

LEDs Added to Bellevue Streets

LED Street Lighting in Bellevue, Washington

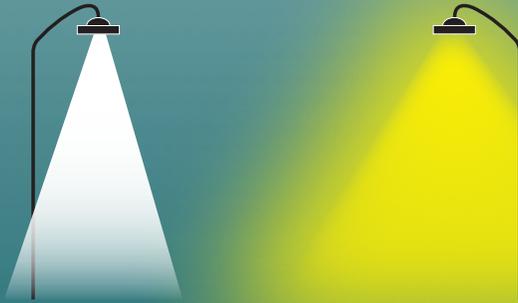
Bellevue is implementing light emitting diode (LED) street lighting to reduce energy consumption and maintenance costs, reduce light trespass, and advance environmental stewardship over traditional high pressure sodium (HPS) lights.

COST SAVINGS

40%

Switching to LED lighting can save the City 40% on energy costs each year

LESS LIGHT TRESPASS



Whiter LED lighting has direct, focused light with less light trespass

Traditional yellow HPS lighting has less focus resulting in more light trespass

LONGER LIFE

3X

LEDs last up to three times as long as traditional street lighting bulbs

2013 City of Bellevue Transportation Department

For years, millions of moody yellow street lights have blanketed American cities. The City of Bellevue alone owns and operates approximately 3,000 street lights and operates an additional 5,000 owned by Puget Sound Energy (PSE). Whether you walk to the bus stop early in the morning or dash to the store before it closes at night, you probably take this technology for granted; it's always just there and you rarely notice it.

That is you rarely notice it until the light that you are so accustomed to traveling under looks different.

And looking different is exactly what's happening all over the City as older, yellow high-pressure sodium (HPS) lights are gradually being replaced by higher-efficiency, longer-lasting light emitting diode (LED) lights.

What is an LED street light?

A *War and Peace*-sized novel could be written about LED street lighting and the nuances of how many lumens per watt are emitted, optical control, surge suppression ratings, and ambient temperature. Essentially, a LED light uses many individual light sources (LEDs) to form a matrix of light compared to a single bulb used in HPS lights.

Making the switch to LED in Bellevue

Switching to LED street lighting will help support Bellevue's Environmental Stewardship Initiative by reducing the City's carbon footprint, as well as reducing the ongoing cost of providing street lighting. With rising energy prices, the City's street lighting budget has increased faster than inflation. Gradually switching from HPS to LED lighting will enable the city to not only reduce costs, but also be a leader in how public agencies provide street lighting on their roadways.

Started as part of a cost-savings and energy-reducing initiative, LED street lighting is becoming more commonplace throughout the City. The first experience with LED lighting was a test project in Factoria in 2008, with the first roadway section being rolled out shortly thereafter in Wilburton on 118th Ave SE from Main Street to SE 5th Street. Bellevue now has 140 LED street lights, with more planned soon.

Bellevue is not alone in converting from HPS to LED. Seattle City Light is a leader in the conversion to LED lighting, and many cities all over the world are making the switch too, and for good reason.

Why use LED Street lighting?

- **Longer life.** LED lighting has a 10-15 year useful life compared to 4-5 years for a HPS light bulb.
- **Cost Savings.** Because LED lights use less energy and last longer, operation and maintenance costs are reduced. It is estimated that if Bellevue is one day able to switch to all LED lights, \$340,000 per year in energy costs would be saved.
- **Less Light Trespass.** LED is more exact in lighting the desired areas with less light trespass (i.e. more light on the road and less on adjacent properties).
- **Environmental Benefit.** LED lights result in reduced greenhouse gas (GHG) emissions from producing less energy to run the lights and fewer service trips. Also, no mercury is used in the production of LED lights.
- **Management.** LED lights come with features that allow for the implementation of a future street light management system. Such a system would allow for remote detection of failures and ability to dim lights during certain hours for additional energy savings.

Though there are many benefits to using LED street lighting, especially in the long-term, there are some short-term considerations.

Considerations

- **Higher initial cost.** The initial cost of the LED light can be up to three times as much as HPS lights. That higher initial cost is recovered and converted to cost savings over the life of the light.
- **Mimicking daylight.** LED lights produce a whiter light compared to HPS. This has the potential to disrupt individual circadian rhythms more than the yellow light of HPS. The upside of the whiter light is it is easier for the human eye to distinguish details and colors leading to research into the idea of using less light on our roadways.
- **Brightness.** LED lights tend to be brighter than HPS when looking directly at the light source. This may cause more discomfort for aging eyes as it takes more time to adjust eyesight to lighting conditions.
- **Risk.** The implementation of any new technology comes with risks, especially for early implementers. For instance, the lower life cycle costs expected from LED are based on projections and not actual case studies because LED lighting is new. However, projections are based on standard testing procedures.



An example of LED lighting showing the matrix of individual LEDs that comprise a street light (Source: Flickr user letscommunicate)

Moving Forward

While there currently is not a set schedule for converting all city street lights to LED, there are certain areas and instances where LED is prioritized over HPS, generally falling into 4 categories:

1. Retrofitting existing PSE owned lights that are on wood poles in residential areas
2. Lights on new roadway and development projects
3. Retrofitting existing arterials that have city-owned HPS lights
4. New light installations on existing wood poles in residential areas

The city recently received an energy conservation grant to retrofit over 100 street lights on three corridors in the City. This project is planned for implementation on Cougar Mountain Way, and portions of NE 24th Street and Northrup Way, in 2013.

Due to the newness of LED technology and with the introduction of new products, how the City uses LED lighting is continuously refined. For instance, LED lights from just two years ago were much more “white” than current lights; the whiteness is now analogous to the color temperature of moonlight. Each wave of technology and lessons learned from the rolling out of LED lights are fed back into how City engineers manage LED street lighting. As the wrinkles of this new technology are ironed out and more benefits are realized, the future looks bright for the streets of Bellevue.



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Transportation Department