BRIGHT LIGHTS, BIG SAVINGS

Townships Tout the Many Benefits of LED Traffic Signals

Townships that have made the switch from incandescent to LED traffic signals have one thing to say about the drawbacks: There are none. Despite a higher purchase price, the lights use such a small amount of electricity that they pay for themselves in just a few years or less. Factor in their greater visibility, a five- to 10-year lifespan, and lower maintenance costs, and it's no wonder townships are giving the green light to a new generation of traffic signals.

BY **JENNIFER L. HAWBAKER** / ASSISTANT EDITOR

As a retired electrical contractor, Allen Kreider began looking for ways to cut energy costs as soon as he was elected supervisor in Manor Township, Lancaster County. Now, with an energy management system in place for the municipal building, he is literally taking his crusade to the streets. In doing so, he might have found the biggest savings potential yet: replacing the incandescent lights in the township's traffic signals with LED — or light-emitting diode — fixtures.

Kreider clearly has done his research, and rattles off the selling points of the new lights in quick succession: greater visibility, low energy consumption, the ability to run on battery backups, and lower maintenance costs thanks to a five- to 10-year lifespan.

"Our electric bill has gone from about **$100** to **$20-some** dollars per signal, per month."

After crunching the numbers, the township was sold — despite the comparatively high purchase price for LED vs. incandescent lights. "We did an analysis for one intersection, and it truly works out," Kreider says. "We're replacing a 150-watt light bulb with one that's 11 watts and a 69-watt bulb with one that's 7 watts. For one fixture, the total cost is about $3,200. Payback will be three years and two months. That's about a 30 percent return on your money, and you can't get that anywhere else."

Energy-saving technology

Manor Township will include funds for the new signals in its 2008 budget, Kreider says. The way he sees it, the sooner they're installed, the sooner the township will start reaping the benefits.

LED traffic signals have been around since the early 1990s but until recently, were priced out of reach for most municipalities. Initially, red was the only color available. Now the price has dropped, and townships can choose to replace any or all of the colors, as well

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Townships are switching from incandescent traffic signals to new LED, or light-emitting diode, technology. The LED signals cost more up front, but townships have reported energy savings from 60 to more than 85 percent. Combine that with decreased maintenance costs, and the lights should more than pay for themselves in a few years — or less.

as arrows and pedestrian signals.

The technology that lights an LED traffic signal can be found all around us, from the numbers on a digital alarm clock to the little green light that tells you the coffeemaker is still on to the towering signs that light up Times Square.

What a driver approaching an LED traffic signal sees as a single round light is actually made up of many tiny LED bulbs that fit into an electrical circuit. Apply an electric current, and each one is illuminated by the movement of electrons in a semi-conductor material. The material used determines the color of the light.

This technology makes the LEDs incredibly energy-efficient. "Instead of using a 150-watt light bulb in a traffic signal, you're using a module that consumes 12 watts or less," says Bill Conrad, vice president and general manager of Signal Service in Chester County. "The savings is huge.

"Over a certain number of years," he adds, "you reach a break-even point where your cost to purchase and install the signals equals your energy savings. From that point forward, that savings stays in the municipal budget."

Safety and savings

The supervisors in East Buffalo Township, Union County, took plenty of time to research LED signals before making any replacements. "We did quite a bit of looking around and talking to people," supervisor and roadmaster Lawson Fetterman says. "We finally made the switch, and the first year that we had all of our lights converted, our savings in electricity was 66 percent."

That's just the beginning of the story, though, Fetterman says. Because the lights use a minimum amount of energy, the township was able to install uninterrupted power supplies — battery backups — to keep them shining in a power outage. "Three of our lights are on a major north-south artery," he says, "so it's critical to keep those working."

That's another savings for the township since it no longer has to pay police officers to direct traffic when the power fails. "Six batteries can last four to eight hours in a power failure, allowing crews to get out and get the problem fixed," says Mark Pemru, a traffic control spe-

CALCULATE POTENTIAL SAVINGS

Should your township make the LED signal switch?

To get a glimpse of how much your township could save in energy costs by switching to LED traffic signals, use the Energy Savings Calculator from the U.S. Environmental Protection Agency and the U.S. Department of Energy.

Log onto www.energystar.gov, go to "Products," and then click on "Lighting." On the left side of the screen, click on "Traffic Signals," and then on the right side, click on "Savings Calculator."

This calculator considers maintenance, as well as operating costs, giving a more accurate picture of potential total savings than some other online calculators.

cialist in PennDOT District 11.

LED signals solved another problem for Warminster Township in Bucks County, where traffic lights have competition for a driver's attention. "In our township, there's a lot of clutter as far as lights go," supervisor and secretary-treasurer Richard Luce Jr. says, " but you can see the LED lights over a mile away."

Bright lights don't mean big bucks, though. Luce estimates the township has saved at least 60 percent on its energy costs since the LED installation.

The LEDs are guaranteed for five years as compared with their incandescent counterparts, which are generally changed at least once a year. While some townships report the lights lasting much longer, Fetterman says for East Buffalo Township, the warranty came in handy. "Not every light in our township lasted that long," he says, "but the company made things right and replaced the ones that went out prematurely."

Unlike incandescent lights, which can be shining brightly one moment and burn out the next, LEDs fade away slowly as individual diodes fail, leaving the rest of the light still working. That gives townships time to have the light fixed before a complete outage, upping the safety factor for motorists.

> "It's really a **no-brainer**. Even if a municipality didn't have any grants to replace the modules, they would be **stunned** by the **savings**, especially with the **prices** still **dropping**."

Working together

While some townships have made the move to LED technology on their own, others are part of a multimunicipal effort to standardize, save money, and cut energy consumption. The 102 signalized intersections in Lycoming County, for example, now sport LEDs thanks to a project started by the West Branch Council of Governments.

Tom Lyons, Municipal Services manager for PennDOT District 3, says the idea started to take shape in 2005 when he and COG president Paul Wentzler, a Muncy Township supervisor, attended a meeting where officials from the City of Lancaster touted the benefits of LED traffic signals.

Lyons was impressed by more than the money, though. "I saw how easy it was to change one of the lights," he says. "I have Cub Scouts — third and fourth graders — who have wired lamps that are more complicated than this changeout. It's unbelievably simple." That ease of installation, Lyons says, will help keep installation costs low.

The COG invited the rest of the Lycoming County municipalities to join the venture, and the county commissioners also got involved. "They supported the project from start to end," Lyons says. "The commissioners committed $150,000 of their liquid fuels funds to the project and then extended their commitment to purchasing all the LED modules. Their total contribution was $170,000."

The municipalities each paid a share of the $75,000 cost to install more than 2,400 LED modules and 206 pedestrian signals — and were helped even further by a $35,000 grant from the state Department of Community and Economic Development.

One of the participants, Loyalsock Township, is already seeing a payback from the installation. "I averaged out our bills over the last year, and with our 13 signals, our savings is about 71 percent," township manager Bill Burdett says. "Our electric bill has gone from about $100 to $20-some dollars per signal, per month."

"It's really a no-brainer," Lyons says. "Even if a municipality didn't have any grants to replace the modules, they would be stunned by the savings, especially with the prices still dropping."

Lyons says that Columbia County is next in line for a complete traffic signal retrofit. "The commissioners have committed $50,000 to replacing all the old incandescent lights with new LED modules," he says, "and the Central

State grants help fund multimunicipal LED projects

Townships that join together to purchase LED traffic signals are eligible for grant money through the state Department of Community and Economic Development's Shared Municipal Services Program.

"We've given about half a dozen grants for these projects," says Dean Fernsler, a local government policy manager with the Governor's Center for Local Government Services.

Fernsler also offers a reminder that the state looks favorably on the best examples of multimunicipal cooperation. "The more participants you have, the better the quality of the grant application," he says.

For more information on the Shared Municipal Services Program, log onto www.newpa.com and choose "Funding and Program Finder." Select "Community" on the next screen, and scroll down to the Shared Municipal Services Program Link. Townships may also call the Governor's Center toll-free at (888) 223-6837.

Log onto **www.newpa.com** or call (888) 223-6837 to learn more.

Susquehanna Council of Governments is going through the process right now to look at the needs and funding options in Northumberland County."

Townships working on their own and trying to minimize costs should consider replacing only one or two colors in their traffic signals. "In a perfect world, they should replace them all," says Bill Conrad of Signal Service, "but when funding becomes an issue, I would say to replace the red first — or preferably the red and green — and then the amber. Because the amber lights are only on for three or four seconds per cycle, they last longer and the payback time on those is much greater."

LED signals are available for purchase through the state's COSTARS program, which currently has four vendors under contract, and municipalities that join together to purchase the lights are eligible for funding through the state's Shared Municipal Services Program *(see sidebar on Page 29)*.

The Sustainable Energy Fund of Central Eastern Pennsylvania, an energy conservation and education group established by the Pennsylvania Public Utilities Commission, offers another option to help cash-strapped townships begin to realize energy savings. Through its traffic signal retrofit program, the fund offers upfront financing for municipalities to install new signals. The money they save in electric bills over the next five years goes to pay off the loan.

"First we do an energy audit," says SEF project manager John Forsyth. "We go out and take a look at the municipality's traffic signals, and from there we look at their utility bills and do a rate comparison between what they currently pay vs. going to LED. We generate a report that shows the cost savings over a five-year period, and from there we offer to finance the project.

"The savings are averaging around 85 percent," Forsyth adds.

Even with no outside funding, townships are deciding to spend money to save money by retiring their inefficient, incandescent signals. "Anything that will save money is generally a good thing," says Robin Smith, supervisor and secretary for Athens Township in Bradford County. "The only thing we regret about changing all our signals to LED is that we waited so long to do it." ✦

PHOTOS COURTESY OF SIGNAL SERVICE, INC.

ABOVE: The black spot on the green signal is a tell-tale sign that the incandescent light is nearing its end. The experts say that LEDs burn cooler and last must longer — five years or more.

LEFT: In addition to lighting traffic signals, the bright LED technology is also used for school speed limit signs and overhead street lights.

Sustainable Energy Fund offers financing for LED retrofits

Upfront financing through the Sustainable Energy Fund of Central Eastern Pennsylvania can help townships make the switch to more energy-efficient LED traffic signals without a significant initial cash outlay.

The SEF, founded by the Pennsylvania Public Utilities Commission, is a nonprofit organization that promotes clean and renewable energy projects. Through its traffic signal retrofit program, the SEF offers upfront financing for municipalities to install new signals. The money they save in electric bills over the next five years goes to pay off the loan.

SEF project manager John Forsyth says the group first assesses a municipality's traffic signal needs and then reviews its utility bills. A rate comparison between current energy use and projected use with LED signals shows the anticipated savings over five years, and that establishes the basis for the financing.

Although the SEF was established to serve PPL customers, Forsyth says townships statewide are eligible for the program. "We would need to look at the electric rates," he says. "Some of those in western Pennsylvania are significantly lower than in the eastern part of the state, and in those cases, we could not guarantee savings."

In the municipalities the program has served so far, he adds, the savings are averaging around 85 percent.

For more information on the Sustainable Energy Fund's LED program, log onto www.thesef.org, call John Forsyth at (610) 264-4440, ext. 17, or e-mail him at jforsyth@thesef.org.