



High Performance Lighting Upgrades

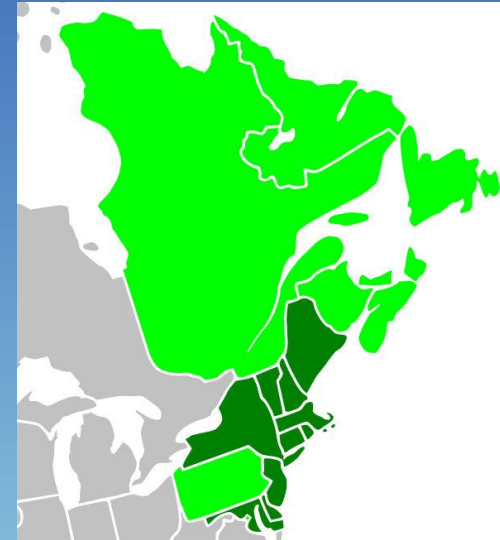


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Designers and builders of energy efficiency retrofit projects for commercial, industrial, school and municipal buildings.

Regional Greenhouse Gas Initiative (RGGI)

- This energy-efficiency project was made possible, in part, through RGGI. Lowering bills. Conserving energy. Creating jobs.
- RGGI is a cooperative effort by ten Northeast and Mid-Atlantic states to reduce greenhouse gas emissions from the electric power sector through individual CO2 Budget Trading Programs in each of the ten participating states.
- Learn more at www.rggi.org/home



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Why Energy Efficiency?

- Keeps the cost of electricity down by reducing system wide peak demand for electricity.
- Energy efficiency is our cheapest source of electrical energy @ \$0.03 per kilo-watt hour (kWh).
- Spur economic growth through investment in our own state's economy of monies currently spent on energy imports.
- It's an uninterruptable power source.

(excerpt from the New Hampshire Climate Action Plan, March 2009)

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Why Focus on Lighting?

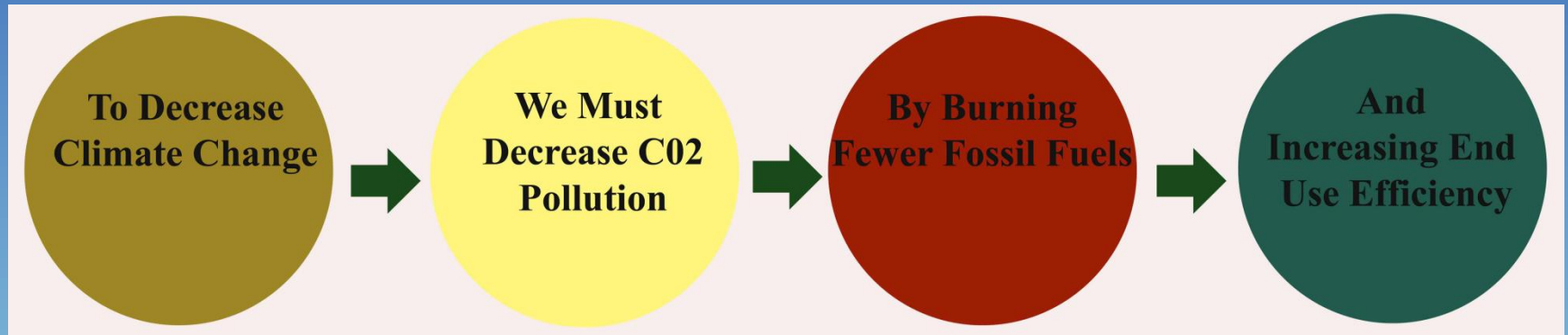
- Improved lighting enhances visual comfort, reduces eye fatigue, and improves performance on visual tasks.
- In a typical commercial building lighting can account for up to 35% of the electric bill. That is a big piece of the pie.
- Increasing lighting efficiency = decreased electricity cost
- Improving end-use energy efficiency means burning less fossil fuels

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New Hampton School Project Goals

- Reduce electricity costs
- Improve lighting quality
- Take action to reduce the schools carbon footprint



Source: adapted from www.ENERGYSTAR.gov

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Project Scope

Removed 400W metal halide and replaced with 2x4 four lamp T5 high output fixtures with occupancy sensors.

Smith Gym



Field House



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Lighting Project Savings Summary: New Hampton School

Annual Cost Savings: \$15,139.72	Annual kWh Savings: 108,141
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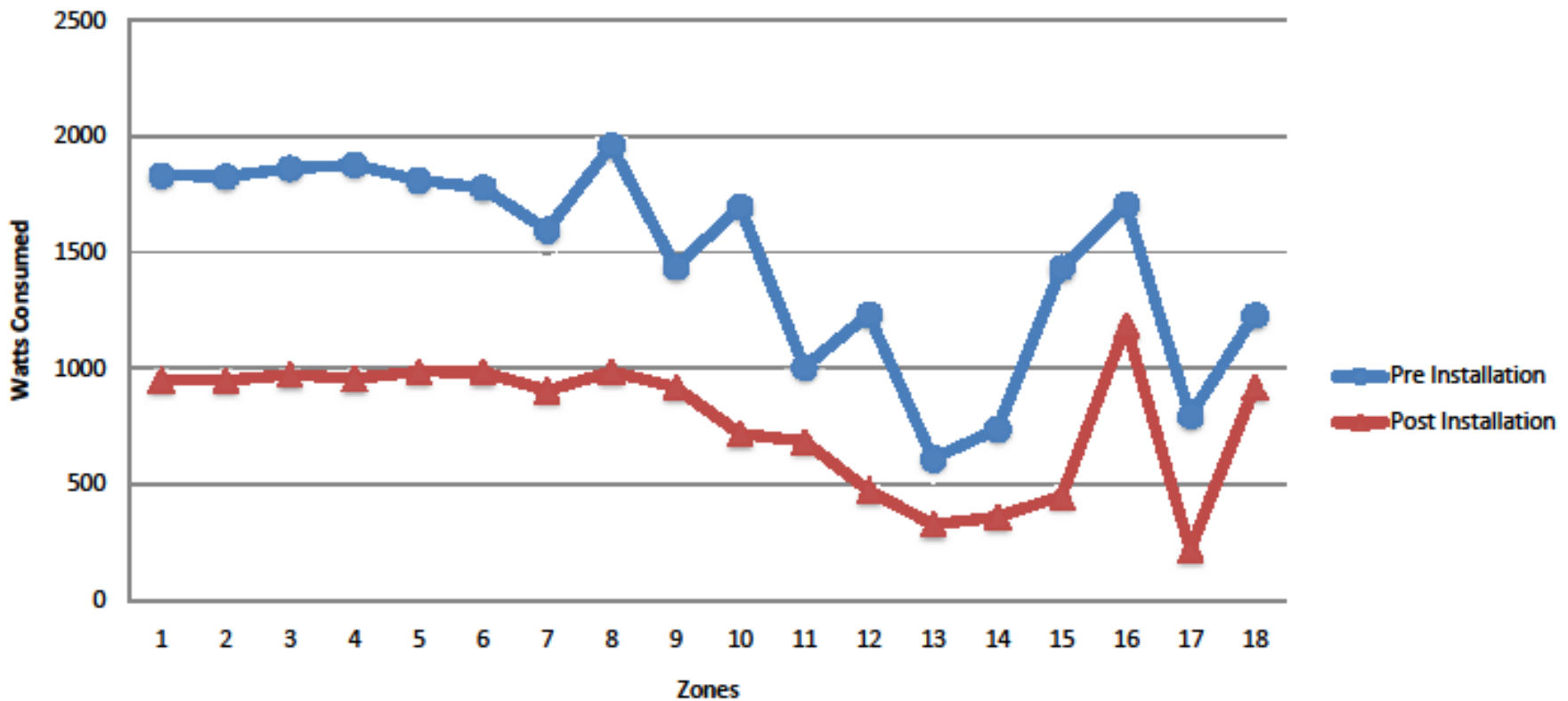
CO₂ Equivalent: **53 metric tons**

- Carbon absorbed by **1,358** tree seedlings grown for 10 years
- Removing emissions from **10** cars and **5,939** gallons of gasoline consumed
- Removing **19** tons of trash from the landfill



Lighting Electric Savings Measured Results

Smith Gym and Field House



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Basic Lighting Terminology

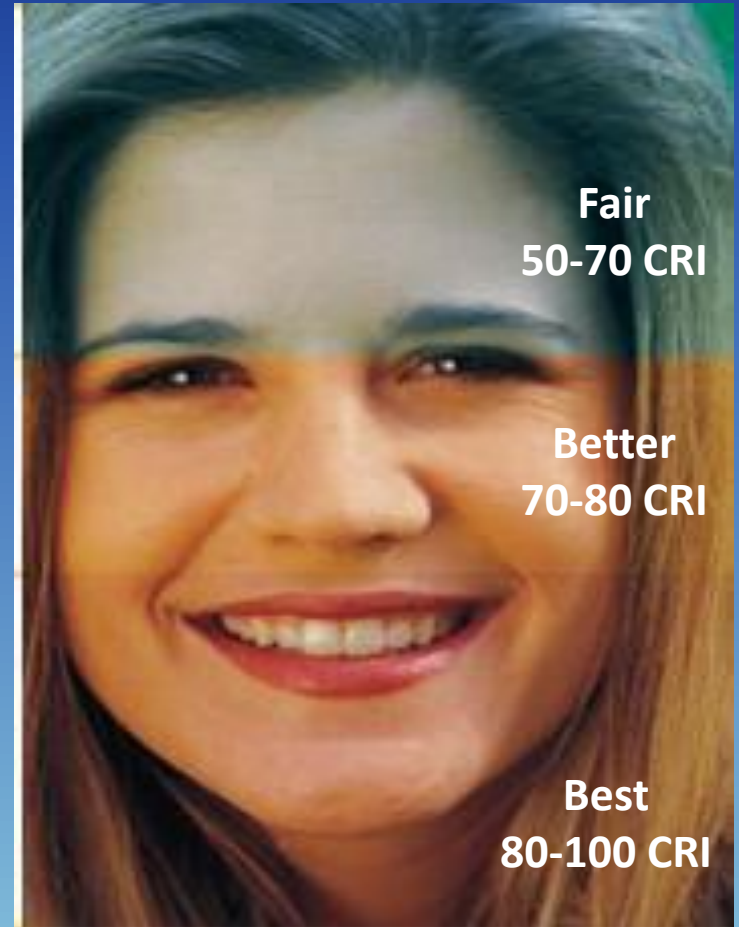
- Lamp = Bulb
- Ballast = Transformer
- Luminaire = Fixture
- Light Emitting Diode (LED)
- Watt (W) – A unit of electrical power
- Demand=Kilowatt (kW) = 1000 watts
- Usage=Kilowatt hour (kWh) =kW*time
- Efficacy= lumens/watt

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Color Rendering Index (CRI)

- Measured on a scale of 0 to 100, describes the ability of a light source to render a sample of eight colors relative to an incandescent source.
- Light sources with a CRI of 80 or higher are considered to provide excellent color rendering
- CRI is an average value so it will not describe how a light source renders a specific color.



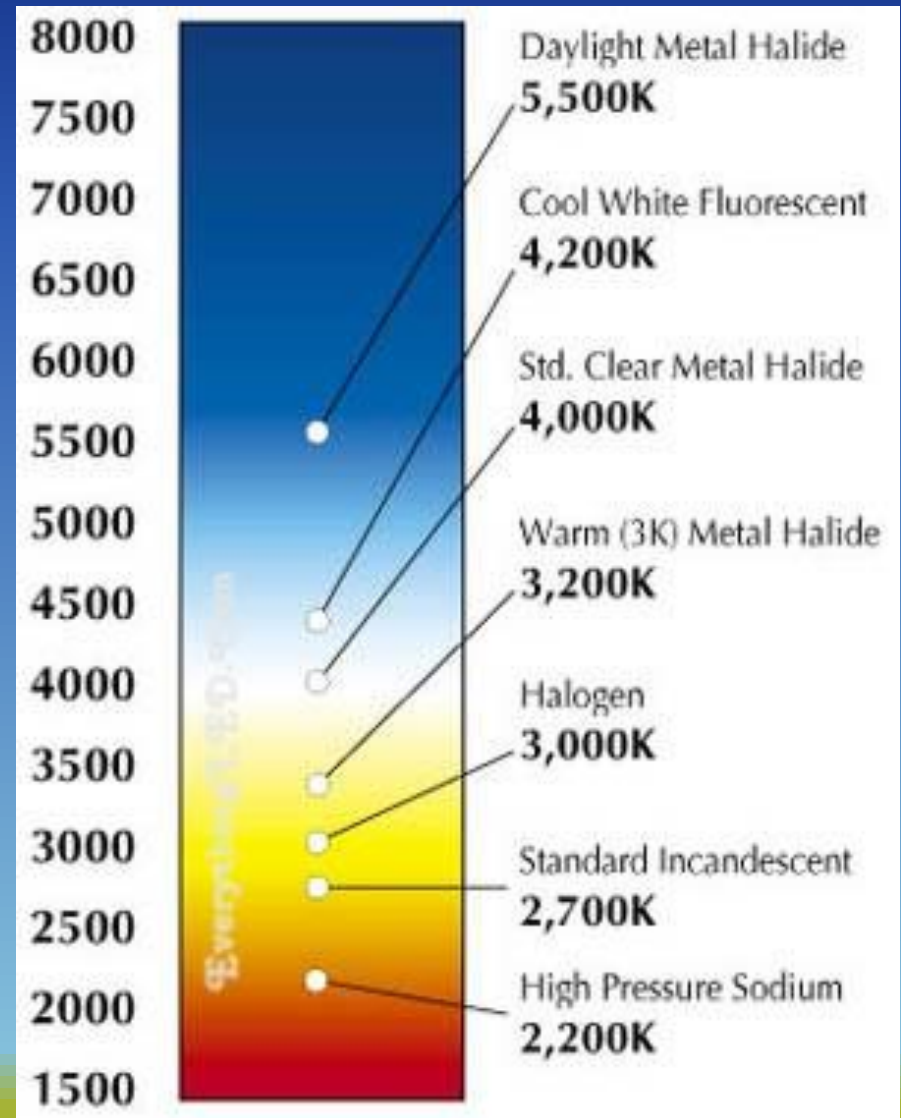
Source: http://www.energystar.gov/index.cfm?c=fixture_guide.pr_fixtures_guide_lightquality

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Color Temperature

- The color appearance of the light.
- The standard is based upon the color given off by a tungsten filament heated to a specific temperature in degrees Kelvin (K).
- Above 5000K CCT is used
- Blue sky 12,000-20,000K



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Tips for Saving Energy at Home:

Change a Light

- Replace your five most frequently used light fixtures or the bulbs in them with ENERGY STAR qualified lights, and save more than \$65 a year in energy costs.

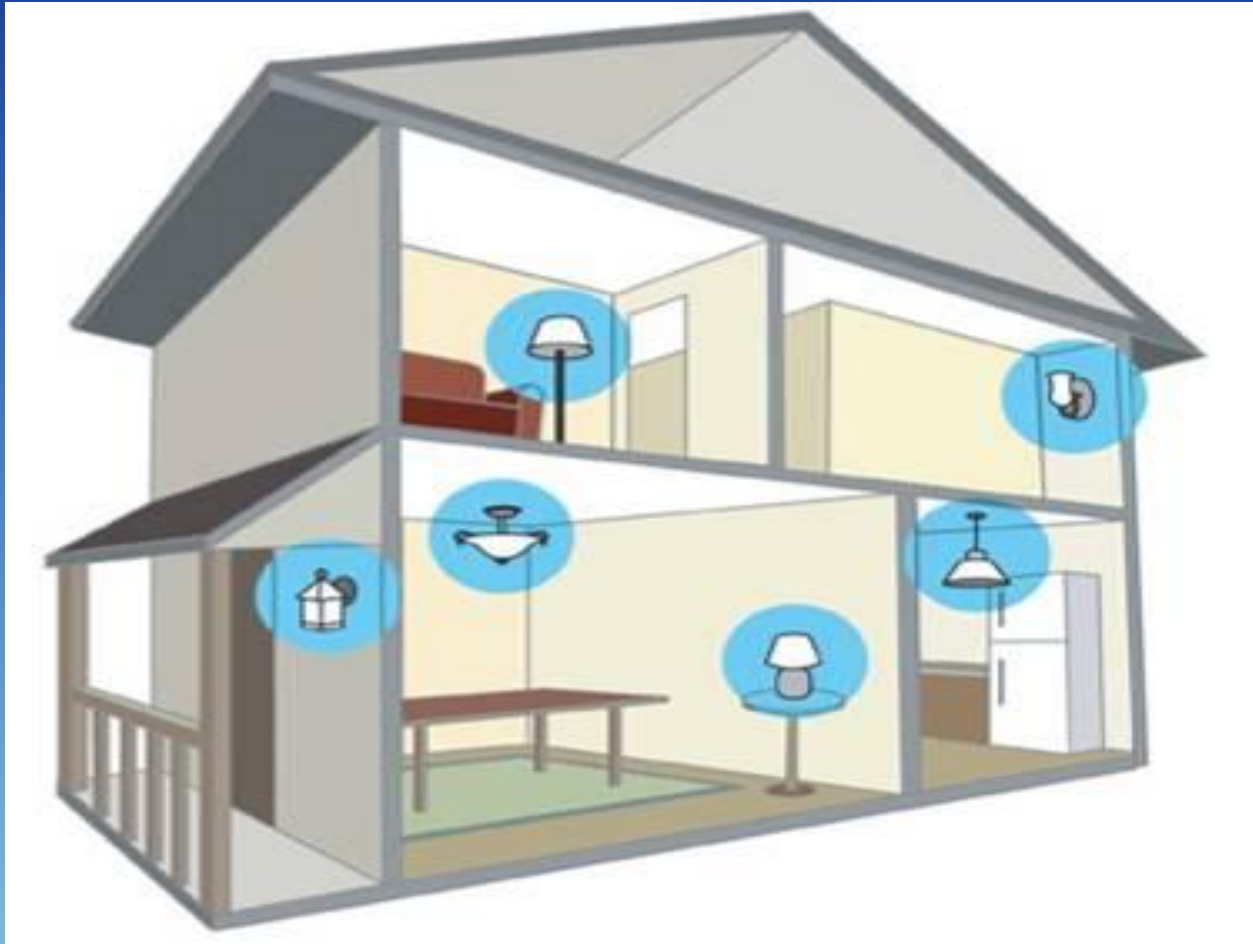


Source: www.energystar.gov

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Where to Use CFLs?



Source: www.energystar.gov

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ENERGY STAR

Qualified Lighting Products



ENERGY STAR Qualified Light Bulbs

Typically purchased to replace incandescent bulbs in existing non-qualified light fixtures



ENERGY STAR Qualified Light Fixtures

Typically purchased as a complete new fixture that includes the CFL bulb

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Source: www.energystar.gov

The Facts about CFLs and Mercury

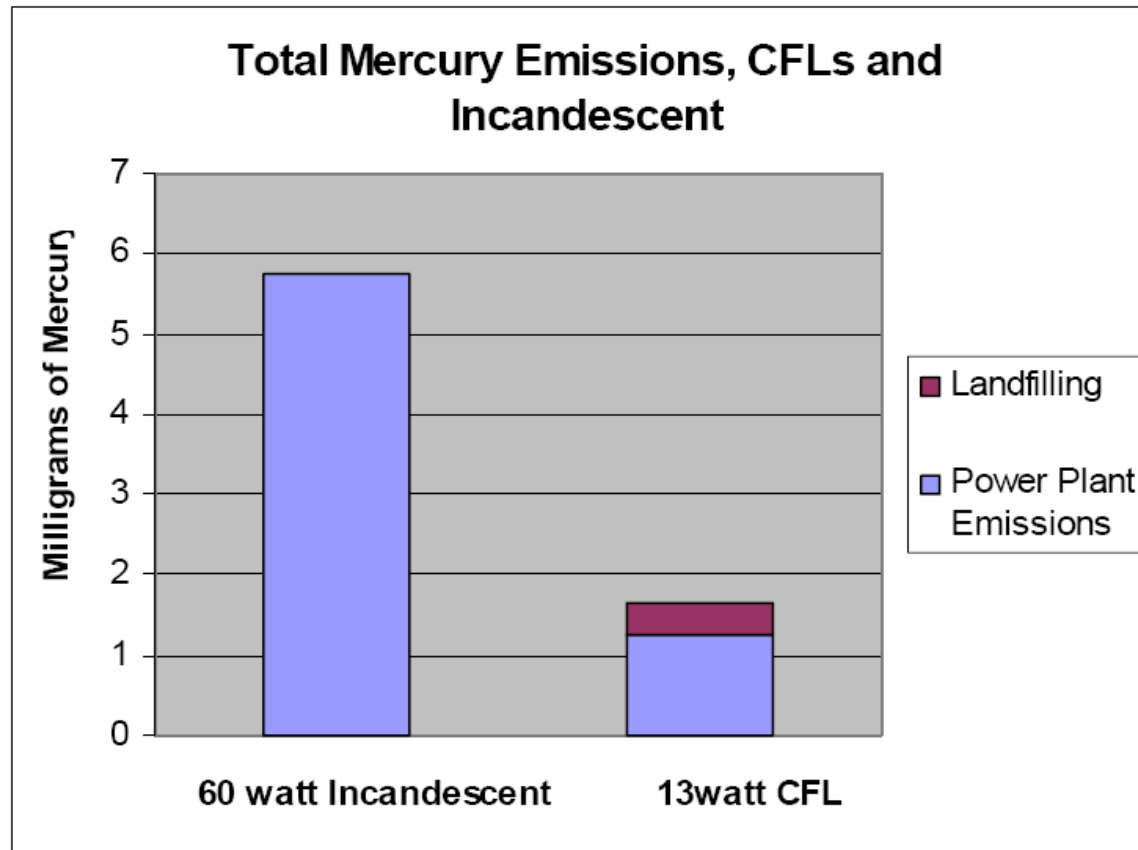
- Because CFLs use less electricity than traditional light bulbs, they reduce demand for electricity; that reduction means less mercury is emitted from power plants.
- CFLs contain a very small amount of mercury — an average of 4 milligrams in each bulb.
- No mercury is released when the bulbs are intact or in use.

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The Facts about CFLs and Mercury

Figure 1



Source: http://www.energystar.gov/ia/partners/promotions/change_light/downloads/Fact_Sheet_Mercury.pdf

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CFL Disposal in New Hampshire

- Do not dispose CFL bulbs in regular household trash.
- Recycle lamps at Town Recycling Centers or participating True Value and Ace Hardware Stores.
- For additional information on properly disposing broken CFLs go to:
<http://des.nh.gov/organization/commissioner/pip/factsheets/co/documents/co-19.pdf> or
<http://www.epa.gov/mercury/spills/index.htm#fluorescent>

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No Cost/Low Energy Savers



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No Cost Energy Savers

- Unplug cell phone battery chargers or power adapters
- Turn off lights when leaving a room
- Keep air registers and vents clear to allow air to flow freely throughout the room
- Keep condenser surfaces of refrigerators and AC units clean
- Always set back heating and set forward cooling set points on your thermostat
- Lower water tank temperatures
- Think about paint color choices
- Think about where you plant vegetation

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Saving Energy Helps Protect the Environment



FACT:

If every American home replaced just one light bulb with an ENERGY STAR bulb, we would save enough energy to light more than 3 million homes for a year, more than \$600 million in annual energy costs, and prevent greenhouse gases equivalent to the emissions from more than 800,000 vehicles.

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Learn More

- To find out more ways you can save energy at home visit:
 - www.myenergyplan.net
 - www.nhsaves.com
 - www.energystar.gov
- To learn about state, local, utility and federal incentives that promote renewable energy and energy efficiency visit:
 - www.dsireusa.org

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