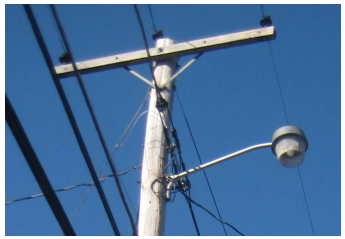
Improving the Efficiency of Public Outdoor Lighting in Dummerston

The Dummerston Energy Committee is working with Efficiency Vermont to improve the efficiency of outdoor municipal and public lighting. This initiative has several components: Inventory what is currently in place; evaluate need for lighting; eliminate any unnecessary fixtures; consider municipal ownership of pole-mounted fixtures; and develop projects that would replace the old inefficient fixtures with modern LED versions.



First the committee inventoried all outdoor public and municipal fixtures in town. These fixtures have been broken into several categories. There are 27 traditional mercury vapor streetlights, 30 lights on the school, 6 on the fire stations, and 11 lights on or around other municipal buildings such as the town office and highway garage.

The 27 traditional mercury vapor streetlights alone consume an estimated 11.8 megawatt hours per year, generated approximately 27,500 lbs of CO2 and cost the town $4165.00 in 2010.

Dummerston Street Lights	2005	2006	2007	2008	2009	2010	Average
KWH per Year	11,826	11,840	11,797	11,876	11,902	11,808	11,842
Cost per Year	$3,642	$3,603	$3,713	$3,923	$3,967	$4,165	$3,835

We have begun to evaluate the lights to determine if they are needed at all. In this first major action step, the committee has recommended removal of 7 streetlights. Elimination of these 7 lights would reduce those numbers by 25% to $2850, 8850 kWh and 20,625 lbs of CO2. Public feedback will be solicited during this critical step and concerns vetted before any lights are removed.

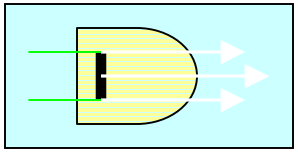
For the remaining pole lights we will consider the pros and cons of municipal ownership vs. power company ownership. If the town purchased these fixtures there would be a large expense of LED fixtures to overcome. This expense is offset by rebates from efficiency Vermont. The town would also be responsible for any future maintenance costs if the fixtures were damaged. The benefits include many more options for the size and type of fixtures used and a much lower monthly fee from the power company, which would pay off the original expense well before the fixtures reach end of life.

We are working to develop proposals for the remaining municipal lights. For each municipal or public area we will develop a scope and budget to include replacement of the existing fixtures with LED fixtures. In some cases we will recommend building-mounted fixtures in lieu of pole-mounted lights. We will also employ modern controls and motion detectors to minimize wasted energy. We will search out other incentives and funding that may be available to defray the cost of these improvements. Each of these projects will be submitted to the town leadership for evaluation and approval.

Frequently Asked Questions:

I like the existing Mercury Vapor fixtures. Why do we need to do anything with the lights we have?
The manufacturing and importing of Mercury Vapor ballasts were banned in 2008 by a 2005 federal law. Eventually all these fixtures will fail and with the exception of changing the bulb cannot be repaired.
If we do nothing, as they fail the power company could replace them with High-Pressure Sodium (HPS), or Metal Halide (MH). We would then have to pay depreciation costs on the HPS or MH if we wished to swap them to LED.

What is an LED?



A light emitting diode (LED) is a semiconductor device that emits visible light when electrical current passes through it; it is a special kind of diode.

Why use these LED fixtures, I have heard they are really expensive to purchase?

The life expectancy of a MV bulb is typically 24,000 hours (until it reaches 50% of it's original light output). At an average of 12 hours per night each bulb will last 5 years. You then have a choice, let the bulb decline further with a significant loss of light or replace the $10 bulb using an estimated $150 in labor for linemen and traffic control.

For comparison, the LED fixtures that CVPS and GMP use are rated for 150,000 hours until they reach 70% of their original light output (34 years @ 12 hrs/night). That means 6 bulb changes averted by using LED with only a 30% loss of light output in over 30 years.

Mercury Vapor fixtures are inefficient when compared to other choices, producing less light relative to the energy consumed. The 100-watt MV can be replaced with a 25 watt 20- LED fixture. The initial cost of the LED fixture is high compared to the older technologies, but the LED fixtures will pay for themselves with future energy and maintenance savings.

Also, unlike Fluorescent lighting, MH and HPS lights, LEDs do not contain mercury, so there is less environmental and health hazard with disposal or accidental breakage.

I heard these lights will shine in my windows at night, is this true?

All High Intensity Discharge (HID) bulbs such as Mercury Vapor, Metal Halide and High-Pressure Sodium produce light in ALL directions, this accounts for significant "Light Trespass" into unwanted areas, and sky glow. This can be reduced through fixture design using reflectors, shields and lenses all of which reduce the overall fixture efficiency.

LEDs are directional light sources; Each LED only produces light in one direction. LED fixtures employ 20 or more individual LED's, these are arranged to adequately light the intended area needed without creating light trespass or sky glow.

Aren't LED's a very bright white or bluish light?

Not all LED's are created equal. Manufactures are currently making LED's that produce light ranging from a warm white (3500K) color temperature to much cooler-feeling Day Light (6000K) color temperature. For comparison, the white light from a Metal Halide lamp is typically about 5500K. Many times this is one of the choices when ordering a fixture—many choose the high-color-temperature lights (5500-6000K) because they are slightly more efficient than their warmer counterparts. Currently both CVPS and GMP are using only 6000K fixtures with only one light pattern. This is another benefit to municipal ownership: to be in control of what brand, wattage, light pattern and color temperature of fixtures end up on our streets.

The covered bridge LED's were ordered with 4300K LEDs. These LED fixtures are currently using 1/5th the electricity that the original 2000K Sodium Vapor fixtures used, and most residents seem to agree that they produce a much better light with little glare.

The MV streetlight on the fire station takes so long to warm up the fire trucks are gone before it is even fully on! How quickly does the LED light up?

Most LEDs are considered instantaneous light sources, coming up to full brightness instantly; however the "driver" (electronic circuits that drive and control the current through the LED) may be designed to ramp up the light gradually. For example, the LED fixtures on the Dummerston Covered Bridge change from low output to high in 1 or 2 seconds.

The fluorescent light in my garage takes forever to start in the winter, how will VT winters affect the LED?

LEDs perform very well in cold weather; they have no trouble starting in cold weather. In fact, their biggest enemy is heat. While LEDs do not radiate heat like light bulbs, there is heat generated within the diode. If this heat is not dissipated the diode will prematurely fail. (This is why most LED light fixtures have aluminum fins on them—to dissipate heat.) Additionally, a warm LED emits slightly less light than a cold LED. The rated life of LEDs is typically measured at 77 degrees F; operating them in cold environments only extends their already long life.

Besides the covered bridge are there any other LED lights in this area?

Yes, in fact the Holiday Inn Express parking lot off of Putney Road and the Riverbend Farm Market in Townsend had LED lights before our bridge. In Brattleboro, the parking garage, and the courthouse have LED lights. (The courthouse has a very bright and poorly situated LED fixture over the east vehicle entrance that produce glare to drivers as you head up Putney Road.)

In contrast, many parking lots on Putney road have very attractive LED lighting, including Staples Plaza, BRW Plaza, Burton Car Wash, and Stacy Subaru. The canopy lights at Brattleboro Mobil are also LED. In Hinsdale, the canopy and parking lot lights of the T-Bird are now LED.

To view what LED street light CVPS has chosen (the Beta Ledway, 20 LED, 6000K) there is one in the parking lot of their garage just off of Route 30, just north of the new West River park.

GMP has chosen the same fixture except they went with 4300K