RENOVATION UPGRADE REPORT



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.

Next steps:

- ☆ Review your customized action plan below to improve the energy efficiency of your home;
- You may be eligible for **financial incentives** to support your energy-efficient upgrades. Please visit <u>www.canada.ca/greener-homes-grant</u> to view the financial incentives available.
- Need help getting started? Go to our resources www.nrcan.gc.ca/kthi.

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.





By implementing all upgrades, you are helping to fight climate change and could reduce GHG emissions by up to 2.5 tonnes per year.

ENER GUIDE

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

1. Upgrade heating system

Install a new ENERGY STAR certified air-source heat pump that has a Heating Seasonal Performance Factor 2 (HSPF2) Region V of 6.6.

This upgrade could reduce the energy consumption of your house by 23 gigajoules per year.

Did you know?

Space heating accounts for 48 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 www.nrcan.gc.ca/energy/products/categories/heating/13740 for information on choosing a heating system.

Your energy advisor's comments

When upgrading your air conditioner, I suggest replacing it with an air source heat pump. The heat pump will act as the air conditioner to provide cooling in the summer. In the heating season it will meet most of your heating needs.

Installing a heat pump is the single largest step you can take to reduce fossil fuels used by your home, increasing your heating efficiency from 96 % for the furnace to 250% or more.

Heat pumps work like your air conditioner but in reverse (they extract heat from the outdoors and move it inside during the winter). Due to improvements in technology in recent years, cold climate models now work exceptionally well throughout the entire winter, making them quiet heating and cooling systems for your home.

To be eligible for the GH loan:

1) The installation must include all components of the heat pump system. For mini- or multi-split systems, this means both the outdoor and indoor units. For central systems, this means the outdoor and indoor units, as well as the furnace or air handler that is listed as part of the heat pump system (unless that furnace is already in the home, in which case it can be kept). The exception to this is "Coils Only" systems that can be paired with any existing furnace.

2) The heat pump system must be capable of distributing heat throughout the entire home, including basements where the height is 1.8 m (5 ft. 11 in.) or higher. A minimum of one indoor head or warm air supply outlet is required on every floor, including a mezzanine that has a room with a door, of each dwelling unit in the building. In the case of a split-level home, one indoor head or warm air supply outlet is required on the uppermost floor, and one per pair of split levels. More than one indoor head and/or warm air supply outlet per floor may be required to ensure heat distribution throughout the entire building.

3) For a mini- or multi-split system, at least 2 new heads must be installed.

4) To determine the eligibility of the product, use the AHRI number and make and model of the indoor and outdoor units provided by the mechanical system contractor to confirm that it is included on the Searchable product list of eligible heat pumps for the Canada Greener Homes Initiative, here:

https://oee.nrcan.gc.ca/pml-Imp/index.cfm?action=app.welcome-bienvenue

Although significant energy savings can be achieved by installing a heat pump, this may not translate into lower utility costs, depending upon the relative prices of utilities in your region.

A mechanical system contractor can advise on whether a heat pump is the right choice for your circumstances. The contractor is responsible for specifying (including load calculations, sizing and selection) and installing the new system to meet all requirements. It is highly recommended to obtain two signed attestation forms from your contractor confirming that the heat pump has been installed by a trained and licensed professional certified in your province or territory, and that it is capable of distributing heat throughout the entire conditioned space in the home. The attestation forms are available on the Canada Greener Homes website, with a link below.

Attestation forms:

 \cdot the mechanical system has been installed by a trained and licensed professional certified in your province or territory:

https://natural-resources.canada.ca/sites/nrcan/files/science-and-data/funding-and-partnerships/greener-homes/MechanicalSystem-Contractorqualification_Final.pdf

-the air source heat pump or cold climate air source heat pump is capable of distributing heat to the entire home:

https://natural-resources.canada.ca/sites/nrcan/files/science-and-data/funding-and-partnerships/greener-homes/AirSourceHeatPumporColdClimateAirSourceHeatPumpDesignandInstallation.pdf

Note: The attestation forms do not replace the requirements listed above, but serve to protect your best interests and ensure that the mechanical contractor understands the heat distribution requirements.

At the second audit, I will take pics of the invoice and the outdoor and indoor units.



2. Insulate foundation

- Increase the insulation value of 100% of your basement walls (Foundation 1) from the interior by RSI 1.95 (R-11.1).
- □ Increase the insulation value of 100% of your pony walls (Foundation 1) by RSI 1.94 (R-11.0).
- □ Increase the insulation value of your foundation headers (BW hdr-01) by RSI 1.94 (R-11.0).

This upgrade could reduce the energy consumption of your house by 10 gigajoules per year.

Did you know?

Your foundation accounts for 38 percent of the estimated annual heat loss of your house.

Useful tips

Assess the status of your foundation for water leaks, cracks and flooding and remediate 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. Refer to your energy advisor's comments to determine which would be best suited for your foundation.

Consult our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

Your energy advisor's comments

Further insulating basement walls can reduce energy costs and improve comfort. The current building code requirement for basement wall insulation is a minimum of R-20. You can see how much heat loss is from your basement and how much you can save in the chart further down in the report.

Since your basement is already insulated with R-12 in 2x4 stud walls it makes it more difficult to add insulation. The best way to do this is to take down the stud walls (the framing may be able to be re-used) and add continuous rigid low permeability insulation such as EPS, GPS, polyisoboard, or a faced mineral wool against the foundation wall and re-build the stud walls and insulate the cavities with batt insulation.

Another option is to leave the walls up and add continuous insulation over the inside of the wall and to redrywall. I don't prefer this method because you can trap moisture in the wall and cause mould growth and rot. There was no moisture barrier against the foundation wall so moisture or liquid water can enter the wall anyway and you have and interior poly vapour barrier that inhibits drying to the inside. This is a difficult issue and if you intend to add insulation please contact me and we can discuss methods and options.

Make sure you and/ or your contractor pay attention to air sealing wherever possible.

To qualify for the GH loan, a minimum of 20% of the foundation wall area must be upgraded and an insulation level of at least R 10 added.

This work will be completed and may be covered-over by the time I come back for the second audit, so you will need to take work-in-progress pics showing the type and depth of insulation being installed (on the interior or exterior) as well as pics showing whole walls insulated.

If you add exterior insulation to the outside walls then this would add the recommended header (rim joist) insulation. If you don't add exterior wall insulation then the header area can be insulated from the inside in all the joist cavities with rigid foam and re-using the existing batt insulation.

Keep the invoice for the work (this includes receipts for insulation if you are doing the work yourself) to show me at the second audit.



3. Upgrade ventilation system

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

This upgrade could increase the energy consumption of your house by 1 gigajoules per year.

Did you know?

Upgrading your ventilation system can improve indoor air quality and comfort. A heat recovery ventilator (HRV) or energy recovery ventilator (ERV) saves energy 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 outdoor air by passing the two separate airflows through a heat exchanger.

Useful tips

When purchasing an HRV or ERV, choose a model that is certified by the Heating and Ventilating Institute (HVI) and consider models that have a high efficiency motor to help reduce electrical consumption. Ensure that the HRV or ERV system is designed, installed and balanced by a technician certified by a recognized mechanical organization. Select equipment tailored to your needs.

Keep contaminants away from the fresh air intake when your HRV/ERV is operating. For example, avoid putting trash next to the air intake, do not use pesticides and herbicides nearby and keep your barbecue downwind. If you must generate pollutants near the air intake temporarily, turn the HRV/ERV off until you complete the activity.

Consult Natural Resources Canada's publication about Heat Recovery Ventilators at www.nrcan.gc.ca/energy/products/categories/cooling-ventilating/ventilating/hrv/16197.

Your energy advisor's comments

Your house has very little air leakage. This is a big asset, in terms of energy efficiency, but it also means that more ventilation is recommended to maintain proper indoor air quality. To allow you to ventilate your house properly without losing all of the heat with the exhausted air, I am recommending the installation of a Heat Recovery Ventilator (HRV), or an Energy Recovery Ventilator (ERV). An ERV is different from an HRV in that it also maintains some of the moisture in the interior air, which can help to reduce dryness in the winter time.

But understand your circumstances before committing to this upgrade. Do you have evidence of moisture or condensation? Do odours linger or does the air feel stuffy? Do you have mould growing in the corners of the walls or elsewhere? Because, for less extreme cases, fresh air can be brought in by using bath fans more frequently, but without the advantage of heat recovery from an H/ERV.

Where possible use the H/ERV for some other function (besides whole-house ventilation), for example providing exhaust from a basement bathroom, or even a main floor bathroom since the ducting can often be run up the wall cavities. You can even abandon a noisy bath fan and seal it up.

When purchasing an HRV or ERV, choose a model that is certified by the Heating and Ventilating Institute (HVI) and consider models that have a high efficiency motor to help reduce electrical consumption.

It is advisable to hire a contractor that is certified in ventilation system design and installation by an industryrecognized organization, such as the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI), which is also recognized by your local jurisdiction. For a list of HRAI certified designers and installers, visit "http://www.hrai.ca" and under Home & Building Owners, click on Find a Contractor.

For more information on HRVs or ERVs, refer to NRCan's publication entitled, Heat Recovery Ventilator, available for download at the following link:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oee/files/pdf/publications/HRV_EN.pdf

For information on HVI-certified HRVs and ERVs, visit www.hvi.org or call 1-847-526-2010.

Note that the report shows a small increase in energy consumption from this upgrade since it is adding ventilation to your home. The reality is likely to be different since you will likely need to use the other exhaust fans less.

If you install an HRV or ERV, keep the invoice to show me at the second audit.



4. Insulate main walls

Increase the insulation value of your main walls (Main floor) by RSI 1.94 (R-11.0).

□ Increase the insulation value of your main walls (Main floor Garage) by RSI 1.94 (R-11.0).

This upgrade could reduce the energy consumption of your house by 4 gigajoules per year.

Did you know?

Main walls account for 14 percent of the estimated annual heat loss of your house.

Useful tips

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

Consult our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

Your energy advisor's comments

Based on information gathered at the audit, I am assuming that your exterior walls are currently insulated with R19 fiberglass batts. The current building code requirement for wall insulation is a minimum of R22 to R27 depending on other component efficiencies of the building.

The bar graph further down in this report shows the calculated heat loss through the exterior walls now versus if you were to add insulation to the walls. The insulation must be tight to the house and the joints between the sheets of insulation sealed to reduce air leakage areas (air leakage would reduce the effectiveness of the insulation much like leaving your parka open in winter). Have a look at the bar graph further down in the report to see the calculated difference in heat loss this upgrade could create.

You could add a layer of rigid foam to the outside of your walls, especially if you are intending to replace windows with new triple pane Energy Star certified windows. If you are getting new windows then this is the perfect time to upgrade the insulation. Then the new windows can be full frame replacements instead of keeping the old frames and installing a smaller window with less glass area. Also the new windows can be installed to the new plane of the wall and properly air and weather sealed.

I modeled adding 2" of isoboard rigid foam (R12) to the outside of the walls and then re-siding which will make the wall perform at R31. You should have at least 1/3 of the R value of the stud cavity insulation (R19) as outside continuous insulation to reduce the possibility of condensation in the wall cavity. This means you need to install at least R7.5 continuous insulation to the outside. Continuous insulation reduces thermal bridging through the wood framing and creates a much better performing wall. You may be able to remove and re-use the siding if you can match the existing colour and type with additional siding.

To be eligible for the GH loan, at least 20% of the exterior wall area must be upgraded and the insulation level increased by at least R7.5.



5. Upgrade windows

Replace 14 windows with ENERGY STAR certified models.

This upgrade could reduce the energy consumption of your house by 8 gigajoules per year.

Did you know?

Windows account for 24 percent of the estimated annual heat loss of your house.

Useful tips

Replacing windows can improve aesthetics, reduce noise from outside, reduce maintenance, increase property resale value, improve comfort and reduce condensation during cold weather. ENERGY STAR certified windows, patio doors and skylights are among the most energy efficient in the marketplace.

Consult our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

Your energy advisor's comments

This recommendation has a lower priority because window are very expensive and have a very low return on investment from energy savings. I would only replace windows if you are going to add exterior insulation. Then the new windows can be full frame replacements that are installed to the new plane of the wall and properly weather and air sealed.

When you replace windows make sure the installer pays attention to airtightness and let them know that the air leakage will be measured again when they are done. Also, feel free to mix and match between the two tiers of eligible windows. For example, getting the upper tier windows for fixed windows may be more economical than operable windows.

Replacing old, damaged or leaky windows with new ENERGY STAR certified products can help you save energy, improve comfort and reduce noise.

For the GH loan, to determine eligibility of the window you are seeking to purchase, CONFIRM THAT IT IS INCLUDED ON ONE OF THE SEARCHABLE PRODUCTS LISTS OF ELIGIBLE WINDOWS FOR THE CANADA GREENER HOMES INITIATIVE.

ENERGY STAR labels must be affixed to windows at the time of installation and remain in place until the time of your post-retrofit evaluation. If ENERGY STAR labels are removed prior to the post-retrofit evaluation, the following photos are your responsibility to acquire, retain and provide to the energy advisor at the time of the post-retrofit evaluation:

A photo of each newly-installed windows showing a portion of the surrounding wall assembly from the inside, outside or both, AND

A photo of each ENERGY STAR label affixed to the window that clearly shows the ENERGY STAR certification mark, Manufacturer model code/ number, U-factor/ Energy Rating, NRCan reference number or a Certified Products Directory (CPD) number, and a Certified mark from one of the following:

- Canadian Standards Association (CSA)
- Intertek Canada
- Keystone Certifications
- Labtest Certification (LC)
- QAI Laboratories
- National Fenestration Council (NFRC)

Removed labels must be submitted and provided to the energy advisor.

Request your supplier/ installer to include the following information on the invoice:

- Name of the homeowner and address of the house;
- · Date of installation;
- · Window make and model numbers;
- NRCan Reference Number;
- · Indication of whether windows are ENERGY STAR or ENERGY STAR Most Efficient;
- Number of windows and location of each installation;
- U-factor/ Energy Rating (ER);
- · Itemized cost of each window and total cost of installation; and
- Itemization of any other work done as part of the installation, such as air/ gap sealing associated costs.

Please note that a window schedule (quote) cannot be used as a substitute for the aforementioned acceptable window validations and cannot be submitted as a standalone document to validate window installation and eligibility. However, the window schedule may be attached to the invoice provided there is a reference on the invoice to a schedule reference number to link the two documents.

The Greener Homes loan is not available for skylights.

Keep the invoice to show me at the second audit.



6. Insulate attic

□ Increase the insulation value of your attic (Ceiling01) by RSI 4.41 (R-25.0).

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

Did you know?

Ceilings account for 7 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.

Consult our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

Your energy advisor's comments

For new houses the Ontario Building Code requires a minimum insulation level of R-50. Your attic has R-35. Therefore, I recommend adding insulation to raise the R-value to a minimum of R-50. I modeled an upgrade to R-60 so if you only install insulation to R-50 the energy savings will be somewhat less.

Insulation slows the rate of heat loss, resulting in improved energy use and reduced energy costs. Blown cellulose is an ideal material for use in this application. This recycled newsprint insulation material is widely available, cost-effective, has a higher R-value per inch than fibreglass, and has a very low carbon footprint.

Make sure your insulation contractor or you spends some time BEFORE insulating to look for and seal all the potential air leaks in the attic. For example, electrical penetrations, bathroom fans, electrical boxes, plumbing penetrations, chimney chases, partition walls, drop valances/bulkheads, etc. Time spent now will not only save energy, but will also increase comfort and reduce moisture movement into the attic which will protect your house from long term damage.



7. Perform air sealing

□ Improve the airtightness of your house by 10% to achieve 2.91 air change(s) per hour at 50 pascals.

This upgrade could reduce the energy consumption of your house by 1 gigajoules per year.

Did you know?

Air leakage accounts for 15 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 our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

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

- According to the blower door test done at the initial audit, the "equivalent leakage area" of your house is 212.6 sq inches. That means that if you were to add up all of the little leaks around your house and, instead, had just one opening in the wall, it would measure about 14.6 inches by 14.6 inches.
- Another way to think of it is this: if I had set my blower door fan to the highest setting and left the fan turned on for one hour, the number of times the total amount of air inside your house was replaced with fresh outdoor air is called the ACH50. A house that is more air-tight has a lower ACH50. Your house has an ACH50 of 3.43 which is fairly airtight.
- I have included air sealing just so you will be eligible should you manage to meet the target, which is not easy in a house that is below 5 ACH50 (which yours is). So, by all means, work at improving air tightness but do not count on hitting the target!
- Follow my recommendations I made when we toured the house finding air leakage spots during the blower door test. Also refer to the air leakage checklist I have included with your report.
- Air sealing (or, draft-proofing) is one of the most cost-effective energy-saving measures you can undertake. Achieving any of the targets defined for your home typically requires that the work be performed by an airsealing professional.

- Help through the GH loan is available if the airtightness of your home is improved to achieve or exceed the air change rate target proposed above.
- NOTE: In some instances, performing air sealing may result in inadequate ventilation or may increase radon levels, which may be detrimental to the house and its occupants. A balanced mechanical ventilation system such as a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) may help to address these concerns. Your house is airtight enough that you need an HRV to have good indoor air quality. Please seek additional information from your energy advisor and a qualified ventilation contractor.
- □ The blower door test will be repeated during the second audit to measure the new air tightness values.
- Keep any invoices for air sealing work done, or materials used (such as caulking and weather stripping) to show me at the second audit.



8. Upgrade hot water system

Install a new ENERGY STAR certified, electric heat pump water heater with an energy factor (EF) of 2.25.

This upgrade could reduce the energy consumption of your house by 5 gigajoules per year.

Did you know?

Water heating accounts for 18 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 *www.nrcan.gc.ca/energy/products/categories/water-heaters/13735* for more information.

Your energy advisor's comments

I suggest replacing your water heater with an electric heat pump water heater only when the existing hot water heater comes to the end of its service life.

A heat pump water heater transfers heat from indoor air to the water in its tank, thereby reducing room temperatures. This will increase heating requirements somewhat during the heating season. At the same time, the equipment will remove moisture from the air while cooling it, which can be beneficial in the summer. If a heat pump water heater is to be installed, its presence should be considered in the sizing of the heating system.

For the GH loan, to determine the eligibility of the product you are seeking to purchase, confirm that it is included on the Searchable product list of eligible heat pump water heaters for the Canada Greener Homes Initiative, here:

https://oee.nrcan.gc.ca/pml-Imp/index.cfm?language_langue=en&action=app.searchrecherche&appliance=HP_WH_GH&_gl=1*1vm8wmp*_ga*NTI2NzE3MTkzLjE2NzczNDA3ODA.*_ga_C2N57Y 7DX5*MTcwMDA3OTk3OS4zMjluMS4xNzAwMDgwOTMwLjAuMC4w

NOTE: since heat pump water heaters draw heat from the surrounding indoor air, they require adequate airflow to operate properly. They cannot be located in tight or confined spaces unless provision is made for adequate airflow.

At the second audit I will take a pic of the water heater and the invoice.



9. Upgrade cooling system

□ Install a new ENERGY STAR certified air conditioner.

This upgrade could reduce the energy consumption of your house by 1 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.

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 *www.nrcan.gc.ca/energy/products/categories/cooling-ventilating/13756* for more information.

Your energy advisor's comments

The energy savings here result from switching to a heat pump which, in addition to heating your home in the winter, can also cool your home in the summer at a very high level of efficiency.

10. Upgrade doors

Replace 2 doors with ENERGY STAR certified models.

This upgrade could increase the energy consumption of your house by 0 gigajoules per year.

Did you know?

Doors account for 2 percent of the estimated annual heat loss of your house.

Useful tips

ENERGY STAR certified doors are among the most energy efficient in the marketplace. If there is a window in the door, consider units with low-E coatings and inert gas fills.

Consult our **resources** <u>www.nrcan.gc.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768</u> to learn more and take action.

Your energy advisor's comments

Door replacement has a low return on investment from energy savings and I have made this recommendation a lower priority.

Doors can be weather stripped and the single pane side and top lites can have storm windows made which will improve energy efficiency.

When you replace doors, as well as ensuring the doors meet the rebate eligibility standards, make sure the installer pays attention to airtightness and let them know that the air leakage will be measured again when they are done.

See the information below regarding rebate eligibility:

Replacing old, damaged or leaky hinged doors with new ENERGY STAR certified products can help you save energy and improve comfort. The door upgrade applies to the entire door system installed in a rough opening. A door system installed in a rough opening may consist of one or more doors and may include side lights and transoms. Side lights and transoms installed in the door rough opening are not considered windows.

To determine the eligibility of the door(s) you are seeking to purchase, confirm that each door is included on the Searchable product list of eligible doors for the Canada Greener Homes Initiative.

ENERGY STAR labels must be affixed to each component of the door system at the time of installation and remain in place until the time of your post-retrofit evaluation.

If ENERGY STAR labels are removed prior to the post-retrofit evaluation, the following photos are your responsibility to acquire, retain and provide to the energy advisor at the time of the post-retrofit evaluation:

A photo of each newly-installed door system showing a portion of the surrounding wall assembly from the inside, outside or both, AND

A photo of each ENERGY STAR label affixed to each component of the door system that clearly shows the ENERGY STAR certification mark, Manufacturer model code/number, U-factor/ Energy Rating, NRCan reference number or a Certified Products Directory (CPD) number, and a Certified mark from one of the following:

- Canadian Standards Association (CSA)
- Intertek Canada
- Keystone Certifications
- Labtest Certification (LC)
- QAI Laboratories
- National Fenestration Council (NFRC)

Removed labels must be submitted and provided to the energy advisor.

Request your supplier/ installer to include the following information on the invoice:

- Name of the homeowner and address of the house;
- Date of installation;
- Make and model numbers of each door component (side lite, transom, door leaf);
- NRCan Reference Number;
- Indication of whether door system components are ENERGY STAR certified;
- Number of door system components and location of each installation;
- U-factor/ Energy Rating (ER);
- · Itemized cost of each door system component and total cost of installation; and
- Itemization of any other work done as part of the installation, such as air/ gap sealing associated costs.

Please note that a door schedule (quote) cannot be used as a substitute for the aforementioned acceptable door system validations and cannot be submitted to the portal as a standalone document to validate door system installation and eligibility. However, the door schedule may be attached to the invoice provided there is a reference on the invoice to a schedule reference number to link the two documents.

Keep the invoice to show me at the second audit.



11. Add a renewable energy system

□ Install a photovoltaic system designed to deliver 2867.5 kilowatt-hours per year.

This upgrade could reduce the energy consumption of your house by 11 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

If you choose to install a PV system, it is strongly recommended that a full assessment by a professional solar PV installer, including the measurement of solar irradiance (how much sunlight falls on the roof) is undertaken to provide detailed information on considerations for your home and specific installation recommendations, including the size and related energy production of the system.

To qualify for the GH loan, the rated PV panel must have peak power capacity higher than or equal to 1.0 kW DC. I modeled and the energy production shown is for a 10 kW system.

The system must be composed of PV panels and an inverter certified to CSA Standards and, if required, of inverters also certified to CSA Standards.

Solar panels can be mounted on the house or ground, as long as they are on the property / land of the house associated with the application.

Building permits may be required for both off-grid and grid-connected installations. For a grid connected system, a copy of the letter of approval or permission for interconnection issued by the local electrical or building authority is required.

For more information, refer to Natural Resources Canada's Solar Ready Guidelines document that can be found online, here:

https://natural-resources.canada.ca/energy-efficiency/data-research-insights-energy-ef/housing-innovation/solar-ready-guidelines/5141

Keep the invoice and Solar Ready Assessment to show me at the second audit.

PV BATTERY

GH loan requirements:

· Must be connected to a permanently mounted photovoltaic system

 \cdot Batteries can be for a new battery system, the replacement of existing batteries or to supplement an existing battery system

· Batteries must be rated for deep cycle (any technology)

· Inverter and charge controller purchase and installation costs can be included as part of the battery system's total cost; and

· Batteries must be permanently installed (i.e. portable batteries and electric vehicles are not eligible for this rebate).

Best practices:

· Consider (if required or included) an inverter with true sinewave output, a minimum continuous capability of 1200 Watts (W) and a minimum surge capability of 2500 W

 \cdot Consider a battery system with a minimum total capacity at 4500 Watt hours at 20 hours. To determine amp hours, divide 4500 Watt hours by the voltage of the battery. For example, for a 12 volt battery the capacity required is 375 Amp hours

• Inverter and charge controller should be certified to CSA C22.2 107.1, "Power conversion equipment" or CSA C22.2 62109, "Safety of power converters for use in photovoltaic power systems".

• Discuss maintenance, warranties and specifications with your supplier or contractor when selecting the most appropriate type and size of batteries for your specific usage.

· The installation or inspection of a battery back-up system must be undertaken by a licensed and trained professional.

• An electrical permit for installation of the batteries and any related equipment or work must be obtained, as required. Please note that recent changes to the Canadian Electrical Code may prohibit battery installations inside dwellings so check with your supplier, installer or local code authority.

This resiliency measure must be combined with an energy efficiency retrofit (insulation, space and/ or water heating) from the Greener Homes Initiative.

Keep the invoice to show me at the second audit.



Additional energy advisor comments

This report includes the recommended retrofits that I believe will have the greatest impact on improving the energy efficiency of your house. Some recommendations may be for your health and safety and the durability of your house.

When your work is complete and you call the office to schedule a follow-up visit, I will return to document the improvements that you have made. Please keep all ENERGY STAR stickers on windows/ doors, invoices for all work completed by a contractor, sufficient renovation pictures if insulation will be covered up, and receipts for materials purchased and installed yourself. I will need these to document your upgrades.

I recommend taking pictures of walls while insulation is being installed, and before covering. Then show them to your energy advisor, during the post-retrofit evaluation, to ensure that you will get full credit for your newly-installed insulation.

During your renovations, please feel free to call me if you have any questions about the project at 613 864-3099. When you are done, I will return to check the contractor's work and document the upgrades. The fee for this follow-up visit is at present \$250. If you have any questions or concerns about your rating or report, contact me, or Green Communities Canada at 1-855-640-1100. Green Communities Canada is an alliance of local non-profit organizations that provide environmental and other community benefits. Visit us at www.greencommunitiescanada.org.

Hiring a contractor is required for several of the home retrofits and strongly recommended for the others. The contractor is responsible for complying with local bylaws and relevant provincial, territorial and federal legislation and guidelines.

Neither NRCan nor we endorse the services of any contractor, nor any specific product, and accept no liability in the selection of materials, products, contractors or performance of workmanship. Before undertaking retrofits, find out about the appropriate products, safety and installation techniques, and ensure that all retrofits meet local building codes and by-laws.

Zero-interest loan available.

The Canada Greener Homes Loan (GH loan), a loan from the Canada Mortgage and Housing Corporation, is available for homeowners to complete upgrades which are recommended in this report, up to \$40 000, repayable over a 10-year period.

While the Greener Homes grants are not available, to be eligible for the Loan, windows, doors, water heaters and space heating equipment must be on the applicable eligible products list, found on the Greener Homes Initiative site. And, insulation levels in floors, walls and ceilings must following the eligibility requirements as shown on the Greener Homes Initiative site.

More loan information can be found here:

https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-loan/24286

Thank you,

Alan Leonard

NRCan Registered Energy Advisor 613 864-3099 Alanleonard9@gmail.com Rideau Environmental Action League https://www.realaction.ca

NOTES:

- Energy use reductions are calculated with each upgrade taken on its own. Combinations of upgrades may produce slightly different results.

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





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*.

A 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.

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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:

- □ 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 **RGY-SAVING** product label to help you select the most energy efficient model. For more information, go to 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.