



Kansas LTAP Fact Sheet

A Service of The University of Kansas Transportation Center for Road & Bridge Agencies

Save Electricity with LED Streetlights

By Nora Fairchild

If you are trying to make sustainable changes in your community, one simple solution is to install or replace existing street lights with LED light fixtures. This article will explain how LEDs work, the costs and benefits of making the switch and how LED lighting contributes to sustainability.

How LED lights work differently than incandescent bulbs

Light-emitting diode (LED) light bulbs are becoming fairly common in household use. Due to their energy efficiency and long-term cost-effectiveness, communities are bringing the bulbs to a larger scale for use in street light fixtures.

The fixtures include many individual LED bulbs in one unit. The light from LED bulbs is clear blue or white rather than yellowish like incandescent street lamps. This change helps colors being illuminated to look more “true,” and may help some people see better while driving.

Efficient and effective

Several characteristics of LED fixtures help communities save money:

Energy efficiency. LED fixtures use significantly less power to operate than incandescent fixtures. According to a study by the Missouri Center for Transportation Infrastructure and Safety at the Missouri University of Science and Technology (Missouri S&T), LEDs can provide a 93 percent energy savings.

Bulb longevity. LEDs contain no



LED bulbs are valued for their potential 93 percent energy savings and 10 year lifespan.



mercury and produce less heat than other bulbs so that the unit can work efficiently without premature bulb burnout. LED bulbs transfer heat over the area of the lamp evenly, and the unit lasts longer as a result. Missouri S&T estimates the lifespan of an LED bulb at 10 years.

Maintenance advantages. While traditional bulbs need to be replaced as soon as the bulb goes out, LED fixtures contain many small individual bulbs that create a uniform glow so it is hardly noticeable when a few of the small bulbs go out. Maintenance can be scheduled at regular intervals rather than in response to instances of street lights burning out.

A good fit with solar power. LED light fixtures come in different types,

including solar-powered. Using solar power is especially feasible for these fixtures because the energy draw from LED bulbs is much lower than for incandescent bulbs.

Can be retrofitted. A new LED unit can replace an incandescent unit on an existing pole. Swapping the units takes only about 30 minutes per fixture, per the Missouri S&T.

Cost

Upfront, LED street light units are significantly more expensive than traditional ones. According to an article in USA Today, LED units cost about \$1000 per unit compared to conventional units that are around \$250 each. Bulbs are more expensive too; LED street light bulbs themselves go for about \$40, while conventional high pressure sodium lamp bulbs are about \$20. However, LEDs are much more energy efficient, and that's the primary way long-term cost savings are achieved. While communities would have to pay more for the fixture to start, they would save maintenance costs and energy costs over the long run, helping to make up the difference.

Communities using LEDs

Many communities across the United States, large and small, are using or piloting LED street light fixtures in their jurisdictions. Here are just a few:

City of Los Angeles, California, uses LED street lights, and their Bureau of Street Lighting states that LEDs are a no-cost sustainable alternative because



According to Pacific Gas and Electric Company there are many benefits of replacing traditional street light bulbs with LED bulbs:

- Improved night visibility for pedestrians, bicyclists and drivers due to higher color rendering, higher color temperature (more prevalence of yellowish white, orange and red colors) and increased illuminance uniformity
- Significantly longer lifespan
- Lower energy consumption
- Reduced maintenance costs
- Instant-on with no run-up or re-strike delays
- No mercury, lead or other known disposable hazards
- Lower environmental footprint
- An opportunity to implement programmable controls (e.g. bi-level lighting)

they are highly efficient.

City of Lawrence, Kansas. A newspaper article about Lawrence, Kansas' switch to LED bulb units in the vintage-looking streetlights downtown reported that it will take about 40 years for the lights to pay for themselves in energy savings. Even with the long payback, staying with traditional bulbs may soon not be an option for many communities. Assistant city public works director Mark Thiel said Lawrence's switch to LED lights would be inevitable because of decreasing production and decreasing popularity of metal halide and high pressure sodium light bulbs.

Riley County, Kansas. Riley County Public Works has installed five different types of LED street lights in their parking lot to test their effectiveness. All are solar powered.

Solar panels come in two types—monocrystalline and thin film. Rod Meredith, the County's assistant public works director, says the thin film system is a better alternative for use with LEDs because it includes batteries in the base of the pole that enable more storage

capacity for power. The streetlight also remains dim until a car approaches, preserving power until it is needed. LEDs do not take as long as traditional lights to illuminate to full brightness. These units cost about \$7,000.

Meredith says solar technology coupled with LED fixtures really saves money if the fixtures are being placed in a new area that would otherwise not need electrical lines installed.

Riley County plans to install three more types of LED street lights in their parking lot this year to consider the best options for future use in parks and possibly on county roads. Meredith says that the LED street lights they are testing are self sufficient and work well.

For more information about Riley County's test of solar powered LED units, contact Rod Meredith at (785) 539-2981.

Potential downsides to using LED technology

Technology is new and changing.

Meredith said the only thing to watch out for is the rapidly changing LED

industry. Because the products are so new, variations of LEDs fixtures come out often that you may not be able to depend on using the same replacement equipment and bulbs and procedures again and again.

Very bright light. According to the Missouri S&T, there have been complaints that LED street lights are too bright and at times distracting for drivers. In residential areas, LED street lights can be bothersome at night when they are in close proximity to bedroom windows. However, Meredith says that the complaints he received in Riley County were that the solar lights installed in their parking lot were not bright enough. He plans to install one of the brightest LED fixtures soon to compare it to the relatively dimmer models he currently has in place.

On the plus side, LEDs' capacity for brightness could allow bicyclists to ride at night with greater safety.

Are LED units worth the extra cost?

The initial cost of LEDs can be intimidating and could deter a community from making the switch. However, LED street light fixtures are energy-efficient and can be cost-effective in certain situations. They have more potential to be cost effective for new installations rather than retrofits on existing fixtures that already have an incandescent fixture in place and you could just continue replacing the bulb when it burns out. Still, retrofits allow for significant energy savings and more predictable maintenance—a plus for any community, and something to consider as electricity prices continue to rise in Kansas and the availability of incandescent bulbs declines over time. ■

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