Home **Energy Efficiency** Kit

CITY OF
Leduc

INTRODUCTION

Thank you for borrowing this Home Energy Efficiency Kit. Inside the kits are tools and information to help you understand your household energy use and find ways to save money and energy.

By finding energy efficiencies in your home, you can save on your utility bills. Changes or upgrades made helps to reduce our carbon footprint and support the City of Leduc's climate change goals of reducing greenhouse gas emissions.

As shown in the graph, the average home uses the most energy to heat up spaces. You can use this as a guide to help you target places with higher energy use so changes made can have a more significant impact.

The kit is intended to help you get started by considering building materials and designs that can make a difference on your home's energy efficiency. This kit is not an official home energy evaluation. An EnerGuide home energy evaluation (nrcan.gc.ca/myenerguide) requires extensive testing completed by a trained professional. For additional information, visit Leduc.ca/EEkits

This guide is for informational purposes only. A professional should be consulted if your home does not meet the guidelines listed or on any general concerns about the safety or comfort of your home.
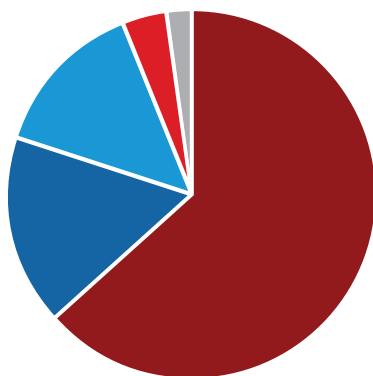
Average Home Energy Use

64% Space Heating
17% Water Heating
14% Appliances
4%   Lighting
2%   Space Cooling

Source: NRCan 2019

INSIDE THE KIT

A. Thermal Scanner (charging cord underneath)

B. Fridge / Freezer Thermometer

C. Batteries for Fridge / Freezer Thermometer
  (4 AA & 2 AAA)

D. Radon Detector (3 AAA batteries underneath)

E. Thermometer / Hygrometer

F. Wattmeter

G. Air Quality Monitor (charging cord underneath)
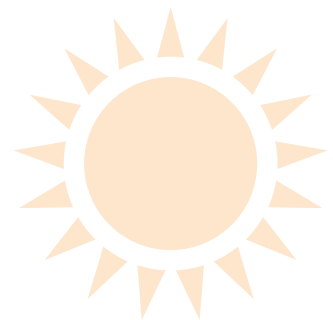
Energy Efficiency Tools and Instructions

A – Thermal Scanner (Measures Temperature)

A thermal scanner detects heat (infrared light) and converts it into a visual image. Darker colours indicate colder areas while lighter colours indicate warmer areas (cold to hot: black [coldest], blue, green, yellow, orange, red, white [warmest]).

Measure your home temperature on cold winter days to identify leaks or poorly insulated spots in the building. Walk around the inside and outside of your home looking for significant temperature differences when pointing the scanner at all external walls, floors, roofs, and important spots listed below.

If there is a leak in your home, seal it with caulking, sealant, spray foam, weatherstripping, insulation or consult a professional for further advice.

Important Spots
(where outside air may enter a home)

• Attic	• Exhaust Fans
• Baseboards	• Fireplaces
• Water Pipes	• Chimneys
• Sewers	• Light Fixtures
• HVAC Ducts	• Electrical wiring
• Wall Vents	• Outlets/Switches

Appliances
(look for a leak or a faulty seal)

• Refrigerator	• Boiler
• Freezer	• Furnace
• Oven	
• Microwave	
• Computer	

Get Started

1. Press and hold the power button to turn the unit on.

2. Check the top right corner of the display screen to make sure the battery is charged. If the battery is low, plug in using a USB-C cable (requires 6 hours for a full charge).

3. Using the crosshairs on the display screen for targeting, point the thermal scanner at the object. The laser's circular target identifies test spots. Pull the trigger on the front of the unit to capture an image (if desired).

• To view images: Go to GALLERY and use arrows to scroll through images

• Deleting an image: Go to GALLERY and use arrows to scroll through images then press MENU, DELETE (or DELETE ALL IMAGES)

4. When done, press and hold the power button to turn the unit off.

B & C – Fridge/Freezer Thermometer
(Measures Fridge/Freezer Temperature)

Changing to the recommended temperature can save up to 25% of the energy used by that appliance.

Look for energy star certification on new appliances or set your fridge to the energy-saving temperature listed below.

	Refrigerator	Freezer
Recommended Temperature	2 to 4°C (36 to 39°F)	-15 to -18°C (5 to 0°F)
Energy Saving Temperature	4°C (39°F)	-15°C (5°F)

Get Started

1. Remove the back panel of the main unit and insert 2 AAA batteries as indicated then replace the back panel. The display will turn on.

2. On each of the two sensor units, slide down the front panel and insert 2 AA batteries as indicated then replace the front panel. The red light on the front of the unit will turn on.

3. Place main unit on refrigerator/freezer door (magnets on the back of the u nit) or on a flat surface using the flip-out stand.

4. Place one of the sensor units inside the refrigerator and the other unit inside the freezer.

5. Wait for the sensor units to acclimatize. After 5 mins, press the "CLEAR" button to reset the 'MAX' and 'MIN' values recorded.

6. Once the test is complete, remove batteries from the main unit and both sensor units. Display on main unit and red light on sensor units will turn off.

Notes
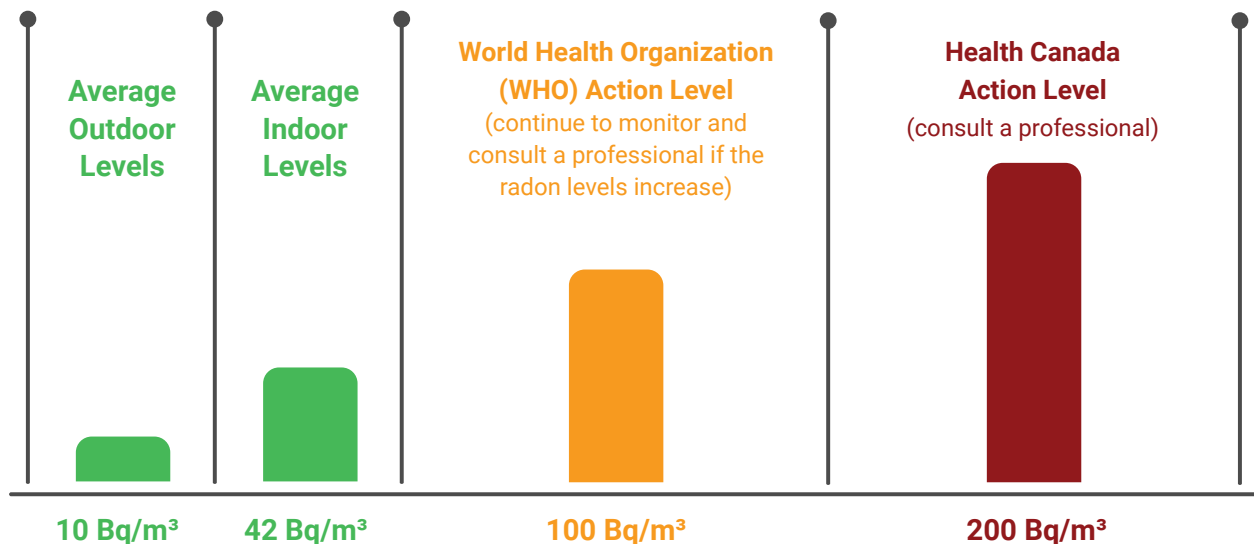- To use the alarm settings, press the "Alarm Indoor" button and then "Alarm Sensor 1/ Alarm Sensor 2" button. Press them again to deactivate.
- Press the "+/C/F" button to change between Celsius and Fahrenheit display

D – Radon Detector (Measures Radon Levels)

For best results, complete a radon test in the winter. Put the detector in the basement for at least 24 hours to complete the test.

Average Outdoor Levels
10 Bq/m³

Average Indoor Levels
42 Bq/m³

World Health Organization (WHO) Action Level
(continue to monitor and consult a professional if the radon levels increase)
100 Bq/m³

Health Canada Action Level
(consult a professional)
200 Bq/m³

Get Started

1. Remove the back panel and insert 3 AAA batteries as indicated then replace the back panel (all stored data is deleted and the instrument resets upon battery replacement).

2. Wait for the instrument to calibrate. The screen displays 'CAL' (approximately 30 seconds).

3. The screen will then show 4 flashing dashes (- - - -) by both the Long-Term and Short-Term indicators as the instrument collects initial readings.

4. Place the instrument in a living area making sure it is:
   • At least 50 cm above the floor,
   • At least 150 cm from the nearest door, window, or air vent, and
   • Not exposed to direct sunlight or moisture.

5. Once in place, try not to move it for the duration of the test (24 hours – 1 week).

6. Once the test is complete, remove the batteries and the display will turn off.

Notes

• Long-Term Average represents the average radon value for the ongoing measurement, max one year (updated once a day).

• Short-Term Average alternates between showing radon values for the last day (updated hourly) and for the last seven days (updated once a day).

E – Thermometer (Measures Temperature) and Hygrometer (Measures Humidity)

You can save as much as 10% on heating and cooling costs by adjusting the indoor temperature for the season (cooler in winter; warmer in summer) and using nighttime setbacks. Reduce energy by installing a programmable thermostat which automatically adjusts your home temperature and wearing extra layers during winter.

	Average Indoor Temperature	Sleeping Temperature	Empty House
Winter Heating Setpoint	20ºC (68ºF)	16ºC (60ºF)	16ºC (60ºF)
Summer A/C Setpoint	25ºC (78ºF)	Turn off A/C and open windows	Turn off A/C
Summer No A/C	Outside Temperature	Open Windows	Close Windows

Humidity	Humidity Level	Result	Fix
Too Little	Under 5% for multiple days	Excessive dry skin and home materials	Humidifiers or growing plants indoors
In-between	5% - 50% humidity	Normal conditions	No Problems
Too Much	Over 50% for multiple days with no rain outside	Increased risk of mould and dust mites	De-humidifier or improved HVAC system

Get Started

1. Move the switch on the top edge of the unit to the 'ON' position to turn it on.

2. The current temperature and % humidity will be displayed.

3. Push the "C/F" button to switch between Celsius and Fahrenheit.

4. Push the "MIN" button to display the minimum temperature and humidity values recorded.

5. Push the "MIN" button again to return to the normal display.

6. Push the "MAX" button to display the maximum temperature and humidity values recorded.

7. Push the "MAX" button again to return to the normal display.

8. Move the switch on the top edge of the unit to the "OFF" position to turn it off.

F – Wattmeter (Measures Electricity Use)

Electric energy (electricity) is measured in Kilowatt-hours (kWh), to use the wattmeter:

- Plug an appliance into the wattmeter and then into the wall to measure the amount of energy used by the appliance in Kilowatt-hours.
- Test appliances and devices which appear off, but still may consume energy even when not being used, such as computers, televisions, microwaves, etc. (this "phantom power" accounts for 10% of home energy use).

Note: DO NOT use the wattmeter with blow dryers or space heaters as the high energy use may damage the device.

Step 1	Step 2	Step 3	Step 4	Step 5
Record your total monthly payment from your electricity bill.	Record your monthly energy usage in kWh from your electricity bill.	Divide Step 1 by Step 2 to calculate your electricity price.	Record how many kWh your appliance uses over an hour, a day, or a week.	Multiply Step 3 by Step 4 to find how much your appliance costs to run over time.

Example:

$150	500 kWh	$150 / 500 kWh = $0.30/kWh	40 kWh/week	$0.30/kWh * 40 kWh/week = $12/week
		Monthly payment / monthly kWh = electricity price		electricity price*appliance kWh = appliance energy cost

Get Started

1. Plug the unit into a wall outlet and then plug the appliance into the unit.

2. Use the "Function" button to scroll between screens. All screens show the run time that the electrical appliance has been connected and also:

- Screen 1: the current amount of power being used by the electrical appliance connected in Watts (W) and the cumulative costs (if the value for electrical costs has been entered),
- Screen 2: the cumulative amount of power being used by the appliance connected in kilowatt Hours (kWh) and the cumulative number of days the appliance has been running,
- Screen 3: the voltage of the grid and the grid frequency in Hertz (Hz),
- Screen 4: current of the electrical appliance connected in Amperes (A) and the power factor of the electrical appliance connected,
- Screen 5: the minimum power recorded during operation (W),
- Screen 6: the maximum power recorded during operation (W), and
- Screen 7: where you can set the cost / kWh.
  - Long press the "COST" button
  - Press the "FUNCTION" button
  - Use the "UP" and "DOWN" buttons to adjust the value
  - Press the "COST" button again to confirm and exit the settings menu

G – Air Quality Monitor
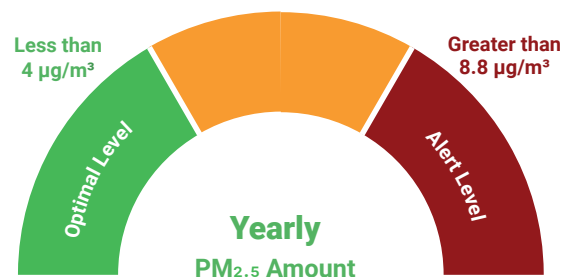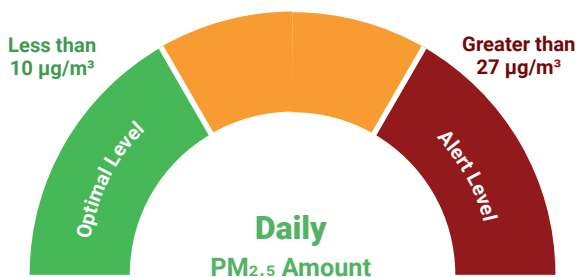### (Measures CO_2 and Particulate Matter)

Ensure all windows and doors are closed for at least an hour before using the air quality monitor. Average outdoor carbon dioxide (CO_2) levels are 350 to 450 ppm, while the maximum indoor CO_2 level is 1,000 ppm.

Humans are the main source of CO_2 indoors and serve as an excellent indicator of indoor air stagnation by poor HVAC air replacement and ventilation. CO_2 levels over 1,000 ppm may suggest inadequate ventilation but is not dangerous. Note: CO_2 is different than carbon monoxide, which is dangerous to humans. It is recommended that all homes have a carbon monoxide detector.

Particulate matter, $PM_{2.5}$ refers to tiny particles or droplets in the air that are 2.5 microns or 10 microns in width (much less than a human hair). Alberta is often above the recommended levels of $PM_{2.5}$ so be sure to compare indoor to outdoor air, especially during times of wildfire smoke.

Replacing HVAC air filters when recommended (generally, three months) or if dirty, sooner is one way to improve indoor air quality and increase energy efficiency. Additional air purifying devices can further reduce the particulate matter in the home if air quality is still a concern.

Less than 10 µg/m³ — Optimal Level

Greater than 27 µg/m³ — Alert Level

Daily
$PM_{2.5}$ Amount

Less than 4 µg/m³ — Optimal Level

Greater than 8.8 µg/m³ — Alert Level

Yearly
$PM_{2.5}$ Amount

Get Started

1. Press and hold the white button to turn the unit on.

2. Check the top right corner of the display screen to make sure the battery is charged. If the battery is low, plug-in using the USB cable (requires 3 hours for a full charge).

3. Single-click the white button to change between Celsius and Fahrenheit.

4. Let the unit stand for 2-3 minutes before recording readings as it takes a few minutes to stabilize.

5. When done, press and hold the white button to turn the unit off.

How To Increase Your
Home Energy Efficiency

Now that you have completed the series of tests on your home, here are a few energy-saving tips and upgrades to consider for your home to make it more energy-efficient. The list of tips and upgrades are only suggestions for the average home. A professional should be consulted if your home does not meet the guidelines listed or for any general concerns about the safety or comfort of your home.

Heating and Cooling
(Thermal Scanner, Thermometer/Hygrometer)

Energy Saving Tips:

1. Adjust the temperature for the season, when you are not home or when you are sleeping.

2. Perform regular maintenance, clean filters and vents often to improve efficiency.

3. Move furniture blocking your heat vents for better airflow and heat distribution.

4. Put on more layers in winter, such as a sweater and thermal socks.

5. Open the window or use a fan instead of air conditioning when possible.

6. Use the sun to your advantage, opening the blinds on cold days and closing them on hot days.

7. Plant deciduous (leaf) trees in the south to reduce summer sun and increase winter sun when the leaves fall off. Plant evergreens (needle trees) in the north and west to block cold winter winds.

Upgrades:

1. Increase insulation to reduce cold air flow into your home in winter.

2. Window replacement to double/triple pane windows can save a lot on heating bills.

3. Install an energy efficient door to reduce home energy loss

4. Install solar panels which can generate revenue by selling excess power back to the grid.

5. Install a programmable thermostat that can adjust the temperature for different times of the day.

6. Use weather-stripping or caulking to seal the gap around windows and doors.

7. Buy a window insulation kit with plastic wrap to increase insulation in old windows.

8. Install an air-source or ground-source heat pump (geothermal) to use electricity to generate heat in winter and air conditioning in summer.
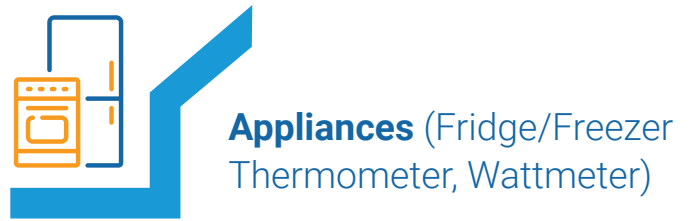
Water

Energy Saving Tips:

1. Adjust your hot water to an average temperature of 49°C (120°F) to save on heating bills.

2. Use a rain barrel to water outdoor gardens.

3. Buy cold water detergent to run your washing machine on cold to save money on water heating.

4. See if the toilet has a leak by putting a few drops of food colouring into the toilet tank. After 20 minutes, see if any food colouring appears in the toilet bowl to indicate a leak. Consult a professional to fix it.

5. Use a bucket and a large measuring cup to measure the flow rate for 10 seconds. If your shower flow rate is higher than 15 litres per minute then purchase a new showerhead. If your kitchen or bathroom tap flow rate is higher than 6 litres per minute then install an aerator.

Upgrades:

1. Install insulation on all hot water pipes to reduce heat loss in your pipes.

2. Purchase a tankless water heater to save space in your home and reduce energy costs over time.

3. Install a heat pump water heater and use electricity to heat your water to reduce your carbon footprint.

Appliances (Fridge/Freezer Thermometer, Wattmeter)

Energy Saving Tips:

1. Use the right-sized appliance for the job: e.g. microwave/toaster oven for something small.

2. Match pots and pans to the right size of burner and use lids.

3. Run appliances such as dishwashers and laundry machines once there is a full load.

4. Unplug appliances when not in use to avoid "phantom" or background energy waste.

5. Try no-power alternatives, such as a clothesline instead of the dryer.

6. Vacuum the coils on the back of your fridge to increase efficiency.

7. Ensure appliance doors seal properly, especially the fridge and oven.

8. Monitor old, inefficient fridges/freezers, hot tubs and space heaters for replacement timing.

9. Remove freezer frost buildup at ¼ inch buildup to increase the appliance efficiency.

Upgrades:

1. Purchase energy star® appliances because they have been certified for low energy use.

2. Install an electric stove instead of a gas stove to eliminate pollution in your home and reduce your carbon footprint.

Lighting (Wattmeter)

Energy Saving Tips:

1. Turn off the lights when not in the room.
2. Take advantage of natural light when available and open the blinds to let the light in.

Upgrades:

1. Switch old lightbulbs to LED bulbs which last much longer and save up to 80% on lighting costs.
2. Install motion sensors to automatically shut the lights when there is nobody in the room

Air quality (Radon detector, Air quality monitor)

Energy Saving Tips:

1. Grow plants indoors to increase oxygen and remove harmful chemicals from the air.
2. Purchase eco-friendly, green-certified cleaning solutions which emit less toxins into the air.
3. Limit fireplace or candle burning where possible.
4. Use fans when cooking.
5. Use an air purifier.

Upgrades:

1. Upgrade your HVAC system to filter air more frequently and thoroughly.
2. Get your home professionally air sealed to reduce air leakage and keep polluted air outside (e.g. wildfire smoke, dusty roads).

Energy Efficiency
Supports and Programs

There are many supports and programs available to help you make energy-efficient upgrades to your home.

1. An EnerGuide home evaluation is an extensive series of tests conducted by a trained professional which will provide you with a full assessment of your home's energy performance and expert advice on how to make it more efficient. EnerGuide is Canada's standardized energy rating and labelling system that certifies the energy efficiency of products and homes.
    Learn about the EnerGuide home evaluation at nrcan.gc.ca/myenerguide

2. City of Leduc's Clean Energy Improvement Program (CEIP) is available to homeowners who want to improve their property with energy-efficient upgrades by offering a flexible financing option that is paid back through property taxes. Learn more at leduc.ca/cleanenergyimprovementprogram

3. Greener Homes Grant: This federal program provides up to $5,000 to upgrade your home.
    Visit www.nrcan.gc.ca.

4. Greener Homes Loan: This federal program provides up to $40,000 in interest-free loans to upgrade your home. Details at www.nrcan.gc.ca.

5. Understanding your energy bill. For more information about how to understand your bill, call your retailer (the number on your energy bill) or visit the Utility Consumer Advocate website at ucahelps.alberta.ca.

6. Ask the experts at your local hardware store for information on energy-efficient products.

7. Consult a professional.

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CONTACT

For more information on energy efficiency supports and programs, visit Leduc.ca/EEkits

If you have any questions or comments about the Home Energy Efficiency Kits, please contact: EcoSmart@leduc.ca