

RENOVATION UPGRADE REPORT

ENERGUIDE

Your EnerGuide* rating and this report are based on data collected and, where necessary, presumed from your evaluation. Rating calculations are made using standard operating conditions.



Rating: 130 gigajoules per year (GJ/year)

Heated floor area: 238.7 m² (2569.3 ft²)

Rated energy intensity: 0.54 GJ/m²/year

Evaluated by: Michel Lavigne

Quality assured by: City Green Solutions

File number: 7941D00035

Data collected: April 19, 2018

Year built: 1968

NRCan.gc.ca/myenerguide

HOUSE CHARACTERISTICS

For building envelope and mechanical system details, please refer to the *Homeowner Information Sheet*.

House type: one storey, single detached

Number of windows: 20

Number of doors: 6

Airtightness: 8.52 air changes per hour at 50 pascals

Main energy source: electric

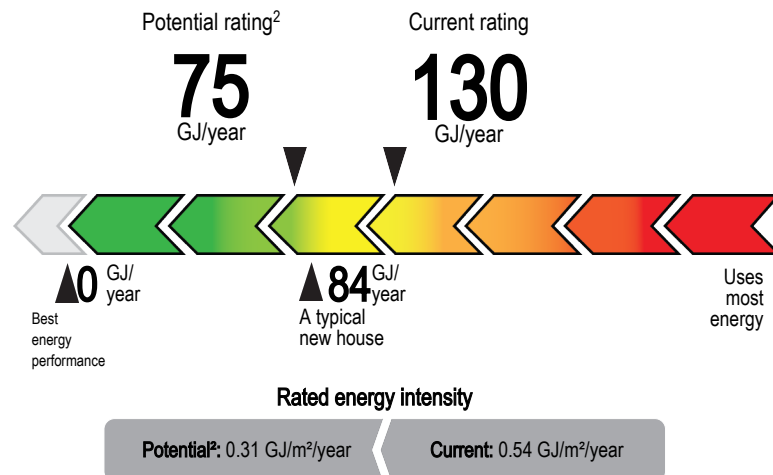
Heating system: electric furnace

Cooling system: n/a

Hot water system: electric storage tank

HOW YOUR HOUSE COMPARES

EnerGuide Rating¹



COMPARATOR

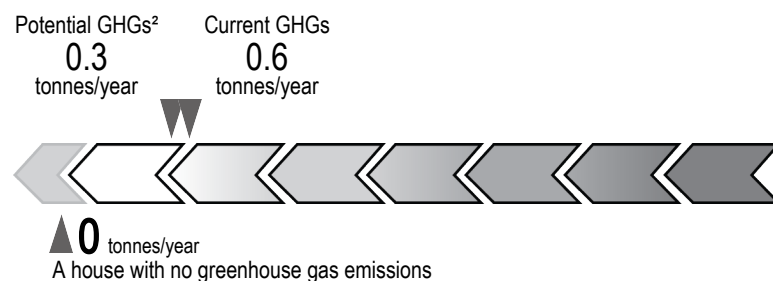
84 GJ/year

A typical new house: this house if built to building code energy requirements.

NOTES:

1. The rating is expressed in gigajoules per year. One gigajoule is roughly equal to the energy contained in 30 L of gas in a car's gas tank.
2. Potential figures show where the house would rate if all recommended upgrades were implemented.
3. Refer to the *Homeowner Information Sheet* glossary for calculation details.

Rated greenhouse gas (GHG) emissions³

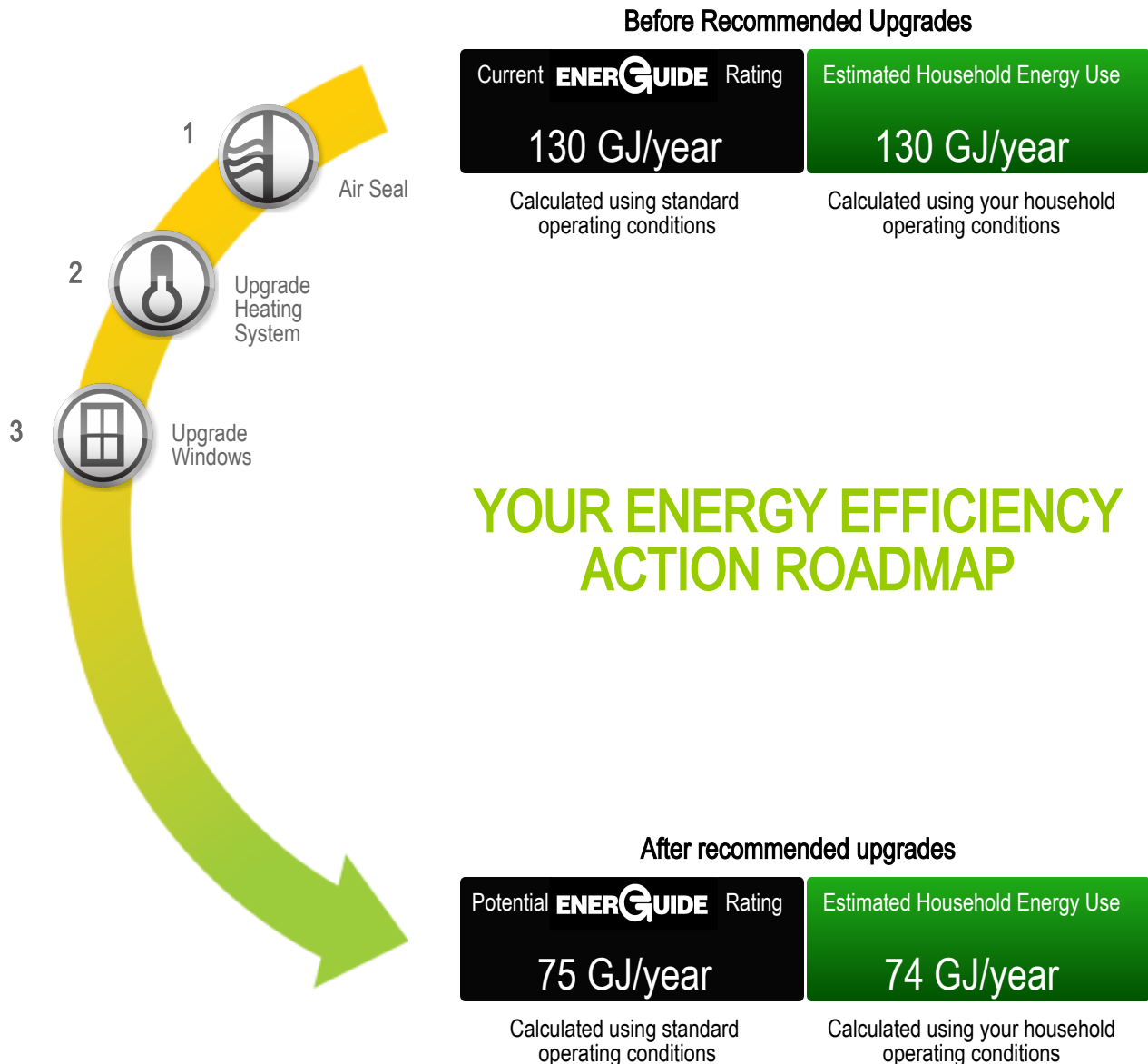


*EnerGuide is an official mark of Natural Resources Canada

ENERGY EFFICIENCY ACTION ROADMAP

The route to making your home more energy efficient

In developing your prioritized list of recommended upgrades, your energy advisor has used the house-as-a-system concept (described later in this report) and has considered potential renovation plans, the financial considerations of each upgrade, and the extent that each upgrade contributes to energy savings. This is your customized roadmap for improving your home's energy performance and is based on your household operating conditions, if provided. If you have questions or concerns about these recommendations, please contact your energy advisor or your service organization.



i Operating conditions

Your EnerGuide Rating was calculated using standard operating conditions, including average climate patterns, a standard set of occupants (a family of two adults and one child), standard thermostat settings for heating and cooling, and standard use rates for such things as lighting, appliances and hot water. This allows for the comparison of houses where the house itself is rated independent of occupant behaviour.

Your Estimated Household Energy Use was calculated using your household operating conditions, the information that you provided to your energy advisor about your home's actual number of occupants and their energy use patterns. This provides an annual energy use estimate that is customized to your particular household.

RECOMMENDED UPGRADES AND RESULTS

RECOMMENDED ENERGY EFFICIENCY UPGRADES	RATING REDUCTIONS ^A (GJ/year)	ESTIMATED HOUSEHOLD SAVINGS ^A (GJ/year)
Total reductions for all recommended upgrades	55	56
1. Air Seal <ul style="list-style-type: none"> Improve the airtightness of your home by 16% to achieve an air changes per hour rate of 7.16 at 50 pascals. 	3^B	3^B
2. Upgrade Heating System <ul style="list-style-type: none"> Secondary: Install a new air-source heat pump that has a heating seasonal performance factor (HSPF) of 8.5. 	42	42
3. Upgrade Windows <ul style="list-style-type: none"> Replace 12 window(s)/skylight(s) with units that are more energy efficient. 	17	17

TABLE NOTES:

- A. The individual rating reductions and estimated household savings are calculated with upgrade measures undertaken in isolation. Combinations of upgrades may produce slightly different results.
- B. Because of the very house-specific results associated with air sealing, there is a broader error range for the estimated impact of this upgrade.

RECOMMENDED UPGRADE DETAILS

Your energy advisor's comments

Your energy advisor has provided additional comments, elaborating on your specific recommended upgrades. These are provided at the end of each upgrade section. The energy advisor and service organization are responsible for the accuracy of these comments and should be contacted if clarification is needed. The Government of 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.

1. Air Seal

Air sealing is one of the most cost-effective energy-saving measures you can undertake. It is typically performed before other upgrades to ensure optimal benefit from all the work being done to your home. Air sealing can improve your comfort by reducing drafts and heat loss, minimizing potential moisture damage to your home and reducing the transfer of both dust and noise from outdoors, all the while helping to lower your heating bills. Your home's air leakage accounts for 15 percent of your annual heat loss.



Recommendation:

Improve the airtightness of your home by 16% to achieve an air changes per hour rate of 7.16 at 50 pascals.

- ⦿ To achieve the full benefits of air-sealing, speak to your energy advisor or a reputable air sealing company before you begin. The blower door test performed during your home energy evaluation along with comments from your energy advisor will help you identify some air leakage sites in your home and can provide a starting point for improving the airtightness of your home.
- ⦿ You may be able to perform some or all of the work yourself, but you should have an air sealing or ventilation professional ensure all ventilation, and health and safety concerns are addressed before you begin.
- ⦿ When you have completed your air sealing upgrades, have an energy advisor or air sealing company perform a second blower door test. This will evaluate your efforts and alert you to any potential ventilation issues in your home.
- ⦿ Common and accessible air leakage locations such as electrical outlets and ceiling fixtures, wire and pipe penetrations, window and door frames, attic hatches, ducts, and baseboards can be sealed with caulk, foam sealant, appropriate types of tape or gaskets.
- ⦿ Typically more difficult to seal air leakage sites, such as those found at foundation headers (rim joist), wall to ceiling junctions and chimney penetrations, may require more aggressive air sealing techniques with barrier materials such as polystyrene plastic foam board insulation, spray foam and non-flammable products (e.g. sheet metal).



Consult *Keeping the Heat In* to learn more and take action.

nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/housing/Chapter4_e.pdf



Your energy advisor's comments

The proposed renovation upgrades include reducing air leakage by reducing drafts in your home. Draft proofing your house has many benefits; it keeps cold air out in the winter and warm air out in the summer; it reduces the amount of moisture coming into your house and being forced into the building envelope; it improves comfort by reducing drafts and reduces energy loss.

I attach a document "Best Practice Guide Air Sealing and Insulation Retrofits" which provides good info about insulating and draft proofing

Tackle locations below in order of priority to have the quickest and best impact

Very High Priority – large holes regardless of location

- The fireplace downstairs does not have a damper. Cover up the opening with a removable cover or seal it more permanently if you are not using it.

High Priority - Smaller holes on top floor

Medium Priority - Smaller holes on bottom floor

Lower priority - Smaller holes on main floor

- Adjust the door strike of the garage door to ensure that the door closes more tightly
- Replace the weather stripping on the front door.

There are specific rebates for reducing your air leakage - \$10 for every 1% improvement. In addition, if you improve by 15% it qualifies as an upgrade towards the Bonus Offer of \$750

2. Upgrade Heating System

Upgrading your heating system lowers your energy bills and, depending on the particular system upgrade, can also improve your comfort, control over how and when your home is heated and reduce risks from combustion spillage by using sealed combustion equipment. Space heating accounts for 67 percent of your home's estimated annual energy use.

**Recommendation:**

Secondary: Install a new air-source heat pump that has a heating seasonal performance factor (HSPF) of 8.5.

- ⊙ Hire a reputable contractor that is qualified in air source heat pump system design and installation, and recognized by an industry organization, such as the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) to install your air source heat pump. Choose a model with the recommended efficiency rating.
- ⊙ If you already have ductwork or are installing it, your contractor will likely recommend a central air source heat pump system. With existing ductwork, your contractor should also consider whether there is a need for the replacement, sealing or balancing. If you don't have ductwork, consider installing a ductless mini-split air source heat pump system.
- ⊙ Perform any planned building envelope upgrades before your heating contractor begins work because a more energy efficient building envelope may mean that a smaller heating system will comfortably heat your home. Before deciding on the capacity and model of your air source heat pump, your contractor should first conduct a heat loss/heat gain calculation for your home. Give your contractor a copy of the *Homeowner Information Sheet* from your EnerGuide home evaluation to provide important details and a reference for the calculation.

NOTE: Inform your heating contractor of any building envelope upgrades that you undertake following your EnerGuide home evaluation since those upgrades may render certain details in your *Homeowner Information Sheet* inaccurate.

- ⊙ Before deciding on a model, ask your contractor to review the AHRI Certificate of Certified Product Performance or AHRI Reference Number of the proposed system. Also ensure that it is compatible with the new or existing forced air heating system and that it meets the recommended efficiency ratings.
- ⊙ To ensure maximum performance and efficiency, discuss system maintenance and the possibility of a service agreement with your contractor. Cleaning or replacing filters is an example of important regular system maintenance.
- ⊙ Consider installing a programmable thermostat that is properly matched to your heating system for optimum savings, further reducing energy consumption by approximately 2 percent for every 1 °C set-back.



Consult Natural Resources Canada's publication *Heating With Electricity* at nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/publications/Heating_with_Electricity.pdf to learn more and take action.



If your contractor recommends a split-system air source heat pump, consult the split-system heat pumps database at oeef.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=HP_SS.

**Your energy advisor's comments**

The proposed renovation upgrade includes a switch from your electric furnace to a central heat pump with a minimum 8.5 HSPF and 15 SEER.

This has the biggest impact on improving your energy efficiency. A heat pump also allows you to cool in the summer.

There are currently no rebates for upgrading from an electric furnace to a central heat pump.

3. Upgrade Windows

Upgrading your windows improves your comfort by creating more consistent temperatures within the rooms that have upgraded windows. This upgrade also reduces your heating and cooling bills (if applicable), and may provide reductions in outdoor noise. Replacing your windows can also reduce or eliminate condensation on the inside of the glazing and frames. Of your home's total annual heat loss, your windows account for 30 percent.

**Recommendation:**

Replace 12 window(s)/skylight(s) with units that are more energy efficient.

- ⊙ Before work begins, speak to your energy advisor, a windows contractor or a construction expert to understand the details of your renovation. Replacing windows, skylights or patio doors is best done by a trained professional, but you may choose to do this work yourself. However, only perform this work yourself if you have carefully researched all of the necessary technical, health and safety considerations.

- ⦿ Install the units recommended by your energy advisor or contractor that are matched to your climate zone in order to maximize all the benefits of new windows, patio doors, and skylights.
- ⦿ For optimum savings and energy efficiency, consider units with features such as low-E coatings, inert gas fills, triple glazing, internal-shading devices and insulated edge spacers and frames that can reduce surface condensation and summer overheating.
- ⦿ Additional savings can be achieved with durable weatherstripping and appropriate hardware to ensure a tight, energy-efficient fit.
- ⦿ Once renovations are finished, have an energy advisor perform a post-retrofit evaluation and blower door test to ensure your home's airtightness has been maintained or improved. If not installed correctly, new units can lose heat through air leakage and allow for rain penetration.



Search Natural Resource Canada's Windows Database for ENERGY STAR windows at
oee.nrcan.gc.ca/pml-lmp/index.cfm?language_langue=en&action=app.search-recherche&appliance=WINDOWS



and the Skylight Database for ENERGY STAR skylights at
oee.nrcan.gc.ca/pml-lmp/index.cfm?language_langue=en&action=app.search-recherche&appliance=SKYLIGHTS



Your energy advisor's comments

The proposed renovation upgrade includes replacing all your existing metal windows with Energy Star, double glaze, vinyl windows with low e and argon.

Your current windows rate at approximately R1.5 for the double glazed, metal framed windows with a small spacer of 6mm and R0.75 for the single pane window. An upgrade increases the r value to R3.25

In addition to reducing heat loss, new windows reduce air leakage which improves comfort.

There are no specific rebates for new windows; however, if you change more than 65% of all windows it is eligible as one upgrade towards the Bonus Offer of \$750.

ADDITIONAL COMMENTS

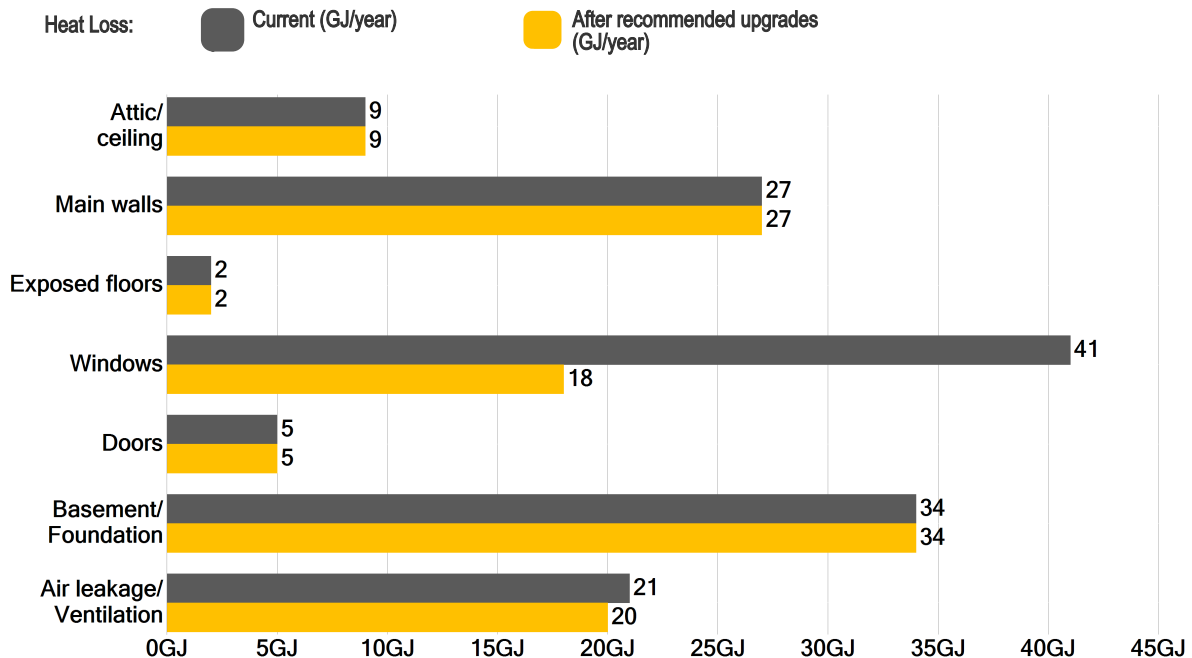
I attach a screen shot of the energy cost savings that could result from performing all the upgrades. Please be aware that results are subject to change based on a number of factors such as the individual practice towards use of energy, the variability of the weather and the cost of energy.

These upgrades are just options for you and is not meant to be a list of the things that must be done to your house. However; depending on your appetite to make significant lasting changes you are armed with information on the benefits of doing the upgrades.

The total savings from performing all the upgrades is less than the sum of performing each upgrade individually as you will see from the table. This is because as you reduce your air leakage or insulate your walls the benefits of upgrading the heating system is not as significant as you reduce your heat loss

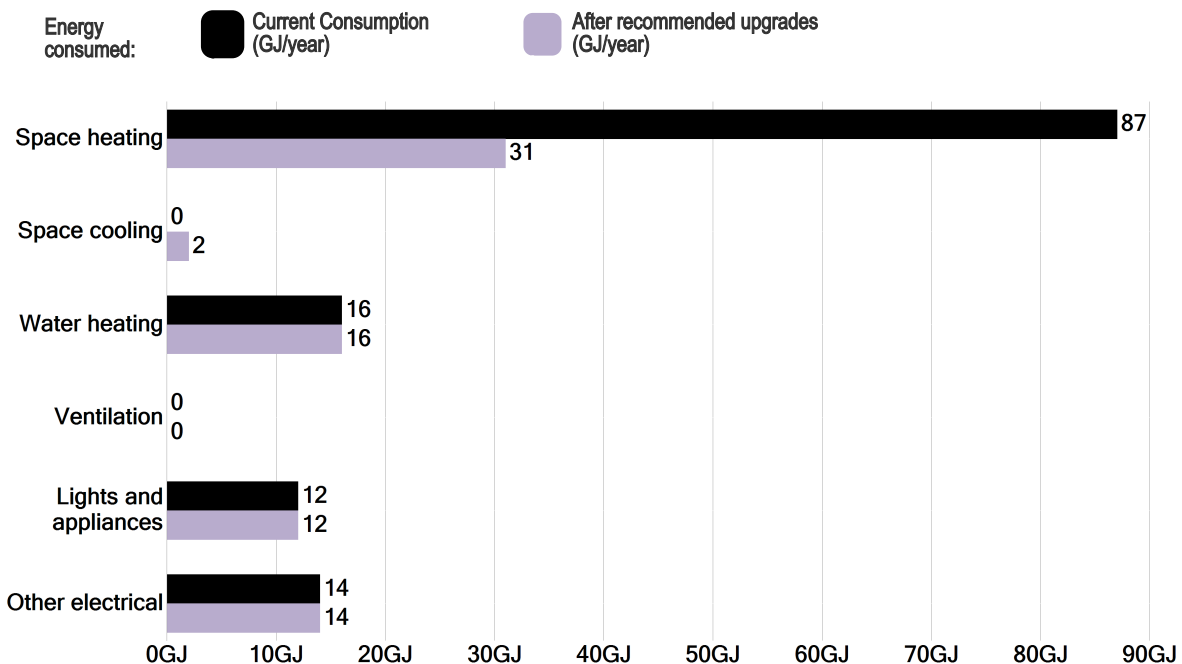
BEFORE AND AFTER: HEAT LOSS THROUGH THE BUILDING ENVELOPE

This bar chart shows where heat is lost from your home, calculated using your household operating conditions. The dark bars show the areas where you are losing heat now. The longer the bar, the more heat you are losing. The light bars show the estimated heat loss if you were to complete all your recommended upgrades as outlined.



BEFORE AND AFTER: ESTIMATED ENERGY USE

The bar chart below shows the potential for improving the energy performance of your home, calculated using your household operating conditions. The grey bars show your current estimated consumption. The longer the bar, the more energy you are using. The blue bars show your home's estimated energy consumption if you were to complete all your recommended upgrades as outlined.



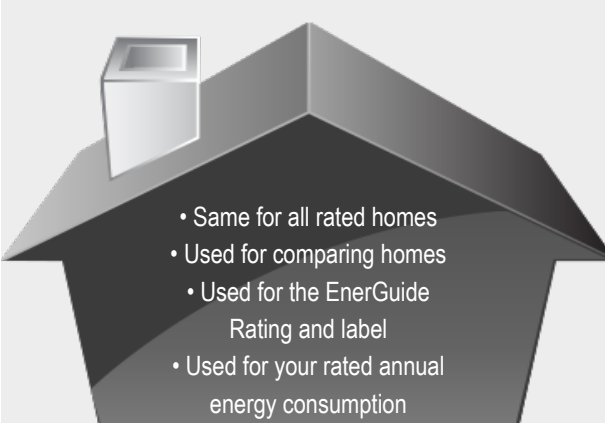
OPERATING CONDITIONS

The EnerGuide Rating System uses two different sets of operational information: standard operating conditions and your household operating conditions. Your EnerGuide Rating was calculated using standard operating conditions, including a standard number of occupants and assumed energy use patterns, along with your home's characteristics and mechanical systems. The standard operating conditions ensure that the house is rated independent of the energy choices of the occupants living in it. This in turn enables a comparison of rated energy performance with other houses that receive EnerGuide Ratings.

Your Estimated Household Energy Use, as seen in YOUR ENERGY EFFICIENCY ACTION ROADMAP, was calculated using household operating conditions. This is the information that you provided to your energy advisor about your home's actual number of occupants and their energy use patterns. Your Estimated Household Energy Use thus provides an annual energy use estimate that is customized to your particular household.

The following tables show the values used for each set of conditions.


Standard Operating Conditions
 For comparing your home to other homes



- Same for all rated homes
- Used for comparing homes
- Used for the EnerGuide Rating and label
- Used for your rated annual energy consumption

Number of occupants:	3
Appliance load:	6.3 kWh per day
Lighting load:	2.6 kWh per day
Other electric:	9.7 kWh per day
Daytime heating setpoint:	21°C
Nighttime heating setpoint:	18°C
Cooling setpoint:	25°C
Number of cooling months:	0
Hot water load:	186.45 L per day at 55°C

Your Household Operating Conditions
 For understanding and taking action on your home



- Specific to your home
- Used for recommended upgrades
- Used for your estimated annual energy consumption
- Provided by you to your energy advisor

Number of occupants:	3
Appliance load:	6.3 kWh per day
Lighting load:	2.6 kWh per day
Other electric:	9.7 kWh per day
Daytime heating setpoint:	21°C
Nighttime heating setpoint:	18°C
Cooling setpoint:	25°C
Number of cooling months:	Full Season
Hot water load:	186.45 L per day at 55°C

Utility bills

Your home's annual energy use, as reflected on your utility bills, is not likely to exactly match either your EnerGuide Rating or your Estimated Household Energy Use due to normal fluctuations in your household's energy use and changes in yearly weather patterns. In addition, there is a group of significant home energy uses, such as a pool or hot tub, which are not included in the calculations. These items are not common to most houses and are excluded from the calculations to enable better comparisons of the rated energy performance between homes. If your house has one or more of these refer to your *Homeowner Information Sheet* to learn more about the estimated energy use of these items.

i House-as-a-system concept

Your house operates as a system. All the elements of a house, the building envelope, mechanical systems, indoor and outdoor environment and occupant activities, affect each other. Their interactions must be considered to ensure optimal performance and comfort. For example, reducing the air leakage of your home (air sealing) may require increasing ventilation to prevent moisture build-up and ensure proper indoor air quality. Reducing heat loss through the building envelope reduces your home's heating requirements. A smaller heating system may then be sufficient. Your energy advisor applied the house-as-a-system concept when developing your recommended upgrades.

For more information about this concept and how it relates to your house, refer to the Natural Resources Canada publication *Keeping the Heat In* available at

nrcan.gc.ca/energy/efficiency/housing/home-improvements/15768.



IMPORTANT UPGRADE CONSIDERATIONS

Building codes and by-laws

Before undertaking upgrades or renovations, ensure that all proposed renovations meet local building codes and by-laws.

Health and safety

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 house or the presence of vermiculite, a warning has been included in this report. However energy advisors are not required to have expertise in health and safety matters, and homeowners are solely responsible for consulting a qualified professional to determine potential hazards before undertaking any upgrades or renovations.

Hiring a contractor

Before hiring a contractor, find out about the appropriate products and installation techniques. Request written quotations from several contractors for comparison and obtain a written contract. The Canada Mortgage and Housing Corporation and the Canadian Home Builder's Association publish a useful brochure on this subject, *Get it in Writing!* Visit hiringacontractor.com or call 1-800-668-2642 to order. The Canadian Home Builder's Association also provides advice on hiring a contractor at chba.ca/renovating/hiring-contractor.aspx.

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.

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 it might be in your home and you plan to undertake renovations (including insulation or air sealing work) that may cause the vermiculite insulation to be disturbed, contact professionals who are qualified to handle asbestos before you proceed with the renovations. For a listing of qualified professionals, look in the Yellow Pages™ under 'Asbestos Abatement & Removal'. For information on vermiculite insulation that contains asbestos, refer to the Government of Canada web page entitled "*Health Risks of Asbestos*" at healthycanadians.gc.ca/environment-environnement/outdoor-air-exterieur/asbestos-amiante-eng.php.

FEDERAL GOVERNMENT RESOURCES FOR TAKING ACTION

Home energy efficiency

Natural Resources Canada publishes a variety of publications that can help you improve the energy efficiency of your home. These publications are available online at nrcan.gc.ca/energy/efficiency/housing/publications/15813 or by calling the publications order desk at 1-800-387-2000.

Health and safety

Natural Resources Canada produces a brochure entitled *Planning Energy Efficiency Renovations for Your Home* which includes important information on health and safety issues, as well as links to related documents from Health Canada and the Canada Mortgage and Housing Corporation. It can be accessed at nrcan.gc.ca/energy/efficiency/housing/home-improvements/5021.

Renovation publications

The Canada Mortgage and Housing Corporation publishes a large number of renovation planning fact sheets that are available at no cost. There are also some excellent in-depth publications for sale. Visit cmhc-schl.gc.ca or call 1-800-668-2642 to order material.

Humidity control

A relative humidity level of between 30 and 55 percent is recommended in your home for optimal health and comfort. Dehumidifiers can help reduce moisture levels, especially in basements where relative humidity levels are often high. If you have a humidifier or dehumidifier, ensure that it is regularly cleaned and maintained, and that the humidistat is set at an appropriate humidity level. You can use a hygrometer to measure relative humidity. The Canada Mortgage and Housing Corporation fact sheet *Measuring Humidity in Your Home* at publications.gc.ca/collections/collection_2011/schl-cmhc/nh18-24/NH18-24-1-2009-eng.pdf gives good advice.

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 be a risk to both your or your family's health. For more information, visit Health Canada's website at hc-sc.gc.ca/ewh-semt/radiation/radon/index-eng.php.

Keeping the Heat In



Natural Resources Canada has produced a guide to educate you on basic principles of building science and to provide guidance on upgrading the energy performance of your home. *Keeping the Heat In* is a useful tool when planning an energy-efficient retrofit to your home. Visit nrcan.gc.ca/energy/efficiency/housing/home-improvements/15768 to learn more.

GET STARTED TODAY!

You now have information about your home and recommendations on how to improve its energy efficiency. Taking action can lead to improved comfort, better health and reduced annual utility costs. It can also contribute to reduced greenhouse gas emissions.

Some municipalities, provinces and territories, and some utilities offer energy efficiency incentive programs. For further information or links to complementary regional programs, visit nrcan.gc.ca/energy/funding/efficiency/4947.

Along with the upgrade recommendations, here are some simple actions you can take to save energy and money:

ENERGY-SAVING TIPS

- Install and use a programmable electronic thermostat to reduce the heating temperature of your home 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 lighting, 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. For more information, go to energystar.gc.ca. You can also look for the EnerGuide product label to help you select the most energy-efficient model. For more information, visit www.nrcan.gc.ca/energy/products/energuide/label/13609.
- Replace your light bulbs with ENERGY STAR certified ones, such as compact fluorescents or light emitting diodes (LEDs). They last longer and reduce electricity consumption;
- 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 so that it only turns 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 showerheads (rated at less than 7.6 litres per minute) and faucet aerators;
- Fix leaky faucets and outside hose bibs; and
- Plug your home entertainment systems and home office equipment into power bars that can be easily turned off when equipment is not in use. Refer to the fact sheet *Standby Power - When "Off" Means "On"* at publications.gc.ca/collections/collection_2014/mcan-nrcan/M144-160-2014-eng.pdf for information on standby losses.

