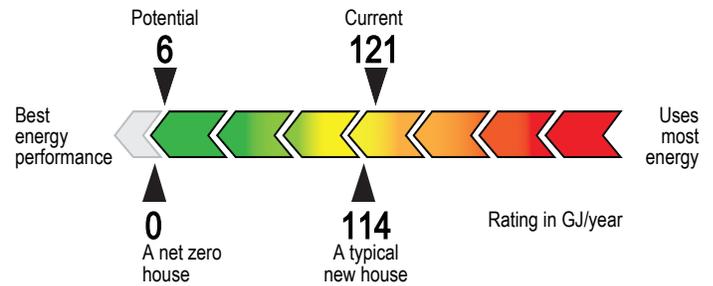


# RENOVATION UPGRADE REPORT



Year built: 1998



## Assessment date:

February 20, 2020

This report identifies your home's energy savings opportunities by providing you with recommended renovation upgrades. It complements your EnerGuide label and your Homeowner Information Sheet and includes:

- 🏠 Your customized action plan to improve the energy efficiency of your home;
- 🏠 Information on your rating and potential contribution to greenhouse gas (GHG) emission reductions;
- 🏠 Before and after heat loss and energy use estimates;
- 🏠 Important health and safety information; and
- 🏠 Additional energy savings tips.

## YOUR ENERGY EFFICIENCY ROADMAP

Your energy advisor has prioritized your recommended upgrades based on the potential energy savings, the life expectancy of your home components, the interactions between systems, your potential renovation plans and the costs to perform the upgrades.



### 1. Insulate sloped ceilings and flat roofs

[ Save 2 GJ/year ]



### 2. Insulate attic

[ Save 3 GJ/year ]



### 3. Upgrade heating system

[ Save 21 GJ/year ]



### 4. Upgrade hot water system

[ Save 18 GJ/year ]



*Additional recommendations on next pages*



By implementing all upgrades, you are helping to fight climate change and could reduce GHG emissions by up to 4.9 tonnes per year.

## RECOMMENDED ENERGY EFFICIENCY UPGRADES

A customized plan to improve the energy efficiency of your home is found below:



### 1. Insulate sloped ceilings and flat roofs

- ❑ Increase the insulation value of your sloped ceiling (Ceiling02) by RSI 5.11 (R-29.0).

This upgrade could reduce the energy consumption of your house by 2 gigajoules per year.

#### Did you know?

Ceilings account for 10 percent of the estimated annual heat loss of your house.

#### Useful tips

The following are some of the items to consider before insulating:

- ❑ Ensure the roof does not leak.
- ❑ Ensure electrical work is up-to-date and that all desired ceiling fixtures have been installed.
- ❑ Look for opportunities to air seal before insulation is added.
- ❑ Ensure adequate venting is installed and that it is not blocked by insulation.
- ❑ Ensure all exhaust fans and ducts entering the sloped ceiling or flat roof are sealed and vented to the outside.

Sloped ceilings and flat roofs can be insulated from the interior, exterior or both using a variety of methods. Refer to your energy advisor's comments to determine the best approach.

Consult chapter 5 of [Keeping the Heat In](#) to learn more and take action.

#### Your energy advisor's comments



Cathedral Ceiling or Flat Roof: Your cathedral ceiling is actually quite easy to insulate. If you engage a contractor to top up insulation levels in the gable roof consider also topping up your cathedral ceilings to the same level, R60. Considering heat travels the path of least resistance, it is important to have a continuous level of insulation whenever possible.



### 2. Insulate attic

- ❑ Increase the insulation value of your attic (Ceiling01) by RSI 5.11 (R-29.0).

This upgrade could reduce the energy consumption of your house by 3 gigajoules per year.

#### Did you know?

Ceilings account for 10 percent of the estimated annual heat loss of your house.

#### Useful tips

The following are some of the items to consider before insulating the attic:

- ❑ Ensure the roof does not leak.
- ❑ Ensure electrical work is up-to-date and that all desired ceiling fixtures have been installed.
- ❑ Look for opportunities to air seal before insulation is added.
- ❑ Ensure adequate attic venting is installed and that it is not blocked by insulation.
- ❑ Ensure all exhaust fans and ducts penetrating the attic are sealed and vented to the outside.

## RECOMMENDED ENERGY EFFICIENCY UPGRADES - CONTINUED

Consult chapter 5 of [Keeping the Heat In](#) to learn more and take action.

### Your energy advisor's comments



It is recommended you consider topping up current insulation in the attic to a total value of R60. Take the opportunity to seal all attic penetrations such as the attic hatch, plumbing stacks, bathroom exhaust fans and electrical junction boxes or pot lights to take advantage of potential air sealing opportunities while insulation work is being completed.

Attic Airsealing: Be sure to perform complete airsealing of the attic floor and any adjoining walls before insulating the attic.

Airsealing and insulating your attic can also help prevent the formation of dangerous icicles and reduce excess humidity and moisture accumulation which can negatively impact building materials.



### 3. Upgrade heating system

- ❑ Install a new electric forced-air furnace.
- ❑ Install a new ENERGY STAR certified air-source heat pump that has a heating seasonal performance factor (HSPF) of 12.

This upgrade could reduce the energy consumption of your house by 21 gigajoules per year.

### Did you know?

Space heating accounts for 52 percent of the estimated annual energy use of your house.

### Useful tips

Perform any planned building envelope upgrades before your heating contractor begins work since a more energy efficient building envelope may mean that a smaller heating system could be installed. The contractor should first conduct a heat loss calculation before deciding on the capacity and model of your heating system.

Your *Homeowner Information Sheet* provides important details and a reference for this calculation. Inform your heating contractor of any building envelope upgrades performed since your evaluation, or that will be undertaken since these may render certain details in your *Homeowner Information Sheet* inaccurate.

Consider purchasing a system that is ENERGY STAR certified when available. Consult Natural Resources Canada's website at <https://www.nrcan.gc.ca/energy/products/categories/heating/13740> for information on choosing a heating system.

### Your energy advisor's comments



Consider the option of installing an Air Source Heat Pump (ASHP) when you are looking at replacing your existing central air conditioner. These highly-efficient systems extract energy from the outside air to heat your house, but also provide cooling in the summer. To work effectively, an ASHP needs to be well sized for your house, typically about 25% larger than the design cooling load (see the Space Cooling section of your Homeowner Information Sheet) (1 kW = 3,400 BTU/h).

The upgrade to your cooling system would be integrated with the ASHP upgrade. These systems not only provide efficient heating for your home but also substantially improve on the efficiency of your current central air conditioner.

Your home has been modeled with an ASHP which operates at a heating efficiency of 12 HSPF and a cooling efficiency of 18 SEER. It also assumes you are using your windows for natural cooling during the cooling season 20% of the time.

Your home has also been modeled with an Electric Forced Air Furnace back up system for additional reductions in GHG production associated with the combustion of fossil fuels.



### 4. Upgrade hot water system

- ❑ Install a new ENERGY STAR certified, electric heat pump water heater with an energy factor (EF) of 2.97.
- ❑ Install a drain-water heat recovery system with an efficiency of 53.3%.

This upgrade could reduce the energy consumption of your house by 18 gigajoules per year.

#### Did you know?

Water heating accounts for 20 percent of the estimated annual energy use of your house.

#### Useful tips

The efficiency of fuel-fired water heating equipment is expressed as the energy factor (EF), uniform energy factor (UEF) or thermal efficiency. The higher the number, the more efficient the water heater. The efficiency of storage-tank electric water heating equipment is expressed in watts of standby loss, where the lower the number, the more efficient the water heater.

Look for an energy-efficient model and ensure it is properly sized for your needs. Use manufacturers' sizing charts available from your contractor or retailer. See Natural Resources Canada's website at <https://www.nrcan.gc.ca/energy/products/categories/water-heaters/13735> for more information.

#### Your energy advisor's comments



**Drain-Water Heat Recovery:** It is recommended that you consider the installation of a Drain-Water Heat Recovery system (DWHR). These units are installed into your main plumbing stack draining at least one shower, and they recycle otherwise lost heat from the water draining from your showers or baths. It collects this heat recycles it to be used by your water heater, reducing the amount of energy your hot water heater requires. I have modeled your home with a 60" length system rated at approximately 53% efficiency. But you may consider installing other lengths of system depending on the amount of plumbing stack available. The greater the length the greater the efficiency.

Your home has also been modeled with a Heat Pump Electric Hot Water Heater. These systems are an excellent option to consider reducing the energy and costs associated with your domestic hot water requirements. A system with an energy factor of 3.3 has been specified.



### 5. Perform air sealing

- ❑ Improve the airtightness of your house by 10% to achieve 2.37 air change(s) per hour at 50 pascals.

This upgrade could reduce the energy consumption of your house by 2 gigajoules per year.

#### Did you know?

Air leakage accounts for 20 percent of the estimated annual heat loss of your house.

#### Useful tips

Air sealing is one of the most cost-effective energy-saving measures you can undertake. It is typically performed before and during other upgrades to ensure optimal benefit. Air sealing can help to minimize potential moisture damage and improve comfort by reducing drafts, heat loss, dust and outdoor noise in your home.

Consult chapter 4 of [Keeping the Heat In](#) to learn more and take action.

## RECOMMENDED ENERGY EFFICIENCY UPGRADES - CONTINUED

Air leakage locations identified by your energy advisor are listed below:



- As we discussed during the visit, there are a number of locations in the home which are suspected to be a source of air leakage. Consider strategic air sealing activities which target air leakage in order to minimize heat loss, improve home comfort and reduce your utility costs. Your key air leakage sites were: your attic hatch, window and door trim, ceiling penetrations such as pot lights, electrical boxes and ceiling exhaust fans. You would also benefit from sealing leaks on your outside walls at light switches and electrical outlets with the use of foam gaskets and child safety plugs. I would suggest paying particular attention to the following areas:
- \* Attic penetrations: Seal plumbing stacks, chimneys, tops of partition walls
- \* Attic hatch: Caulk trim gaps and update weatherstripping
- \* Pot lights: Install airtight insulation rated vapour barrier boots
- \* Bathroom exhausts: Seal fan housing with foil tape, seal any gap between housing and drywall with expanding foam.
- \* Windows: Caulk all visible gaps including trim at drywall. Inspect seasonally and caulk any gaps that develop, even on new windows
- \* Window or door weatherstripping: upgrade as necessary
- \* Doors: If weather-stripping cannot be upgraded, consider replacing with Energy Star doors
- \* Electrical outlets, switch plates
- \* Basement header, rim joist and sill plate: Caulk all gaps and penetrations
- \* Basement walls: completely seal any penetrations through your foundation walls, such as AC lines, vents, and any decommissioned ducting.
- \* Fireplace: ensure your wood fireplace damper is fully operable and is configured to provide a good seal against draft. Considering the effectiveness of a chimney to draw warm air from within the home it is important that the damper is maintained and is kept closed when the fireplace is not in use. You may also consider the use of fireplace chimney balloons which is a device intended to provide an enhanced seal in the fireplace flue. It is critical these are removed prior to using the fireplace.
- \* Additionally you may look at the option of sealing the masonry of the fireplace surround to your interior wall finish, and the penetration of the chimney through the attic floor.
- \* Floor perimeter: Caulk gaps at baseboards and ¼ round
- Attached Garage: Because of the dangers of carbon monoxide and other pollutants from automobile exhaust, it is important to ensure that the garage is hermetically isolated from the rest of the house. This means that all routes of air leakage must be sealed, including effective weatherstripping of the door that leads to the interior of the house.



### 6. Upgrade cooling system

- Install a new ENERGY STAR certified air conditioner.

This upgrade could reduce the energy consumption of your house by 3 gigajoules per year.

#### Did you know?

Space cooling accounts for 5 percent of the estimated annual energy use of your house.

#### Useful tips

Perform any planned building envelope upgrades before your contractor begins work since a more energy efficient building envelope may mean that a smaller cooling system could be installed. The contractor should first conduct a heat gain calculation before deciding on the capacity and model of your cooling system.

## RECOMMENDED ENERGY EFFICIENCY UPGRADES - CONTINUED

Your *Homeowner Information Sheet* provides important details and a reference for this calculation. Inform your contractor of any building envelope upgrades performed since your evaluation, or that will be undertaken, since these may render certain details in your *Homeowner Information Sheet* inaccurate.

Consider purchasing a system that is ENERGY STAR certified. Consult Natural Resources Canada's web site at <https://www.nrcan.gc.ca/energy/products/categories/cooling-ventilating/13756> for more information.

### Your energy advisor's comments



### 7. Add a renewable energy system

- Install a photovoltaic system designed to deliver 14869.6 kilowatt-hours per year.

This upgrade could reduce the energy consumption of your house by 55 gigajoules per year.

### Did you know?

Solar and wind energy can be used for electricity generation.

### Useful tips

Installing renewable energy systems will offset some or potentially all of the purchased energy required to operate your home while decreasing the greenhouse gas emissions generated.

### Your energy advisor's comments



Photovoltaic Systems: The kWh energy production here is that of a typical PV system, based on the area and orientation of your available space. Output of an installed PV system will vary depending on a number of factors, and would be precisely modeled after your post-retrofit assessment.

For planning purposes, a solar array with an area of 800 square feet has been modeled for your home.



### Additional energy advisor comments

A Note from your Service Organization

Thank you for engaging EnviroCentre to perform your energy assessment. If you have any questions concerning the recommendations in this report, please contact EnviroCentre at 613 656-0100 or visit our website, [envirocentre.ca](http://envirocentre.ca)

You can also contact your Energy Advisor directly.

## RECOMMENDED ENERGY EFFICIENCY UPGRADES - CONTINUED

The information and recommendations provided during your audit and in this report, including any estimated savings, are based on a visual inspection of your building or business, its equipment, and information available on your use of energy. This report is based on the Energy Advisor's best judgment given the information and time available. Please note that it outlines only potential savings and makes no guarantee about actual savings partly because the advisor has been unable to measure the actual consumption of your equipment or the actual use of space or water heaters, ventilation and/or air conditioning equipment, appliances, lights and other devices. Remember that the way you or your tenants occupy your house or building can have a big impact on the actual consumption of energy. Finally, please note that this service is not a structural inspection and does not evaluate the structural and safety integrity of your building.

If you would like to book a second visit for an official assessment after upgrading, you can do so through EnviroCentre. If these assessments are part of the requirements of a rebate program, please make sure your timelines, upgrades and documents adhere to the rules of that particular program.

If your renovations involve additions or other major changes to the shape of your exposed walls, ceilings or foundation, please note that there may be a surcharge at that time for extra data collection and remodeling your software file.



### Learn more about energy efficiency upgrades

Natural Resources Canada has developed [Keeping the Heat In](#), a guide that explains basic principles of building science and offers guidance on home renovation projects such as adding insulation and air sealing.

#### NOTES:

- 🏠 Energy use reductions are calculated with each upgrade taken on its own. Combinations of upgrades may produce slightly different results.
- 🏠 If negative savings are shown, please see your energy advisor's comments for an explanation.

# ENERGY EFFICIENCY FORECAST

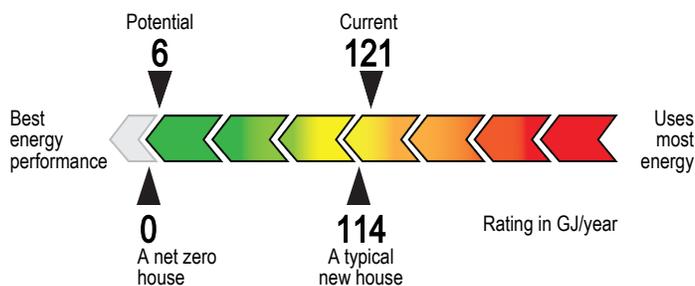
## YOUR HOME'S ENERGY POTENTIAL



By implementing the recommended upgrades, you will not only see an improvement in your EnerGuide Rating but you might also reduce greenhouse gas (GHG) emissions.

Note that the energy consumption indicated on your utility bills may be higher or lower than your EnerGuide Rating. This is because the EnerGuide Rating is based on standard assumptions regarding how many people live in the home and how it is operated. Refer to your *Homeowner Information Sheet* for details on the EnerGuide Rating System standard operating conditions.

### EnerGuide Rating



A **gigajoule (GJ)** is a unit of energy that can represent all energy sources found in Canadian homes such as electricity, fossil fuels and wood.

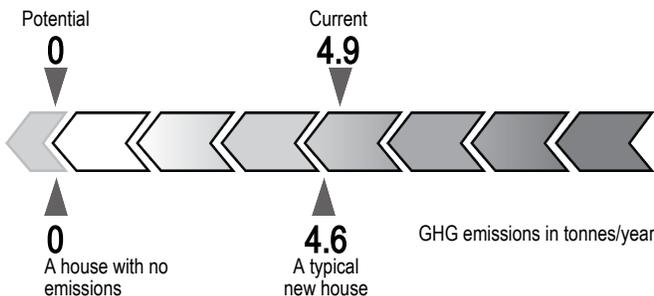
A **typical new house** is a reference point for comparing your rating to that of a similar house built to current energy efficiency requirements.

### Rated energy intensity



The **Rated energy intensity** is an estimate of your home's annual energy use relative to its size. It allows you to compare the energy used by homes of different sizes on a "per square metre" basis.

### Rated greenhouse gas (GHG) emissions

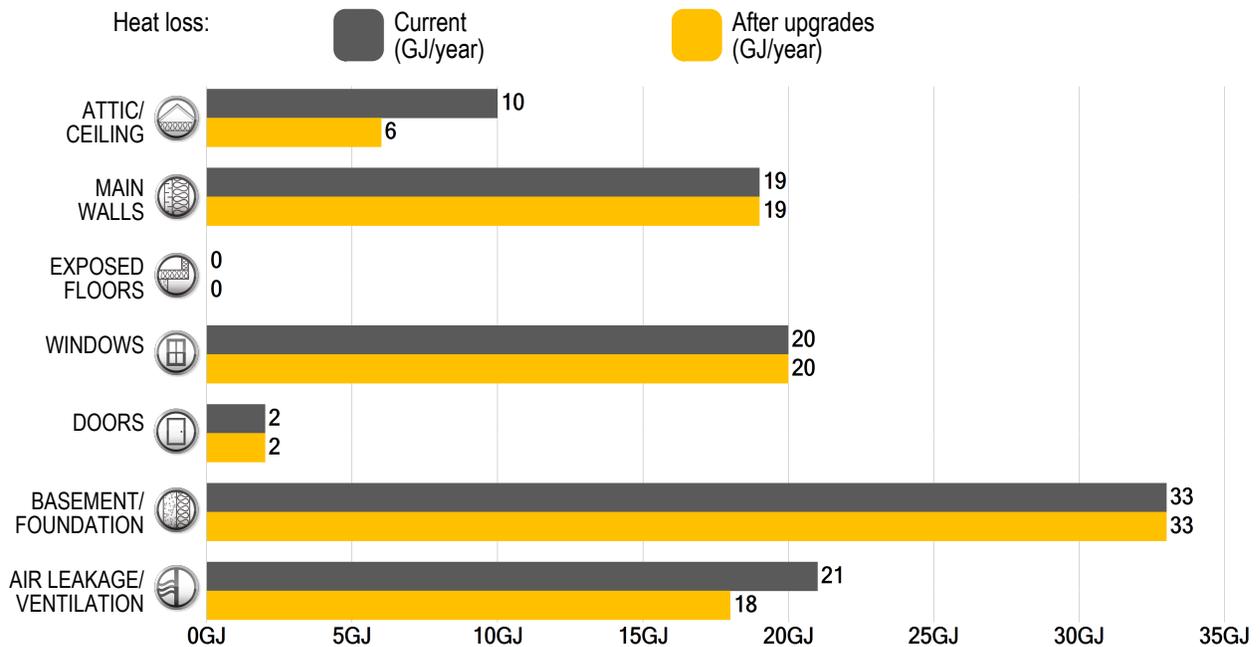


Every time we use energy from fossil fuels such as oil and gas, we produce **greenhouse gas (GHG) emissions** that contribute to climate change. We can reduce these emissions by making homes more energy efficient and lowering energy use.

## ENERGY EFFICIENCY FORECAST - CONTINUED

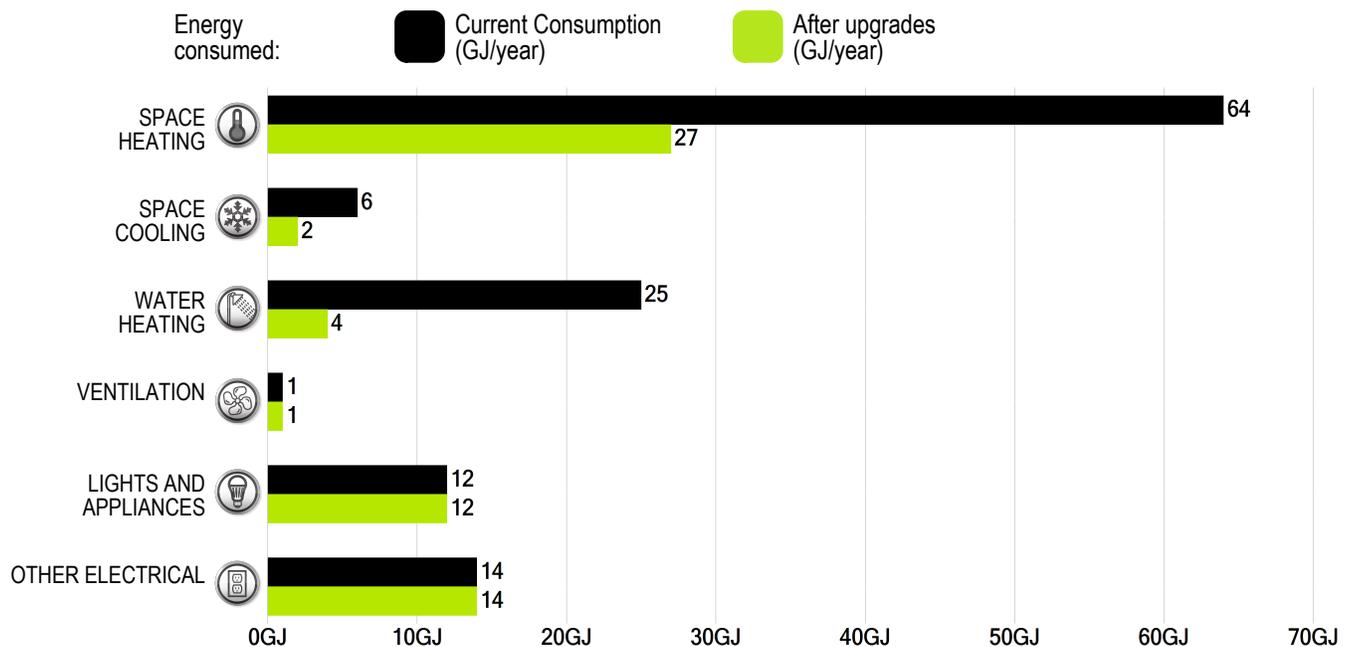
### BEFORE AND AFTER: Estimated heat loss through the building envelope\*

This bar chart shows where heat is lost from your house. The dark bars show the areas where you are currently losing heat. The longer the bar, the more heat you are losing. The light bars show the estimated heat loss if you were to complete all the recommended upgrades as outlined.



### BEFORE AND AFTER: Estimated energy use\*

This bar chart shows the potential for improving the energy performance of your house. The dark bars show your current rated consumption. The longer the bar, the more energy you are using. The light bars show the rated energy consumption if you were to complete all the recommended upgrades as outlined.



\*Calculated using standard operating conditions. Refer to your *Homeowner Information Sheet* for more information.

### HEALTH AND SAFETY INFORMATION

If your energy advisor has identified a potential health or safety concern related to insufficient outdoor air, risk of combustion fumes being drawn into the home or the presence of vermiculite, a warning has been included in your *Homeowner Information Sheet*. However, energy advisors are not required to have expertise in health and safety matters, and it is the sole responsibility of the homeowner to consult a qualified professional to determine potential hazards before undertaking any upgrades or renovations. Visit Natural Resources Canada's webpage *Health and safety considerations for energy-efficient renovations*.

#### 🏠 Humidity control

A relative humidity level of between 30 and 55 percent is recommended for optimal health and comfort. For more information on assessing moisture levels in your house, visit the Canada Mortgage and Housing Corporation's website.

#### 🏠 Radon

Radon is a naturally occurring radioactive gas that is colourless, odourless and tasteless. It is formed from the radioactive decay of uranium, a natural material found in some soil, rock and groundwater. When radon is released into the outdoor air, it gets diluted to low concentrations and is not a concern. However, in enclosed spaces like houses, it can sometimes accumulate to high levels, which can pose a risk to both your or your family's health. For more information, visit Health Canada's website.

#### 🏠 Asbestos and vermiculite insulation

Vermiculite insulation installed in homes may contain asbestos. This can cause health risks if inhaled. If you find vermiculite insulation during renovations, avoid disturbing it. If you suspect the presence of asbestos in your home and plan to undertake renovations (including insulation or air sealing work) that may cause the vermiculite insulation or asbestos to be disturbed, contact professionals who are qualified to handle asbestos before you proceed with the renovations.

#### 🏠 Combustion gases

The use of fuel-burning heating equipment can inadvertently lead to hazardous combustion gases being drawn into your home. Always consult a qualified heating and ventilation contractor when servicing or replacing this type of equipment and ensure you have a functioning carbon monoxide detector. Refer to the publication entitled *Combustion gases in your home: What you should know about combustion spillage* on Natural Resources Canada's website to learn more about combustion spillage.

### DISCLAIMERS

EnerGuide is an official mark of Natural Resources Canada.

The ENERGY STAR® mark is administered and promoted in Canada by Natural Resources Canada and used with permission.

While energy advisors and service organizations use Natural Resources Canada's official marks, trademarks and software under licensed agreement, they operate as independent businesses and are not agents, partners, or employees of Natural Resources Canada.

Natural Resources Canada does not endorse or make any representation of warranty as to the accuracy or applicability of the energy advisor's comments with respect to your particular home.

Natural Resources Canada does not endorse the services of any contractor, nor any specific product, and accepts no liability in the selection of materials, products, contractors nor the performance of workmanship.

The rating and potential savings in this report are based on the conditions of your home at the time of the evaluation and the use of EnerGuide standard operating conditions.

## ADDITIONAL INFORMATION - CONTINUED

---

Along with the upgrade recommendations, here are some simple actions you can take to be more comfortable, save money and reduce GHG emissions:

### ENERGY-SAVING TIPS

- Install and set-up programmable electronic thermostats to reduce the heating temperature at night and when you are away. For each degree of setback, you can save up to 2 percent on your heating bills.
- When replacing appliances, electronics and office equipment, look for ENERGY STAR® certified products. ENERGY STAR certified products are among the most efficient and use up to less than half as much energy in standby mode (i.e. when they are turned "off") than non-certified products. You can also look for the EnerGuide product label to help you select the most energy efficient model. For more information, go to [energystar.gc.ca](http://energystar.gc.ca).
- Replace your light bulbs with ENERGY STAR certified ones, such as light emitting diodes (LEDs). They last longer and use less electricity.
- Insulate the first two metres of the hot and cold water pipes starting from the water heater with insulating foam sleeves or pipe wrap insulation. By doing so, you will save on your water heating costs and reduce your water consumption. For a fuel-fired water heater, maintain a 15 cm (6 in.) clearance between the water piping insulation and the vent pipe.
- If you use a block heater for your car, use a timer. Set the timer to turn on one to two hours before you plan to start your vehicle.
- Replace your kitchen and bathroom exhaust fans with ENERGY STAR certified exhaust fans vented to the outside.
- Install a timer on your bathroom exhaust fans so that the fans are not left running for extended periods of time.
- Install low-flow shower heads (rated at 7.6 litres per minute or less) and faucet aerators.
- Fix leaky faucets and outside hose bibs.
- Plug your entertainment systems and office equipment into power bars that can be easily turned off when equipment is not in use.

---

### NOTES:

### Questions about this report?

Please contact your energy advisor.

[NRCan.gc.ca/myenergiguide](http://NRCan.gc.ca/myenergiguide)