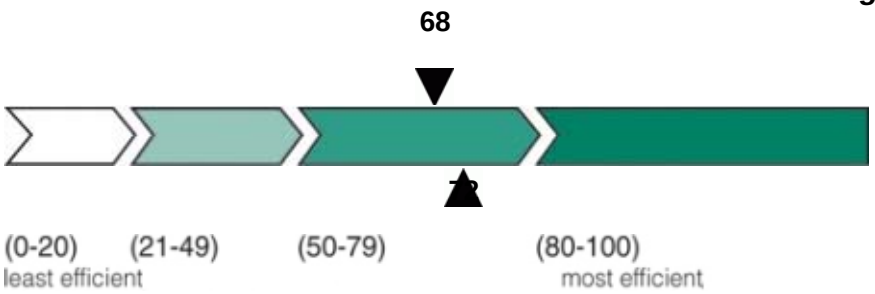
ecoENERGY
Retrofit Homes

Energy Efficiency Evaluation Report
File number: xxxxxxxxxx

EnerGuide Rating



Property Owner:
D. Client
4 Daor Road,
Ottawa, Ontario

House type: Row house, middle unit

No. of storeys: Two

No. of RO windows: 11
RO = rough opening

Air conditioner: Yes

Main energy source: Natural gas

Heating system: Furnace

Domestic hot water: Natural gas

Air leakage rate @ 50 Pa: 10.07 ACH
ACH = number of air changes per hour

Equivalent Leakage Area: 1613.4 cm^2

The results of your pre-retrofit energy evaluation show that your house rates 68 points on the EnerGuide scale. If you implement all of the recommendations in this report, you could reduce your energy consumption by up to 14% and increase your home's energy efficiency rating to 72 points. The average energy efficiency rating for a house of this age in Ontario is 66; whereas the highest rating achieved by the most energy-efficient house in this category is 87.

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 72 points, you will reduce its GHG emissions by 1.0 tonnes per year!

Remember that you have up to 18 months from the date of this report to complete your renovations and qualify for an ecoENERGY Retrofit - Homes grant. So the sooner you start your renovations, the earlier you will see the energy savings. And let's not forget how reduced energy consumption helps protect the environment.

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

Service Organization: Best Consultants Inc.
Telephone: 613-XXX-XXXX

Certified Energy Advisor: Ad Vizer

Date of evaluation: March 25, 2010
Date of report: March 31, 2010

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 are the federal grant amounts that you could receive as well as information on the potential for energy savings and EnerGuide rating improvement. For more information, read the 'Recommended Energy-Saving Measures' section of this report and the NRCan brochure entitled *Retrofit Your Home and Qualify for a Grant!* found in your ecoENERGY homeowner kit. 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.

Note: Some provinces and territories offer complimentary grants and other incentives for reducing energy use in the home. Refer to your local government for information on other energy-saving programs or visit ecoaction.gc.ca and follow the links to ecoENERGY Retrofit's "Grants and incentives" Web page or call 1 800 O-Canada (1-800-622-6232).

Retrofits **These upgrades qualify for a federal grant up to a maximum total incentive value of $5,000:**	**Federal Incentive**	**Potential for Energy Savings ***	**Potential Rating Improvement**
* One (1) star = lowest savings / five (5) stars = highest savings			
AIR SEALING Improve the air tightness of your house by 18 percent to achieve an air change rate per hour of 8.3 at a pressure of 50 Pa.	$150	★★	2.7 points
ATTIC/ROOF INSULATION Increase the insulation value of your attic from the current level, which is evaluated at RSI 4.9 (R-27.9), to achieve a total minimum insulation value of RSI 8.8 (R-50).	$77	★	0.5 points
Increase the insulation value of your cathedral ceiling, which is evaluated at RSI 3.5 (R-19.9), to achieve a total minimum insulation value of RSI 5 (R-28).	$45		
WATER CONSERVATION Replace 3 toilet(s) with low-flush or dual flush toilet(s) that meet(s) the minimum requirements.	$150	–	0 points
WINDOWS AND DOORS Replace 10 window(s) / skylight(s) with models that are ENERGY STAR® qualified for climate zone B.	$300	★	1.6 points

Natural Resources Canada (NRCan) reserves the right to revise the grant amounts, as required.

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 the regional weather data that is averaged over the last 30 years.

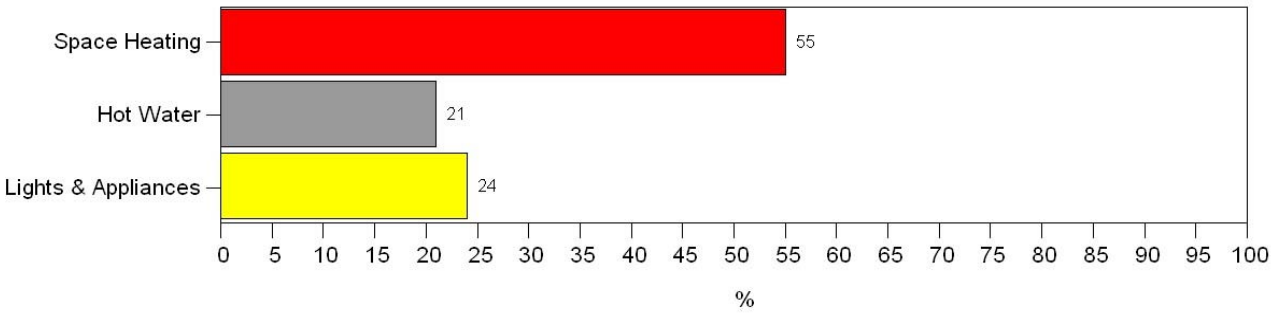
Figures 1 through 3 show the results of your energy evaluation based on the standardized conditions. The results may not entirely reflect your household since your actual energy consumption and future savings are influenced by the number of occupants, their day-to-day habits and lifestyles.

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, 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.

Figure 1. Estimated Breakdown of Energy Consumption



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 26 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 26 percent by performing all of the recommended upgrades.

Figure 2. Estimated Percentage of Potential Energy Savings

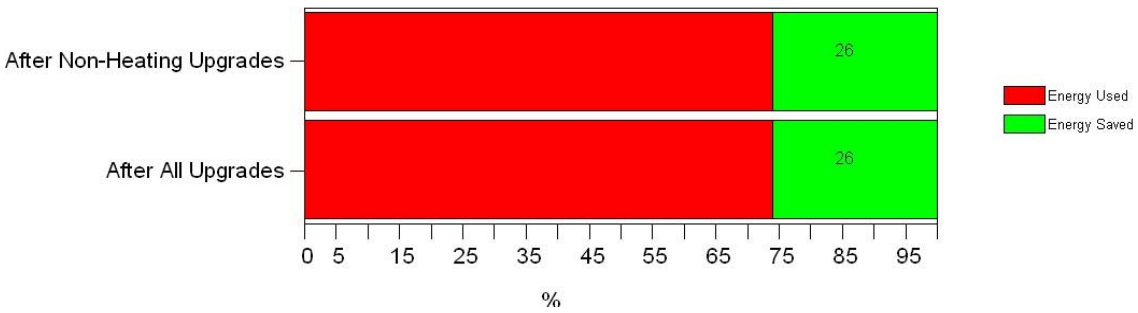
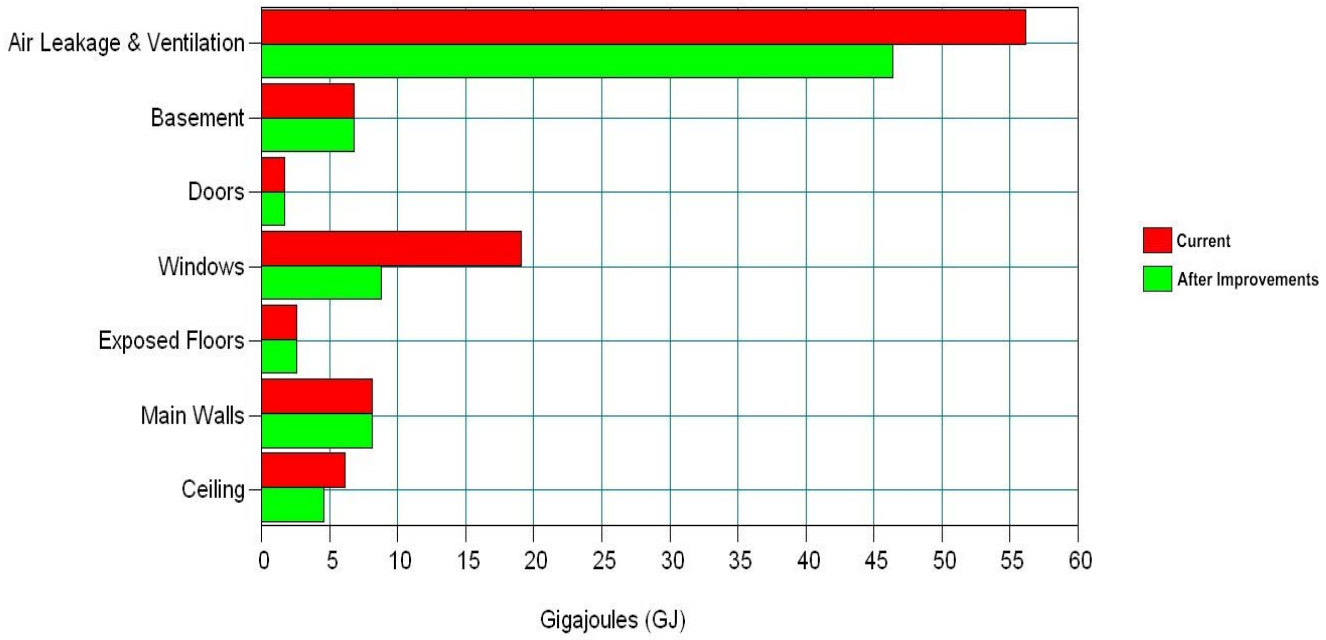


Figure 3 shows where the energy used for space heating is lost from your home. This energy is measured in gigajoules (GJ), where 1 GJ is equivalent to 278 kilowatt-hours (kWh) or 948,000 Btu/hour.

The red bars show the areas of your home 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



5. RECOMMENDED ENERGY-SAVING MEASURES

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.

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 square inches)

Common Air Sealing Locations in a 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

- electrical ceiling fixtures
- electrical box and wire penetration
- exterior pipe penetration
- baseboard trims and mouldings
- window frames
- door frames
- fireplace
- chimney
- attic hatch
- basement header (rim joists)

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, good quality weatherstripping is a cost-effective way to reduce air leakage. Check weatherstripping annually and replace worn materials before the cold weather sets in.

Caulking is used on the interior to seal small cracks and penetrations on the inside surface of your walls, ceilings and floors. Caulking is also 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.

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.

Natural Ventillation in Your Home

Natural ventilation is the exchange of air between the outside and inside of a house through intentional openings (windows, doors, dryer vents) and unintentional openings (air leakage points, cracks) in the building envelope. Natural ventilation occurs as a result of stack effect and wind effect. Wind effect causes pressure-induced natural ventilation and is dependant on wind direction, velocity, air density and the height of the house. Stack effect is based on the heat transfer and the air movement mechanism of convection. Warm air is lighter than cool air because it is less dense. As warm air rises in a house it expands creating a high, positive pressure at the top of the house. The high pressure air is forced out of the house through openings in the upper house envelope. The air leaving the upper level of the house creates lower, negative air pressure in the lower levels causing air from the exterior to infiltrate into the home. Stack effect is dependant on the temperature difference between the inside and outside of the house as well as the height of the house. Large temperature differences between the inside and outside of the house create larger pressure differences and I therefore increased stack effect. The combination of these pressure-induced effects can have a significant impact on natural ventilation rates in a home.

Many people think that houses that are "leaky" are healthier than houses that are "too tight." They believe that natural ventilation will provide sufficient fresh air and will remove indoor air pollutants.

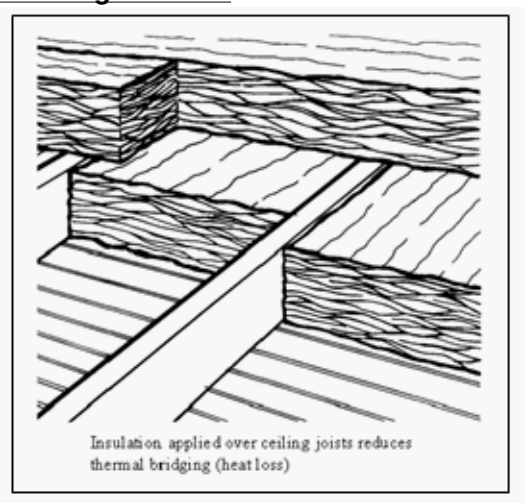
Many older, leaky houses have sufficient air changes, due to the stack and wind effect during the colder months, to eliminate or reduce moisture and pollutant problems. In fact, because of the increased stack and wind effects during the
winter, these houses are often over-ventilated. This results in wasted energy, high heating bills, discomfort from drafts and low levels of relative humidity, resulting in static electricity and dry skin and throats. Infiltration can also bring pollutants into the living space from the exterior and from within the building envelope.

Furthermore, some parts of the house may not be ventilated while others are over-ventilated because of the location of unintentional openings or leakage areas.

How much ventilation is required?

An acceptable air change rate is between 0.2 and 0.35 air changes per hour with 0.30 being the usual recommended level (depending on the source strength of the indoor air pollutants). This means that every hour, between 20 and 35 percent of the indoor air is exchanged with outdoor air, and that between every three to five hours the house has a total change of air. NRCan assumes at least a 0.30 air change per hour for all houses through a combination of natural and mechanical ventilation.

Insulating the Attic


Insulation applied over ceiling joists reduces thermal bridging (heat loss)

In addition to reducing energy use, increasing the insulation level in the structure between your ceiling and the roof (attc space) 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.

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: Attic insulation upgrades are eligible for an ecoENERGY Retrofit – Homes grant. The grant amount differs according to the existing insulation value and the total insulation value achieved. Information on the eligibility requirements when insulating attics can be found in the brochure entitled *Retrofit Your Home and Qualify for a Grant!*

Recommendation: Increase Insulation of Both Flat and Cathedral Ceilings

Increase the insulation value of your above your flat ceiling and cathedral ceiling to the insulation value noted in the section of this report entitled 'Your Home Energy Action Checklist'.

Energy Star Window Information

The selection of new windows for your home will affect energy efficiency and comfort levels for many, many years. 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 all year-round and reduce noise from the outside. Depending on the amount of humidity in your home, there will 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: The replacement of windows and skylights with models that are ENERGY STAR-qualified is eligible for an ecoENERGY Retrofit – Homes grant. However, you must choose models that are ENERGY STAR-qualified for your climate zone. Keep proof of the ENERGY STAR qualification of the windows for your climate zone and show it to the energy advisor during the post-retrofit evaluation of your home. A window is defined as the rough opening (RO) in the wall under ecoENERGY Retrofit – Homes. The RO is the opening in the wall when the entire window unit is removed. The first page of this report indicates how many ROs are in your home.

If You Decide to Upgrade Your Windows
If you decide to replace your windows, select ENERGY STAR-qualified windows and 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.

Water Conservation
Water conservation is an important part of a home energy saving plan. Whether you are on municipal water or a well, water conservation can lessen your impact on the environment by reducing the energy use associated with water treatment and delivery, including the electricity used for pumping water and sewage.

Toilet usage can account for approximately 30 percent of indoor water use. The amount of water used depends on several factors: the flush volume, how often the toilet is flushed and the toilet's condition (adding dye to the tank water can reveal a leaky flush valve if the colour shows up in the bowl without flushing). For example, if you replace a toilet that flushes with 13 litres of water with a 6-litre model, you will save more than half of the water you and your family use. And additional water economy can be achieved by installing a dual-flush toilet designed to save about 25 percent more water than a 6-litre toilet.

Grant Eligibility: The replacement of existing toilets with low- or dual-flush toilets is eligible for an ecoENERGY Retrofit – Homes grant. New toilets must meet three performance criteria for water savings sustainability and long-term water saving performance. The new models must:

1. be rated at 6 litres per flush or less;
2. meet the Los Angeles Supplementary Purchase Specification (referred to as SPS); and
3. have a flush performance of 350 grams or more.

Information on qualified makes and models is available at www.veritec.ca. Click "Reports" and download the most recent version of the MaP report. Go to the appendix with the list of toilets sorted by performance.

Important: To ensure compliance, you must keep sufficient documentation on the make and model number of the replacement model(s). Show this information to the energy advisor during your post-retrofit evaluation.

Recommendation:
When replacing your toilet(s), purchase low- or dual-flush models that meet the requirements described above.

Energy Assessment Summary

for Jean Laframboise(4 Presland St., Ottawa, Ontario)

Your home has an EnerGuide rating of 68 and can be improved by making some home improvements.

The following comments outline some of your home's components and some suggestions.

Air Tightness, Air Leakage and Air Sealing Locations in Your Home

Your home has an estimated air leakage area (ELA) of approximately 250 square inches which is like a square opening of about 16 x 16 inches. You have air leaks in your home which can be easily sealed to help reduce energy loss. If you improve the air tightness of your home and reach 20% better than the target, you will qualify for an additional $150 above the combined Federal and Provincial base grant of $300 for a 10% improvement.

Listed below are some air leakage areas we found (during our walk through with you) in your house as observed during the blower door test. This list will help guide your air-sealing work:

- rear patio door has significant air leakage
- significant air leakage from the attic following vent surfaces down to the mechanical room
- electrical outlets
- fireplace
- attic hatch

I recommend air sealing your home as best as possible. Your goal is the air-leakage rate indicated at the beginning of this report, in the section *Your Home Energy Action Checklist*. You must meet or exceed the goal indicated to be eligible for an ecoENERGY Retrofit grant for air sealing. The results of the air sealing work will be measured at the time of your post-retrofit evaluation.

Attic / Cathedral Roof Insulation

The flat part of your attic has approximately 9 to 10 inches of loose fiberglass insulation and it is unevenly spread and also compressed in some areas. The rear portion of your attic over the master bedroom has an additional layer of R20 Pink fiberglass batt over the loose fill fiberglass insulation. Your roof is suffering from heat loss which is causing the ice damming on your roof. I suggest that after air sealing is performed in your attic, that you evenly spread the existing insulation and increase the insulation as indicated at the beginning of this report, in the section *Your Home Energy Action Checklist*. This should help reduce heat loss and ice damming.

Windows

I have included information regarding the benefits of upgrading to Energy Star qualified windows.

Air Conditioning

Your window AC also qualifies for a grant if you replace this unit with an Energy Star qualified unit.

Remember that Federal grants are matched by Ontario Provincial grants for the ecoEnergy program.

Please review your report and contact us if you have any additional questions or concerns.

Sincerely,

Guy Bonneau

Green Home Energy Inc.

6. ENERGY-SAVING TIPS

Although these actions may not 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 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) maintains 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.

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.

Vermiculite and Renovation
Older vermiculite insulation installed in homes may contain amphibole asbestos. If the insulation is in the walls or attic spaces and is not disturbed, it poses very little risk to the health of the occupants. However, if vermiculite is found during a renovation, or if you suspect it might be in your home and you plan to renovate (including insulation or air sealing work), contact professionals who are qualified to handle asbestos before you proceed with the renovation. 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 hc-sc.gc.ca/iyh-vsv/prod/insulation-isolant_e.html or call Health Canada at 1 800 443-0395 to order a copy.

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!

Remember, you have up to 18 months to complete your retrofits and qualify for an ecoENERGY Retrofit - Homes grant.