



DECEMBER 2020



DRAYTON VALLEY

The E-CENT Kit Guideline

Supported by FortisAlberta
and in partnership with
Drayton Valley Municipal Library

CONTENTS

- 1 Acknowledgements
- 2 Introduction
- 4 What is in your E-CENT Kit?
- 17 Energy Use in Your Home
- 18 Energy Savings Guide
- 25 Learn More
- 26 Resources Used

This **E-CENT Kit** project is a partnership between the Town of Drayton Valley and the Drayton Valley Municipal Libraries.



We thank Fortis Alberta for supporting this project through their “Save Energy” grant.



INTRODUCTION

Thank you for borrowing this Energy Conservation Tools Kit (E-CENT Kit). The **E-CENT Kit** was designed to help you understand how energy is consumed in your home, whether you own or rent your accommodation. Technical expertise or extensive knowledge on energy is not required!

- The first section gives you step-by-step guidance on how to use the seven tools provided in the **E-CENT Kit** to measure energy use in your home.
- The second section includes handy tips to reduce energy use in your home.

Benefits of improving your home energy efficiency:



Potentially reduce your energy bills.



Add comfort to your home



Reduce your ecological footprint



- It is important to understand that you are **NOT** undergoing a home energy audit.
- An energy audit is an extensive series of tests conducted by a trained professional. Examples of tests in a professional energy audit includes a blower door test, a duct pressure test, HVAC commissioning and professional thermal imaging analysis.
- You are simply doing your own evaluation of your home energy's use to understand potential opportunities to conserve energy.

ENERGY USE IN YOUR HOME

Your home energy use depends on many factors, such as:

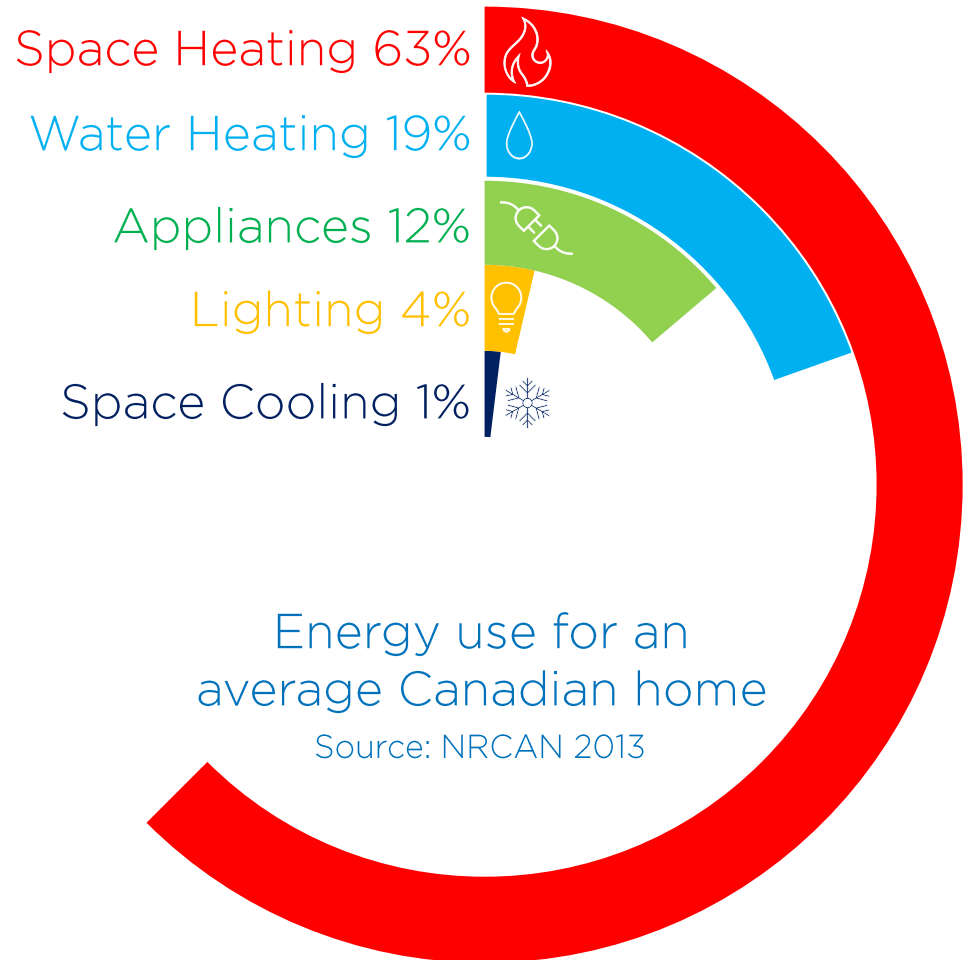
- home type and size
- quality of insulation
- number of people living there
- the weather

Given Canada's cold weather, space and water heating usually make up the bulk of energy use.

Drayton Valley residents typically use natural gas for home and water heating while electricity provides lighting and powers their appliances and electronic devices.

When starting to implement energy efficiency measures, focus on the largest energy users to make the most savings!

Use the **E-CENT Kit** to detect key areas for improvement in your home.



Light Bulbs and Plug

For comparing LEDs and incandescent lamps.



Energy Meter

Measures energy use of home appliances.



Thermal Imaging Camera

Measures temperature of areas, objects and surfaces



What is in your **E-CENT** Kit?



Light Meter

Measures the amount of light in a room.



Fridge/ freezer Thermometer

Measures fridge and freezer temperatures.

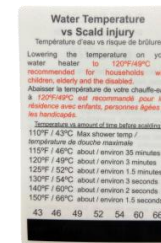


Digital Timer

For keeping track of time

Temperature Cards

Measures hot water temperature.



E-CENT Tool: Thermal Imaging Camera

What is it for?

Use the thermal imaging camera to detect places that are losing heat or letting cool air in.



To prevent dropping the camera, remember to use the hand strap.



Do not point the laser in people's eyes.



Children should be supervised when using the camera.

Using the thermal imaging camera

1. Check that the camera is charged.
2. Put on the hand strap.
3. Press and hold the (⏻) **POWER** button for a few seconds to switch the camera on or off. If the screen goes black, it has likely timed out. Just press and hold the power button again.
4. Point the camera toward the test area and scan as desired.
5. The centre of the screen will show an infrared image while the top shows the temperature at the centre of the image.
 - Greens and blues represent cooler temperatures
 - Yellows, reds and whites represent warmer temperatures
6. Pull the trigger to capture an image.
7. Press the laser pointer (★) button if you want to activate the laser pointer.



Measuring temperatures for energy conservation

- Wait for appropriate weather. Preferably when there has been a difference of at least 10°C between indoor and outdoor temperatures for several hours.
- Start inspecting the outside of your home. Look out for areas that show large temperature changes. This can be an indication of poorly insulated areas, air leaks and water infiltration.
- Continue inspecting the inside surfaces of your home for temperature anomalies. Focus on windows, doors, baseboards and electrical outlets along exterior walls, fireplaces, attics and basements, heating vents, where the wall meets the foundation and the walls themselves.
- Take readings in several locations in your house to see if your home has an even temperature. You can use a candle or incense stick too to check for air movement.

What's next?

Seal off air gaps and repair poor insulation. Consult your local home renovation expert to ensure you are not negatively affecting your home ventilation.

Examples of what you might see

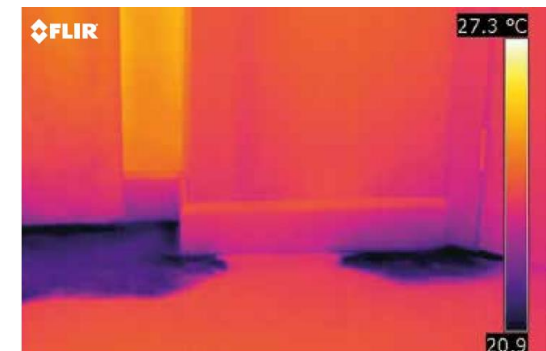
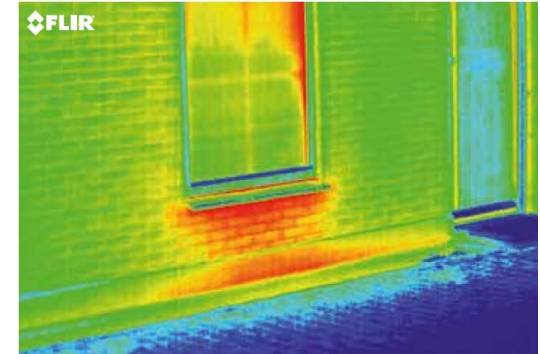
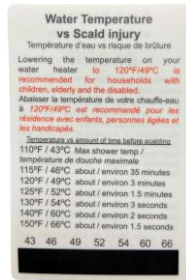


Photo credit: FLIR Thermal Imaging Guidebook for Building and Renewable Energy Applications

E-CENT Tool: Hot Water Temperature Card and Digital Timer

What is it for?

- The hot water temperature card measures hot water temperature.
- The digital timer counts down from a specific time interval.



Using the digital timer

1. Press the **MIN** and **SEC** buttons at the same time to reset to zero.
2. Set the required time using **MIN** and **SEC** buttons.
3. Press the **START/STOP** button to activate the countdown.
4. The timer will beep at the end of the countdown.

Measuring hot water temperature

You will need the hot water temperature card and the digital timer for this activity.

1. Turn on the hot water tap and run it for 60 to 90 seconds.
2. Hold the black strip on the hot water temperature card under the running water for **15 seconds**.
3. If the number on the card is higher than 54°C, consider adjusting your hot water tank settings or speaking with a professional if you are not sure.



Measuring water flow from shower or tap

You will need the digital timer, a bucket and a large measuring cup for this activity.



1. Turn on the shower/tap to full capacity.
2. Set the timer for 10 seconds. Start the timer as you put the bucket under the water.
3. Collect all water coming out for ten seconds.
4. Measure the amount of collected water in **litres**.
5. Multiply the number of litres by 6 to give you a flow rate per minute.



Example: If you collected two litres in ten seconds, then the flow rate is
 $2 \text{ litres} \times 6 = 12 \text{ litres per minute}$.

6. Compare your flow rate with the recommended flow rate provided :

Bathroom Tap	Kitchen Tap	Shower
6 litres per minute	6-9 litres per minute	15 litres per minute

Source: City of Edmonton , How to Use the Green Home Energy Toolkit

- For shower flow rate higher than 15 litres per minute, consider installing a low-flow shower head.
- For tap flow rate higher than 6 litres per minute, consider installing an aerator.

Toilet leak test

You will need the digital timer and some dark food colouring for this activity.



1. Remove the tank lid, then flush.
2. After the flapper/tank ball drops and the tank refills, add several drops of dark food colouring.
3. Wait at least **20 minutes** without flushing.
4. After 20 minutes, look in the toilet bowl. If you can spot any trace of colour, there is a leak.

Leaks often occur at the flapper valve, which is simple and inexpensive to replace. Your local hardware store can recommend the best valve for you.

It's a good idea to check your toilet twice a year. Be aware of time-released toilet bowl cleaners that sit in your tank as these can speed the deterioration of parts and cause leaks in your toilet.



E-CENT Tool: Fridge/Freezer Thermometer

What is it for?

Use the fridge/freezer thermometer to check that your refrigerator and freezer meet Alberta Health Services (AHS) recommended temperatures.

Freezer	Refrigerator
+ 4°C (40°F) or colder	- 18°C (0°F) or colder

Source: Alberta Health Services

Bacteria need the right temperature to grow. In colder temperatures, bacteria can still survive but may grow slowly.



On the other hand, setting the temperature too cold can cause ice to form and prevent air circulation. It may even lead to electronics failure.

From the energy perspective, fridge and freezers are always running. Keeping the temperature unnecessarily low uses up more energy and you will end up with a higher energy bill.

Using the fridge/freezer thermometer

1. Place the thermometer onto the **middle shelf** of the fridge or freezer. Avoid placing it too close to other items or into the fridge door.
2. Close the fridge/freezer door.
3. Wait **30 minutes** or even overnight for the thermometer to adjust to the temperature.
4. Check that the measurement meets the recommended temperatures by AHS.
5. You may need to adjust the fridge/freezer to a different setting and repeat Steps 1-4.



E-CENT Tool: Energy Meter

What is it for?

Use the energy meter to measure the amount of electricity used by your small-to-medium sized appliances and electronics.

You can now:

- Find items that draw power even when turned off.
- Compare the amount of electricity consumed in different modes: fully operating, on standby, or on eco-mode.
- Compare your item's performance with Energy Star models.
- Estimate the cost of running your item in one year.





The energy meter should not be used with direct current appliances (like hot tubs and ceiling fans). The energy meter **CANNOT** be used for appliances operating at 220 V or 240 V (like your oven and clothes dryer). These appliances can be recognized by the different wall outlets they use.

What can you measure with the energy meter?

The energy meter can be used on most small household appliances that operate between 110 V to 120 V, such as:

- | | | | |
|-----------------------------------------|-----------------------------------------|-------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> Cable box | <input type="checkbox"/> Hair dryer | <input type="checkbox"/> Printer | <input type="checkbox"/> Toaster |
| <input type="checkbox"/> Computer | <input type="checkbox"/> Microwave oven | <input type="checkbox"/> Refrigerator | <input type="checkbox"/> Video game system |
| <input type="checkbox"/> Coffee maker | <input type="checkbox"/> Modem | <input type="checkbox"/> Space heater | <input type="checkbox"/> Wireless router |
| <input type="checkbox"/> DVD/VCR player | <input type="checkbox"/> Phone charger | <input type="checkbox"/> Stereo equipment | |
| <input type="checkbox"/> Freezer | <input type="checkbox"/> Power strip | <input type="checkbox"/> Television | |

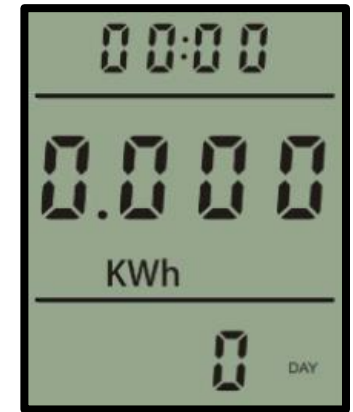
Source: Energy Trust of Oregon, Check Out Energy Savings

Defining electrical terms

- **Watt (W):** a unit of energy
- **Kilowatt (kW):** 1,000 watts
- **Kilowatt-hour (kWh):** a measurement of energy used over time, this is the billing unit used by the electrical utility.

Example: A 60 W lightbulb operating for 20 hours uses 1.2 kWh.





Using the energy meter with large appliances

For larger appliances that are plugged in for long periods of time, use kWh.

1. Plug the energy meter into the electrical outlet.
2. Press the **RESET** button using a pen. Press the **FUNCTION** button until you see **kWh** unit showing in the middle display.
3. Plug your appliance into the energy meter. Once plugged in, the meter will start recording the power consumption in kWh and elapsed time.
4. Wait for at least an hour then record the kWh and duration from the meter. The meter resets to zero when unplugged, so it is important to record before unplugging.
5. Calculate the results:

- Identify the kWh used for a single hour.

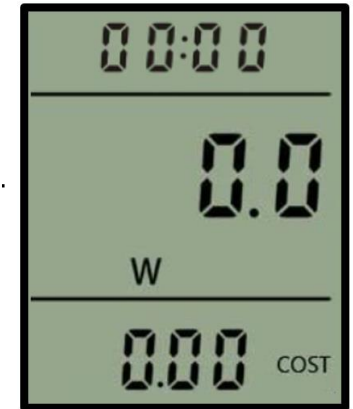
Example: The energy meter was plugged in for 01:30 hours and used 0.20 kWh in that time. To calculate use for one hour, divide 0.20 by 1.5 hours = 0.13 kWh/one hour

- To estimate total use for a year, multiply kWh used in one hour by number of hours used per day by 365 days.

Example: $0.13 \text{ kWh/one hour} \times 24 \text{ hours/day} \times 365 \text{ days/year} = 1,140 \text{ kWh/year}$

- To estimate the total cost per year, multiply your kWh used in one year by the power rate per kWh.

Example: $1,140 \text{ kWh/year} \times \$0.08/\text{kWh} = \$91 \text{ per year}$



Using the energy meter with small appliances

For smaller appliances that are not plugged in for long periods of time, use Watt.

1. Plug the energy meter into the electrical outlet.
2. Press the **RESET** button using a pen. Press the **FUNCTION** button until you see **W** showing in the middle display and **COST** in the bottom display. Make sure there is no **Lo** or **Hi** displayed at the bottom display.
3. Plug your appliance into the energy meter.
4. Switch on your appliance and record the Watt reading from the meter. As this is an instantaneous reading, you can switch appliance settings and take note of the Watt difference.
5. Calculate the results:

- What is the active power used by the appliance on different settings?

Example: Your hairdryer uses 1,400 watts on “High” and 1,000 watts on “Low”.

- To estimate total watts-hours used in a year.

Example: The hairdryer is used on “High” setting for 10 minutes a day for 3 days a week.

$10 \text{ minutes/day} \times 3 \text{ days/week} \times 52 \text{ weeks/year} = 1,560 \text{ minutes/year} = 26 \text{ hours/year}$

$1,400 \text{ watts/use} \times 26 \text{ hours/year} = 36,400 \text{ watt-hours/year}$

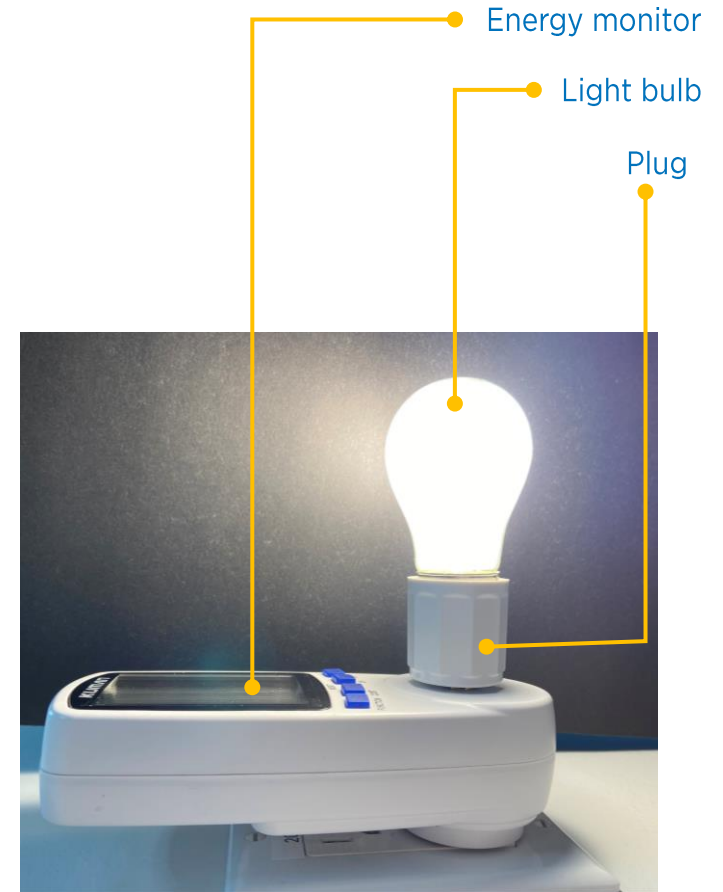
- To estimate the total cost per year, multiply your watt-hours used in one year by the power rate per kWh.

Example: $36,400 \text{ watt-hour/year} \times 1 \text{ kWh}/1000 \text{ watt-hour} \times \$0.08/\text{kWh} = \$2.91 \text{ per year}$

Comparing LEDs and incandescent lightbulbs

You will need the two light bulbs, the energy meter and the light bulb plug.

1. Screw one of the lightbulbs into the light bulb plug.
2. Plug the energy meter into the electrical outlet.
3. Press the **RESET** button using a pen. Press the **FUNCTION** button until you see **W** unit showing in the middle display and **COST** in the bottom display. .
4. Insert the light bulb plug into the energy meter.
5. Record the Watt reading from the meter.
6. Remove the plug, unscrew the lightbulb and replace with the second lightbulb. Repeat Steps 3-5.
7. Compare the two Watt readings, what can you deduce from these measurements?



Try to take readings with the light meter and the thermal imaging camera too!

E-CENT Tool: Light Meter

What is it for?

Use the light meter to measure the brightness in your room.



Using the light meter

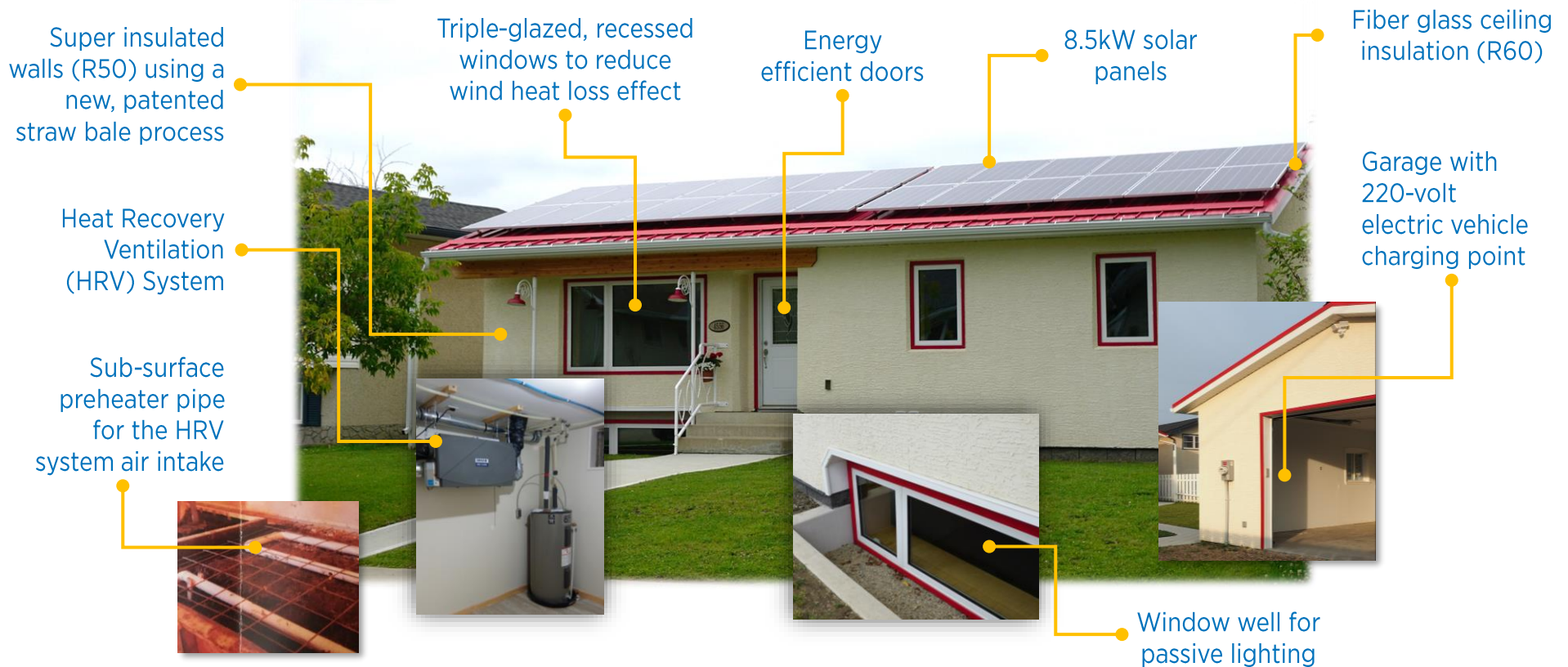
1. Set the range selector to 2,000.
2. Put the sensor on the work surface of the room you want to measure (i.e. table, kitchen counter). For hallways, place the sensor on the floor.
3. Switch the meter on. Take the cover off the sensor.
4. When the reading is stable, record the lux measurement and compare to the table provided.
5. If the display shows 1, the lux is higher than 2,000. Switch range selector to 20,000.
6. When you are finished with the light meter, make sure you replace the cover and switch the meter off.

Activity	Recommended Minimum Lux
Entertaining and dining	100-220
Casual reading and grooming	220-550
Kitchen and laundry (general light)	220-550
Office work	320-640
Kitchen (food preparation)	550 - 1,100
Prolonged reading or studying	550 - 1,100
Workshop activities	550 - 1,100
Sewing (medium coloured fabrics)	550 - 1,100
Sewing (dark fabrics)	1,100 - 2,200
Hobbies involving fine details	1,100 - 2,200

From: City of Edmonton , How to Use the Green Home Energy Toolkit

Case Study: Net-Zero Energy Home in Drayton Valley

This 1963 bungalow on 44 Avenue was completely retrofitted by local builder, Keith Warren, using local materials and local workmanship. The bungalow is now completely up-to-code and is so energy efficient, it produces more energy from the 8.5kW rooftop solar PV panels than it uses.



Additional information available from Off the Wall Construction and Renovation Facebook

ENERGY SAVINGS GUIDE

Having an energy efficient home means that you and your family will live in a comfortable setting with lower utility bills. Research suggests that energy efficient homes, depending on their features, increase in value at a greater rate than conventionally designed homes. What's not to love about that!

This guide lists a range of energy savings measures developed to manage energy use in homes. A cost scale is provided to indicate how much each of these energy savings measure might cost to implement. Select measures that work best for your home and budget. Do shop local and get advice from professionals whenever you can!

Whether you are renting accommodation or own your own house, you deserve a comfortable and healthy home!



Free



Low Cost



Medium Cost



High Cost

thank you

FOR SHOPPING LOCAL



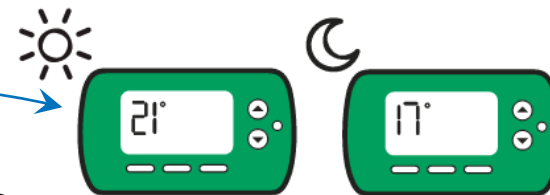
E-CENT Tips: Space Heating and Cooling

- (F) Close doors to cupboards and unused rooms to **reduce the space** you have to heat.
- (F) Maybe grab a **blanket** or put on an extra sweater and socks instead of turning up the heat?
- (F) Avoid putting furniture in front of **heating vents** as this blocks heat from radiating to the rest of your space.
- (F) During summer, **fans** use far less energy compared to air-conditioners.
- (\$) Decorate with **carpets and rugs** to help insulate cold floors.
- (\$) Apply a plastic film to your windows to prevent heat from escaping during cold winter months. Check your friendly neighbourhood hardware store for **Window Insulation Kits**.
- (\$) Seal air leaks by applying **caulking** around windows and between baseboards and floor.
- (\$) **Weather stripping** can create a tight seal and eliminate drafts around your windows and doors.



💰 Get your boiler **serviced regularly** to ensure it is running optimally.

💰 Install and correctly use **programmable thermostats**.

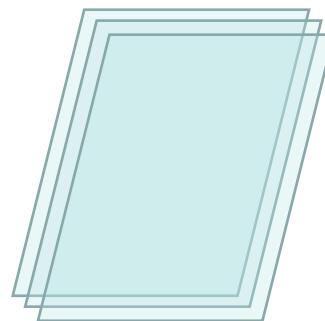


💡 Did you know that a 1°C drop in temperature for eight hours could reduce your heating energy consumption by up to 2%?

\$\$\$ Install new or additional wall insulation to reduce your heating needs. Consider sealing air leaks to the attic and crawl space too.

\$\$\$ Install high-efficiency furnaces and boilers. Look for the **ENERGY STAR** symbol!

\$\$\$ Replace your windows with more **energy efficient window** options (double/triple glazing).



Toolkit Time!

Use the thermal imaging camera to detect places that are losing heat or letting cool air in.

See page 5 for instructions.



E-CENT Tips: Domestic Water

Water heating is expensive! When you use hot water at home, you are paying for both the water and the energy used to heat it.

- ⓕ Use **cold water settings** for your washing machine – your clothes will last longer too!
- ⓕ Take **shorter showers** and **turn-off the tap** when brushing your teeth.
- ⓕ Only run dishwasher and washing machine with **full-loads**.
- ⓕ Do the **toilet leak test!** See page 9 for instructions.
- Ⓢ Fix dripping taps and leaking toilets immediately!
- Ⓢ Installing **low flow showerheads and faucet aerators** can help reduce water usage by 25-60%
- ⓈⓈ **Insulating hot water pipes** keeps the water in your pipes warm, so less energy is required to bring hot water to your faucet. Find hot-water pipe insulation at your local hardware store!
- ⓈⓈⓈ Replace older appliances and fixtures with energy efficient models. You might qualify for a rebate from the Drayton Valley's **Preserve Our Ultimate Resources (POUR) Program!**



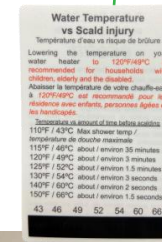
Toolkit Time!

Use the hot water temperature card to measure hot water temperature from your taps.

See page 7 for instructions.









Use the digital timer to measure your shower and tap flow rates.

See page 8 for instructions.



E-CENT Tips: Lighting

Lighting is an essential part of Drayton Valley homes, especially during the darker winter months. How can we take advantage of natural light from the sun and reduce our reliance on electricity?

-  Make good use of your blinds and curtains! Open your blinds on winter days to use sun's energy to heat and light up your home. Close them on summer days when it's already warm.
-  Get into the habit of turning off lights when a room is not occupied.
-  Clean your windows, lights, bulbs and shades regularly to increase room brightness.
-  Do the LED vs incandescent test! [See page 15 for instructions.](#)
-  Some tasks require brighter, directed lights. Make use of task lighting to avoid lighting up the entire room.
-  Convert all lightbulbs to LEDs. LEDs are much more energy efficient and longer lasting.
-  Try using solar powered lights for outdoor decorations, or illuminating your walkways and decks.
-  Consider installing lighting controls like automatic timers, motion sensors and dimmer switches.



Toolkit Time!

Use the light meter to measure your light availability and compare it to your task needs.
[See page 16 for instructions.](#)

E-CENT Tips: Appliances and Electronics

Individual appliances may be low energy consumers. But take a look around your house and count the number of appliances and electronics you own. Include anything that needs to be plugged in, even for just a short time. Add them all up and they can contribute significantly to your energy bills.

- F Always use the **correct appliance** for the job. Smaller appliances such as toaster ovens, microwaves and slow cookers use less energy than the stove. Match pots and pans to the right size burner and use lids to save energy and time.
- F If available, consider using the **eco-setting suggestions** that come with your appliance or device.



Toolkit Time!

Use the fridge/freezer thermometer to adjust your temperature settings.

See page 10 for instructions.

- F Use the **correct temperature setting** in your refrigerator and freezer. Too high and your food might spoil, too low is wasteful and unnecessary.
- F Ensure that the fridge and freezer doors **seal properly** by keeping it clean and inspecting the condition of the sealing strips.
- F Defrost your fridge and freezer every 6 months.
- F Make sure your fridge/freezer is in a cooler, well-ventilated location.

- F A clean appliance will not only work more efficiently but will be more durable too. Bonus points? **Cleaning regularly** prevents the growth of bacteria and mold, so you can keep your food safe and your dishes and clothes smelling fresh.
- F **Cook meals together.** Why not bake your lasagna and apple pie at the same time?
- F Run your dishwasher on **low temperature** and make sure it is **always full** before turning it on. If you can, skip the drying cycle and let the dishes **air dry** instead.
- F **Hang clothes** to dry instead of using a dryer.
- F Use **dryer balls** in your dryer to speed up drying time.
- F **Unplug your devices** when not in use and slay the energy vampires in your home!
- \$ Try using a **smart power bar** that come with built-in timers or auto-shut off features.
- \$\$\$ When upgrading appliances, look for the **ENERGY STAR** symbol. You can also use **EnerGuide** labels to compare between similar sized models.



Toolkit Time!

Use the energy meter to check how much electricity is used when appliances are in different settings.

See page 11 for instructions.



LEARN MORE

Home Energy Audit

Interested in pursuing a full home energy audit? Make sure your energy auditor is registered with Natural Resources Canada: <https://oee.nrcan.gc.ca/residential/personal/home-improvement/service/contact-advisors.cfm?attr=0>

EnerGuide™

EnerGuide™ is Canada's energy rating and labelling system that certifies the energy efficiency of your home. Learn more at: <https://www.nrcan.gc.ca/energy-efficiency/energuide-canada/energuide-energy-efficiency-home-evaluations/20552>

Edmonton Average for Reference

The average apartment in Edmonton uses 200-500kWh each month. Compare this to the average house at 800-1,200 kWh and mobile homes at 1,000 – 1,500 kWh
https://www.edmonton.ca/programs_services/documents/PDF/HomeEnergyToolkit-web.pdf

Understanding Your Energy Bill

Your energy bill consists of two parts, energy use charges and delivery charges. Learn more at: <https://ucahelps.alberta.ca/understanding-your-bill.aspx>

Further Reading

The Drayton Valley Municipal Library has more resources if you need further ideas to improve your home's energy efficiency. <https://draytonvalleylibrary.ca/>

FortisAlberta has a portal on energy savings for customers in their region. <https://www.fortisalberta.com/customer-service/save-energy>

RESOURCES USED

Reports

- City of Edmonton. *Green Home Guide*.
- City of Edmonton. *How to Use the Green Home Energy Toolkit*.
- City of St Albert. *Home Energy Assessment Toolkit*.
- City of Red Deer. *Energy & Water Conservation Toolkit*.
- City of Vancouver. *Do-it-Yourself: Home Energy Audit*.
- CODEMA. *Guide to Home Energy Savings*.
- CODEMA. *Home Energy Saving Kit Manual*.
- Energy Trust of Oregon. *Check Out Energy Savings*.
- National Resources Canada. *Energy Savings Toolbox: An Energy Audit Manual and Tool*.

- Natural Steps Canada. *Sustainability at home: A toolkit*.
- Town of Okotoks. *DIY Home Energy Audit Kit*.

Websites

- How to give your home an energy audit, <https://globalnews.ca/news/1996590/how-to-give-your-home-an-energy-audit/>
- Is it an Energy Audit or an Energy Assessment? <https://www.barriersciences.com/blog/energy-audit-vs-energy-assessment>
- Energy Efficiency Trends in Canada 1990-2013. <https://www.nrcan.gc.ca/energy/publications/19030>
- Energy savings tips. <https://www.fortisalberta.com/customer-service/save-energy/energysavingstips>

The E-CENT Kit Guideline

QUESTIONS OR COMMENTS?

Energy Program Coordinator
Town of Drayton Valley
draytonvalley.ca/drayton-valley-energy/

