HEAT

HOME ENERGY ASSESSMENT TOOLKIT

INSTRUCTION MANUAL

stalbert.ca

City of St. Albert
Cultivate Life

HOME ENERGY ASSESSMENT TOOLKIT

City of St. Albert

In partnership with the St. Albert Public Library
and in support of the City of St. Albert Environmental Master Plan's

Goal #2: Reduce energy consumption and
greenhouse gas emissions

and

Goal #8: Reduce water consumption

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A STEP IN THE RIGHT DIRECTION

Thank you for signing out the City of St. Albert's Home Energy Assessment Toolkit (HEAT).

The efficient use of energy is on everyone's mind these days. Sometimes, though, it can be difficult to know just where to start. That's where HEAT comes in.

This toolkit will help you understand how energy is used in your home. It provides a simple, step-by-step approach to reducing energy use. Here you'll find tips and strategies for shrinking your energy footprint, along with the tools you need to help you assess how efficiently your home uses energy.

These tools are easy to use. You don't have to be handy – you just need to be able to follow a few simple steps.

Let's get started!

Icons and logos

As you read through the manual, you will see these images and logos.

Tool time

This icon lets you know there is a tool in the toolkit to help you complete this task.

Online

This icon lets you know you can find more details online.

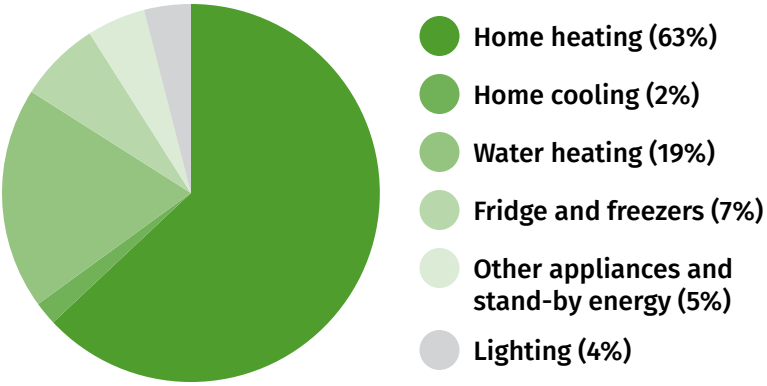
Energy Efficiency Alberta

This logo lets you know the province's new program has tools, resources, and equipment to help you complete this task.

EnerGuide
This logo lets you know the government of Canada's labelling system can help you make the right decision when buying new equipment, electronics, and appliances.

Home energy use

The total home energy use in a typical Alberta home looks like this:



Source: Natural Resources Canada

With this toolkit, you can find out how efficiently you use energy in each of these key areas. An energy efficient home will save you money in the short and long term.

We're here to help

If you have questions as you work through HEAT, please let us know. We are happy to help.

You can contact us by email at **environment@stalbert.ca** or by phone at 780-459-1735.

HEAT TOOLKIT

1 Digital Timer

2 Drip Gauge

3 Hot Water Temperature Strip Card

4 Refrigerator/Freezer Thermometer

5 SD Card

6 USB Charger

7 Flow Meter Bag

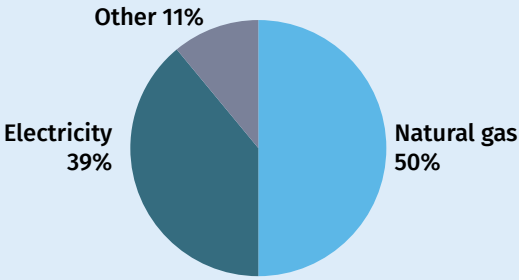
8 Infrared (IR) Thermometer

9 Kill-A-Watt® Meter

HEATING AND COOLING YOUR HOME

Whether you live in an apartment, a condo, or a house of any size, most of your household energy is used to heat your home. In Alberta, with our cold, snowy winters, this comes as no surprise. About 63 per cent of a typical household's total energy use goes to heating our homes, with an additional 2 per cent used for cooling homes in hot months.

How we heat our homes in Canada (2011)



Source: Statistics Canada, 2011

"In the City of St. Albert, there are few major industrial emitters of greenhouse gases (GHG) or other pollutants. Therefore, the greatest reduction in GHG emissions will result from both corporate (the City of St. Albert) and community (residents and local businesses) actions."

City of St. Albert, Environmental Master Plan, 2014

HEAT's High Five

Here are our top five tips for reducing energy consumption and heating-related costs in your home.

Use a programmable thermostat

A programmable thermostat allows you to set a number of different temperatures to "kick in" at pre-set times of the day. For example, if everyone is out of the house or apartment by 8:30 a.m. and back by 4:30 p.m., you can set the thermostat to automatically lower the temperature in the morning and then to increase the temperature by the time everyone returns in the afternoon.

If you'd like to receive a free programmable thermostat, contact Alberta's Energy Efficiency program. A program

representative will provide and install a programmable thermostat at no charge to you. Email hello@efficiencyalberta.ca or phone 1-844-357-5604 for details.

Stir the breeze

During hot weather, use a fan to cool your home instead of air conditioning. Fans use far less energy and, when combined with an open window on the shaded side of a house, can keep your home or apartment comfortably cool.

Be an energy star

When it's time to upgrade your furnace, choose one with an ENERGY STAR® symbol label.

In Canada, ENERGY STAR® is the mark of high-efficiency products. Typically, an ENERGY STAR® certified product is in the top 15 to 30 percent of its class for energy performance. Learn more about Energy Star labelling at energystar.gov.

Here comes the sun

In Alberta, we get plenty of sunshine. With the government of Alberta's Household Energy Efficiency program it is easier than ever for you to harness that renewable energy to heat your home. The program provides significant rebates – up to 30% off – for homes that switch to solar heating.

Insulate

If your home is properly insulated, warm air will stay inside – where it should be – in the winter months. In the summer, a well-insulated home will keep you cool. Use the infrared thermometer in this toolkit to help you determine just how well insulated your home is. Directions are provided in the Tool Time section below.

For a more extensive list of tips for efficient home heating, visit the Natural Resources Canada website and choose "Energy Efficiency" under the "Energy" tab.

Tool time: Infrared (IR) Thermometer

Before you take steps to improve energy efficiency related to home heating, you need to know two things: where heat is escaping and where cold air is coming in.

Sometimes, locating drafty areas or gaps in insulation is a simple task – you notice an icy build-up on windows in the winter or you feel cold air coming in around your door frame even when the door is closed. But heat loss is not always easy to detect – unless, of course, you have an infrared (IR) thermometer like the one in this toolkit!

With an IR thermometer, you can locate all of your home's heat-loss trouble areas, even the ones in hard-to-reach places.

Follow these steps to find the heat-loss areas in your home.

1. Check to see whether the thermometer is charged. If it isn't, lift the flap on the side of the thermometer. You'll see a micro-USB port. Plug the USB end of the cord into the micro-USB port and the other end into a standard outlet. Allow the device to charge for four to six hours.

2. Press and hold the Menu button for a few seconds to activate the thermometer. You will see a prompt to put in an SD card. You can use the SD card provided if you'd like, but you can also continue without the card.

3. Point the thermometer at the area you want to assess for heat loss. Some of the most common culprits in a home are:

   a. Windows

   b. Baseboards

   c. Electrical outlets on exterior walls

   d. Walls

4. You will see a type of “heat map” on the screen, showing the areas of temperature difference.

   a. The blue and green areas are the cooler areas

   b. The yellow, orange, red, and white areas are the hotter areas

   c. The number you see in white letters in the corner of the screen indicates the temperature at the centre of the screen.

5. Record the problem areas as you move through each room. Keep track of the problems areas as you move through each room. If you decide to use an SD card, you can pull the trigger and a photo of the “heat map” will be saved on the card. You can download the photo onto a computer or device.

6. Take steps to address problems, if you can. Weather stripping, caulking, heavy window coverings, and “door snakes” are inexpensive, easy, and effective solutions.

Not sure how to read the IR thermometer screen? Watch it being used on the City of Edmonton website at edmonton.ca/energyauditvideo.

WATER HEATING

We heat water for all kinds of reasons: for example, doing dishes, having a bath or shower, and washing clothes. In the typical Canadian home, the energy used to heat water accounts for 19 per cent of the average household's energy use.

Of course, hot water conservation is the most obvious solution. The less hot water we use, the less energy it will take to heat that water.

"Per capita, water consumption in Canada is the second highest in the world, exceeded only by the United States. The average Canadian uses 328 litres of water per day in his or her home."

Environment Canada, 2011

A precious resource

Using less water in general – hot or cold – is a good idea. While Canada is home to 7 percent of the world's fresh water, the supply is not endless. If we want to ensure a fresh water supply for future generations, we need to conserve this precious resource.

HEAT's High Five

Here are our top five tips for using less water and for reducing energy consumption and costs related to heating water for home use.

Right as rain

Use a rain barrel (or two or three) to capture water from your eavestroughs. Use that water for your lawn and garden. Cover the top of the rain barrel with a lid or a fine mesh to keep mosquitoes away.

You can save money by buying your rain barrels through the City of St. Albert rain barrel program. Go to the City's website and enter "rain barrel" in the search bar to learn more about this program.

Fully loaded

Only run your dishwasher and washing machine when you have a full load. Fewer loads equals less energy used.

Brrrr!

Wash clothes in cold water to reduce the cost of heating water. In 2011, 58% of Canadians washed laundry in cold water as a way of saving energy. (Statistics Canada)

Turn it off

Take shorter showers to conserve water. Start by timing how long you currently spend in the shower, then reduce your time gradually. If you usually take a 10-minute shower, aim for seven minutes, or even five. By cutting your time in the shower to five minutes, you can reduce your water use and related CO_2 emissions by 70 to 80 per cent, savings thousands of gallons of water and hundreds of pounds of CO_2 emissions each year.

Low-flow shower heads and aerators

Replace showerheads and faucets that don't meet low-flow standards. Using the flow meter bag and timer in this tool kit, test the flow rate of your current shower head. If you discover that the water flows at a higher-than-recommended rate, contact the Energy Efficiency Alberta household program.

Energy Efficiency Alberta

A qualified installer will come to your home at a time that suits you and replace high-flow shower heads and aerators with low-flow alternatives – at no cost to you. You can contact the program by email at hello@efficiencyalberta.ca or by phone at 1-844-357-5604.

For a more extensive list of ways to conserve water and reduce the energy used to heat water, visit David Suzuki Foundation's Queen of Green blog and search for "how to conserve water."

Tool time:
Flow Meter Bag and Digital Timer

This handy tool will help you figure out the rate at which water flows through kitchen and bathroom taps and shower heads. Water flow is generally measured in litres per minute (L/min).

1. Turn on the shower head or faucet you are testing and adjust its flow to the flow rate you would normally use.
2. Place the digital timer where you can see it clearly and push the start button.
3. Hold the bag open and place it under the fixture for exactly five seconds.
4. At the five-second mark, move the bag away from the flow and record the L/min measurement displayed on the side of the bag.
5. Pour the water out of the bag and repeat the task to confirm your results. Ideally, you want to see a flow rate of no more than 6 L/min for the taps and no more than 15 L/min for the shower head.
6. Replace shower heads and install or switch out faucet aerators if flow rates are higher than the recommended limits. In Alberta, you can do this at no cost through the Energy Efficiency Alberta program. See details below.

Energy Efficiency Alberta

What is an aerator, anyway?

An aerator is that little screen-like device that screws onto or nests into your faucet head. When water comes through the aerator, it emerges as a stream of both water and air. Most newer faucets will already have aerators, although these may need replacing over time.

Tool time: Drip Gauge and Digital Timer

The drip gauge will help you calculate how much water you waste in a year from leaky faucets.

1. Place the digital timer where you can see it clearly.
2. Place the drip gauge under a leaky faucet for exactly five seconds.
3. At the five-second mark, move the drip gauge away from the drip.
4. Record the very small, hard-to-see LPD and LPY figures. The LPD figure indicates the number of litres of water that drip from your faucet in a day; the LPY reading indicates the number of litres of water that drip from your faucet in a year.
5. Repair or replace the leaky faucets. Often, this simply requires replacing the washer inside the tap. You can find directions in do-it-yourself books at your local library, by asking for advice at your local hardware store, or by following step-by-step videos on YouTube.

Tool time: Hot Water Temperature Strip Card and Digital Timer

Even though you only use hot water a handful of times each day, the water in your tank is being heated constantly. A great deal of your household energy consumption goes toward keeping water hot.

One way to reduce the amount of energy used to heat water is to ensure the water isn't hotter than it needs to be. After all, the hotter the water, the more energy required to heat it.

The Canada Safety Council recommends that the temperature of water flowing from your tap should fall between 43 °C and 49 °C. This is hot enough to get dishes clean and to take a good hot bath or shower, without risking burns.

How hot is the water flowing from your taps? Let's find out.

1. Turn on the hot water tap and let it run for 60 to 90 seconds.
2. Place the digital timer where you can see it clearly and then start the timer.
3. Hold the black strip on the Save Energy ecofitt card under the running hot water stream for 15 seconds.
4. If the number on the card is higher than 49 °C, consider asking a professional to adjust your hot water tank.

Note: While some water tanks have a gauge that indicates the temperature of the water in the tank, this is not always an accurate estimate of the temperature of the water that flows from the tap.

A “tankless” task

You might want to consider buying a tankless (on-demand) water heater. Rather than storing a supply of always-ready-to-use heated water, these units heat water only as it is needed. This way, you are not using energy to heat standing water. A solar hot water system is another option. This system supplements your existing system, heating up to about 60 per cent of your home’s hot water.

To learn more about traditional and alternative hot water tanks, download Natural Resources Canada’s Water Heater Guide.

APPLIANCES AND ELECTRONICS

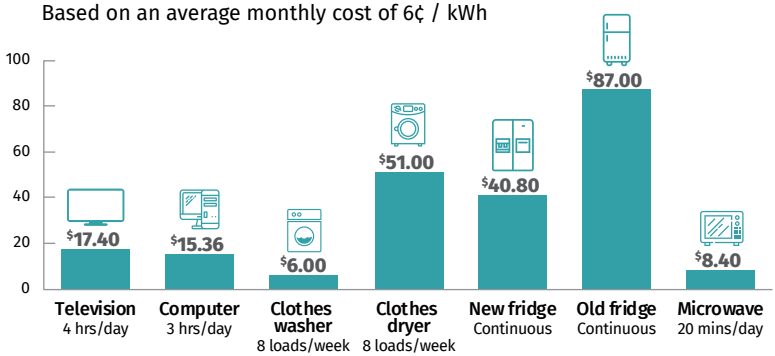
Take a look around your house and count the number of appliances and other electronics you own. Include anything that needs to be plugged in.

Clock radios and computers, televisions and toasters, mixers and microwave ovens. Big or small, used daily or only once in a while. In Canada, we own far more appliances and electronics than we used to. According to Natural Resources Canada, in 2011 Canadians owned 160 per cent more electronics than they did in 2001!

Together, these appliances and electronics account for about 12 per cent of the average home's energy use.

Household devices annual costs

Based on an average monthly cost of 6¢ / kWh



Source: Energy Alberta

HEAT's High Five

Here are our top five tips for reducing energy consumption and costs related to household appliances and electronics.

Hang it up

In the warm-weather months, dry your laundry outside on a clothesline. Your clothes and linens will smell and feel fresher. Plus, they look so lovely blowing in the breeze! If you live in an apartment or don't have room for a clothesline in your yard, you can use a clothes horse to dry clothes without using a dryer.

Size-to-fit

Whenever possible, use smaller appliances for cooking. For example, a toaster oven uses less energy than a full-sized oven.

Cover up

Use lids on your pots and pans. Your food will cook faster, which means shorter cooking times and therefore lower energy use.

Smart bars

Power bars with built-in timers or auto-shutoff features can help you save energy. These power bars can be programmed to turn outlets off and on according to a schedule that you set.

As part of the Energy Efficiency Alberta program, you can replace your traditional power bars with smart power bars at no cost. Contact the program by email at hello@efficiencyalberta.ca or by phone at 1-844-357-5604.

Be an energy star

When you are ready for a new appliance, the ENERGY STAR® symbol lets you know you are buying a product that meets or exceeds high-efficiency standards.

For a more extensive list of tips for reducing energy consumption and the costs related to household appliances and electronics, visit Alberta Environment and Parks website.

Phantom of the outlet (aka standby power)

Most electronic devices and many appliances remain plugged in all day, but are only used for only a few minutes or a few hours at a time. When you are done using the clothes dryer, the microwave, or the television, for example, you don't unplug it until the next time it is used.

However, as long as these devices are plugged in, they are using a small amount of power – referred to as standby or phantom power. This wasted power is responsible for up to 10 per cent of the power used by appliances and electronics (Natural Resources Canada).

These tips will help reduce phantom power consumption in your home.

1. Turn off your computer or put it in sleep mode when you're not using it.

2. Plug devices into a power bar and turn off the bar when the devices are not in use. "Smart bars" can leave one or two items fully powered while automatically shutting off the ones you aren't using.

3. When you are away on holidays, unplug as many appliances as you can.

Tool time: The Kill-A-Watt® meter

The Kill-A-Watt® meter measures the amount of electricity used by your appliances and electronics when they are operating fully, on standby, or using an alternate setting, such as an eco-setting.

How much energy do your appliances and electronics use? Let's find out.

1. Plug the Kill-A-Watt® meter into a standard wall outlet. If possible, choose an outlet that is higher up on the wall and not blocked by furniture or by the appliance you are testing. This will make it easier to read the Kill-A-Watt® display screen.

2. Plug the appliance or electronic device whose energy consumption you want to assess into the Kill-A-Watt® meter.

3. Read the display screen at intervals during the day or week. The screen shows two types of information:

    a. The amount of power being used: This is measured in kilowatt-hours, which is also the unit of measure you'll find on your electricity bill. You can use this information to calculate the energy use and cost on a daily, weekly, or yearly basis. According to the Call Me Power website, the average annual cost for electricity cost in a single detached home in Alberta is $1710.00, or about $142.50/month.

    b. How long the appliance or electronic has been attached to the Kill-a-Watt meter.

4. The reading indicators will automatically reset to zero when their maximum limit is reached.

5. Press the purple "set" button to show the cumulative energy consumption since power was applied to the unit. Then press the button again to display the cumulative time since power was applied to the unit.

Tool time: Refrigerator/freezer thermometer

Because your fridge and freezer are always running, they use more energy than appliances that only run some of the time. In fact, fridges and freezers account for about half of your home appliance and electronics energy use.

With these appliances, the colder the interior temperature, the more energy being used. EPCOR recommends a refrigerator temperature of 3 °C and a freezer temperature of -18 °C.

Are your fridge and freezer running at optimal temperatures? Let's find out.

1. Hang the Niagara thermometer in the fridge or freezer overnight.
2. Place the device so it doesn't touch anything. The magnetic and adhesive backing allow for different placement options.
3. Read the temperature.
4. Adjust the appliance's temperature using its built-in thermostat, if necessary.

"Adjusting refrigerator and freezer temperatures to the recommended settings saves energy and improves refrigerator/freezer efficiency by up to 8%."
– Niagara thermometer manual

Tool time: Infrared thermometer

If you'd like a more high-tech way to check the temperature in your fridge or freezer, you can use the infrared (IR) thermometer.

1. Check to make sure the IR thermometer is charged. If it isn't, lift the flap on the side of the thermometer. You'll see a micro-USB port. Plug the USB end of the cord into the micro-USB port and the other end into a standard outlet. Allow the device to charge for four to six hours.

2. Using the fully charged device, press and hold the Menu button for a few seconds to activate the thermometer. You will see a prompt to put in an SD card. You can use the SD card provided if you'd like, but you can also continue without the card.

3. Open the fridge or freezer door and aim the thermometer at the centre of the interior.

4. You will see a type of "heat map" on the screen. The temperature will display in the top left corner of the display screen in white letters, showing the temperature at the centre of the image.

5. Read the temperature.

6. Adjust the appliances' temperature settings, if necessary.

If you are having problems understanding the thermometer, you can watch it being used on the City of Edmonton's website at edmonton.ca/energyauditvideo.

LIGHTING

There's nothing like summer in St. Albert. We soak up the sun and warmth until late at night. From May through July, it feels as though we barely have to turn on a light. In winter, of course, the opposite is true.

All told, lighting accounts for about 4 per cent of energy usage in a typical Alberta home. While that may not seem like much, it is not that difficult to reduce consumption in this area even more.

> *"ENERGY STAR certified light bulbs use a remarkable 70-90% less energy, on average, than traditional incandescent light bulbs. ENERGY STAR-certified light bulbs using light-emitting diode (LED) technology last at least 15 times longer than incandescent bulbs."*
>
> *Natural Resources Canada, 2016*

HEAT's High Five

Here are a handful of ideas for reducing energy consumption and lighting-related costs in your home.

Sunny side up

Use the sun's energy to heat and light up your house on cold days and block it from your house on warm, bright days. Simply open your blinds in the winter and close them during the summer.

Turn it off

The best energy-saving device is the light switch. Get into the habit of turning off the lights when a room is not occupied.

Right light

Some tasks require more and brighter lights than others. A reading lamp, for example, uses less energy than an overhead light, and focuses light only where you need it.

It's all in the timing

Lighting controls such as automatic timers, motion sensors (especially for outdoor lights), and dimmer switches help reduce electricity use.

L-E-Ds are F-R-E-E

Consider using LED lights, which are more energy efficient and longer lasting than "old style" incandescent bulbs.

Under the provincial government's Energy Efficiency Alberta program, you can replace existing incandescent nightlights and light bulbs with LED products, which use significantly less energy. Any household can participate in the program. Learn more on the Energy Efficiency Alberta website.

Energy Efficiency Alberta

Or you can contact the program by email at hello@efficiencyalberta.ca or by phone at 1-844-357-5604.

For a more extensive list of tips for reducing energy consumption and the costs related to lighting, visit the Enmax website and choose "Energy Saving Tips.

Tool time: The Kill-A-Watt® meter

As well as using the Kill-A-Watt® meter to measure the amount of electricity used by your appliances and electronics, you can use it to measure the energy used by plug-in light fixtures in your home, whether they are in use or on stand-by.

How much energy do your plug-in lamps and light use? Let's find out:

1. Plug the Kill-A-Watt® meter into a standard wall outlet that is close to your plug-in lamp. If possible, choose an outlet that is higher up on the wall and not blocked by furniture or the lamp you are testing. This will make it easier to read the Kill-A-Watt® display screen.

2. Plug the lamp that you are assessing into the Kill-A-Watt meter.

3. Read the display screen at intervals during the day or week. The screen shows two types of information:

    a. The amount of power being used: This is measured in kilowatt-hours, which is also the unit of measure you'll find on your electricity bill. You can use this information to calculate the energy use and cost on a daily, weekly, or yearly basis.

    b. How long the lamp has been attached to the Kill-a-Watt® meter.

4. The reading indicators will automatically reset to zero when their maximum limit is reached.

5. After using the Kill-A-Watt meter for a day or two, switch to an LED light and compare energy use.

LEARN MORE

If you'd like to learn more about energy efficiency, energy conservation and sustainable living, the St. Albert Public Library recommends these books from its collection.

Better: The Everyday Art of Sustainable Living (2015)
Nicole Caldwell
640 CAL

Carbon Buster's Home Energy Handbook: Slowing Climate Change and Saving Money (2007)
Godo Stoyko
644 STO

Consumer Guide to Home Energy Savings (2007)
Jennifer Thorne Amann
644 AMA

DIY Projects for the Self-Sufficient Homeowner: 25 Ways to Build a Self-Reliant Lifestyle (2011)
Betsy Matheson
643.7 MAT

Ecoholic Home: The Greenest, Cleanest and Most Energy-efficient Information Under One (Canadian) Roof (2009)
Adria Vasil
640 VAS

Greened House Effect: Renovating Your Home with a Deep Energy Retrofit (2013)
Jeff Wilson
643.7 WIL

Greening Your Home: Successful Eco-Renovation Strategies (2014)
Thomas Teuwen and Linda Parker
643.7 TEU

Insulate and Weatherize for Energy Efficiency at Home: Expert Advice from Start to Finish (2012)
Bruce Harley
693.83 HAR

Visual Handbook of Energy Conservation: A Comprehensive Guide to Reducing Energy Use at Home (2013)
Charles Wing
690.0286 WIN

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http://acclaimedfurnace.com/

B.C. Hydro. Kilowatt hour explained.
http://www.nrcan.gc.ca/sites/oee.nrcan.gc.ca/ files/files/pdf/equipment/WaterHeaterGuide_e.pdf

Call Me Power.
http://callmepower.ca/en/ab/electricity/cost/averages-house-apartment-condo#house

City of Edmonton. Energy Audit.
edmonton.ca/energyauditvideo

City of St Albert:

> **Environmental Master Plan**
> https://stalbert.ca/city/environment/plans-publications/environmental-master-plan/
>
> **Rain barrel program.**
> https://stalbert.ca/home/utilities/water/saving-water/rain-barrels/

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http://www.davidsuzuki.org/blogs/queen-of-green/2015/07/howto-conserve-water/

Energy Alberta. Energy used by appliances.
http://www.energy.alberta.ca/Electricity/684.asp

Energy Efficiency Alberta
https://www.efficiencyalberta.ca/

Enmax. Energy saving tips.
https://www.enmax.com/home/energy-saving-tips

Environment Canada. Talking Water.
https://www.ec.gc.ca/Content/D/2/9/D295883B-4FB7-457E-AB8B-9C9D4CA15821/COM1300_Talking_Water_e_web.pdf

Green Lifestyle Changes. Take 5 Minute Showers.
http://www.greenlifestylechanges.com/take-5-minute-showers/

Natural Resources Canada:

Energy Star.
http://www.nrcan.gc.ca/energy/products/energystar/12519

Energy Star.
http://www.nrcan.gc.ca/energy/products/categories/electronics/14195

Lighting.
https://www.nrcan.gc.ca/energy/products/categories/lighting/bulbs/13918

Pie chart graphic of energy use.
http://www.nrcan.gc.ca/energy/products/ categories/appliances/13630

Water heater guide.
http://www.nrcan.gc.ca/sites/oee.nrcan.gc.ca/files/files/pdf/equipment/ WaterHeaterGuide_e.pdf

When Off Means Off.
http://www.nrcan.gc.ca/sites/oee.nrcan.gc.ca/files/files/pdf/residential/ personal/Standby-Power_E_Jan2013.pdf

www.nrcan.gc.ca/energy/efficiency/housing/home-improvements/4995

Statistics Canada:

Cold water use
http://www.statcan.gc.ca/pub/11-526-s/2013002/part-partie1-eng.htm

How we heat our homes
http://www.statcan.gc.ca/pub/11-402-x/2007/1741/ceb1741_003-eng.htm

stalbert.ca

City of St. Albert
Cultivate Life