RENOVATION UPGRADE REPORT

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.



ENERGUIDE

Rating: 146^{gigajoules per year}

Heated floor area: 237.3 m² (2554.3 ft²) Rated energy intensity: 0.62 GJ/m²/year Evaluated by: Alan Leonard Quality assured by: GCI/REAL File number: 11L1DSAMPLE Data collected: December 6, 2018 Year built: 1959

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: 13 Number of doors: 2 Airtightness: 3.46 air changes per hour at 50 pascals Main energy source: natural gas Heating system: condensing natural gas furnace Cooling system: central air conditioner Hot water system: natural gas storage tank with pilot

HOW YOUR HOUSE COMPARES





COMPARATOR

101 GJ/year

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

NOTES:

- 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.

0 tonnes/year

A house with no greenhouse gas emissions

*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.



Derating 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

RE	COMMENDED ENERGY EFFICIENCY UPGRADES	RATING REDUCTIONS ^A (GJ/year)	ESTIMATED HOUSEHOLD SAVINGS ^A (GJ/year)
То	tal reductions for all recommended upgrades	32	31
1.	Insulate Foundation	24	24
•	Foundation - 1: Increase 100% of the insulation value of your basement walls from the interior by RSI 2.64/R15.0.		
•	BW hdr-01: Increase the insulation value of your foundation headers by RSI 1.94 / R 11.0.		
2.	Upgrade Ventilation System	-2	-2
•	Install a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) that is certified by the Home Ventilating Institute (HVI) and that is also ENERGY STAR certified.		
3.	Upgrade Heating System	1	1
•	Install a new ENERGY STAR certified, forced-air, condensing, gas-fired furnace that has an annual fuel utilization efficiency (AFUE) of 96 %.		
4.	Air Seal	1 ^B	1 ^B
•	Improve the airtightness of your home by 10% to achieve an air changes per hour rate of 3.11 at 50 pascals.		
5.	Upgrade Hot Water System	7	7
•	Install a new ENERGY STAR certified tankless gas-fired water heater with an energy factor (EF) of 0.82.		

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.

WARNINGS:

Ŵ

The results of the energy simulation determined that this house may not receive sufficient outdoor air to maintain good indoor air quality. Please seek additional information from your energy advisor and a qualified ventilation contractor.

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. Insulate Foundation

Before work begins, speak to your energy advisor, an insulation contractor or a construction expert to understand the details of your renovation. You can do this work yourself or hire a reputable insulation contractor. Only perform this work yourself if you have carefully researched all of the necessary technical, health and safety considerations for exterior excavations, such as following safe trenching practices. Assess the status of your basement for persistent water leaks, cracks and flooding. Repair these issues before beginning any insulation job.

Foundations can be insulated from the interior, exterior or a combination of both depending on accessibility and the complexity of the building. Always look for opportunities to improve air sealing before or during basement wall insulation upgrades. Consider any electrical or plumbing upgrades before insulating your basement walls.

Insulating one or more elements of your home's foundation improves comfort and can reduce your energy bills. Improvements to your home's insulation can allow for subsequent smaller sizing of new heating and cooling systems when undertaking those upgrades. Your home's foundation accounts for 37 percent of your annual heat loss.



Recommendation:

Foundation - 1: Increase 100% of the insulation value of your basement walls from the interior by RSI 2.64/R15.0. BW hdr-01: Increase the insulation value of your foundation headers by RSI 1.94 / R 11.0.

- Before insulating basement walls from the interior, a moisture barrier is usually applied to the inside face of the walls, up to the grade level. However, plastic foam board insulation or closed-cell spray foam may act as a moisture barrier and negate the necessity of a separate sheet moisture barrier. Discuss your options with a professional.
- The three most common interior basement insulation approaches to achieve the recommended thermal resistance (RSI/R) value are:

i. Add batt insulation, which requires building stud walls on the interior side of the basement walls to create cavities for the batts; ii. Add rigid board insulation directly to the basement walls; or

iii. Add spray-on closed cell foam directly to the foundation wall with or without strapping or studs.

- When insulating from the interior with batt insulation, upgrade the existing frame wall after removing existing wall features (i.e. trim, baseboards, vapour barrier etc.), or add a new frame wall that will accommodate electrical outlets, window and door frame extensions, and the upgraded level of insulation.
- Our Unlike batt insulation, foamed plastic rigid-board or spray-on closed cell foam insulation can be applied directly to the foundation walls. If you use the framed-wall method, it is recommended to build the wall out from the foundation wall so that insulation can be installed both behind the framed wall and within the framed wall cavities.
- With the assistance of local code officials, assess the need for and the type of any air and vapour barriers, as well as the need for fire resistant coverings, such as drywall.
- Rim joists/floor headers can be a major air leakage and heat loss site.
- The first step is to air seal all of the joints using caulking or canned injectable urethane foam along the header joist. This includes sealing any joints at the floor above, the bottom plate, the basement wall, and any openings and penetrations. Then add the insulation to achieve the recommended thermal resistance (RSI/R) value. Ensure that plumbing pipes are on the warm side of the insulation.
- Insulation can be of the spray foam type or can consist of pieces of batt insulation, snugly fitted foam board insulation or a combination of both. The easiest way to achieve both the air sealing and increased insulation in the header space is to have a qualified contractor spray foam the interior header/rim joist space. Be sure to check with your local building authority about requirements for any fire-retardant products to be applied over the insulation and their installation methods.
- With the batt/foam board approach, typically a piece of foam board will be applied over the batt insulation to act as a vapour barrier and to keep the batt secure. This can be a piece of low-permeability plastic foam board insulation, such as extruded polystyrene, polyurethane or polyisocyanurate, cut to fit snugly between the joists. Installing a piece of drywall is another option for keeping the batt in place.
- Seal the edges of the rigid insulation or drywall with a compatible caulk. If the basement walls below are insulated and have a polyethylene air or vapour barrier, this barrier should be sealed to the header/rim joist barrier to ensure a continuous seal.



Consult *Keeping the Heat In* to learn more and take action. nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/housing/Chapter6_e.pdf

Your energy advisor's comments

The uninsulated foundation accounts for largest percentage of your heat loss and I highly recommend that you insulate this area for substantial

savings.

At minimum I would install 2" of polyisoboard or 3" of foil/plastic faced expanded polystyrene rigid foam board to achieve an R-value of 12+. Exposed foam can produce toxic smoke when burned so you should install strapping and drywall or other finish that will act as a thermal (fire) barrier.

Tape or caulk all joints and penetrations in the rigid foam so that the foam becomes a moisture barrier to stop water from entering from the foundation. The foam will also act as a vapour retarder and you won't need to install polyethylene behind the drywall.

If you construct a hybrid wall with rigid foam against the foundation and a frame wall with batt insulation against the foam sheets you could receive a larger grant amount. The wall would have to have an insulation value of at least R-23.

Don't forget to further insulate and air seal the header/rim joist at the same time. This can be done with the same rigid foam and batt insulation used on the basement walls.

2. Upgrade Ventilation System

Upgrading your ventilation system can improve your indoor air quality and comfort. A heat recovery ventilator (HRV)/energy recovery ventilator (ERV) saves on energy costs compared to conventional ventilation systems by recovering heat from stale indoor air as it is exhausted. An HRV/ERV simultaneously exhausts stale indoor air and brings in fresh outdoor air by passing the two separate airflows through a heat exchanger. With proper high efficiency particulate air (HEPA) filters, an HRV/ERV can also help reduce dust and many other outdoor irritants from entering your home.



Recommendation:

Install a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) that is certified by the Home Ventilating Institute (HVI) and that is also ENERGY STAR certified.

- Itire a reputable contractor that is qualified in ventilation 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 ENERGY STAR certified heat recovery ventilator (HRV) or energy recovery ventilator (ERV). For maximum performance, comfort and warranty protection, professional installation is recommended. Do not perform this work yourself.
- Your home's size, room types, layout, type of heating system and geographical location all affect the ventilation system upgrade best suited to your needs and its installation. Speak to your contractor or energy advisor about the differences between an HRV and an ERV and which may be more appropriate for your home.
- Ensure that your home has reached sufficient levels of airtightness to maximize an HRV's/ERV's effectiveness. Discuss airtightness with your energy advisor and ventilation contractor. The results of your home's blower door test will provide valuable information.
- When buying an HRV or ERV, choose a model that is certified by the Home Ventilating Institute (HVI) and consider models with a high efficiency motor(s) to help reduce electrical consumption. Choose a control system that is easy to understand and meets your needs.
- Be sure to learn as much as you can from your contractor about the best way to operate the new system. Discuss a service agreement or other method with your contractor to ensure your HRV or ERV receives regularly scheduled maintenance. For example, grates and filters must be cleared or changed regularly for the system to operate as designed.



Consult Natural Resources Canada's *Heat Recovery Ventilators* at nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/energystar/HRV_EN.pdf to learn more and take action.



Search Natural Resource Canada's Ventilators Database at oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcomebienvenue&language_langue=en for ENERGY STAR certified heat recovery and energy recovery ventilators.

Your energy advisor's comments

Because your home is fairly airtight and is likely to get more so if you draft proof I have recommended an HRV (Heat Recovery Ventilator). The natural air changes per hour are below the threshold where I am required to recommend an HRV. An HRV is a balanced whole house ventilation system that provides fresh air, exhausts an equal amount of polluted indoor air and recovers much of the heat from the outgoing air. This is the best way to assure that you have excellent indoor air quality and doesn't have the same energy loss as when using exhaust only fans. With an HRV you can draft proof the house as much as possible and still have excellent indoor air quality.

Make sure that the HRV is Energy Star qualified and HVI listed so that you get the most efficient unit and that it has been tested to assure its

performance. The HVAC contractor should be HRAI qualified for ventilation design and installation. There are many sources of indoor pollutants and humidity in a house and it is essential to your health and the durability of the building to air

seal the house while also providing good ventilation.

Using a hygrometer can help you monitor humidity. The optimum relative humidity (RH) is between 30-60%. In our climate you may wish to be on the low side or even well below 40% RH in winter in order to reduce condensation on windows and other cold surfaces.

The existing bath fan didn't seem to have much effect when I was testing for possible back drafting and may not be providing adequate ventilation.

If you don't install an HRV or until you do then install an Energy Star qualified and HVI certified fan with a low sone (sound) rating. Fans are available with sone ratings of less than 1 which is barely audible. The fan can be controlled with a timer that can be programmed to run on a regular basis, say for 10-45 minutes an hour. The run time of the fan can be adjusted so that you are comfortable, the house isn't too dry or humid and you are getting fresh air and exhausting indoor pollution and moisture. This will assure that ventilation isn't just happening when you shower or see excessive condensation on the windows. Make sure that the fan is ducted to the outside with insulated duct with a dampened weather hood.

3. 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 61 percent of your home's estimated annual energy use.



Recommendation:

Install a new ENERGY STAR certified, forced-air, condensing, gas-fired furnace that has an annual fuel utilization efficiency (AFUE) of 96 %.

- Itire a reputable contractor who is qualified in heating 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 forced-air, condensing gas-fired furnace. Do not perform this work yourself.
- Choose an ENERGY STAR certified model with the recommended annual fuel utilization efficiency (AFUE) rating. Models with variable heat output and direct current (DC) fan motors will further reduce fuel and electrical consumption. Your contractor should also consider whether there is a need for the replacement, sealing or balancing of the ductwork that distributes the warm air throughout your home.
- 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 the furnace, 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.

- 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 furnace 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 *Heating With Gas* at nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/energystar/Heating_With_Gas.pdf to learn more and take action.



Search a comprehensive Furnaces Database at <u>energystar.gov/productfinder/product/certified-furnaces/results</u> for ENERGY STAR gualified makes, models and efficiency information.

Your energy advisor's comments

If you install a new furnace it needs to have an efficiency of at least 95% AFUE to receive an incentive grant. If you are investing in a new furnace then I recommend getting the highest efficiency available as it will have a long service life. An ECM blower motor will give you substantial electricity savings and you may be able to get a \$250 rebate from Save On Energy through your HVAC contractor. A two stage or modulating burner is also a good idea so that the furnace fires at only the rate needed to heat your house and it will heat much more comfortably.

Make sure that the contractor gives you a detailed invoice with the Brand, model/serial number, the AFUE efficiency, that it is Energy Star rated, the AHRI number and if it has an ECM motor.

4. 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 12 percent of your annual heat loss.



Recommendation:

Improve the airtightness of your home by 10% to achieve an air changes per hour rate of 3.11 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

Your house is fairly air tight and you need more ventilation to have good indoor air quality and to reduce humidity. The blower door test result shows that your house is airtight enough that I am required to recommend an HRV (heat recovery ventilator)!

You can't have a house that is too air tight, only one that is unventilated!

Do not do extensive air sealing/draft proofing unless you install an HRV. Then you can do as much draft proofing as possible and still have excellent indoor air quality.

Then you can use the recommendations that I made when we toured the house during the blower door/ air tightness test to most effectively air seal your home. Also refer to the air tightness checklist I have included in your report.

5. Upgrade Hot Water System

Upgrading your hot water system lowers your energy bills and, depending on the particular system upgrade, can better meet your daily hot water needs. After space heating, water heating is the largest energy cost in most Canadian homes. Water heating accounts for 18 percent of your home's estimated annual energy use.



 Hire a reputable contractor who is qualified in domestic hot water system design and installation to install your gas-fired, ENERGY STAR certified, tankless water heater.

- Have your contractor select the model's capacity by calculating the hot water flow rates and water temperatures required in your home. The contractor will also verify that your gas supply is sufficient for the volume required by the unit being installed. You can discuss manufacturers' sizing charts with your contractor.
- Look for models with flow rates of a minimum 13.25 litres per minute (3.5 U.S. gallons per minute) based on a temperature rise of 42.8 °C (77 °F). Otherwise, cold water inlet temperatures and high-demand faucets can result in unsatisfactory low flow rates or reduced hot water temperatures.
- Condensing, tankless water heaters have higher efficiencies than non-condensing models, and are not required to be vented to a chimney. Condensing models require a plumbing drain or condensate pump to remove the water produced. Units are commonly mounted on the interior surface of exterior walls and vented directly through the wall. For higher efficiency, look for heaters without pilot lights.
- The installation of a tankless water heater will not reduce wait times for hot water delivery at your faucet; in fact it may increase the wait time. Talk with your contractor on methods to reduce wait times (e.g. relocate water heater closer to fixtures, redesign water pipe system, recirculation system, etc.).



Consult Natural Resources Canada's *Water Heater Guide* at nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/energystar/WaterHeaterGuide_e.pdf to learn more and take action.



Search a comprehensive Water Heaters Database at <u>energystar.gov/productfinder/product/certified-water-heaters/results</u> for ENERGY STAR certified water heaters.

Your energy advisor's comments

The hot water tank (HWT) has an open flue with a natural draft chimney. The HWT has been 'orphaned' when the old condensing furnace was installed and may not always be able to develop a strong draft and may back draft combustion gases into the house. Ask your heating contractor if they think that this will be a problem. Inform them that the house is fairly airtight you intend to do draft proofing. There is an energy cost to having the combustion air duct as it is a year round opening into the house but you may need to keep it to provide enough air to the HWT. Your heating contractor may recommend removing it when a new furnace is installed with an exhaust and combustion air supply pipe. Now the furnace is using most of the combustion air supply but the house is air tight enough that the open flue HWT may not have enough combustion air to maintain a good draft.

I recommended an instantaneous hot water heater to solve the potential back drafting problem with the natural draft HWT and to save energy. You will certainly save energy by installing a high efficiency tankless hot water heater with an EF 0.82 but it is an expensive upgrade and you may have a low return on your investment because there are just two occupants.

You could get a safer HWT with a slightly higher efficiency (a 'power vented' HWT) but it wouldn't give you an incentive grant and the existing tank is fairly new.

Make sure that you have carbon monoxide detectors and that one is upstairs where it will wake you if the alarm sounds. Never ignore an alarm, leave the house and get professional/emergency help. A digital CO detector can notify you if there is carbon monoxide in the house even if it is below the alarm threshold. If you see any number other than zero on the detector you should call your heating contractor and find out what the problem is.

ADDITIONAL COMMENTS

Thank you for your business!

Before and/or during your renovations please feel free to call me if you want advice or clarification. I am always willing to answer questions about your renovations and upgrades and whether they will qualify for incentive grants.

When you are done with your upgrades I will return for a fee of \$200, check your or the contractor(s) work, do another blower door/air leakage test, update your ENERGUIDE rating and process any incentive grant application for you. The Enbridge Home Energy Conservation Program will rebate up to \$550 of the cost of the audits along with the incentive grants if you qualify for them.

Please follow my recommendations carefully and make sure that all upgrades fulfill the requirements of the Home Energy Conservation program if you intend to apply for an incentive grant. Get detailed invoices/receipts from contractors showing scope of work, R value, amount of insulation/thickness; brand, model, and serial number of new equipment, its efficiency, AHRI number and/or Energy Star qualification etc. Save any rating stickers (e.g. on windows and doors) that will help prove that an upgrade qualifies for an incentive grant. Take photos of any upgrade I won't be able to see when finished showing measured depth and type of insulation etc. If you cannot prove that the upgrade(s) fulfils the requirements of the HEC program you will not get a grant for that upgrade.

If you have any doubts about whether an upgrade will qualify for a grant please contact me with the information from the contractor or manufacturer and I will help you assess its suitability.

REAL is a member of Green Communities Canada which is an alliance of local non-profit organizations that provide environmental and other community benefits. Visit us at www.realaction.ca or www.greencommunitiescanada.org

Alan Leonard Registered Energy Advisor Rideau Environmental Action League 613 864-3099 alanleonard9@gmail.com

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.



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.

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-environment/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 <u>nrcan.gc.ca/energy/efficiency/housing/home-improvements/15768</u> 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.

Address: 99 Anystreet, Anytown, ONTARIO, K7A 5A5

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

- 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 <u>energystar.gc.ca</u>. 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/rncan-nrcan/M144-160-2014-eng.pdf for information on standby losses.



ENERGY-SAVING TIPS

HOMEOWNER INFORMATION SHEET

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.



ENERGUIDE

Rating: 146^{gigajoules per year}

Heated floor area: 237.3 m² (2554.3 ft²) Rated energy intensity: 0.62 GJ/m²/year Evaluated by: Alan Leonard Quality assured by: GCI/REAL File number: 11L1DSAMPLE Data collected: December 6, 2018 Year built: 1959

NRCan.gc.ca/myenerguide

HOW YOUR RATING IS CALCULATED:

- I. Rated annual energy consumption
- II. Minus renewable energy contribution
- 146 GJ/year - 0 GJ/year

Equals your EnerGuide rating

- 0 GJ/year = 146 GJ/year

I. Your rated annual energy consumption is the total amount of energy your house would use in a year based on the EnerGuide Rating System standard operating conditions. For your house, this includes 17.26 GJ of passive solar gain.

Energy Sources	Rated Consumption (GJ/year)	Equivalent Units (per year)	Greenhouse Gas Emissions (tonnes/year)
Natural gas	114	3067m ³	5.8
Electricity	32	8920kWh	0.6
Total	146		6.4

II. On-site renewable power generation systems can offset some or even all of your home's energy consumption. Renewable energy contributions are factored differently for your rating and your greenhouse gas emissions calculations.¹

On-Site Renewable Energy	Estimated Contribution (GJ/year)	Equivalent Units (per year)	Offset Greenhouse Gas Emissions (tonnes/year)
Electricity	0	0 kWh	0.0
Solar water heating	0	0	0.0
Total	0		0.0

YOUR RATED GREENHOUSE GAS EMISSIONS CALCULATION:

minus emissions onset by on-site renewables	- 0.0 tonnes/year
Minus emissions offset by on-site renewables	- 0.0 tonnes/year
Total greenhouse gas emissions	6.4 tonnes/year

HOW YOUR RATED ENERGY IS USED:

The chart below represents the breakdown of rated annual energy consumption in your home under standard operating conditions. You can use these figures as a guide to help identify where you can lower home energy costs through proper home maintenance, efficient home operation, energy efficiency renovations or equipment replacement.



WHERE YOUR HOME LOSES HEAT:

Houses lose heat through their exterior shell, or building envelope. The chart below shows where and how your home loses heat. The quality and upkeep of your home can have a major impact on the amount of energy your heating and cooling systems use annually.



*EnerGuide is an official mark of Natural Resources Canada. Refer to the glossary section for an explanation of relevant terms.

HOUSE DETAILS

BUILDING ENVELOPE

ATTIC/CEILING

	INSULATION VALUE			
TYPE	Nominal RSI (R)	Effective RSI (R)	AREA m² (ft²)	
Ceiling - addition: Attic/gable	5.46 (31.0)	5.39 (30.6)	19.5 (210)	
Ceiling01: Attic/gable	5.46 (31.0)	5.25 (29.8)	130.8 (1408)	

MAIN WALLS

	INSULATION VALUE		
TYPE	Nominal RSI (R)	Effective RSI (R)	AREA m² (ft²)
Wall - garage: 38x89 mm (2x4 in) Wood frame	1.43 (8.1)	1.63 (9.3)	9.5 (102)
Wall -addition: 38x140 mm (2x6 in) Wood frame	3.34 (19.0)	3.04 (17.3)	30.1 (324)
Main floor	1.84 (10.4)	1.47 (8.3)	123.4 (1328)

WINDOWS

#	ТҮРЕ	U-factor W/m² • °C (Btu/h • ft² • °F)	RSI (R)			
3	Window - D2	2.7 (0)	0.37 (2.1)			
1	Vinyl, Slider, Double, Low E	2.1 (0)	0.47 (2.7)			
1	Vinyl, Hinged, Double, Low E	2.1 (0)	0.48 (2.7)			
2	Vinyl, Hinged, Double, Low E	2 (0)	0.49 (2.8)			
3	Vinyl, Hinged, Double, Low E	2 (0)	0.50 (2.8)			
3	Vinyl, Hinged, Double, Low E	1.9 (0)	0.52 (2.9)			
Tota	Total window area: 18.88 m ² (203.3 ft ²)					

EXTERIOR DOORS

#	ТҮРЕ	U-factor W/m² • °C (Btu/h • ft² • °F)	RSI (R)		
2	Solid wood	2.6 (0)	0.39 (2.2)		
Tota	Total door area: 3.7 m ² (40 ft ²)				

BASEMENT/FOUNDATION

	INSULATION VALUE		
TYPE	Nominal RSI (R)	Effective RSI (R)	AREA m² (ft²)
Crawlspace - 2 Floor above crawlspace	N/A	0.47 (2.7)	16.7 (179)
Crawlspace - 2 slab	N/A	N/A	16.7 (179)
Crawlspace - 2 walls	1.76 (10.0)	2.14 (12.0)	15.2 (164)
Crawlspace header	3.34 (19.0)	3.68 (20.9)	3 (32)

BASEMENT/FOUNDATION (Continued)

	INSULATION VALUE		4054
TYPE	Nominal RSI (R)	Effective RSI (R)	AREA m² (ft²)
Foundation - 1 Basement header	2.11 (12.0)	2.58 (14.7)	9.4 (101)
Foundation - 1 concrete walls: exterior	N/A	N/A	96.7 (1040)
Foundation - 1 concrete walls: interior	N/A	N/A	96.7 (1040)
Foundation - 1 slab	N/A	N/A	106.5 (1146)

AIRTIGHTNESS

Air leakage rate at 50 pascals	3.46 air changes / hour
Equivalent leakage area	837.4 cm ² (130 in ²)
Normalized leakage area	1.6 cm ² / m ² (2.3 in ² /100 ft ²)

MECHANICAL SYSTEMS

SPACE HEATING

TYPE	OUTPUT SIZE	EFFICIENCY
Condensing natural gas furnace	18 kW 61500 BTU/h	94% AFUE
Design heating load: 15.94 kW		

SPACE COOLING

TYPE	OUTPUT SIZE	EFFICIENCY
Central air conditioner	4.94 kW 17000 BTU/h	10 SEER
Design cooling load: 4.68 kW		

WATER HEATING

TYPE	TANK VOLUME	EFFICIENCY
Natural gas storage tank with pilot	151L (40 USG)	0.55 EF

WHOLE-HOME VENTILATION

TYPE	AIR FLOW RATE	EFFICIENCY
N/A	N/A	N/A

HEATED FLOOR AREA

Above-grade area	130.8 m² (1407.9 ft²)
Below-grade area	106.5 m² (1146 ft²)

WARNINGS



The results of the energy simulation determined that this house may not receive sufficient outdoor air to maintain good indoor air quality. Please seek additional information from your energy advisor and a qualified ventilation contractor.

GLOSSARY

Airtightness

describes how well the building envelope resists air leakage and is measured in air changes per hour at 50 pascals (ACH@50 Pa). The fewer air changes per hour, the more airtight the building envelope is. Equivalent leakage area is another way of describing the airtightness of the building envelope. It represents the size of a single hole in your building envelope if all the individual air leakage holes or gaps were added together. The smaller the equivalent leakage area, the less energy you will need to control the temperature of your home (but you will still need to ensure that you have adequate ventilation).

Design heating/cooling loads

provide an estimate of the capacity of the heating and cooling equipment needed to maintain your home at 22 °C in the winter and 24 °C in the summer and are provided for guidance only. Before having a new heating/cooling system installed, your heating/cooling contractor should perform an independent, detailed heat loss/heat gain calculation on your home in order to select the appropriate equipment.

Gigajoule (GJ)

is a unit of energy. It can be used as a measure of any type of energy that is consumed or produced in your home. Specifically, one GJ is the equivalent of 278 kWh of electricity, 27m³ of natural gas, 26 L of oil, 39 L of propane, or 947 817 BTUs. One GJ is roughly equal to the energy from two standard barbeque propane tanks or 30 litres of gas in a car's gas tank.

Greenhouse gas emissions

are the amounts of carbon dioxide, methane and nitrous oxide that are produced directly, by burning fossil and solid fuels, or indirectly, through the production of electricity. Greenhouse gas emissions are expressed in carbon dioxide equivalent units. Greenhouse gas emissions are calculated by multiplying the quantity of fuel or electricity used in your home by the emission factors for the particular energy source. Electricity factors vary by province because there are different emissions associated with each province's method of producing electricity. One tonne of greenhouse gas emissions is equivalent to the CO₂ emissions produced by driving an average efficiency mid-size vehicle from Toronto to Vancouver.

Heated floor area

represents the total useable area of your home that is heated, measured at the interior of the outer walls or of the walls attached to other buildings.

Insulation values

Are expressed in RSI (m² • °C/W) or R-value (h • ft² • °F/Btu) and represent the resistance to the flow of heat of a given thickness of insulation or construction assembly. The higher the RSI-value (Rvalue), the better the performance. The nominal value represents the resistance to the flow of heat of just the insulation while the effective value represents the resistance to the flow of heat of the entire wall, ceiling or floor assembly considering the structure, insulation, framing, sheathing and all finishing.

On-site renewable energy contributions

are subtracted from the rated annual energy consumption to

calculate the EnerGuide rating. For the calculation of the rated greenhouse gas emissions, on-site electricity generation only offsets emissions associated with electricity consumption, whereas a solar water heater reduces the emissions that would have been produced from the source of energy used to heat water.

Passive solar gain

is the heat from the sun that influences your home's heating and cooling requirements. Generally, south facing windows provide more solar gain.

Rated energy intensity

is calculated by dividing your rated annual energy consumption by your home's heated floor area. It allows you to compare the annual energy use of homes of different sizes on a "per square metre" basis.

Standard operating conditions

have been used to calculate your home's EnerGuide Rating. The rating assumes a standard number of occupants and energy use patterns. This allows for comparison of energy use across houses so that the house is rated and not the operation of the house by the occupants. The values are:

- Two adults and one child, at home 50% of the time;
- Hot water use of 178 - 199 L/day, variable depending on incoming
- ground water temperature; Thermostat settings of 21°C for daytime heating, 18°C for nighttime heating and 25°C for cooling; and
- Lighting, appliance and other electrical loads of 19.5 kWh/day.

U-factor

measures heat transferred through windows and doors, expressed in W/m² • °C (BTU/h • ft² • °F). The lower the U-factor, the better the energy efficiency of a window. The inverse of U-factor (1/U-factor) identifies the resistance to the flow of heat, expressed in RSI. The higher the RSI, the better the window is at resisting heat loss. You can use these values to choose more energy efficient windows.

For more details and additional terms, please visit NRCan.gc.ca/myenerguide.



The energy consumption indicated on your utility bills may be higher or lower than your EnerGuide rating. This is because standard assumptions have been made regarding how many people live in your house and how the home is operated. Your rating is based on the condition of your house on the day it was evaluated.

Quality assured by: GCI/REAL

Visit NRCan.gc.ca/myenerguide



Ressources naturelles Canada

NEXT STEPS

If you have had a Renovation Upgrade Service, refer to your report for the roadmap to making your home more energy efficient. If you have not yet had a Renovation Upgrade Service, why not contact your service organization to learn what you can do to save on energy costs, reduce greenhouse gas emissions and improve home comfort?

Everyone uses energy in their house differently. This report was developed using standard operating conditions as explained in the glossary. Therefore, your EnerGuide rating will not match your utility bills.

UPGRADE CONSIDERATIONS

Before undertaking upgrades or renovations, find out about appropriate products and installation techniques, and ensure that all renovations meet local building codes and by-laws. 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 performance of workmanship.

Where your energy advisor has identified a potential health or safety concern such as insufficient outdoor air, risk of combustion fumes entering your house or risk of exposure to asbestos, they have endeavoured to provide a warning 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.

Visit us today at:

NRCan.gc.ca/myenerguide

Canadä



The energy consumption indicated on your utility bills may be higher or lower than your EnerGuide rating. This is because standard assumptions have been made regarding how many people live in your house and how the home is operated. Your rating is based on the condition of your house on the day it was evaluated.

Quality assured by: GCI/REAL

Natural Resources

Canada

*

Visit NRCan.gc.ca/myenerguide

Ressources naturelles

Canada

Canadä