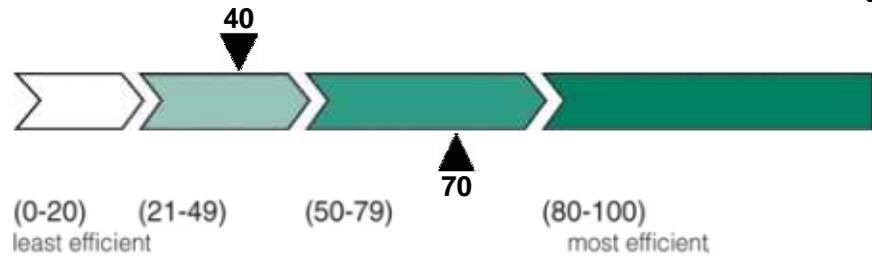


Property Owner:

John Doe
100 Sample road
Sampletown, Quebec
H9W 5H4

EnerGuide Rating



House type: Single detached

No. of storeys: Two

No. of RO windows: 27
RO = rough opening

Air conditioner: Yes

Heating system: Oil
Furnace (Bi-Energy)

Domestic hot water: Electricity

Air leakage rate @ 50 Pa: 12.89 ACH
ACH = number of air changes per hour

Equivalent Leakage Area: 2843 cm²

The results of your pre-retrofit energy evaluation show that your house rates 40 points on the EnerGuide scale. If you implement all of the recommendations in this report, you could reduce your energy consumption by up to 51% and increase your home's energy efficiency rating to 70 points. The average energy efficiency rating for a house of this age in Quebec is 57, whereas the highest rating achieved by the most energy-efficient houses in this category is 80.

The sooner you start your renovations, the sooner you will benefit from the energy savings. And let's not forget how reduced energy consumption helps protect the environment.

Did you know that when you reduce the amount of energy used in your home, you also reduce the production of greenhouse gases (GHG) such as carbon dioxide? By improving your home's energy efficiency rating to 70 points, you will reduce its GHG emissions by 14.5 tonnes per year!

The ecoENERGY Retrofit - Homes program stopped accepting bookings for pre-retrofit evaluations as of March 31, 2010. If there is a complimentary grant program offered by a province, territory, municipality, utility or other organization, your file will be transferred to them in accordance with your consent.

Note: If you notice any discrepancies with the above description of your home, contact your service organization immediately.

Service Organization:
Telephone:

Date of evaluation: April 14, 2011
Date of report: May 29, 2011

Certified Energy Advisor:

Certified Energy Advisor Signature

1. YOUR HOME ENERGY ACTION CHECKLIST

This is your checklist of recommended retrofits to improve the energy efficiency of your home. Included is information on the potential for energy savings and EnerGuide rating improvement. **For more information on implementing the recommended retrofits, read carefully the 'Recommended Energy-Saving Measures' section of this report. Any reference in this report regarding the eligibility for, or availability of, grants under the ecoENERGY Retrofit - Homes program should be disregarded.**

Before undertaking upgrades or renovations, find out about the appropriate products and installation techniques, and ensure that all renovations meet local building codes and by-laws. NRCan does not endorse the services of any contractor, nor any specific product, and accepts no liability in the selection of materials, products, contractors or performance of workmanship.

Note: Some provinces, territories, municipalities and utilities offer complimentary grants and other incentives for reducing energy use. For information on other energy-saving programs, visit ecoaction.gc.ca and follow the links to ecoENERGY Retrofit's "Grants and Rebates" Web page for consumers or call 1 800 O-Canada (1-800-622-6232).

Retrofits	Potential for Energy Savings *	Potential Rating Improvement
ATTIC/ROOF INSULATION		3.4 points
Increase the insulation value of your attic from the current level, which is evaluated at RSI 1.7 (R-9.6), to achieve a total minimum insulation value of RSI 8.8 (R-50).		
Increase the insulation value of your cathedral ceiling, which is evaluated at RSI 1.7 (R-9.6), to achieve a total minimum insulation value of RSI 5 (R-28).		
HEATING SYSTEM		16.5 points
Install an ENERGY STAR® qualified air-source heat pump that has a seasonal energy efficiency ratio (SEER) of 14.5 or higher, a minimum heating seasonal performance factor (HSPF) of 7.1 for Region V and a minimum capacity of 12,000 Btu/hour.		
COOLING SYSTEM (A/C)	—	0 points
Replace your central air conditioning system with an ENERGY STAR® qualified system that has a seasonal energy efficiency ratio (SEER) of 14.5 or higher.		
WINDOWS AND DOORS		5.4 points
Replace 26 window(s) / skylight(s) with models that are ENERGY STAR® qualified for climate zone B.		
AIR SEALING		4.8 points
Improve the air tightness of your house by 24 percent to achieve an air change rate per hour of 9.77 at a pressure of 50 Pa.		
BASEMENT/CRAWL SPACE INSULATION		4.2 points
Increase the insulation value of the basement walls by a minimum of RSI 1.8 (R-10) to a maximum of RSI 4.1 (R-23).		

When replacing ANY of the equipment listed in this report, the new equipment should have an

efficiency rating higher than that of the original equipment.

2. THE ENERGUIDE RATING SYSTEM

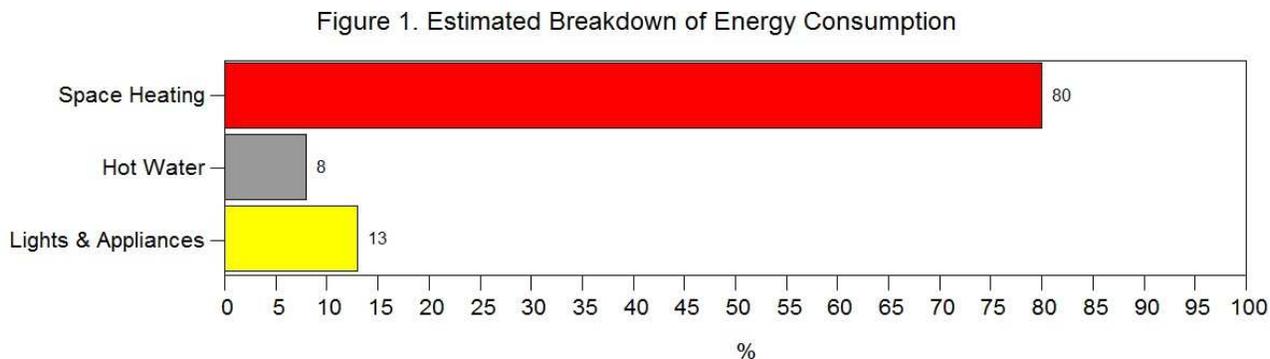
The EnerGuide rating system is a standardized method of evaluation that lets homeowners compare their house's energy efficiency rating to similar sized houses in similar regions. The EnerGuide rating considers the house's estimated annual energy consumption based on an in-depth evaluation of the house's characteristics such as location, size, equipment and systems, insulation levels, air tightness, etc. In addition, standardized conditions are used when calculating the rating in order to compare the efficiency of one house to another. These conditions include: a complete air change approximately every three hours; four occupants; a fixed thermostat setting of 21°C on main floors and 19°C in the basement; average hot water consumption of 225 litres per day; average national electricity consumption of 24 kWh per day; and regional weather data that is averaged over the last 30 years.

Figures 1 through 3 show the results of your energy evaluation based on the standardized conditions. The results may not entirely reflect your household since your actual energy consumption and future savings are influenced by the number of occupants, their day-to-day habits and lifestyles.

3. ENERGY CONSUMPTION

Houses lose heat to the outdoors during the heating season primarily through air leakage and conduction, such as the transfer of heat through the basement and exterior walls, upper floor ceilings, windows and doors (the 'building envelope'). Canada's demanding climate and modifications made to the house, such as drilling holes in walls for new wiring, pipes and lights, all play a part in reducing the efficiency of the building envelope over time. Houses need to be regularly maintained and upgraded to ensure greater energy efficiency, comfort and savings.

Figure 1 breaks down your house's estimated annual energy consumption for space heating, hot water and lights and appliances.



4. SPACE HEATING ANALYSIS

Figure 2 shows the estimated percentage of energy used for the space heating of your home.

- The right side of the top bar shows the percentage of energy you could save if you were to implement all of the upgrades recommended in this report, excluding changes to the space heating equipment. You could save up to 38 percent by performing all of the recommended non-space heating system upgrades.
- The right side of the bottom bar shows the percentage of energy you could save if you were to implement all of the upgrades recommended in this report, including any space heating system upgrades. You could save up to 64 percent by performing all of the recommended upgrades.

Figure 2. Estimated Percentage of Potential Energy Savings

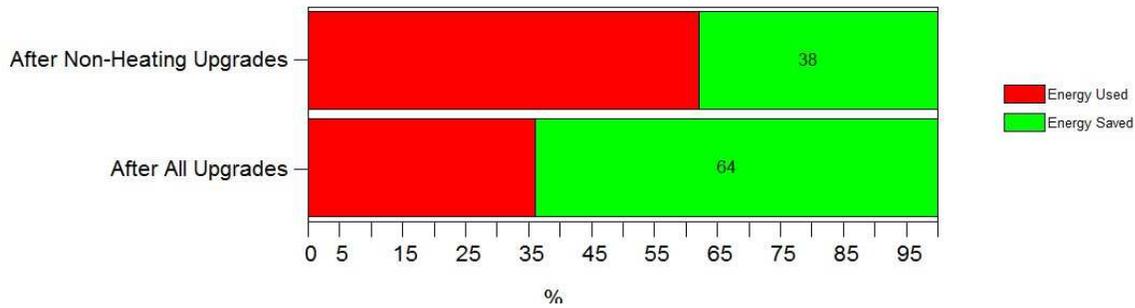
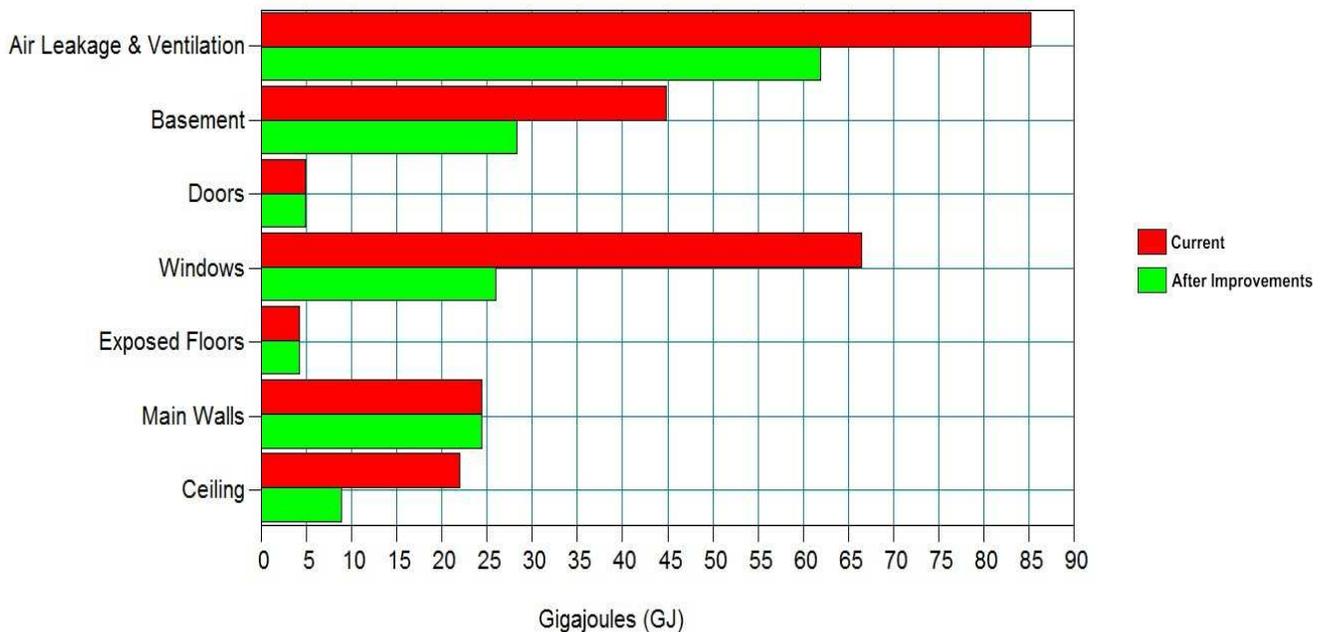


Figure 3 shows where the energy used for space heating is lost from your home. This energy is measured in gigajoules (GJ), where 1 GJ is equivalent to 278 kilowatt-hours (kWh) or 948,000 Btu.

The red bars show the areas where you are losing energy now. The longer the bar, the more energy you are losing. The green bars show the estimated energy loss after you complete your renovations. The larger the difference between the red and the green bars, the greater the potential for energy savings and comfort improvements.

Figure 3. Breakdown of Heat Loss through Building Envelope



Your Home's Estimated Design Heating and Cooling Loads

If you were to implement ALL of the building envelope retrofits recommended in the section of this report entitled 'Your Home Energy Action Checklist', it is estimated that your home's design heat loss would be 66421 Btu/hour (19466 Watts) and its design cooling load would be 32725 Btu/hour (2.7 tons). If you are considering replacing your space heating and/or cooling system, it is recommended that you provide this information to your heating/cooling contractor to help ensure a properly-sized system. However, this is only an estimate based on the data that was collected on your home at the time of the pre-retrofit evaluation. The design heat loss and cooling load can vary depending on different factors, such as the retrofits that you implement and other changes you may make to your home. Prior to having a new heating/cooling system installed, it is recommended that your heating/cooling contractor perform a heat loss/heat gain calculation on

your home to determine the capacity and distribution flows for the new equipment. The contractor should hold current certification for Heat Loss/Heat Gain Calculations from the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). For a list of certified contractors, visit www.hrai.ca and click on "Homeowners and Building Owners" and "SkillTech Academy Canadian Certification Listing", or call 1-800-267-2231.

Important Information Concerning Vermiculite Insulation

Older vermiculite insulation installed in homes may contain amphibole asbestos, which can cause health risks if disturbed and inhaled. If the insulation is contained in the walls or attic spaces and is not disturbed or exposed to the home or interior environment, it poses very little risk. Vermiculite insulation was not detected during the energy evaluation of your home. However, if you find vermiculite insulation during renovations, avoid disturbing it in any way. 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 amphibole asbestos, refer to the Health Canada fact sheet It's Your Health - Vermiculite Insulation Containing Amphibole Asbestos. Visit <http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/prod/insulation-isolant-eng.php> or call Health Canada at 1-800-443-0395 to order a copy.

5. RECOMMENDED ENERGY-SAVING MEASURES

Insulating Cathedral Ceilings

Insulating a cathedral ceiling usually requires the services of a contractor. The main difficulty with cathedral ceilings is the limited space for insulation and ventilation.

When insulating a cathedral ceiling, you must minimize moisture penetration from the house into the roof space, which can lead to moisture problems, reduce the effectiveness of the insulation and damage interior finishes and the roof structure. Therefore, it is critical to seal all air leaks into the ceiling, keep the humidity level in the house at a reasonable level and eliminate existing moisture problems.

Thermal bridging occurs when joists or rafters, which have a relatively low insulating value, conduct heat directly from the ceiling to the exterior of the house. Therefore, it is preferable to eliminate or reduce thermal bridging through the ceiling joists or rafters when you insulate cathedral ceilings. In addition to the heat loss, thermal bridging can cause staining or condensation on the ceiling finish along the joists.

Cathedral ceilings can be insulated using one of the following methods:

- insulating from the exterior
- insulating from the interior by removing the existing ceiling
- insulating from the interior by insulating over the existing ceiling
- insulating the roof space

Insulating from the Exterior

Insulating from the exterior is the preferred method for cathedral ceilings but is one of the most labour intensive. This method usually requires that you remove the roof surface to expose the roof space. Therefore, it is most cost effective to perform this work if your roof needs to be repaired or replaced.

Insulating from the Interior by Removing the Existing Ceiling

Insulating from the interior by removing the ceiling is also labour intensive because it involves: removing the existing ceiling finish, possibly removing the existing insulation and vapour barrier; installing insulation and an air and vapour barrier; and installing a new ceiling throughout the house. As well, it is difficult to correctly insulate and seal the top of the interior partitions with this method.

Insulating from the Interior by Insulating Over the Existing Ceiling

This method is somewhat less labour intensive because the existing ceiling can be left in place and insulation and a new air and vapour barrier is installed over the ceiling, followed by a new ceiling finish. As with the

method explained above, it is difficult to correctly insulate and seal the top of the interior partitions with this method.

Insulating the Roof Space

To insulate the roof space, loose-fill insulation is blown in to fill the cavity between the ceiling and the roof. This method is performed by an insulation contractor.

This method of insulating can eliminate ventilation and is not recommended unless extra care is taken to reduce air leakage into the roof space and prevent potential moisture damage. Unfortunately, air leakage locations in a cathedral ceiling, such as penetrations for electrical wiring, plumbing stacks and the tops of partition walls, are not easily accessible for sealing. In addition, this insulation method may not reduce thermal bridging if the joists are not covered with insulation.

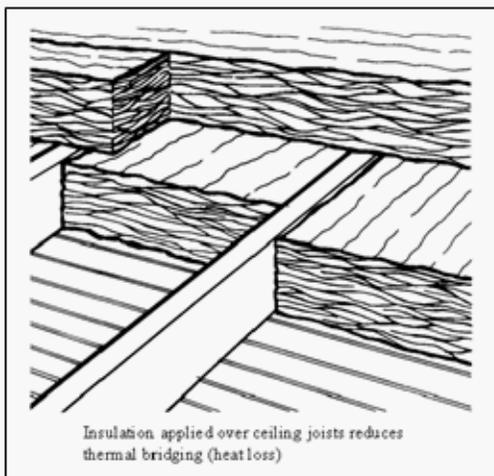
For more information, refer to NRCan's *Keeping the Heat In* and Canada Mortgage and Housing Corporation's *About Your House* and *Renovating for Energy Savings* fact sheets.

Grant Eligibility: Note that you must insulate a minimum of 20 percent of your ceiling area to qualify. The grant amount varies according to the existing insulation value, the amount of insulation that is added and the ceiling area that is insulated. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation

The insulation in the cathedral ceiling at the time of the evaluation was approximately R-10. This insulation value is below today's standards. I recommend you have a qualified contractor insulate your cathedral ceiling to reach a minimum of R-28.

Attic Insulation



In addition to reducing energy use, increasing the insulation level of your attic will keep your house warmer during the winter and cooler during the summer. Effective insulation and air sealing slow the movement of heat and air, and help prevent moisture accumulation in the attic.

When insulating attics, the importance of air sealing cannot be overstated. Before insulating, seal all openings and penetrations to stop interior air from entering the attic. Seal gaps around ceiling light fixtures, plumbing stacks, wiring, chimneys and the tops of interior walls. Install weatherstripping around the hatch or door, and use hooks with eye bolts or a latch to hold the hatch firmly against the weatherstripping.

Ensure that soffit venting is not blocked by the insulation. Baffles may need to be installed against the underside of the

roof along the soffits to ensure proper ventilation.

As is important with the installation of all products, follow the manufacturer's instructions and check with your local building authorities for information on fire safety requirements. For example, do not install insulation or flammable material against or over heat sources, such as masonry or metal chimneys and recessed lighting fixtures.

For more information on insulating attics, consult NRCan's publication entitled *Keeping the Heat In*, Chapters 1–4, and Canada Mortgage and Housing Corporation's *About Your House* and *Renovating for Energy Savings* fact sheets.

Grant Eligibility: The grant amount differs according to the existing insulation value and the total insulation value achieved. Note that you must insulate a minimum of 20 percent of the total ceiling area and reach a total minimum insulation value in order to qualify. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation:

The insulation in the attic at the time of the evaluation was approximately R-10. This insulation value is below today's standards. I recommend upgrading the insulation of the Ceiling/Attic to reach a minimum of R-51.

Skylights

Skylights bring added light to a home and make it more attractive. However, if not designed or installed properly, they can lose far more heat than a standard roof or window. They can also present special problems such as water leakage, condensation, and summer overheating.

Think energy efficiency when selecting and installing a new skylight. Technical breakthroughs such as low E-coatings, triple glazing, inert gas fills, internal-shading devices and improved edge spacers and frames all contribute to improved energy efficiency, solar control and thermal comfort. If possible, avoid high, poorly insulated curbs when having a new skylight installed.

ENERGY STAR® qualified skylights, which are rated for 4 different climate zones, are among the most energy efficient in the marketplace. They'll help keep your home comfortable year-round, reduce outside noise, and, depending on the amount of humidity in your home, there may be less condensation on them during cold weather.

For information on purchasing an energy-efficient skylight, consult the NRCan publication entitled, *Consumer's Guide to Buying Energy-Efficient Windows and Doors*. For information on ENERGY STAR qualified windows, doors and skylights, go to www.energystar.gc.ca and click on 'Windows and Doors' under 'Qualified Products'.

Grant Eligibility: No Rénoclimat grant is available for the replacement of skylights. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation

I recommend that you replace selected skylights with ENERGY STAR qualified units. When replacing your skylights, make sure that you select models matched to your climate zone. Refer to the section of this report entitled, 'Your Home Energy Action Checklist' for your climate zone.

Windows

You may be considering replacing some or all of your windows for various reasons, such as to improve aesthetics, reduce maintenance, increase house resale value, improve comfort, energy efficiency or safety, or to replace broken or inoperable windows. Remember that the selection of new windows for your home will affect energy efficiency and comfort levels for years to come. Technical breakthroughs such as low-E coatings, triple glazing, inert gas fills, and better edge spacers and frames have improved window technology in recent years, offering improvements in solar control, thermal comfort and energy efficiency.

ENERGY STAR® qualified windows, which are rated for four climate zones, are among the most energy efficient in the marketplace. They will help keep your home comfortable year-round and reduce noise from the outside. Depending on the amount of humidity in your home, there may be less condensation on your windows during cold weather.

For information on purchasing energy-efficient windows, refer to NRCan's publication entitled *Consumer's Guide to Buying Energy-Efficient Windows and Doors*. For information on ENERGY STAR qualified windows, doors and skylights, go to www.energystar.gc.ca.

Grant Eligibility: No Rénoclimat grant is available for the replacement of windows. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation

Replace selected windows with ENERGY STAR qualified windows. When replacing your windows, make sure that the models you select match your climate zone. Refer to the section of this report entitled 'Your Home Energy Action Checklist' to determine your climate zone and the number of windows recommended for replacement.

Air Sealing

Reducing air leakage is usually the most cost-effective measure a homeowner can undertake; the leakier the home, the greater the savings! It is not unusual for air leakage to account for 35% of the heat loss in a home. In addition to reducing heat loss, air sealing improves comfort, protects the building structure and other materials from moisture damage, and reduces the amount of dust and noise that enters from the outdoors. Air sealing can also reduce air conditioning loads and energy costs.

A blower door test was performed on your home to measure the amount of air leakage, and to identify the main air leakage locations. The blower door test results are shown on the first page of this report and are explained below.

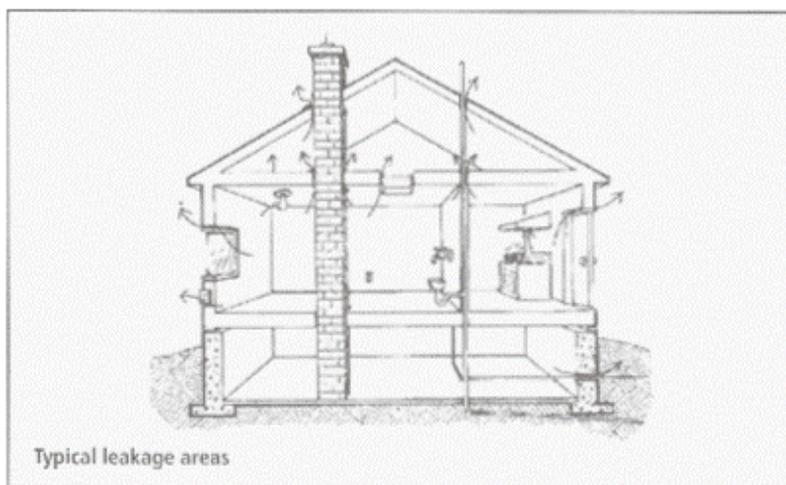
The **Air Leakage Rate at 50 Pascals (ACH)** is the number of complete air changes per hour that occurs in your house when a pressure difference between the inside and outside of the home is set at 50 Pascals (Pa). A 50-Pa pressure difference simulates wind blowing at 56 kilometers per hour on your home. The higher the ACH, the leakier the house.

The **Equivalent Leakage Area (ELA)** represents the total air leakage area. It's like taking all of the air leakage areas (e.g., cracks, holes, etc.) in the home and putting them together to create one large hole in the building envelope. The larger the ELA, the leakier the house. An energy-efficient house might have an ELA as low as 258 cm² (40 square inches) while a leaky house may have an ELA of more than 3226 cm² (500 sq. in.)

Air Sealing Locations in Your Home

Listed below are the most common air leakage areas in a house. Leaks observed during the blower door test are noted. This list will help guide your air-sealing work:

- electrical outlets (insulating plaques + plugs)
- electrical ceiling fixtures/ recessed lights in the kitchen and rear extension (insulating blankets)
- electrical box and wire penetration
- exterior pipe/duct penetrations (exhaust fans and dryer vent)
- baseboard trims and mouldings
- window frames
- door frames and weatherstrips
- fireplace damper (broken)
- chimney (furnace damper)
- floor/wall joints (rear extension, main level and second level)
- basement header (rim joists)
- wall cracks/openings in rear extension (wood panelling)
- ceiling/wall joints (wood panelling)
- exterior front door letter trap



Air Sealing Options

Air sealing can be a do-it-yourself option. Another option is to hire a qualified, professional, air sealer who can locate and seal leaks in your home and likely do a more thorough job. This may be an important consideration if you want to air seal your house to meet a specific air leakage goal, and be eligible for a grant. Professional whole-house air sealing costs vary, depending on the size and complexity of the work.

Air Sealing Materials

Weatherstripping reduces air leakage by sealing gaps around moveable parts of windows and doors. Correctly installed, high quality weatherstripping is a cost-effective way to reduce air leakage. Check weatherstripping annually and replace worn materials before the cold weather sets in.

Interior-grade caulking is used on the interior to seal small cracks and penetrations on the inside surface of your walls, ceilings and floors. Exterior-grade caulking is used on the exterior to keep out rain, snow, wind as

well as insects and rodents. Urethane foam is very good for filling larger joints and cavities but must be protected from the elements and flame sources.

For information on air sealing your home, consult NRCan's publications entitled *Air-Leakage Control, Improving Window Energy Efficiency and Keeping the Heat In*, and Canada Mortgage and Housing Corporation's *About Your House, and Renovating for Energy Savings* fact sheets.

Grant Eligibility: Air sealing can be eligible for a Rénoclimat grant. You must meet or exceed the goal indicated at the beginning of this report, in the section entitled 'Your Home Energy Action Checklist'. The results of the air sealing work will be measured at the time of your post-retrofit evaluation. The grant amount differs according to the percentage by which you have reduced your home's air leakage rate. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation:

I recommend air sealing your home to achieve the air leakage rate indicated at the beginning of this report, in the section entitled 'Your Home Energy Action Checklist'.

Foundations – General

Foundation heat loss can account for 20 to 35 percent of a home's heat loss. A well-insulated foundation can improve home comfort, air quality, structural integrity, and energy efficiency.

Before insulating, first check for moisture in your foundation walls. Tell-tale signs are: staining or mould growth; blistering, peeling paint; efflorescence, a whitish deposit on the surface; spalling or surface deterioration; condensation on walls and metal objects; and a musty smell.

Repair water leaks through the floor and walls, caused by cracks, holes and construction joints. You should also control humidity levels and there should be appropriate weeping tiles and damp-proofing or waterproofing on the foundation walls to prevent moisture from wicking through the foundation wall.

To prevent moisture problems, slope the ground away from the house exterior and direct eavestrough downspouts away from the foundation. Maintain and seal sumps and sump pumps, and install sewer backup equipment, if required.

The type and condition of your foundation will determine if you can insulate from the outside or from the inside. Exterior insulation is the preferred but more costly method. Foundations of rubble, brick, stone and concrete block are best insulated from the exterior. However, you may wish to have an engineer verify your foundation's structural integrity before undertaking any work.

Poured-concrete foundations can be insulated from either the outside or inside, providing there are no serious water or structural problems. Preserved-wood foundations, made with sheathing and studs, are generally insulated by filling in the stud space. Slab-on-grade foundations are typically insulated on the exterior edge. Occasionally, they are insulated on top of the slab and under the floor finish.

For more information about insulating foundations, as well as insulation materials, their properties and their installation methods, consult NRCan's publication entitled *Keeping the Heat In* and Canada Mortgage and Housing Corporation's *About Your House* and *Renovating for Energy Savings* fact sheets.

Foundations – Interior Insulation

Before insulating foundation walls from the interior, a moisture barrier is usually applied to the inside face of the walls, up to the grade level. However, the use of foam board, especially in basements and crawlspaces, may act as a moisture barrier and negate the utility of a separate sheet moisture barrier.

The most common methods of insulating foundations from the interior are to install a wood-frame wall and batt insulation or to apply rigid-board insulation directly to the foundation walls, or both. Wood-frame walls allow for wiring and plumbing to be installed and then hidden, plus it provides solid backing for finishing materials. If you use the framed-wall method, it is recommended to build the wall out from the foundation wall by 64 mm (2 ½ in.) so that a horizontal layer of batt insulation can be installed behind the framed wall.

A hybrid system of water-resistant foam board (type IV or V extruded polystyrene, polyurethane or

polyisocyanurate) with RSI values of 0.035/mm to 0.045/mm (R-5 to R-6/inch) glued directly to the foundation wall, and then the installation of a wood frame wall with additional insulation in the stud space is gaining popularity.

A very effective, but more expensive, insulation-treatment is spray-on, closed-cell polyurethane foam applied by a contractor. It has excellent insulating qualities of RSI 0.042/mm (R-6/inch) and is very effective in retarding moisture that may penetrate through the foundation wall and would normally evaporate into the room. In addition, it will not support mould growth. Finally, an air- and vapour-barrier is then installed on the warm side of the insulation, followed by an interior finish. If a foam product is used, building codes require that it be covered with a fire-resistant material, such as drywall.

Grant Eligibility: The grant amount varies depending on the insulation value added and the percentage of the wall surface that is insulated. Note that in order to qualify you must insulate a minimum of 20 percent of the basement exterior wall area or 100 percent of the crawl space exterior wall area, including the header. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

It is recommended to take photos of your home while the foundation walls are being insulated, showing the amount of insulation being installed, and to show them to the energy advisor during the post-retrofit evaluation. This will ensure that you receive full credit for the insulation.

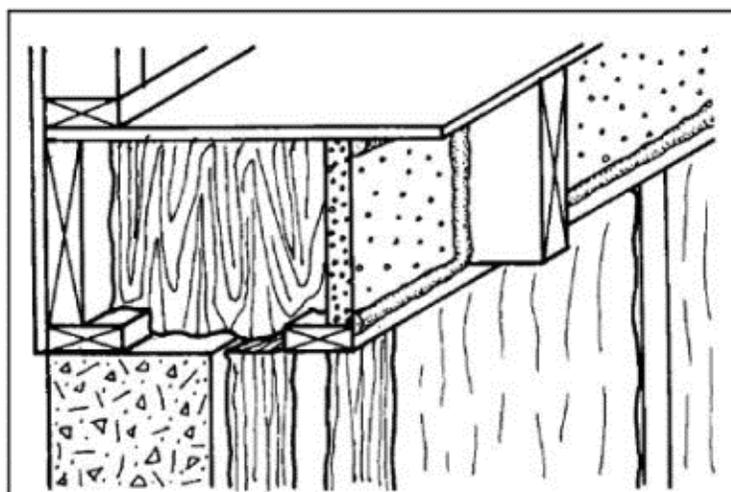
Recommendation:

I recommend adding a minimum of R-10 to the foundation walls, from the interior.

Foundations – Basement Header

The basement header area, which is the area where the first floor joists sit on the foundation wall, is highly susceptible to air leakage and heat loss. Except for foundations where the joists are embedded in the foundation wall or that exhibit signs of moisture, the basement header area should be sealed and insulated.

First, seal all of the joints along the header joist, the floor above, the bottom plate, the foundation wall, as well as any openings and penetrations, using latex acrylic caulking or silicone. For large joints and openings, use urethane foam sealant. Then fill the space between the joists with batt insulation, ensuring that there is no air space behind the insulation and that any water pipes are on the warm side of the insulation. Next, install a piece of low-permeability, rigid, foam board insulation, such as extruded polystyrene, polyurethane or polyisocyanurate, which has been cut to fit tightly between the joists. Seal the edges of the rigid insulation with a compatible, non-hardening sealant. If the basement walls below are insulated and have a polyethylene air and vapour barrier, this barrier should be sealed to the rigid insulation.



Rigid extruded polystyrene insulation caulked between the joists continues the air and vapour barrier up to the sub-floor.

Another very effective method to seal and insulate the basement header is to have a contractor apply spray foam insulation to the entire area.

Note that if a foam product (spray foam or foam board) is used, building codes may require that it be covered with a fire-resistant material, such as drywall. Check with your local building authorities.

Caution:

It is not recommended to insulate between joists that are embedded in a stone, brick, or concrete foundation wall. Air circulation may be necessary in this area to prevent moisture buildup and the deterioration of the joist ends. In these cases, it is best to simply seal the joints along the foundation, joists and floor.

For more information on insulating basements, refer to the NRCan publication entitled *Keeping the Heat In* and Canada Mortgage and Housing Corporation's *About Your House* and *Renovating for Energy Savings* fact sheets.

Grant Eligibility: Only home owners heated with oil, propane or electricity are eligible for a Rénoclimat grant for the insulation and air sealing of the basement header. Note that you must seal and insulate the entire basement header and increase the insulation value by a minimum of RSI 3.5 (R-20) to qualify. For more information, refer to the brochure entitled *Tableau des aides financières du programme Rénoclimat*.

Recommendation: I recommend that you seal and add a minimum of R-20 of insulation to the basement header.

Combustion Spillage Test – No Spillage Detected

As part of the blower door test, a combustion spillage test was performed to determine if the use of air exhaust devices such as exhaust fans, dryers and central vacuums may cause combustion products from fuel-burning appliances such as wood or gas-fired fireplaces, oil/gas furnaces and water heaters to spill into the home creating a safety hazard. Based on the results of the combustion spillage test, no evidence of excessive depressurization was observed during operation of all of the exhaust devices in the home.

Heating System

If you are considering replacing your heating system, it is strongly recommended that you follow these important steps first:

- Complete all of the building envelope energy efficiency upgrades, such as air sealing and insulation, because this will likely result in the need for a smaller and less expensive heating system.
- Next, ensure that your heating contractor performs a heat loss calculation on your home to determine the capacity and distribution flows for the new equipment. A properly sized heating system will reduce on/off cycling, energy use, wear and tear on parts, and improve comfort. The contractor should hold current certification for Heat Loss/Heat Gain Calculations from the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). For a list of certified contractors, visit www.hrai.ca and click on "Homeowners and Building Owners" and "SkillTech Academy Canadian Certification Listing" or call 1-800-267-2231.

Forced-Air Heating Systems

Forced-air heating systems can provide heat quickly throughout the home. In conjunction with additional equipment, they can also humidify, ventilate, cool and dehumidify the air.

Before installing a new forced-air heating system, ensure that the ductwork is adequately sized, located, balanced and sealed. Improperly designed ductwork can create comfort problems, such as rooms that are too hot or too cold, due to an inconsistent flow of air throughout the house. Your heating contractor should have current certification for Residential Air System Design from the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). For a list of certified contractors, visit www.hrai.ca and click on "Homeowners and Building Owners" and "SkillTech Academy Canadian Certification Listing" or call 1-800-267-2231.

If you are thinking of buying a new forced-air furnace, consider choosing one with a brushless, direct current (DC) motor. This type of motor, which runs the circulating fan, operates economically by adjusting its speed based on the demand. So, for extended or continuous fan operation, a brushless, DC motor can reduce your electricity bills while delivering heat more evenly. When used continuously, high-efficiency motors use two-thirds less electricity than a standard motor.

When choosing a new forced-air furnace, look for a model that is ENERGY STAR® qualified. When properly designed and installed, ENERGY STAR qualified heating equipment can save you 15 percent or more on your heating bills each year, depending on where you live and how much you pay for your energy. The equipment will usually pay for itself in energy savings over its lifetime.

For optimum savings, install a set-back thermostat. You will save about 2 percent in energy consumption for every Celsius degree of set-back.

And remember, to ensure maximum performance and efficiency, maintain your furnace and clean or replace the air filters regularly, as recommended in the furnace owner's manual.

Air-Source Heat Pumps

Air-source heat pumps, which include air-to-air and air-to-water heat pumps, extract heat in the air from outside and transfer it to a distribution system in the house during the heating season.

Different terminology is used for the efficiency ratings of heat pumps. For example, air-source heat pumps have seasonal heating and cooling ratings. The heating rating is the Heating Seasonal Performance Factor (HSPF), while the cooling rating is the Seasonal Energy Efficiency Ratio (SEER). However, in the manufacturers' catalogues you may still see Coefficient of Performance (COP) or Energy Efficiency Rating (EER) ratings. COP is used to rate cooling or heating efficiencies and EER only rates the cooling efficiency. The higher the rating, the more energy efficient is the heat pump. ENERGY STAR® qualified heat pumps are among the most energy efficient in the marketplace.

An air-source heat pump consists of a matched condenser coil (outdoor unit comprising a condenser coil, compressor and cooling fan) and an indoor evaporator coil (typically located with the furnace). Many manufacturers voluntarily submit their products for testing by the Air Conditioning, Heating and Refrigeration Institute (AHRI) to assure consumers that their energy efficiency claims have been verified by an independent, third-party source. However, the AHRI does not certify individual indoor or outdoor coils. The AHRI only certifies matched indoor and outdoor coils which work together to achieve the given SEER/HSPF rating for the heat pump system. Note that air-source heat pumps can also be sold together with a furnace or fan-coil. In these cases the AHRI number will refer to a furnace or fan-coil in addition to the indoor and outdoor coils.

Natural Resources Canada (NRCAN) maintains a database of all registered air-source heat pumps in Canada. ENERGY STAR air-source heat pumps will be marked as such in this database. You can verify that the system your contractor is proposing is a matched system by asking him or her to provide you with an AHRI Certificate of Product Rating, or an AHRI Certified Reference Number (also known as ARI, or AHRI number). This reference number can be entered into the NRCAN air-source heat pump database at <http://oee.nrcan.gc.ca/residential/business/manufacturers/search/heat-pumps-search.cfm> to verify that the system is matched (e.g., AHRI # 1278951 references outside coil YZE03611 and indoor coil AV*36+TXV) and is ENERGY STAR compliant. If you do not have an AHRI number you will need the manufacturer's name and model number for both the indoor and outdoor coils (and furnace/fan coil if applicable) to find the equipment in the NRCAN database.

Ask your contractor to indicate the AHRI Certified Reference number on your invoice, as well as the indoor and outdoor unit model numbers (and furnace model number, if applicable) and provide this information to your energy advisor at the time of the post-retrofit evaluation.

For more information on air-source heat pumps, refer to the NRCAN publication entitled, *Heating and Cooling with a Heat Pump*.

Grant Eligibility: Only home owners heated with oil, propane or electricity are eligible for a Rénoclimat grant for the installation of an ENERGY STAR qualified air-source heat pump. We recommend that you read note 6 of the brochure entitled *Liste de contrôle des mesures éconergétiques suggérées* for additional information on the eligibility requirements.

Recommendation:

I recommend that you install an ENERGY STAR qualified air-source heat pump that meets the requirements described in note 6 of the brochure entitled *Liste de contrôle des mesures éconergétiques suggérées* to heat and cool your home.

Conversion from Electric Heating (DT rate) with Oil Backup to Electric Heating

At the time of the evaluation, your house was heated with an oil furnace.

A dual-energy heating system uses two energy sources: electricity as the main source and a fuel (oil) as the auxiliary source. The objective of using such a system is to take advantage of the more cost-effective energy source to heat your house under any given set of conditions.

The system operates in a relatively simple way: when the outdoor sensor, installed near the electric meter, records a temperature at or above -12°C (or -15°C, depending on the climate zone of your house), it signals the heating system to run only on electricity when there is a call for heat. The energy consumed is then billed by Hydro-Québec at a reduced rate. When the outside temperature falls below -12°C (or -15°C), the sensor signals the furnace and oil heating takes over from electricity, which is then billed at the higher rate.

Contact Hydro-Québec to find out what is required to start using the dual-energy system currently installed. After that, a heating expert will have to make the necessary alterations to the heating system. You will then be able to take advantage of the DT rate and enjoy the independence gained by using two energy sources for your heating needs.

To determine the grant amount that you will receive refer to the following site:

<http://aee.gouv.qc.ca/en/my-home/renoclimat/financial-assistance/>

Upon completion of some or all of the recommended improvements, or within 18 months or the end of the program (whichever come first), you are urged to schedule a post - retrofit evaluation of your home so that the improvements can be documented and to issue a new EnerGuide for Houses Label. **The post - retrofit evaluation cost is \$25 + Tax .**

To be eligible for an incentive from Rénoclimat, the Energuide rating must improve by at least two points on the EnerGuide scale to receive financial assistance from the Agence de l'efficacité énergétique.

6. ENERGY-SAVING TIPS

Although these actions may not be eligible for an incentive, they will help you save energy and money:

- Install and use a programmable electronic thermostat (set the heating temperature to 20°C while you are at home and 17°C 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® qualified products. ENERGY STAR® qualified products use less than half as much energy in standby mode (i.e. when they are turned "off"). For more information, go to <http://energystar.gc.ca>. You can also look for the EnerGuide label to help you select the most energy-efficient model.
- Replace your light bulbs with energy-efficient ones, such as compact fluorescents. They last longer and reduce electricity consumption.
- Insulate the first two metres of the hot and cold water pipes with insulating foam sleeves or pipe wrap insulation. By doing so you will save on your water heating costs and will reduce your water consumption. Besides saving energy, water will arrive at the faucets warmer or colder. Insulating cold water pipes will also avoid condensation from forming on the pipes. This prevents dripping on the ceiling finish or the basement floor. For a fuel-fired water heater, maintain a 15-centimetre (6-inch) clearance between the water piping insulation and the vent pipe.
- Use a timer for your car's block heater. Set the timer so that it turns on two hours before you start your vehicle.
- Install an ENERGY STAR® qualified kitchen or bathroom exhaust fan.
- Install a timer on your bathroom exhaust fan(s).
- Install low-flow showerheads (rated at less than 9.8 litres per minute [L/min]) and faucet aerators.
- Fix leaky faucets and outside hose bibs.
- Plug your home office equipment into a power bar that can be easily turned off when equipment is not in use. Refer to the fact sheet *Standby Power - When "Off" Means "On"* for information on standby losses.

7. INFORMATION RESOURCES

Home Energy Efficiency

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

Renovation Publications

Canada Mortgage and Housing Corporation (CMHC) 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 your material of interest.

Hiring a Contractor

Before you have any work done, request quotations in writing from professional contractors and obtain a written contract. CMHC has a very useful fact sheet on this subject, *Hiring a Contractor*, which includes a draft contract. Visit cmhc-schl.gc.ca or call 1-800-668-2642 to order.

Mold

If you suspect mold growth in your home, it is recommended that the mold damaged area(s) be cleaned thoroughly or removed and properly disposed of. To control and reduce the potential for mold growth, maintain indoor humidity at appropriate levels, and remedy water infiltration and leakage issues. Refer to the CMHC fact sheet *About Your House: Fighting Mold - The Homeowner's Guide* for information on proper mold identification and cleaning procedures. Visit cmhc-schl.gc.ca or call 1-800-668-2642 to order.

Radon

Radon is a radioactive gas that is colourless, odourless and tasteless. Radon is formed by the breakdown of uranium, a natural radioactive material found in soil, rock and groundwater. When radon is released from the ground 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 the health of you and your family. For more information, refer to the CMHC publication *Radon – A Guide for Canadian Homeowners* or visit the Health Canada web site at <http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/index-eng.php>.

Humidity Control

A relative humidity (RH) level of between 30 and 55 percent is recommended in the home. 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 and the CMHC fact sheet *Measuring Humidity in Your Home* gives good advice. In addition, dehumidifiers can help reduce moisture levels especially in basements.

GET STARTED TODAY!

Now that you have the tools to improve your home's energy efficiency, you can look forward to enjoying the added comfort of your ecoENERGY improved home. Not only will you benefit from increased comfort, you will also save on your energy bills year after year. And let's not forget your reduction of greenhouse gases!

IMPORTANT INFORMATION

Important additional information regarding eligibility requirements can be found in the brochure entitled *Tableau des aides financières du programme Rénoclimat*