OSRAM SYLVANIA Brings New Light to the Streets

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By Heather Weston, LED Product Marketing Manager, OSRAM Slyvania

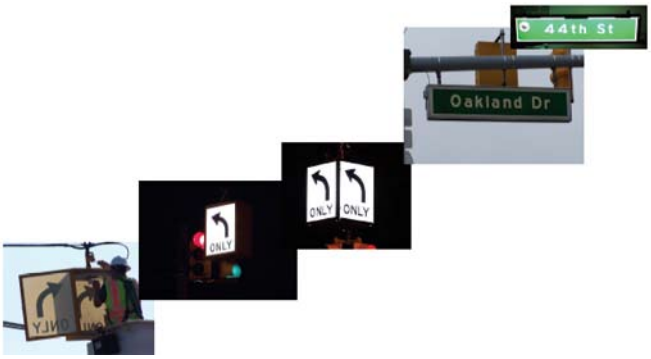
According to the U.S. Department of Energy, energy consumption for all lighting in the United States is estimated to be 8.2 quads, or about 22 percent of the total electricity generated in the U.S. and one-fifth of the national electrical consumption. At the city level, this translates to high levels of energy consumption and expense deficits, which is particularly detrimental with the current state of the American economy. Municipality officials are examining ways to combat the global energy crisis and limit operation costs without sacrificing city safety and electrical performance. Perhaps the easiest way to accomplish reduction in energy and costs is by upgrading the city's lighting.

LED Technology

Light emitting diode (LED) systems are quickly becoming the light source of choice for numerous applications due to their ruggedness, reliability, long life, energy efficiency and low maintenance requirements. LEDs have also opened new avenues in lighting with their Colormixing and color sequencing capabilities. LED systems offer unique capabilities for architectural enhancements and decorative lighting due to their small sizes and system flexibility.

In the municipality space, LED technology offers solutions that conserve energy, improve public safety and enhance the city's appearance. There are several new trends in municipality lighting including the incorporation of LED technology in Traffic and Street Signage, Subway and Business Signage, and Streetlighting.

Traffic and Street Light Signage



Several cities have implemented LEDs in traffic and street signage with positive results. Although the technology for LED traffic lights has been around since the 1990s, most cities have not made the change. Incandescent or halogen bulbs are most commonly used in Traffic signals, with a rating between 50 and 150 watts to light the green, red and yellow signals. Most cities in the United States can take advantage of LED technology in this space because LEDs are brighter, last longer, and save energy compared to traditional light sources.

In terms of brightness and functionality, LED light contrasts better to environmental elements such as sun or overcast skies. LEDs are also programmable light sources that are easily controlled by timers and other time dependent devices. LEDs are instant-on and the light output does not depreciate as quickly as conventional light sources.

While incandescent and halogen bulbs last for months, LEDs last for years. LEDs don't suddenly burn-out, leaving limited time for replacing and opening intersections for chaos. Instead, these intelligent light sources dim gradually over time, after 25,000—50,000 hours of operation, and never fully burn-out. The constant replacement of incandescent and halogen bulbs costs money for labor, equipment and lamps, not to mention it ties up traffic, which can be horrible in cities like New York and Boston! LED technology extends the time in between maintenance visits which minimizes costs, helping cities save money.

The most compelling attribute of LED technology is the energy savings, which is good not only for the environment but the city's budget as well. LEDs operate on very low wattage in comparison to incandescent and halogen bulbs, typically between 15 and 20 watts as opposed to 50-100 watts. Consider that a large city can have as many as 10,000 intersections, with as few as four traffic lights and as many as 16 at each crossing. This means that it is entirely conceivable that a larger sized city has between 40,000 and 80,000 traffic lights, which consist of three light bulbs each. This equates to 120,000 to 240,000 light bulbs throughout a city. Now assume that each of those traffic lights use a 100-watt bulb. Factor in that the light is on 24-hours, so in theory it uses 2.4 kWh per day at between $0.08 and $0.16 cents per kWh. Without doing the math, it is obvious that a smaller city could save hundreds annually; a big city could see cost savings in the millions.

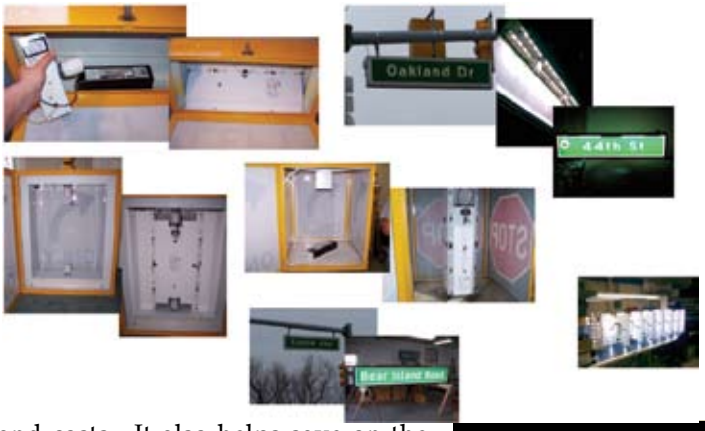
Another area of increased interest is the use of LED technology is backlit street signs. Several municipalities are testing LED retrofit systems into their backlit case signs indicating turns, one ways and street names. LED technology is far superior compared to the mercury vapor lamps previously used in this sector. In factors such as environmental, cost and safety, LED technology has a clear advantage. Cities are often concerned about using the out-dated mercury vapor technology, as the lamps contain mercury and can be potentially harmful if the casing breaks and mercury is leaked. LED technology contains no harmful substances and is inherently difficult to break. Additionally, LEDs themselves do not require special disposal and therefore save even more in costs to the city and environment.

LED retrofits have an added safety benefit in that even illumination is possible as placement of LEDs is easy to achieve. From 47 lumens per watt to 66.2, motorists and pedestrians have increased visibility and are alerted to upcoming traffic sooner.

Again, like with the traffic light example, lit street signs with LED retrofits enable cities to save on energy consumption

Continued on page 47

OSRAM SYLVANIA Brings New Light to the Streets . . . *Continued from page 46*



and costs. It also helps save on the cost of labor, maintenance and unscheduled servicing of street lamps. Servicing a light source is the other most expensive part of operating the light source. Due to the long life of LEDs, which on average is 12 years, cities can theoretically be 12 years free of maintenance costs due to servicing

Does not require purchase of a new case sign to capture energy and other savings - can BE retrofit or installed into a new sign, or be installed by sign manufacturer.

out-of-order street lamps.

By implementing LED technology in this capacity, cities can save anywhere from 65-85 percent of the energy used to light their street signs, depending on the placement of the case sign. Assuming 5,000 case signs are installed, a city could realistically expect to save over a million dollars in energy over the course of 12 years simply by replacing mercury vapor lighting with signage LED retrofits. Furthermore, the use of LED technology instead of mercury vapor lamps, allow cities to save an estimated 160 million pounds of CO_2 emissions, reducing their carbon footprint dramatically and ensuring a healthier future for their residents.

Subway and Business Signage

Upgrading subway and business sign lighting is another small step with big results in the municipality setting. In most cities, three major concerns reside over their light selection: costs for proper lighting, security for citizens and protecting the integrity of historic sites. LED lighting presents a great solution for all three in the subway and business space.

Subways are full of signs, light boxes and contour lighting applications essential to inform and direct travelers; all of which can be upgraded to efficient LED systems. LEDs are a better choice in this segment because of their controllability, their ability to withstand cold temperatures and excellent

Continued on page 48

color rendering. It is equally as important to keep a fluid nature to the signs to prevent mishaps in visibility or half burnout. Many cities are considering LED technology as a popular alternative to neon.

Street Lighting

By converting the existing street lighting system to a sustainable LED solution, cities can capitalize on substantial energy savings and lower maintenance costs. Specifically, LEDs not only provide more attractive light, they will use six times less energy than traditional lighting. LEDs replace the existing 150W, 250W and 275W metal halide lamps with a 40W total system.

LED street lighting solutions also make a difference for the environment. Reduced energy use helps cut CO_2 emissions from power plants. And, by taking advantage of the directional nature of high brightness, white LEDs, this innovative system focuses light only where it's needed, eliminating light pollution.

Making the Upgrade

Cutting back on lighting costs is the biggest and best opportunity for savings in municipalities. If done properly, lowering your electricity bill doesn't mean lowering your quality and safety standards.

The ongoing cost of maintaining the average lighting system is derived from:

- Material costs – the cost of the lamps
- Labor costs – the cost to replace the lamps
- Energy costs – the cost of energy consumed to operate the lamps
- Recycling costs – removal and disposal of spent lamps in a way that does not negatively impact the environment

Of these, energy costs represent the biggest and best opportunity for savings. Eighty-six percent of the total cost of maintaining a lighting system goes to providing electricity to the application, according to the Illumination Engineering Society of North America (IESNA) Lighting Handbook, 9th edition. The material cost of a lighting system is small, three percent, compared to the cost of energy to operate it.

It's important to look beyond the initial capital investment of upgrading a lighting system and consider long-term benefits and paybacks, as the process can have a huge impact on operating expenses and bottom line. Many of these systems utilize long life lamps, reducing the maintenance and labor requirements due to fewer lamp replacements, which saves the municipality

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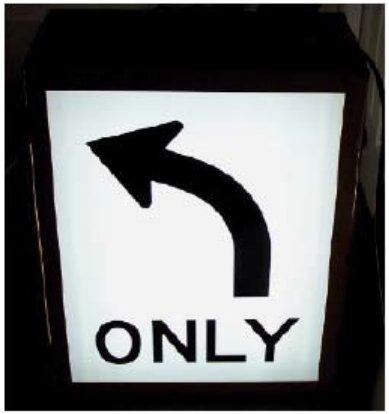
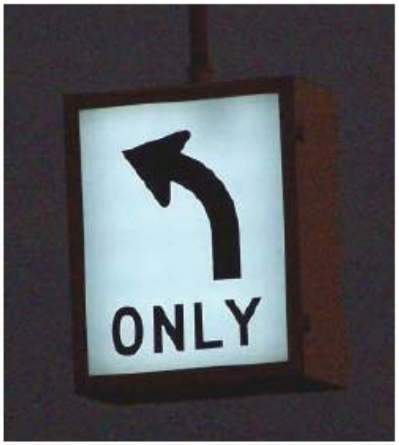


Solution 1 - bath the sign interior with light creating more even lighting - note some shadowing is possible, but visibility remains excellent.



Solution 2 - 2 flat panels of LEDs - individual LEDs are visible.