

PPL Electric Utilities Energy Efficiency and Conservation Program

Lighting Measures

Category	Measure	Qualification	Incentive Amount
Fixtures/Lamps	T-8 Lighting Package	Must replace T12. T8 Lamp Fixture (lamp & electronic ballast)	\$14/fixture
	High Performance / Super T8 Lamps	Replacing T12	\$19/fixture
		Replacing T8	\$5/per fixture
	Light Emitting Diode (LED) Fixtures	Must be Energy Star Rated \leq 15 watts	\$15/fixture or retrofit kit
	Cold Cathode Lamps	2 watt to 8 watt lamps	\$3/lamp
	High-pressure sodium (HPS) lighting	> 65 W and < 300 W	\$40/lamp
	Pulse Start Metal Halide - Exterior	≤ 320 Watt > 150 Watts	\$25
		> 320 Watt	\$50
	De-Lamp and install reflectors	Remove 1 or more lamps replace/retrofit to T8 or T5 + reflector. Must have electronic ballast. Reflector must be mirror, enhanced aluminum or white.	\$50/fixture
	Florescent High Bay lighting package	High Bay Lighting – T5HO. Ceiling must be 15'	\$16/lamp
		High Bay Lighting – T8. Ceiling must be 15'	\$12/lamp
LED Exit lighting	5 watts or less	\$15/unit	
CFL Pin-Based fixtures	ENERGY STAR	\$30/unit	
Controls	Occupancy Sensors	Wall, Ceiling, or Fixture-Mounted Lighting Sensor	Up to \$45/sensor
	Daylighting Controls	Dimming-Continuous, Fluorescent Fixtures	\$35/controlled fixture
	Time Clocks and Sensors	Integrated. Must provide a 20% reduction in operating hours.	Up to \$100/unit

All Information Subject to Change

Current as of 3/26/10

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CFL pin-base Fixtures

Measure Description: Measure incentivizes the installation of ENERGY STAR qualified pin-base CFL fixtures.

Equipment Eligibility: Must be ENERGY STAR qualified.

Incentive:

Measure	Qualification	Incentive Amount
CFL pin-base fixtures	ENERGY STAR	\$30/unit

Detailed Information: A pin-based CFL fixture distributes light more evenly and efficiently, causing an increase of the overall efficiency of the fixture.

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High-Pressure Sodium (HPS) Lighting

Measure Description: Measure incentivizes the installation of high pressure sodium (HPS) lighting with electronic ballast as part of a lighting retrofit. A sodium vapor lamp is a gas discharge lamp which uses sodium in an excited state to produce light. There are two varieties of such lamps: low pressure and high pressure.¹

Equipment Eligibility: New high pressure sodium (HPS) lamp, fixture and ballast. Must replace mercury vapor lamp with HPS lamp wattage > 65 watts and < 300 watts.

Incentive:

Measure	Qualification	Incentive Amount
High-Pressure Sodium (HPS)	> 65 W and < 300 W	\$40/lamp

Detailed Information: High intensity discharge (HID) lighting such as high pressure sodium configurations produce a large amount of light at a low watt to lumen ratio compared to incandescent lighting. The light generated is virtually monochromatic and is easily recognizable by the low contrast colors have when illuminated by it. As such, HID lighting is most practical for exterior lighting installations. High pressure sodium lighting has significant advantages over other HID's such as mercury vapor, with greater energy efficiency, faster start-up, longer bulb life and slower light degeneration.

¹ http://en.wikipedia.org/wiki/Sodium-vapor_lamp

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LED Exit Lighting

Measure Description: Measure incentivizes installing light-emitting diode LED exit lighting; as part of a retrofit. LED lighting fixtures provide the same of performance as more traditional installations with significantly lower energy use.

Equipment Eligibility: 5 Watt (or less) LED Exit Light. Retrofit construction only. Product must meet UL-924 requirements (listed on product's packaging) and local fire codes. Retrofit kits (note: LED retrofit kits are used to replace the lamps within the casing) are not eligible – the entire fixture must be replaced. Must replace either incandescent or Compact Fluorescent Lamps (CFL) exit signs.

Incentive:

Measure	Qualification	Incentive Amount
LED Exit Lighting	5 watts or less	\$15/unit

Detailed Information: LED lighting of this size and used in this capacity is a relatively new but the technology is vastly superior to incandescent and compact fluorescent (CFL) signs. LED exit signs use a fraction of the wattage that incandescent or CFL signs use while lasting over 50,000 hours. The longevity of the equipments lends itself to lower replacement and maintenance costs. In addition, LED signs are generally brighter than their competitors and demonstrate a high level of contrast with their background due to the monochromatic nature of the light they emit. Code requires all new construction to install LED or similar exit signs.

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Lighting Measures

Pulse-Start Metal Halide - Exterior

Measure Description: Measure provides an incentive, based on wattage of fixture for the installation of pulse-start exterior metal halides. Metal halide lamps are more efficient and have better color rendering than mercury lamps. A pulse-start metal halide lamp uses an igniter located inside the ballast pod to start the lamp extending lamp life, lamp output, and brighter light.²

Equipment Eligibility: Pulse-start exterior metal halide. Exterior applications only. Lamp wattages below 150 watts do not qualify. New pulse-start metal halide fixtures or retrofit kits only, must be complete kits (lamp and ballast with fixture). Retrofit kits and new fixtures can be either magnetic or electronic ballasts.

Incentive:

Measure	Qualification	Incentive Amount
Pulse-Start Metal Halide – Exterior	≤ 320 Watt > 150 Watts	\$25
	> 320 Watt	\$50

Detailed Information: Metal halide high intensity discharge (HID) provide a high level of light output and are generally used at higher wattages as they are significantly more efficient than incandescent alternatives. Traditional metal halides are probe-start and use three electrical contacts to ignite the gas in the lamp and remain lit. Pulse-start metal halides use two contacts and an igniter. The effect of this fixture technology is lower electricity requirements, longer lamp life, slower light degeneration, more stable light rendering as lamps age and faster start-up.

Pulse Start lamps have a long rated life, and maintain high light output over the life of the lamp. This enables the user to replace lamps less, thereby saving on lamp and lamp change-out costs. Standard Metal Halide lamps have long rated lamp life; however, due to the lumen output drop over lifetime, they become inefficient very quickly.

² <http://oee.nrcan.gc.ca/industrial/equipment/lighting-pulse/index.cfm?attr=24>
All Information Subject to Change

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Lighting Measures

T-8 Lighting Package

Measure Description: Measure incentivizes the installation of T8 fluorescent lighting packages, which includes both bulbs and ballasts.

Equipment Eligibility: T8 Lamp Fixture (lamp & electronic ballast) Exterior installations do not qualify.

Lamp qualifications

- T8 fixture either 2, 3, or 4 lamps
- Minimum rated lamp life: 18,000 hours

Recommended (not required) ballast qualifications

Power Factor (PF) of greater than or equal to 0.90 **The Power factor (PF) is a measurement of the effectiveness with which an electrical device converts volt-amperes to watts**

Incentive:

Measure	Qualification	Incentive Amount
T8 Lighting Package	T8 2-Lamp Fixture (lamp & electronic ballast)	\$14/fixture

Detailed Information: T8 lighting refers to fluorescent lighting installations with lighting tubes one inch or roughly 26mm in diameter. T8 lamps requires ballasts specifically designed for lamps operating at 265 milliamperes. Therefore, when making the conversion from T12 or other fluorescent installations, generally lighting ballasts must also be replaced. T8 lighting systems are a common improvement from T12 fluorescent lighting systems as their smaller diameter traps less light in the luminaire, light output degenerates more slowly over time and they operate at lower wattages, using less energy and producing less excess heat. More information regarding ballasts can be found at [here](#).³ It is recommended the color rendering index, or CRI, is = 80. CRI is a measure of the quality of color light (0-100), i.e. how well light sources render the colors of objects, materials, and skin tones.⁴ T8 linear fluorescent CRI range from 75 to 85.

³ http://www.lightingassociates.org/i/u/2127806/f/tech_sheets/Basics_of_Ballasts.pdf

⁴ http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/integral_leds/Nexus_Commercial_Lighting_2_IntegralLEDLampCommentsDraft2.pdf

All Information Subject to Change

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Lighting Measures

De-Lamp and Install Reflectors

Measure Description: Measure provides an incentive for buildings to retrofit their lighting systems by incentivizing the removal of outdated lighting technologies to be replaced with newer, more energy efficient technologies and reducing the over-lit area by de-lamping and installing light reflectors.

Equipment Eligibility: Replace an existing fixture with a new T8 or T5 fixture with 1 or more lamps removed than the existing number of lamps. To maintain adequate light levels the new fixture will include a light reflector. The light reflector with reflective coating attaches to the interior of the fixture increasing the light output. The new T8 or T5 fixture must include an electronic ballast. Removing lamps from a T12 fixture that is not being retrofitted with T8 or T5 lamps are not eligible for this incentive. The total number of lamps claimed for de-lamping cannot be more than the number of replacement T8 or T5 lamps with reflectors kits installed.

Lamp qualifications

- T8 or T5 fixture either 2, 3, or 4 lamps
- Minimum rated lamp life: 18,000 hours

Ballast Recommendations

- Power Factor (PF) of greater than or equal to 0.90 (**The Power factor (PF) is a measurement of the effectiveness with which an electrical device converts volt-amperes to watts**)

Incentive:

Measure	Qualification	Incentive Amount
De-lamp and Install Reflectors	Remove 1 or more lamps replace/retrofit to T8 or T5 + reflector. Must have electronic ballast.	\$50/fixture

Detailed Information: De-lamping and installing T8 lighting fixtures with a reflector will replace older, less energy efficiency lighting technology with newer, more energy efficient light bulbs and fixture arrangement. T8 lighting refers to fluorescent lighting installations with lighting tubes one inch or roughly 26mm in diameter. T8 lamps require ballasts specifically designed for lamps operating at 265 milliamperes. Therefore installing new fixtures is almost always necessary when making a switch to T8 lighting systems. T8 lighting systems are a common improvement from more traditional florescent lighting systems as their smaller diameter traps less light in the luminaire, light output degenerates more slowly over time and they operate at lower wattages, using less energy and producing less excess heat. Light output is only intensified by the addition of a reflector.

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Lighting Measures

Fluorescent High Bay Fixtures Lighting Package

Measure Description: Measure incentivizes the installation of high efficiency high bay lighting fixtures in the form of T5 High Output (HO) and T8 Fluorescent lighting.

Equipment Eligibility: High Bay Lighting – T5HO, or High Bay Lighting – T8. Must replace an existing lamp that is either: incandescent, standard metal halide, mercury vapor, high pressure sodium, T12, T12 HO or T12 very HO fluorescent. Existing pulse-start metal halide installations do not qualify.

Incentive:

Measure	Qualification	Incentive Amount
Fluorescent High Bay Fixtures Lighting Package	High Bay Lighting – T5HO	\$16/lamp
	High Bay Lighting – T8	\$12/lamp

Detailed Information: T5HO and T8HO are high output fluorescent lighting fixtures designed to replace traditional High Intensity Discharge (HID) lighting equipment. T5HO and T8HO lighting fixtures outperform their alternatives by delivering the same output in lumens (light output) while using a fraction of the energy. In addition, T5HO and T8HO lighting degrades slower than traditional HID fixtures, have better color rendering, and turn on faster.

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Lighting Measures

Time Clocks and Timers

Measure Description: Measure incentivizes the installation of lighting time clocks and timers as part of an integrated lighting system which turns lighting on or off based on a time schedule.

Equipment Eligibility: An integrated time-clock that automatically switches lighting and other loads on and off on a time schedule, also provides a 20% reduction in operating hours.

Incentive:

Measure	Qualification	Incentive Amount
Time Clocks and Timers	Any	Up to \$100/unit

Detailed Information: Includes an integrated time-clock that automatically switches lighting and other loads on and off on a time schedule, or in response to an occupancy sensor or a building automation system. An ideal application is where the lighting load is either on 24 hours a day or manually operated.

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Lighting Measures

Daylighting Controls

Measure Description: Measure covers the installation of Daylighting Control devices. Daylighting dimming devices are switches that allow the user to operating lighting at less than full power if desired.

Equipment Eligibility: Dimming-Continuous, Fluorescent Fixtures

Incentive:

Measure	Qualification	Incentive Amount
Daylighting Controls	Dimming-Continuous, Fluorescent Fixtures	Up to \$35/controlled fixture

Detailed Information: A dimming switch allows light levels to vary from 0% – 100% brightness. A continuously dimming switch permits variation throughout the range, increasing electricity savings. The baseline measure is operating fluorescent fixtures at full power.

Background Information: Lighting Controls Association wrote a white paper "[Good Controls Design Key to Saving Energy with Daylighting](#)".

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Lighting Measures

Occupancy Sensors

Measure Description: Measure provides an incentive for the installation of wall, ceiling or fixture-mounted occupancy sensors used as part of a lighting system

Equipment Eligibility: Wall, Ceiling or Fixture-Mounted Lighting Sensor. Only hardwired passive infrared and/or ultrasonic detectors that control interior lighting fixtures are eligible.

Exterior lighting installations do not qualify.

Incentive:

Measure	Qualification	Incentive Amount
Occupancy Sensors	Wall or Ceiling-Mounted Lighting Sensor	Up to \$45/sensor

Detailed Information: If a space is unoccupied for a designated amount of time, an occupancy sensor will turn off the lights. The lights will turn on again once the sensor detects a person has entered the space. Occupancy sensors lend themselves to lower energy use as they automatically turn lights off when an area is no longer in use. In most cases a manual override is available.

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Lighting Measures

Cold Cathode Lamps

Measure Description: Measure incentivizes the installation of cold cathode lamps. A cold cathode lamp are a technology similar to a CFL but uses a solid length of tungsten metal as an electrode instead of a coiled tungsten filament.

Equipment Eligibility: New cold cathode lamps greater than or equal to 2 watts, less than or equal to 8 watts, must replace incandescent lamps.

Incentive:

Measure	Qualification	Incentive Amount
Cold Cathode Lamps	greater than or equal to 2 watts, less than or equal to 8 watts	\$3/ lamp

Detailed Information: Cold cathode lamps have a long life (typically 25,000 hours) are dimmable, can be used where frequent starting (cycling) occurs and are wet location rated.

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Lighting Measures

LED (Light emitting diode) Fixtures/ Retro-fit kits

Measure Description: Measure incentivizes the installation of LED fixtures and retro-fit kits (not LED bulbs). LEDs are small light sources that become illuminated by the movement of electrons through a semi-conductor material.

Equipment Eligibility: New LED fixtures or retrofit kits (not LED bulbs) with an energy star rating, must replace incandescent lamps.

Incentive:

Measure	Qualification	Incentive Amount
LED fixtures/ retro-fit kits	Fixtures or retro-fit kits (LED bulbs are not eligible)	\$15/ fixture or retro-fit kit

Detailed Information: LED lighting is more durable, versatile and longer lasting than incandescent or fluorescent lighting. LED lighting uses both light and energy more efficiently and the small bulbs are arranged in specialized arrays that offer great flexibility in design.

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Lighting Measures

High Performance/Super T8s

Measure Description: Measure incentivizes the installation of high performance or super T8s. A fluorescent T8 lamp and electronic ballast lighting system, often called a high performance or “Super T8s,” has advantages in energy efficiency, longer lamp life, and slower lumen depreciation.

Super T8s have a “program start ballast” that allows the lamp to be lit with a softer start-up than the present instant-start T8 ballast. The rated life of the lamp increases from 20,000 hours to 30,000 hours in most cases because the lamp cathode is not subject to a strong inrush of current.

Equipment Eligibility:

Lamps: \geq 3100 initial lumens
 Lumens per watt \geq 90
 94% lumen maintenance (2900 lumens at end of life)
 24,000 hours useful life
 CRI, color rendering index \geq 81

Ballasts: Power factor \geq 0.90
 Frequency $>$ 40 kHz

Incentive:

Measure	Qualification	Incentive Amount
High performance/ Super T8	Replacing T12	\$19/fixture
	Replacing T8	\$5/fixture

Detailed Information: Super T8s have a “program start ballast” that allows the lamp to be lit with a softer start-up than the present instant-start T8 ballast. The rated life of the lamp increases from 20,000 hours to 30,000 hours in most cases because the lamp cathode is not subject to a strong inrush of current.

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