Your Energy Assessment Report

Inside Your Report

- Your Concerns
- Solutions For Your Home
- Detailed Energy Report

Assessment completed for:

Kanata OIL
1965 Oil st
Ottawa
613-555-555

Assessment date:

23 June 2015

Assessment completed by:

Alastair Larwill

EnviroCentre
366 Rideau St
Ottawa ON
K1N 5Y8
613-656-0100
info@envirocentre.ca

Advisor Comments:

Kanata:

It was great to meet you. We've identified some really useful upgrades that should help in addressing your energy and comfort concerns in the home.

As always, if you have any questions, please feel free to contact us.

Thanks!
Alastair

We're listening!

As our client, we want to make sure we're addressing all of your concerns for your home. If we've missed any concerns in this report, please let us know right away.

You'll notice that on the following page we list all of the solutions and match them to the concerns listed here.

Your Concerns

Convert from oil to natural gas

Changing your furnace and your hot water tank from oil to natural gas will dramatically increase your financial savings as well as free up some space in your basement. Natural gas is attractive for home buyers as well if you are planning on selling your home.

Heat Recovery Ventilator

Your home is close to too air tight, if you do airsealing you might find that condensation builds up on your windows during the winter. If this is the case you will require additional ventilation and an HRV can provide that for you.

Insulate your un-insulated portions of your basement

The most cost effective upgrade to your home is to insulate the rest of your basement. It will increase your comfort and save you significantly on your monthly heating bills. Insulating your basement should not make a dramatic difference in your airtightness either because drafts were not detected in your header area.

Redoing your flat roof

Because you are considering doing your flat roof soon, now is the time to consider adding insulation. Ideally insulation would be added in between the joist cavities directly on the second level ceiling to ensure its maximum effectiveness.

Advanced modelling techniques

To try and accurately depict your thermostat setback during the winter advanced modelling techniques were used to try and accurately model your energy savings. The numbers on the front pages are closer to your actual than those found in the body of the report.

Your Solutions

Estimated Totals

Installed Cost

$17,300

This is the approximate cost of your upgrades, based on average pricing for this region and typical installation difficulty. It includes materials and labour, but will vary according to the particular situation and contractor.

Esimated Savings per Year*

$1,800

Or in other words...

Savings on your total energy use	**16%**
Yearly reduction in carbon (kg CO_2)	**1,245**
Equivalent car travel per year, in km	**10,000**
Equivalent trees, growing for one year	**55**

Energy Savings Calculator
1965 Oil st, Ottawa

Yearly Energy Use (GJ): 154.1

	SAVINGS		UPGRADE	PAYBACK
	Energy (%)	Dollars ($)*	COST	(Years)
Ceiling	2.7%	128	5166	40.4
Wall				
Foundation	4.3%	205	1127	5.5
Floor				
Windows and Doors				
Air Tightness	1.8%	87	500	5.8
Heating and Cooling System**	9.5%	1325	6000	4.5
Domestic Hot Water	4.7%	215	2500	11.7
Ventilation System	0.2%	12	2000	166.7
All Upgrades	**16.2%**	**$1,801**	**$17,293**	**9.6**

*Savings and paybacks are based on **EnerGuide for Houses** energy modeling and recent local fuel rates.

**If a heating upgrade involves changing the fuel source, dollar savings can be negative.

Our other services

EnviroCentre is a go-to source of practical services and programs that help you conserve energy, improve environmental health and act more sustainably.

Our wide range of services includes:

- Electricity audits
- Energy assessments on new and existing homes
- Certifications for R2000 and ENERGY Star ®
- Commericial Assessments
- Infared Thermography
- Multi-unit Residential Building Assessments

Thank you!

Thank you for choosing EnviroCentre to perform your Certified Energy Assessment. It has been our pleasure to serve you.

Should you need any further assistance, or require another one of our services, please do not hesitate to get in touch with us again.

You can reach us at 613-656-0100

Regards,

Alastair Larwill

ecoENERGY
an ecoACTION initiative

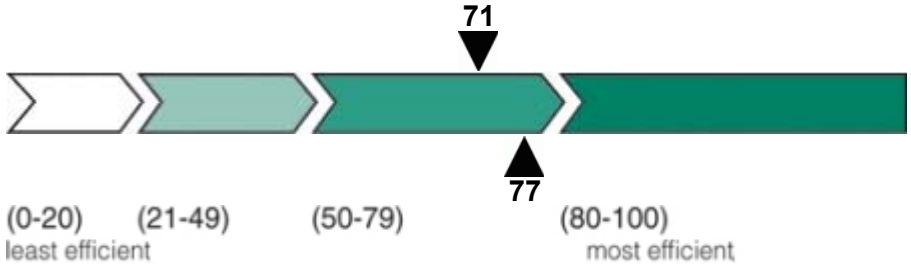
Energy Efficiency Evaluation Report

File number: Kanata C

Property Owner:

Kanata OIL
1965 Oil st
Ottawa, Ontario
K5K 5K5

EnerGuide Rating



House type: Single detached

No. of storeys: Two

No. of RO windows: 12
RO = rough opening

Air conditioner: Yes

Heating system: Oil Furnace

Domestic hot water: Oil

Air leakage rate @ 50 Pa: 4.67 ACH
ACH = number of air changes per hour

Equivalent Leakage Area: 1150 cm^2

The results of your pre-retrofit energy evaluation indicate that your home rates 71 points on the EnerGuide Rating System (ERS) scale. If you implement all of the recommendations in this report, you could reduce your energy consumption by up to 26 percent and increase your home's energy efficiency rating to 77 points. The average energy efficiency rating for a house of this age in Ontario is 61, and the highest rating achieved by the most energy-efficient houses in this category is 83.

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 77 points, you could reduce its GHG emissions by 4.9 tonnes per year.

You have until March 31, 2012 to complete your renovations, and until June 30, 2012 to obtain a post-retrofit evaluation in order to qualify for the federal ecoENERGY Retrofit – Homes grant. Complementary programs may have their own deadlines. The sooner you

start your renovations and invest in energy efficiency upgrades, the sooner you will benefit from the energy savings.

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

Service Organization: EnviroCentre
Telephone: 613-656-0100

Date of evaluation: June 23, 2015
Date of report: July 21, 2015

Certified Energy Advisor: Alastair Larwill

Alastair Larwill

Certified Energy Advisor Signature

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1. YOUR HOME ENERGY ACTION CHECKLIST

This is your checklist of recommended retrofits to improve the energy efficiency of your home. Included below are the federal grant amounts that you could receive through the ecoENERGY Retrofit – Homes program as well as information on the potential for energy savings and EnerGuide rating improvement. You can also choose other eligible measures from the program *Grant Table* (http://oee.nrcan.gc.ca/retrofit/homes/table), even if they do not appear on this list. The more upgrades you choose, the larger the grant and the greater your potential energy savings.

You are solely responsible for researching program requirements, choosing eligible products and keeping all receipts for three years. In many cases, products must appear on specific eligibility lists referred to in the *Grant Table*. For more information on program criteria, visit http://ecoaction.gc.ca/homes or call 1 800 O-Canada.

NRCan transfers file information to complementary programs in certain provinces and territories, which may have their own rules and deadlines. To obtain contact information for these programs, visit http://oee.nrcan.gc.ca/retrofit/homes/regional or call 1 800 O-Canada.

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: The Potential Rating Improvement of each upgrade below is an estimate that may not reflect the final rating a home will receive. For more information, please speak with your certified energy advisor.

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			
HEATING SYSTEM Replace your heating system with an ENERGY STAR® qualified gas furnace that has a 94.0% annual fuel utilization efficiency (AFUE) or higher and a brushless DC motor (when installing a CONDENSING furnace for the FIRST time).	$790	★★★	2.2 points
VENTILATION SYSTEM Install a heat recovery ventilator that is certified by the Home Ventilating Institute (HVI).	$375	★	0.1 points
DOMESTIC HOT WATER SYSTEM (DHW) Replace your domestic hot water heater with an ENERGY STAR® qualified instantaneous, gas-fired water heater that has an energy factor (EF) of 0.82 or higher.	$315	★★	1.0 points

ATTIC/ROOF INSULATION Increase the insulation value of your flat roof, which is evaluated at RSI 3.5 (R-19.9), to achieve a total minimum insulation value of RSI 5 (R-28).	$250	★	0.9 points
BASEMENT/CRAWL SPACE INSULATION 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).	$235	★★	1.5 points
AIR SEALING Improve the air tightness of your house by 10 percent to achieve an air change rate per hour of 4.20 at a pressure of 50 Pa.	$190	★	0.5 points
WATER CONSERVATION Replace 2 toilet(s) with low-flush or dual flush toilet(s) that meet(s) the minimum requirements.	$130	–	0 points

Any new equipment must have an efficiency rating that is higher than that of the equipment it is replacing. If replacing two heating systems, both new systems must be in the same "category" in the *Grant Table*. Visit http://ecoaction.gc.ca/homes for the most up-to-date information and other requirements.

NRCan reserves the right to revise the grant amounts and eligibility requirements. Grants are paid at the rate in effect at the time of the post-retrofit evaluation. The payment of the grants is subject to the availability of funds.

2. THE ENERGUIDE RATING SYSTEM (ERS)

The ERS is a standardized method of evaluation that lets homeowners compare their home's energy efficiency rating to similar sized houses in similar regions. The rating considers the house's estimated annual energy consumption based on an in-depth evaluation of its characteristics such as location, size, mechanical equipment and systems, insulation levels and air tightness. In addition, standardized operating conditions are used when calculating the rating in order to compare the efficiency of one house to another. These conditions include: a complete indoor 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 averaged over the last 30 years.

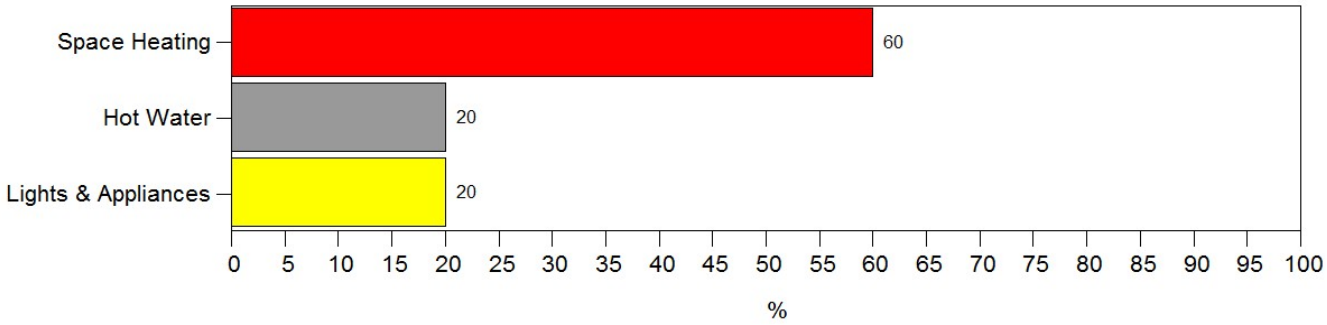
Figures 1 through 3 show the results of your energy evaluation based on the standardized conditions. The results may not entirely reflect your household since your actual energy consumption and future savings are influenced by the number of occupants, their day-to-day habits and lifestyles.

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 building envelope (basement and exterior walls, upper floor ceilings, windows and doors). 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 home'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 15 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 32 percent by performing all of the recommended upgrades.

Figure 2. Estimated Percentage of Potential Energy Savings

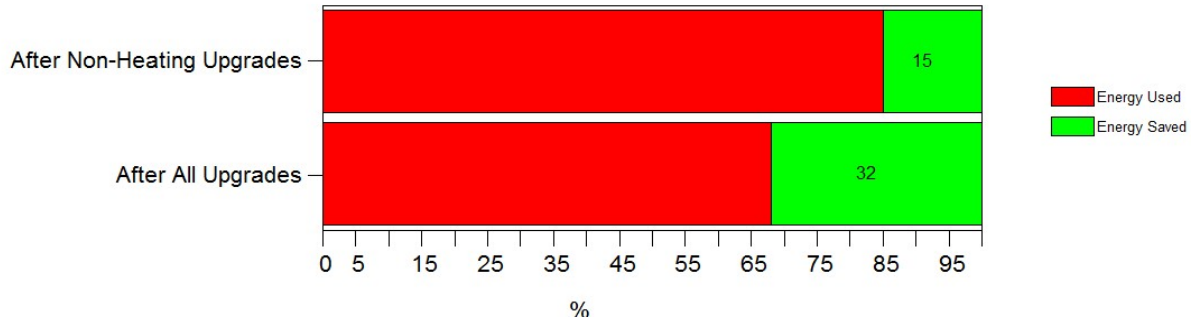
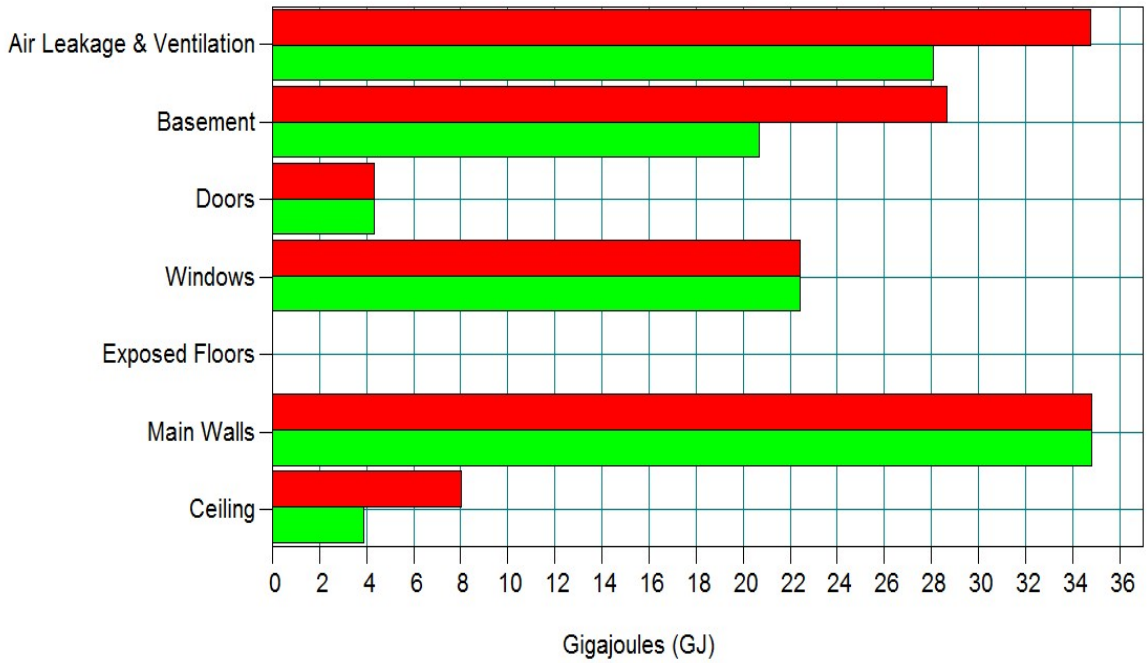


Figure 3 shows where the energy used for space heating is lost from your home. This energy is measured in gigajoules (GJ), where 1 GJ is equivalent to 278 kilowatt-hours (kWh) or 948,000 Btu.

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 estimates that your home's design heat loss would be 38980 Btu/hour (11424 Watts) and its design cooling load would be 24327 Btu/hour (2.0 tons). If you are considering replacing your space heating and/or cooling system, provide this information to your heating/cooling contractor to help ensure a properly-sized system. However, the figures will only serve as 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, have 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. It is advisable to hire a contractor that is certified in heat loss and heat gain calculations by an industry-recognized 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 contractors, visit www.hrai.ca and under *Home & Building Owners*, click on *Find a Contractor*. Click on *3. Locate an HRAI Member Company contractor* and fill out the required information and then click on *Search The Database* 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 PagesTM 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

Domestic Hot Water Systems (DHW)

After space heating, water heating is the second largest user of energy in most Canadian homes, accounting for some 20 percent of total annual energy consumption. Part of this energy consumption is wasted through standby heat loss and wasted hot water. Standby heat loss is usually heat lost through tank walls and water piping. For fuel-fired tank water heaters, it also includes heat loss up the chimney.

The efficiency of fuel-fired DHW equipment is expressed as the energy factor (EF) or thermal efficiency. The higher the number, the more efficient the water heater. The efficiency of electric DHW equipment is expressed in Watts of standby loss, where the lower the number, the more efficient the water heater.

If you are replacing your DHW equipment, look for an energy-efficient model and make sure it's not oversized for your needs. Use manufacturers' sizing charts available from your contractor or retailer. For tank water heaters, look for models that have an external cold-water inlet at the bottom of the tank and integral heat traps. Also look for high overall insulation values.

Water- and Energy-Saving Tips:

- Fix dripping taps.
- Install low-flow showerheads, with ratings of less than 9.5 litres per minute.
- Install faucet aerators.
- Wash laundry with cold water.
- Insulate metallic, hot and cold water pipes with pipe insulation. Water will arrive at the faucets closer to the desired temperature, either warmer or cooler. This reduces tap-running time and reduces water wastage. Insulating cold-water pipes also reduces condensation on the pipes that can cause water stains on surrounding areas.
- For plastic water piping, insulate with approved compatible insulation products.

Note: For fuel-fired water heaters, maintain a 15-centimetre (six-inch) clearance between the pipe insulation and the vent pipe.
For more information on domestic hot water heaters, consult NRCan's publications entitled, *Heating with Gas; Heating with Electricity;* and *Heating with Oil*.

EnviroCentre's experienced advisors offer up-to-date information on energy-saving renovations. .

Air Sealing

Reducing air leakage is usually the most cost-effective, energy-saving measure a homeowner can undertake; the leakier the home, the greater the savings! It is not unusual for air leakage to account for up to 35 percent 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 cm^2 (40 square inches) while a leaky house may have an ELA of more than 3226 cm^2 (500 sq. in.).

Your house has a natural air change rate of **0.247** ACH at normal pressures (estimated air leakage during the critical month of October). This is **low to moderate**.

If the natural ACH is low (less than 0.2 ACH), extra ventilation may be required to reduce the potential for conditions such as stale air, high humidity levels, and condensation on windows. If below 0.15, installation of a Heat Recovery Ventilator (HRV) is strongly recommended.

A natural ACH over 0.4 is usually an indication that the house is drafty and has a large amount of uncontrolled air leakage and unnecessary energy loss. Natural Resources Canada suggests levels of between 0.25 and 0.30 ac/h (natural plus mechanical) as a good rate to ensure good indoor air quality is maintained in the home.

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. 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.

Recommendation:
Air seal 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.

EnviroCentre has helped over 15,000 households in Eastern Ontario.

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 1/2 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 also popular. **To achieve R10, I recommend installing 2 inches of foam board, covered with drywall (no framing necessary). for higher R-values, use a hybrid approach: For example, install R10 extruded polystyrene on the wall and cover with an R14 rock wool filled stud wall as described above to get a total of R24.**

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 may be required on the warm side of the insulation, depending on the type of insulation products used, followed by an interior finish. If a foam product is used, building codes may require that it be covered with a fire-resistant material, such as drywall.

Recommendation:
Insulate the uninsulated portions of your foundation walls from the interior and increase their insulation value as noted in the section of this report entitled *Your Home Energy Action Checklist*, providing that there are no serious moisture or structural problems.

EnviroCentre helps reduce energy use while improving home comfort.

Instantaneous Gas-Fired Water Heaters

Instantaneous gas-fired water heaters (also known as "tankless", "demand" and point-of-use water heaters) have extremely limited or no storage capacity. A natural gas or propane burner rapidly heats the flowing water when a faucet is turned on. Since there is limited or no water storage, standby losses associated with regular domestic tank-type water heaters are eliminated and overall efficiency is higher.

A single, gas-fired instantaneous water heater has the capacity to meet the hot water needs of most homes. Flow rates, based on specified inlet and delivery water temperatures, are critical for assessing the type of unit required for a home. It is recommended to look for models rated at over 13.25 litres per minute (3.5 U.S. gallons per minute) based on a temperature rise of 42.8^{o} C (77^{o} F). Otherwise, cold water inlet temperatures and high-demand faucets can result in low flow rates or reduced hot water temperatures.

These units are commonly mounted on the interior surface of exterior walls and vented directly out the wall. For higher efficiency, look for heaters without pilot lights that are mounted inside the home.

High efficiency, condensing instantaneous water heaters recover heat from the water vapour in the combustion gases. Besides higher levels of energy efficiency, condensing instantaneous units are capable of meeting higher flow rates than non-condensing units. Condensing heaters require a drain or condensate pump to remove the water produced.

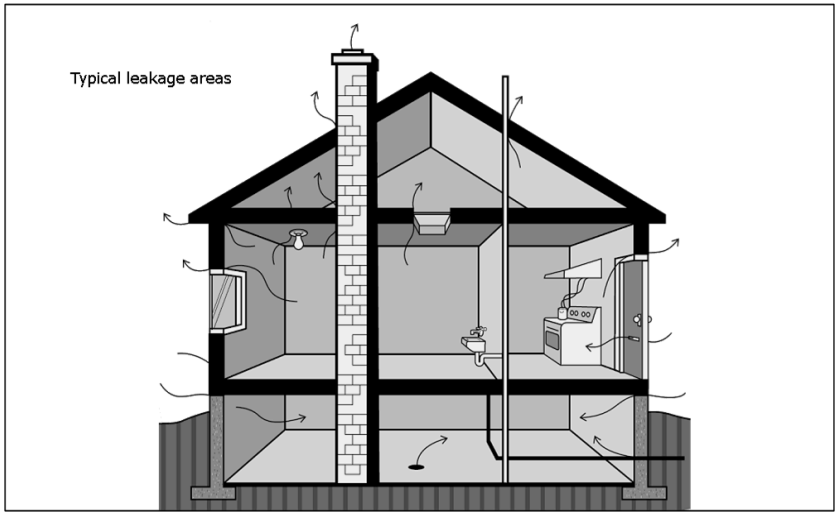
Some utilities rent instantaneous water heaters.

Recommendation:

Replace your hot water heater with an ENERGY STAR qualified instantaneous gas-fired water heater as noted in the section of this report entitled *Your Home Energy Action Checklist*.

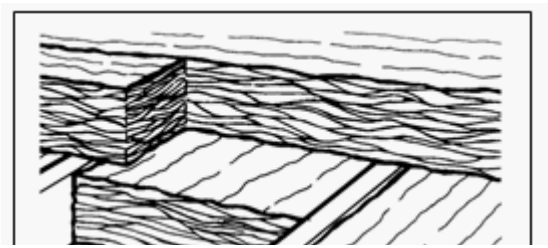
List of Air Leaks

The following is a list of areas where air leaks were observed in your house from top to bottom, along with some other common areas of air leakage. If your estimated rate of natural air leakage is low, airsealing should be approached with caution, as it may lead to poor indoor air quality. However, these leaks can still be sealed to improve comfort and energy savings, especially if you intend to install a Heat Recovery Ventilator (HRV). Major leaks are marked **.



- IMPORTANT: You home is on the cusp of being too air tight. Consider installing an HRV if you want to seal up the drafts found during the audit. (see HRV section
- Plumbing Stack - from inside attic, seal gap between pipe and attic floor with expanding foam
- Wood fireplace is drafty, consider using temporary caulking along the glass doors to seal the gaps for when your fireplace is not in use. Temporary caulking can easily and quickly be removed if you ever wanted to use your fireplace again.
- Exterior outlets are slightly drafty, consider purchasing foam gaskets to place behind the outlets to reduce this draft as well as child protection plugs to plug the outlets that are not in use.
- Corners of many of your windows where there is gaps or cracks in the caulking are drafty. Consider removing the damaged caulking and replacing it to properly seal these drafts.
- Oil furnace and oil hot water tank exhausts are drafty. Consider replacing them with a high efficiency natural gas furnace and an on-demand natural gas hot water tank with sealed combustions to seal this draft.
- Two of the cold air returns on the second level are drafty. Consider removing the plate to try and seal above them with a piece of wood and then use caulking around the wood to thoroughly seal the draft.
- Second level sink drains are drafty, consider spray foaming or caulking around where the sink drain enters into the wall to stop this draft. Or if you are replacing your roof consider sealing this draft from the attic space at the second level ceiling

Attic Insulation



This picture shows how to lay batt insulation, but blown cellulose is usually a better choice, because it is lower cost, easier to install (with the right equipment), more effective, and has high recycled content. 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.

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.

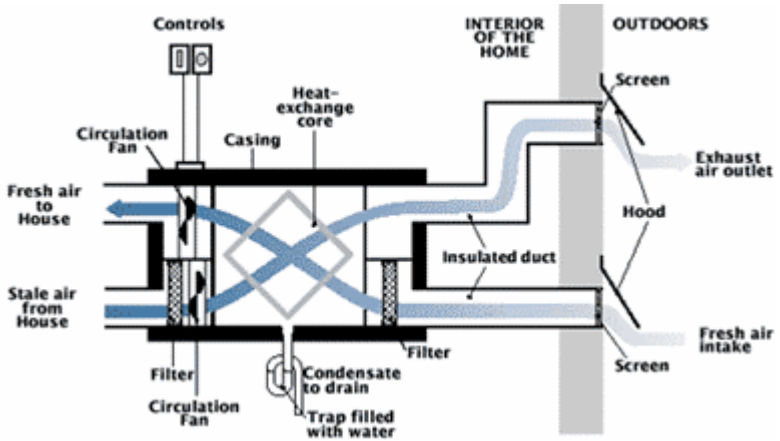
Ensure that soffit venting is not blocked by the insulation. Baffles may need to be installed against the underside of the roof along the soffits to ensure proper ventilation. Also ensure that insulation is gaurded from sources of heat such as shimneys or pot lights.

For more information on insulating attics, 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.

Recommendation:
I've estimated your current attic insulation level at R20. If you decide to redo the roof deck and want to add insultion I would recommend air sealing your ceiling and then putting as much insulation in as possible. Increase the insulation value of your attic to the insulation value noted in the section of this report entitled *Your Home Energy Action Checklist*.

EnviroCentre helps identify your best energy upgrades.

Heat Recovery Ventilators (HRVs) and Energy Recovery Ventilators (ERVs)



An energy-efficient, heat recovery ventilator is one of the best ways to control indoor air quality.

An HRV saves on energy costs compared to conventional ventilation systems because it recovers heat from exhausted air. The HRV draws in stale, indoor air and passes it through a heat exchanger. The exchanger captures most of the heat before it exhausts the stale air outside.

At the same time, the HRV draws outdoor air in for filtering, passes it through the other half of the heat exchanger where it collects heat from the exhausted air, and finally distributes the outdoor air throughout the house. The warmed, outdoor air is distributed through an existing forced-air distribution system or a dedicated ductwork system.

Energy recovery ventilators, or ERVs, are a type of HRV that can exchange both heat and moisture. Where winter climates are extremely dry, ERVs can recover some of the moisture that would be exhausted to the outdoors by a regular HRV. During the air-conditioning season, on the other hand, ERVs can help keep excess moisture out of the home by extracting it from the incoming fresh air and transferring it to the exhaust air. Since less energy is required to lower the temperature of dry air compared to moist air, an ERV can reduce the load on the air conditioner and save you money. However, ERVs can be less efficient in recovering heat than HRVs.

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 industry-recognized 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 www.hrai.ca and under *Home & Building Owners*, click on *Find a Contractor*. Click on *3. Locate an HRAI Member Company contractor* and fill out the required information and then click on *Search The Database* or call 1-800-267-2231.

For more information on HRVs or ERVs, refer to NRCan's publication entitled, *Heat Recovery Ventilator*. For information on HVI-certified HRVs and ERVs, visit www.hvi.org or call 1-847-526-2010.

Recommendation:
If you want to air seal your home or experience condensation on your windows you should consider having an HRV or ERV system designed and installed by an individual who holds current certification from an organization such as HRAI.

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. It is advisable to hire a contractor that is certified in heat loss and heat gain calculations by an industry-recognized 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 www.hrai.ca and under *Home & Building Owners*, click on *Find a Contractor*. Click on *3. Locate an HRAI Member Company contractor* and fill out the required information and then click on *Search The Database* or call 1-800-267-2231.

Inaccessible Attics
Your attic spaces were inaccessible on the date of the visit, so they were modelled with typical insulation values for the dates of construction. If you decide to upgrade, please take measurements and photos of the existing insulation to record its type and depth so we can adjust your file accrdingly. I've estimated your existing insulation at R20.

Forced-Air, Condensing Gas Furnaces
A new high-efficiency, condensing gas (natural gas or propane) furnace will heat your home efficiently and save you money and energy.

Because of their increased efficiency, condensing gas furnaces use, on average, 35 percent less energy than older models and 10 percent less energy than a standard-efficiency model. High-efficiency furnaces use additional heat exchange surfaces to cool the combustion gases to a point at which the water vapour condenses, thus releasing additional heat into the home. The small amount of wastewater produced by this process is piped to a floor drain or condensate pump. This condensing process has another important benefit in addition to producing more heat. It reduces the temperature of the flue gases to the point where they can be vented through approved plastic pipe out a side wall of the house. This eliminates the need for a chimney which is a major source of heat loss in homes with old furnaces.

A gas-fired furnace's energy-efficiency performance over a heating season is called the Annual Fuel Utilization Efficiency (AFUE) rating. This

AFUE is expressed as a percentage where the higher the percentage, the greater the efficiency. In addition, to reducing fuel consumption, modern furnaces can be equipped with high efficiency, direct current (DC) fan motors that consume considerably less electricity than standard alternating current (AC) motors. High efficiency motors are also sometimes referred to as DC brushless motors.

For information on ENERGY STAR®, go to www.energystar.gc.ca and click on *Information for General Consumers* then follow the *Heating equipment* link, or call 1-800-387-2000. For more information on gas-fired heating systems, refer to NRCan's publication entitled *Heating with Gas*.

Recommendation:
Replace your heating equipment with a gas furnace model that meets the requirements as described above.

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. 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.

Information on makes and models is available at www.map-testing.com. Click on *MaP SEARCH* and select the *Meets UNAR/ecoEnergy requirements* check box under the section labeled *Toilet Fixture Criteria/Ratings* and click *Search*.

Recommendation
When replacing your 2 toilets, purchase low- or dual-flush models that meet the requirements described above.

Combustion spillage
As a result of the exhaust devices depressurization test performed on your home, which consists of turning on all exhaust equipment (exhaust fans, clothes dryer, central vacuum system, etc.), it has been determined that the use of this equipment may cause combustion products to be drawn into your home from your combustion appliance(s). **We strongly recommend that you install a carbon monoxide (CO) detector in your home, as well as a smoke detector on each floor, if not already present**. To remediate this potential combustion spillage problem, talk to an expert in your area.

6. ENERGY-SAVING TIPS

Although these actions may not be eligible for an incentive, they may 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. For more information, visit http://energuide.gc.ca.
- Replace your light bulbs with ENERGY STAR® qualified 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 one to two hours before you start your vehicle.
- Install an ENERGY STAR® qualified kitchen or bathroom exhaust fan vented to the outside.
- 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 entertainment system(s) and home office equipment into power bars that can be easily turned off when equipment is not in use. Refer to the fact sheet *Standby Power - When "Off" Means "On"* at http://oee.nrcan.gc.ca/residential/business/manufacturers/standby-power-fact.cfm 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 http://oee.nrcan.gc.ca/publications or by calling the publications order desk at 1-800-387-2000.

For example, *Keeping the Heat In* at http://oee.nrcan.gc.ca/retrofit/homes/keeping is a booklet on basic principles of building science and provides guidance for home retrofit projects such as insulation and air sealing improvements.

Health and Safety
NRCan also produces a brochure called *Planning Your Energy Efficiency Retrofits* at http://oee.nrcan.gc.ca/retrofit/homes/planning, which includes important information on health and safety issues, as well as links to related documents from Health Canada and the Canadian Mortgage and Housing Corporation (CMHC).

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 http://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 several 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 http://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* at http://www.cmhc-schl.gc.ca/en/co/maho/yohoyohe/momo/momo_002.cfm gives good advice. In addition, dehumidifiers can help reduce moisture levels especially in basements.

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 (see Humidity Control, above), 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 http://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.

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. Your retrofits can also contribute to a better environment through clean air and a reduction in emissions.

Remember, you need to adhere to all program requirements and deadlines of ecoENERGY Retrofit – Homes, as well as those of any complementary regional program, in order to qualify for the grant(s).

For more information or links to complementary regional programs, visit http://ecoaction.gc.ca/homes or call 1 800 O-Canada.

A Note from your Energy Advisor

Thank you for engaging EnviroCentre to perform your energy assessment. If you have any questions concerning the recommendations in this report, please contact EnviroCentre at 613 656-0100 or visit our website, http://envirocentre.ca.

The information and recommendations provided by the EnviroCentre during your audit and in this report, including any estimated savings, are based on a visual inspection of your building or business, its equipment, and information available on your use of energy. This report is based on the Energy Advisor's best judgment given the information and time available. Please note that it outlines only potential savings and makes no guarantee about actual savings partly because the advisor has been unable to measure the actual consumption of your equipment or the actual use of space or water heaters, ventilation and/or air conditioning equipment, appliances, lights and other devices. Remember that the way you or your tenants occupy your building, or operate your business, can have a big impact on the actual consumption of energy. Finally, please note that this service is not a structural inspection and does not evaluate the structural and safety integrity of your building.

If you would like to book a second visit for an official assessment after upgrading, you can do so through EnviroCentre. If your renovations involve additions or other major changes to the shape of your exposed walls, ceilings or foundation, note that there may be a surcharge for remeasuring the building and remodeling your software file.

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