

# CO<sub>2</sub>RE Home\$avers

Conserving Electricity



Take Action on Climate Change

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Carbon Dioxide Réduction Edmonton

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## **About CO<sub>2</sub>RE**

### **Created by Edmontonians for Edmontonians...**

Carbon Dioxide Reduction Edmonton (CO<sub>2</sub>RE) is a developing organization formed to implement Edmonton's Community-Wide Greenhouse Gas Emissions (GHG) Reduction and Energy Strategy. CO<sub>2</sub>RE is supported by the City of Edmonton and a group of local organizations dedicated to implementing the strategy and reducing greenhouse gas (GHG) emissions in our city.

The CO<sub>2</sub>RE mission is to work with Edmonton residents, businesses, institutions and industry providing services, programs and initiatives to assist in reducing energy use, thereby reducing the levels of the GHG emissions that are responsible for Climate Change.

### **CO<sub>2</sub>RE goals include:**

- up to a 6% reduction in GHG emissions (from 1990 levels) by the year 2010 and
- a 20% reduction in GHG emissions (from 1990 levels) by the year 2020.

### **Do your part...**

We can do many things to reduce our emissions – and that includes making our homes and lifestyles more energy efficient. The publications in this series are a first step, providing Edmonton with specific how-to guides on improving home energy efficiency, saving money and reducing GHG emissions.

For more ideas on how to become more energy efficient, log onto our website at **[www.co2re.ca](http://www.co2re.ca)**!

### **Free Membership**

Why get a membership? Becoming a CO<sub>2</sub>RE member is free and the more people who join us in taking action on climate change, the faster we will achieve our goals. CO<sub>2</sub>RE is working with local companies to offer incentives on energy-efficient products and programs to further assist homeowners. You'll also receive a regular newsletter with new ideas and updates. Sign up today at **[www.co2re.ca](http://www.co2re.ca)**.

Industrial and commercial/institutional companies can contact our manager at 944-CORE (2673) to find out how they can participate.

## Introduction

This booklet provides a range of how-to information and examples of the savings possible by reducing your electricity use. Most of the energy saving steps mentioned in this booklet are low-cost, but combined can result in annual savings of \$30 to \$120 a year. Still larger savings are possible when you buy new high efficiency equipment or appliances.

There are many reasons to use electrical energy wisely. We pay for the usage on our utility bills and about 80% of Alberta's electricity is produced by burning coal, a major contributor of the Greenhouse Gases (GHG) responsible for global warming and climate change. Reducing your electricity use helps reduce the amount of Greenhouse Gases being released into the atmosphere.

The simple steps to savings outlined in this booklet include:

- No-cost changes in the way you use & maintain appliances,
- Modifications to reduce electricity usage,
- Upgrading electrical equipment & appliances.

## Electricity Usage

The average Edmonton household uses 7200-kilowatt hours of electricity a year. Figure 1 shows an average breakdown of electric energy use in the home.

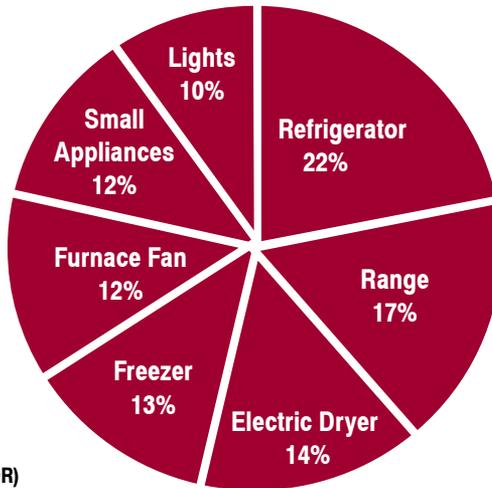


Figure 1  
(Usage figures courtesy of EPCOR)

## How You Pay for Electricity

The basic unit of electric consumption is the kilowatt hour (kWh). A kilowatt-hour is the amount of energy consumed by a load of one kilowatt (which equals 1000 watts) operating for one hour.

For example, a 100-watt light bulb takes 10 hours to consume 100-watt hours or 1 kWh of electric energy ( $100 \times 10 = 1000$ ).

Current electricity cost per kWh (as of September 2004) for Edmonton residential customers including all delivery fees and GST is approximately 8.6 cents. For the average single-family home the actual cost for electricity used (7,200 kWh) is about \$617 a year. Monthly fixed charges and other fees add approximately another \$200 a year to your total electricity bill.

Reducing your electricity usage also has an environmental benefit in reducing the GHG emissions responsible for Climate Change. One Kilowatt hour of electricity produced with coal fired electrical generation produces the equivalent of 0.985 kilograms of carbon dioxide ( $\text{CO}_2$ ), a major greenhouse gas.

**A family using 7,200 Kilowatt hours of electricity yearly is responsible for the production of about 7.092 Kilograms or 7 Tonnes of GHGs yearly.**

## **No-Cost Changes**

**Maintain and Use Appliances Wisely** - Basic maintenance to ensure appliances are working as efficiently as possible is an excellent way to cut electric costs. Using your appliances wisely simply means developing good energy conservation usage habits.

### **Fridges & Freezers**

- Vacuum the coils at the back or bottom of your fridge regularly. Dust interferes with cooling efficiency.
- Refrigerator motors and compressors generate heat, so allow enough space for continuous airflow around your refrigerator. If the heat can't escape, the refrigerator's cooling system will work harder and use more electricity.
- Keep air circulating inside the fridge – i.e. don't overload it or line the shelves with foil.
- Make sure the rubber gasket sealing the door is clean and in good condition. Close the door on a piece of thin paper. If you pull the paper out with little resistance, cold air is escaping and the door needs adjustment or a new gasket is needed.
- Defrost the refrigerator or freezer when ice build-up reaches 6 mm ( $\frac{1}{4}$  inch) by removing the food and thawing the ice build-up.
- Keep your refrigerator's temperature between  $1.7^\circ\text{C}$  and  $3.3^\circ\text{C}$  ( $35^\circ\text{--}38^\circ\text{F}$ ). The freezer compartment should be kept at  $-18^\circ\text{C}$  ( $0^\circ\text{F}$ ) for maximum efficiency and food safety.
- Place the fridge away from direct sunlight or other heat source, i.e. the kitchen range, heat ducts, etc.
- Cool hot foods to room temperature and seal before putting into the fridge. You'll use less energy and reduce condensation. Cold water can help cool food quickly.

- Frozen foods can be defrosted in the refrigerator; the cool air from the packages will help maintain coolness.

## **Stoves & Ovens**

- Regularly clean the drip pans under the elements of your range. Lining drip pans with foil interferes with heat circulation and can damage the elements.
- When cooking with gas, make sure that the flame heats only the bottom of the pot. It's dangerous for the flame to reach the side of the pot and it's a waste of energy.
- Match your pot to the size of the cooking element. The base of the pot should just cover an electric cooking ring. If the pot is too large for the element, more energy will be required to heat the pot. If the pot is too small, energy is wasted.
- Avoid long preheating of the oven. It will heat to 180°C (350°F) in about 10 minutes. Preheating is needed for some baked goods but is not necessary for most roasts and casseroles.
- You can turn off the stovetop heat two or three minutes before the end of the proper cooking time. The element will stay hot, food will continue to cook — and you'll save money!
- Make sure that the oven door seal is tight, if not adjust the door or replace the seal.
- Make sure pots have lids that fit tightly and whenever possible keep lids on when cooking. The lid traps heat in the pots and lets you lower the temperature of the cooking element. You'll use up to 20 percent less energy and your food will also cook more quickly.

## **Clothes Washers**

- Clean the agitator and the filters of both water hose inlets on the back of your clothes washer.
- Clothes rinsed in cold water come out just as clean as those rinsed in warm water. Washing with warm water and rinsing with cold will use 50% less energy than a hot wash and warm rinse.
- Clothes washers are most energy efficient when they're fully loaded.
- Most washers have water-level selectors so choose the right water level for the size of the load. The most efficient use is to wash full loads only.

## **Clothes Dryers**

- Always vent your dryer directly to the outside of the house. Gas dryer units are required to vent directly outside by law.
- Don't overload your clothes dryer. Use the lowest setting that will not over dry your clothes.

- Use the dryer's cool down cycle, usually the permanent press setting to save energy. No heat is supplied during the last few minutes as cooler air is blown through the clothes.
- Try to dry multiple loads of clothing in a row. The dryer stays warmer and saves you energy.
- Clean the clothes dryer lint filter after each use and clean exhaust ducting and vent damper at least once a year. Use a toothbrush and detergent to remove buildup from fabric softeners and dryer sheets from the lint screen.
- Sort clothes to be dried by thickness. Dry the thin, quick-drying items in one load and thicker items, such as towels, in another.
- Once a year disconnect and clean your dryers exterior exhaust system (the pipes) and outside shutter of any lint buildup or blockages to maintain good exhaust air flows.

### **Dishwashers**

- Use the features on your dishwasher. The short cycle uses less hot water and the energy-saver switch reduces electrical use by turning off the heating element so that the dishes air dry.
- Dishwashers are most efficient washing full loads. Use the Rinse and Hold function to pre-clean dishes until you have a full load.

### **Electric Hot Water Tanks**

- Most hot water tanks have factory temperature settings of 60°C (140°F) or higher, hot enough to cause scalding. You can lower the temperature setting for your hot water tank to 50°C (120°F), about as hot as your hand can tolerate it, reducing energy usage by approximately 10% to 15%.
- Once a year drain the sediment from the bottom of the tank.

**Get Mother Nature on Your Side** – Make the most of your appliances and lighting: don't have them working against you:

- Place furniture to take advantage of natural light. Light coloured walls and ceilings increase lighting effectiveness.
- Help your air conditioner; in the summer close windows and curtains during the day and open them at night.
- Help your heating system; in the winter open your curtains and drapes in the day to allow sunshine to help heat your home and close them at night.

**Use Small Appliances** – toaster ovens, crockpots, and microwave ovens – all use less energy than your kitchen range:

- It takes 18 times the electricity to bake a potato in a regular oven than in a microwave.
- A toaster oven is three times as efficient as your range.

## Modifications to Existing Appliances

**Timers and controls** are fairly inexpensive and help cut electricity use:

- Research shows your car's block heater needs to be on for just three hours to ensure quick, reliable starts, even on Alberta's coldest days. Leaving a 600-watt heater on from six p.m. to seven a.m. wastes approximately \$12 of electricity a month.
- Similar savings can result with a power-saver cord, which allows the block heater to operate only when the temperature falls below 2°C (35°F).
- A programmable thermostat which turns your heating system down at night or when you are away from the home will save both fuel and the electricity that runs the furnace fan.
- An automatic timer on your waterbed heater can turn the thermostat down during the day. Keep the bed covered to retain heat.

## Electric Hot Water Tanks

Heat loss accounts for about 15% of water heating costs. Wrapping the hot water tank with an insulating blanket (available in kit form) and accessible pipes with insulation (Figure 2) will reduce the loss to about 4%.

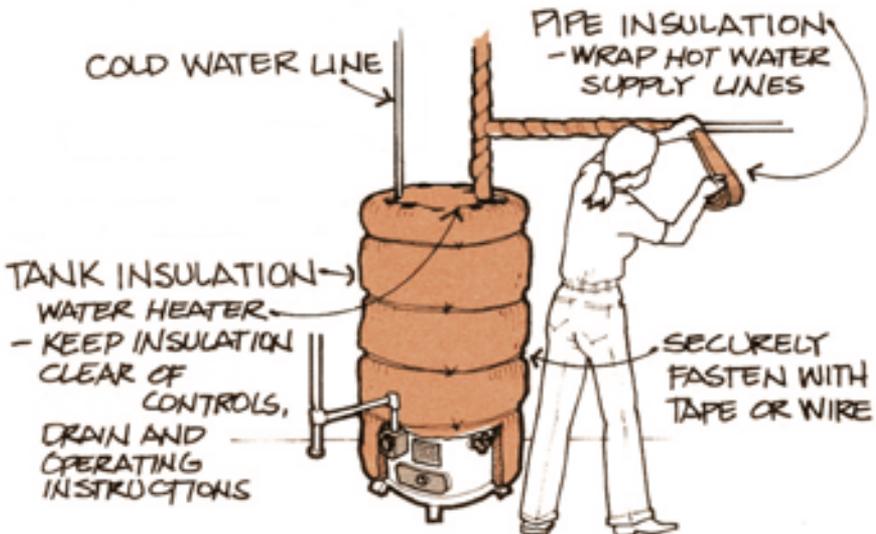


Figure 2

## Lighting

It is estimated that home lighting accounts for about 10% (720 kWh) of the total electrical usage for the average single-family home. Depending on home styles, usage habits and family size, lighting costs can be as much as 12% to 15%.

Controlling your use of lighting is one of the easiest ways to reduce energy costs and GHG emissions. There are a number of changes that you can implement to help reduce home lighting costs.

- One of the best energy-saving devices is the light switch. Get into the habit of turning off the lights when a room is not occupied.
- Lighting controls such as automatic timers, motion sensors and dimmer switches can all help reduce electricity usage.
- Lighting rooms by placing a lamp in the corner reflects more light off the walls and ceiling providing better illumination at lower wattages.
- You can use task lighting, to focus light only where it's needed. A reading lamp placed by a chair lights only the book rather than the whole room.
- If you always forget to turn off the lights there's still hope. You can install motion sensor switches in rooms. For closets or storage rooms consider doorframe switches that turn lights on and off as doors are opened and closed.
- Three-way or dimmer switches allow you to use less light when you wish and higher light levels when you need them.

## Compact Fluorescent Lighting

Compact Fluorescent light bulbs (CFL's - Figure 3) are small, low-wattage fluorescent tubes bent into compact shapes that can be used almost anywhere that standard incandescent bulbs are used. Newer compact fluorescents are available in a variety of sizes and shapes, offer instant on (full lighting) and duplicate the warm quality of incandescent lighting.



Figure 3

One-piece compact fluorescent light bulbs are sold as a complete bulb/ ballast unit. A compact fluorescent uses 75% less electricity than an incandescent bulb while providing the same amount of light and lasts up to 10 times as long (7 to 10 year life span based on 2,000 hours usage yearly).

In comparison a standard incandescent light bulb lasts anywhere from 750 to 1000 hours while 'long-life' bulbs only last about 2500 hours.

CFL's work best when placed in locations where the lighting is used for long periods of time (3 hours a day or more) like the kitchen, living room, family room, home office and reading lamps.

The table below provides a comparison of CFL bulb wattage that provides the same light (or slightly higher) light output as a regular incandescent bulb. To maintain current lighting levels, choose a compact fluorescent which has one quarter the wattage of the light bulb you are now using.

<b>Compact Fluorescent</b>	<b>Incandescent</b>
5 to 7 Watts	25 Watts
9 to 11 Watts	40 Watts
13 to 18 Watts	60 Watts
22 to 28 Watts	100 Watts

### **CFL Savings**

Compact fluorescent bulbs initially cost more than incandescent bulbs, but they use less energy and last longer. As an example let's assume that there are 6 – 100-watt incandescent bulbs in the average home that could be replaced with 6 – 26-watt compact fluorescent bulbs. The following table shows the potential cost savings achievable assuming 10,000 hrs usage (5 years), for each CFL bulb compared to using 60 incandescent bulbs.

<b>Light Source</b> (6 x10,000 hrs of light)	<b>Retail Cost</b>	<b>Energy Cost</b>	<b>GHG Emissions</b> (kilograms)
100-watt Incandescent	\$30 (\$.50 x 60 bulbs)	\$514	5,910
26-watt CFL	\$30 (\$.50 x 6 bulbs)	\$133	1,536
<b>Cost Savings</b>	<b>\$0</b>	<b>\$381</b>	<b>4,374</b>

**If you change 6 incandescent bulbs to CFL's it would save you \$76 a year or about \$381 in total and reduce your share of Greenhouse gas emissions by 874 kilograms a year, for a total of 4.3 Tonnes over 5 years.**

Using CFL bulbs offers additional environmental benefits. One CFL bulb lasts as long as 10 years, eliminating the purchase of nine light bulbs (one per year) and the associated packaging and waste. This translates into less garbage in the landfill and additional secondary GHG emission reductions. You also won't have to change bulbs very often in those hard to reach 9 to 10 foot high ceiling fixtures.

**Turn CFL's Off** – A common myth is that it takes more electricity to turn on a fluorescent light than to leave the light on, or that switching fluorescent lights on and off will damage the ballast. Neither of these myths is true.

While excessive switching may shorten the life of a fluorescent tube slightly, **the most energy efficient unused light is the one that is turned off!**

## **Lighting Controls**

**Timers** – Can save energy and control your interior or exterior lighting, or even appliances, by turning them on and off at a determined time. Most of the modern timers are digital, easy to operate, affordable and can be programmed with multiple settings for 24 hours a day, 7 days a week. Most timers are plug-in products, not requiring an electrician to install them.

You can program the timer to turn lights and electronic appliances on and off at specific times. Look for timer mechanisms that have a manual override function. Some digital timers do not operate CFL lamps efficiently, so please check with the vendor when buying timers for CFL products.

## **Motion Sensors**

In residential applications, outdoor security or yard lights can account for a large portion of lighting energy costs, and are often left on when not needed. Motion sensors are a good choice for controlling outdoor security lighting. The motion sensor keeps the lights on as long as there is movement. After motion has stopped (lapse time is adjustable), the detector switches the lights off.

Interior motion sensors are also available including integrated wall switch units.

These work well in various locations such as seldom used rooms, closets, storage rooms, seldom used bathrooms and garages. If you forget the light when you leave, it automatically shuts off.

## **Day Lighting**

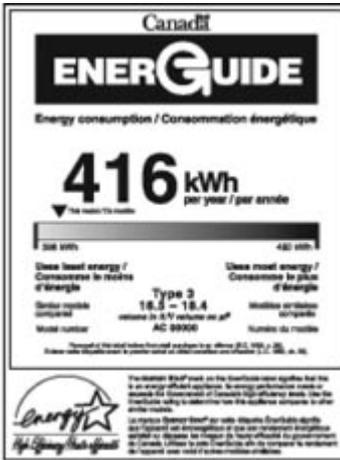
Studies have shown that increased day lighting in homes reduces energy costs and creates health benefits. The most common approach to date for providing natural light has been windows and skylights. If considering skylights choose units with the highest insulating value such as double or triple glazed units with Low-E coating and argon gas fill.

A relatively new product commonly referred to as “Daylight Pipes or Tubes” can be used to bring day light into areas of the home with no natural light. The basic components include reflective tubes that carry light from the roof of a building, a clear plastic dome that sits on the roof and lets in sunlight; a reflective tube that carries light into the interior; and a light diffuser, which looks like a ceiling light fixture and distributes light around the room. Light pipes are a good option to provide day light in rooms and areas in the home, which currently require electrical lighting during the daytime.

## **Energy Efficient Appliances**

If purchasing new appliances, buying the most energy efficient appliances is always the best choice.

When you shop, check the comparative efficiency of various models and brands. The best way is to check the “EnerGuide” label (Figure 4) and compare the kilowatt-hours that the appliance typically uses per month.



### How to read the EnerGuide label

- The large number is an appliance’s estimated annual energy consumption measured in kWh per year.
- The shaded bar scale displays the energy consumption range for appliance models of this type and size. The figure at the left end of the scale indicates the lowest energy-consumption rating; the figure on the right indicates the highest.
- An arrow just above the bar scale shows where the appliance ranks relative to similar models.
- The ENERGY STAR® symbol accompanies the EnerGuide label only on appliance models that achieve premium levels of energy efficiency, based on specific criteria endorsed by NRCan

Figure 4

When shopping for new major appliances, remember that these items really have two price tags: the purchase price and the ongoing operating price. Although some energy-efficient appliances may cost a little more to buy, they’ll save you money on your monthly utility bill.

Over the life of a good appliance, which should be 10 to 15 years, the operating cost savings will more than cover the higher initial purchase price. Remember to match the appliances to the size and needs of your family. Over-sized appliances waste your energy dollars.

## Refrigerators

Refrigerators are one of the largest energy users in the home so it just makes good economic sense to purchase the most energy efficient model you can. Standard-size refrigerators in 2004 must be at least 15 percent more efficient than the minimum federal energy performance standard in *Canada’s Energy Efficiency Regulations* to qualify for the ENERGY STAR mark.

ENERGY STAR qualified refrigerators typically have a more energy-efficient compressor and better insulation than conventional models. They may also have an “Energy Saver” switch that allows consumers to adjust how much energy the refrigerator uses to keep food fresh.

If purchasing a freezer, an upright freezer costs more to operate than a chest-type due to cold air spilling out when the door is opened. Frost-free models have an automatic defrost cycle and cost more to run than manual defrost models.

The table below compares the operating costs of a new 2004 Energy Star rated refrigerator to a standard frost-free 1990 model refrigerator.

<b>*Refrigerators</b>	<b>Energy Usage</b>	<b>Yearly Costs</b>	<b>GHG Emissions (Kilograms)</b>
1990 Model - 16 to 18 cu.ft.	1067 kWh	\$91	1050
2004 Energy Star - 16 to 18 cu.ft.	426 kWh	\$36	419
<b>Yearly Savings</b>	<b>641 kWh</b>	<b>\$55</b>	<b>631</b>

**Assuming an average life expectancy of 15 years, purchasing an Energy Star rated refrigerator would save you approximately \$825 and reduce your share of GHG emissions by 9,465 kilograms or 9.4 Tonnes.**

Energy Star qualified compact refrigerators (7.75 cubic foot or less) must exceed the minimum standard in *Canada's Energy Efficiency Regulations* by at least 20 percent.

### **Clothes Washers**

Standard-size clothes washers in 2004 must be at least 36% more efficient than the minimum federal energy performance standard in *Canada's Energy Efficiency Regulations* to qualify for the ENERGY STAR mark.

The 2 tables below compare the energy usage and saving potentials for a 1990 top-loading clothes washer and a 2004 Energy Star top-load and front-load units.

<b>*Clothes Washers (Top-Loading)</b>	<b>Energy Usage</b>	<b>Yearly Costs</b>	<b>GHG Emissions (Kilograms)</b>
1990 Model	1218 kWh	\$104	1199
2004 Energy Star Model	389 kWh	\$33	383
<b>Yearly Savings</b>	<b>829 kWh</b>	<b>\$71</b>	<b>816</b>

**Assuming an average life expectancy of 10 years, purchasing an Energy Star rated top-loading clothes washer would save you approximately \$710 and reduce your share of GHG emissions by 8,160 kilograms or 8.1 Tonnes.**

<b>*Clothes Washers (New front-loading models)</b>	<b>Energy Usage</b>	<b>Yearly Costs</b>	<b>GHG Emissions (Kilograms)</b>
1990 Model (top-loading)	1218 kWh	\$104	1199
2004 Energy Star (front-loading)	275 kWh	\$23	270
<b>Additional Savings</b>	<b>943</b>	<b>\$81</b>	<b>929</b>

**Assuming an average life expectancy of 10 years, purchasing an Energy Star rated front-loading clothes washer would save you approximately \$810 and reduce your share of GHG emissions by 9,290 kilograms or 9.2 Tonnes.**

ENERGY STAR qualified clothes washers must have advanced design features that deliver cleaning performance while using less energy and 30 to 50% less water. The washer extracts more water from clothes during the spin cycle. This reduces the drying time, saves energy and wear and tear on your clothes. Front-loading models use considerably less hot water than top-loading types saving you additional water and energy costs.

## Dishwashers

ENERGY STAR dishwashers must exceed the minimum federal energy performance standard in *Canada's Energy Efficiency Regulations* by at least 25% to qualify. Additional features include “smart” sensors that adjust the wash cycle and the amount of water to match the load. Some offer an internal heater to boost the temperature of incoming water.

*Dishwashers	Energy Usage	Yearly Costs	GHG Emissions (Kilograms)
1990 Models	1026 kWh	\$88	1010
2004 Energy Star Model	481 kWh	\$41	473
<b>Yearly Savings</b>	<b>545 kWh</b>	<b>\$47</b>	<b>537</b>

**Assuming an average life expectancy of 10 years, purchasing an Energy Star rated dishwasher would save you approximately \$470 and reduce your share of GHG emissions by 5,370 kilograms or 5.3 Tonnes.**

*\* Appliance energy usage figures derived from: Energy Efficiency Trends in Canada (Natural Resources Canada) & EnerGuide Appliance Directory 2002 (Natural Resources Canada)*

## Home Office Equipment

Most office equipment sold today has the ability to switch into “sleep” or low-power mode when it is not being used. To meet the criteria for ENERGY STAR, each product must automatically switch into a “sleep” or low-power mode before the maximum period of inactivity allowed. Turn off your home office equipment or home computers when not in use.

## LED Christmas Lights

New light emitting diodes (LED) Christmas lights are available that are very energy efficient, durable and never get hot. A 300 light string of LED lights only draws about 10.8 watts compared to a string of 300 standard mini-lights (4 watts each), which draws 1,200 watts. For 100 hours of usage the LED lights would cost you about \$0.09 (cents) while standard mini-lights would cost you \$10.28.

**You'd save \$10.19 and reduce your share of GHG emissions by 117 kilograms.**

As outlined in this booklet reducing your electrical energy usage will both save you money and reduce your share of the greenhouse gas emissions responsible for climate change.

## Additional Information Sources

### Natural Resources Canada – Office of Energy Efficiency

[www.oeenrncan.gc.ca](http://www.oeenrncan.gc.ca) – The Office of Energy Efficiency offers a wide range of free publications, programs and services to help Canadians save energy and reduce the greenhouse gas emissions that contribute to climate change.

**EnerGuide for Houses (EGH) evaluations** is a program from Natural Resources Canada. This detailed home assessment provides independent expert advice on the different systems of your home and what can be done to improve comfort, reduce energy bills, and cut down on greenhouse gas emissions that contribute to climate change. Consider having an EGH completed on your home.

**Recommended Reading:** *Keeping the Heat In* is a comprehensive source of energy efficiency how-to information for homeowners. This free publication is available from Natural Resources Canada. **Call toll free at 1-800-387-2000.**

### Canada Mortgage and Housing Corp.

[www.cmhc.ca/publications](http://www.cmhc.ca/publications) – CMHC is a valuable resource for information. The CMHC Order Desk is a one-stop shop for all free and priced publications, fact sheets, reports, videos and other CMHC resources. You can order online, or through their call centre at **1-800-668-2642**.

### EPCOR

[www.epcor.ca](http://www.epcor.ca) – The website contains information on energy and water efficiency with calculators, tools and downloadable publications to assist you in reducing your energy and water consumption.

Tools include a **Home Energy Audit**, a do-it-yourself home audit with a library of resources; **EPCOR House**, an animated tour of a typical home with efficiency information; and calculators for most major appliances, plus a **simple electricity calculator** and **water audit tool**. Tools are located in the EPCOR-Customer Service drop down menus.

### Environment Canada

The Green Lane in Environment Canada's internet source for weather and environmental related to clean air, clean water and climate change. Visit them at [www.ec.gc.ca](http://www.ec.gc.ca)



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# Become A CO<sub>2</sub>RE Member

We all contribute to the problem of Climate Change — and each of us can contribute to the solutions. Become a CO<sub>2</sub>RE Member.

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**CO<sub>2</sub>RE**

Carbon Dioxide Reduction Edmonton

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