



Department of
**Environment &
Conservation**

LED Street Lighting



Acknowledgement & Disclaimer

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DOE High Performance Outdoor Lighting Accelerator

- Part of DOE's Better Buildings Initiative
- State of Tennessee is one of fifteen current members, and one of only 2 states to join the OLA
- **Goals:**
 - Demonstrate best practice approaches to municipal wide replacements
 - Provide tools to address technical issues
 - Help establish policy and utility framework
 - Document and share best practices on overcoming technical, financial, and regulatory barriers
 - Accelerate the adoption and use of high efficiency outdoor lighting in the public sector, replacing over 1,500,000 lighting fixtures over the next two years starting in May 2014

DOE Municipal Solid-State Street Lighting Consortium

- **Goal:** “to build a repository of valuable field experience and data that will accelerate the learning curve for buying and implementing LED lighting”
- Program designed by DOE to share technical information and experience between members on LED street and area lighting applications
- As of April 2013, there were 316 U.S. members, including the Tennessee Valley Authority and several other utilities in the state
- It is estimated that switching to LED lighting over the next two decades could:
 - save the country \$250 billion in energy costs over that period,
 - reduce the electricity consumption for lighting by nearly one half,
 - and avoid 1,800 million metric tons of carbon emission.

Municipal Solid-State Street Lighting Consortium

Tennessee Participants:

City of Knoxville	Knoxville	TN	Municipality
EPB - Electric	Chattanooga	TN	Utility
Knoxville Utilities Board	Knoxville	TN	Municipality
Memphis Light Gas and Water	Memphis	TN	Municipally-Owned Utility
Nashville Electric Service	Nashville	TN	Municipally-Owned Utility
Tennessee Valley Authority	Nashville	TN	Utility



Challenges to LED Adoption

- DOE's Municipal Solid-State Lighting Consortium and DOE's High Performance Outdoor Lighting Accelerator are both dedicated to overcoming challenges associated with scalable adoption of LEDs, which include:
 - Savings potential
 - Product reliability & performance
 - Utility rate structures
 - Up-front costs & financing

- Fifteen Iowa towns and cities united to upgrade more than 1,100 streetlights to LEDs
- Used federal funding, joint purchasing, and technical specifications modified to suit their needs
- Results:
 - buying power
 - substantial energy savings
 - paybacks that might not have been possible individually



Case Study: State of Iowa

- Iowa Association of Municipal Utilities (IAMU) represents all 136 community-owned, locally controlled municipal electric utilities in Iowa
- 15 municipalities chose to utilize a joint purchase and competitive bid process
- Funding: Energy Efficiency Conservation Block Grant (EECBG) & American Recovery and Reinvestment Act (ARRA), and
- Technical assistance: DOE Municipal Solid-State Street Lighting Consortium
- IAMU issued one Request-for-Proposals on behalf of municipalities
- RFP was for three HPS cobra head fixtures—70/100W, 150W, and 250W—so each city could choose fixtures that best met its needs

Case Study: State of Iowa

- 15 participating municipalities installed a total of 1,154 LED streetlights.
- The expected annual energy savings is approximately 549,743 kilowatt-hours, which amounts to \$56,570—or enough electricity to power 43 U.S. households.
- The payback is expected to be between 2.4 and 9.5 years, well within the rated life of the fixtures.
- New luminaires are expected to yield significant annual operation and maintenance savings.
- Communities responded positively to the new lighting, with comments ranging from “easy to install” to “good quality” to “very impressed with the light.”

Community	Number Purchased	Annual Estimated Energy Savings (kWh)
Greenfield	2	736
Anthon	13	4,568
Afton	20	6,745
Earlville	30	11,038
Rockford	38	12,816
Stratford	32	12,847
Westfield	40	13,490
Graettinger	32	16,372

Community	Number Purchased	Annual Estimated Energy Savings (kWh)
Montezuma	41	21,370
Auburn	24	37,843
Tipton	105	42,035
Sergeant Bluff	87	45,346
Anita	138	49,547
Rock Rapids	130	67,759
Algona	422	207,231
Total	1,154	549,743



Tennessee's Street Lighting Landscape

- Local Utilities & Ownership
 - Utility rate structures are often one of the most challenging barriers to overcome: capital, energy, and maintenance are all affected by LED adoption
 - Most utilities do not have a set rate schedule for new LED lighting, which consumes less energy than typical HPS and MH lighting
 - High rate schedules for LEDs can be cost-prohibitive for municipalities
 - In cases where utility owns and operates streetlights, municipality may have to purchase lights from utility OR utility can finance retrofits and increase rates
 - **Our Solution:** City finances via Energy Performance Contract
- Discuss state-specific challenges to LED adoption

How is Tennessee addressing these challenges?

- TDEC's Office of Energy Programs and Clean Energy Solutions have been working to develop replicable policy and utility frameworks for LED adoption in municipalities and counties
- In January, the City of Athens and the Athens Utility Board agreed on a rate structure to accommodate adoption of LED street lights that can set a precedent for other municipalities looking to adopt LEDs

City of Athens & Athens Utility Board

- Through a series of meetings with each other and members of the energy services team (OEP & CESI), the two organizations came to an agreement on the rate structure
- City of Athens' street lights are utility-owned: City needed support from the Board
- Athens Utility Board agreed to modify their tariff to enable Athens to undertake LED conversion & financing
- City of Athens now able to finance LED conversion through an EPC with a 5.5 year payback
- Street lighting measure may be included in larger EPC for other energy conservation measures, such as HVAC replacements, indoor/outdoor lighting upgrades, and controls

Components of Utility Tariff

- Capital: The investment cost of lighting fixture and pole
- Maintenance: Labor time to replace burned out, vandalized fixtures
- Energy: Kwh

Athens Tariff Adjustment

- Capital Cost reduced by 20%
- Maintenance Unchanged
- Energy: kWh savings at 7cents flows to City as long as City finances LEDs

Features of Athens UB/City Agreement

- 2505 fixtures replaced, ranging from 100 to 400W
- Existing fixtures mostly Metal Halide, High Pressure Sodium
- 50% cost savings: \$52,500 annually
- Maintenance savings to AUB: \$62,000 annually
- Estimated Cost: \$700,000 borne by City
- Labor cost: \$50 per pole; lighting fixture, \$130-\$300, depending upon wattage

Contact Us!

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