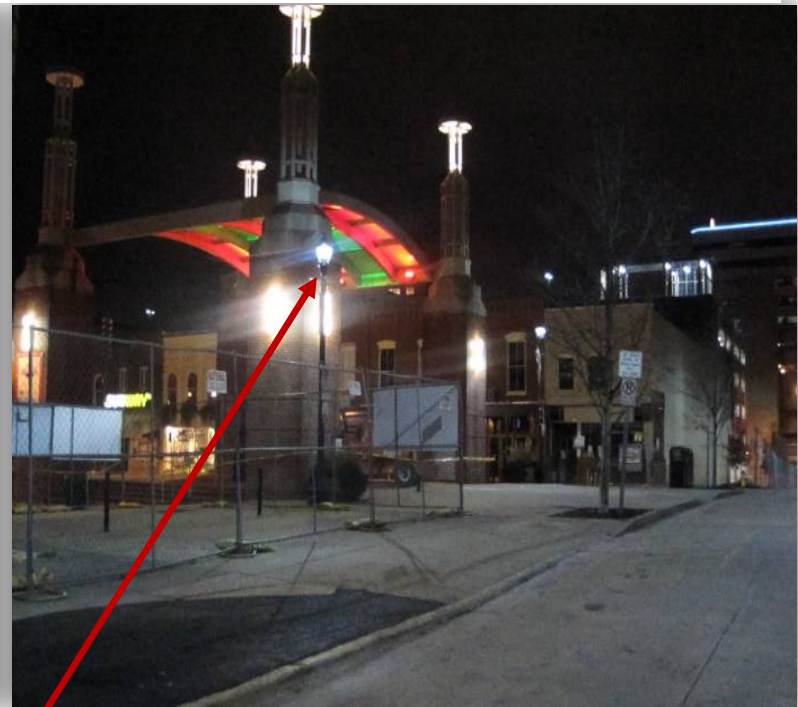
Source: EPRI, 2010

COMPARISON

High Pressure Sodium



LED's



Decorative Fixtures

Disclaimer: Colors are approximate.
Photo Credit: EPRI, 2010

Entrance to Market Square from Wall Ave

KNOXVILLE PILOT DEMONSTRATION

Among the findings...

- LEDs create appearance of more light – light appears whiter and more even than HPS
- Actual energy usage and savings match expectations
 - Average Fixture Max. Power Consumption: 318W (HPS) → 97.75W (LED) = 69% Savings
- LEDs are “up to the task” when applied appropriately

Local experience...

- LEDs have not needed replacement (6+ years old)
- Positive public feedback