



District Department of the Environment's GreenDCEnergy Audit Program:

Residential Energy Audit Report

Homeowner: Emily Gallas
Address: 4430 9th St NW Washington DC

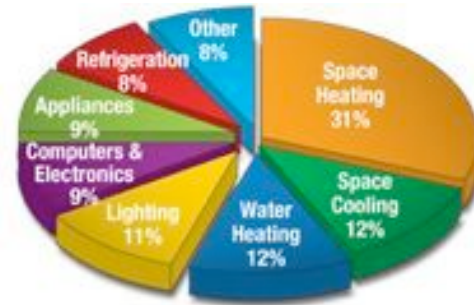
House Type: Duplex
Foundation: Brick/Block
Year Constructed: 1912
Square Footage: 1,500
No. of Stories: 2
Audit Date: 2/25/2011
Audited By: Geary Wills

Overall Energy Rank: ★★☆☆☆



REPORT CONTENT:

- Energy Rankings
 - Overall
 - Air Leakage
 - Insulation
 - Systems
 - Lights
 - Appliances
- Observations & Recommendations
- Home Energy Basics
- Climate Change + Your Home
- Home Energy Actions
- Photo Log
- Resources & Further Information
- Glossary



INTRODUCTION:

This report contains recommendations to help inform and prioritize future retrofit decisions aimed at decreasing your home's energy consumption, improving thermal comfort, and reducing negative environmental impacts associated with the operation of your house. Single family homes and 1-2 story apartments are responsible for a full 15% of the city's greenhouse gas emissions – the major contributor to climate change.

Access Green analyzed your home in the following categories:

- Effectiveness of the air and thermal barriers (building envelope);
- Efficiency of mechanical systems;
- Efficiency of lights and appliances; and
- Overall energy efficiency.

Access Green is a District based provider of energy efficiency and conservation solutions -- from residential to commercial, and from the private sector to work with governments. We have three primary objectives: 1) make all homes healthy and comfortable, 2) save money for residents on their utility bills, and 3) improve the planet while doing the first two.

Let us know if you have any questions regarding your report and we will be happy to discuss in more detail.

ENERGY RANKINGS:

Overall



Air Leakage	1 / 5
Insulation	4 / 5
Systems	3 / 5
Doors & Windows	2 / 5
Lights	4 / 5
Appliances	5 / 5

RECOMMENDATIONS:

Priority Investments

Any improvements made toward a more energy efficient home are great! The following improvements will offer the best value for money spent to increase in the energy efficiency of your home and are top priorities:

- Install CO monitors in home
- Repair/replace chimney damper system by qualified professional. Add upgraded pressure cap is applicable
- Have entire duct system tested for proper air flow/seal

Small Repairs with a Big Impact

Not every improvement to your home needs to be a big one or cost a lot of money. Here are a few recommendations that are inexpensive and you can do yourself.

- Seal around all flue penetrations in basement with fire rated spray foam
- Seal the door to the converted attic space using interior style, peel back weather stripping, and a draft dodger door sweep to prevent any drafts from entering the conditioned living space
- Re seal around all exterior door and window trim with caulk
- Seal all exterior wall baseboards with caulk
- **Install foam outlet plate gaskets on exterior wall outlets/switches**
- **Upgrade weather stripping on all exterior entry doors. Add upgraded sweeps**
- **Continue to install CFL light bulbs as all others blow. Focus on high usage areas**

Comprehensive Assessment

The following table presents the items that were included in the assessment with corresponding values for their performance. Items that we recommend be addressed are ranked on a scale of 1 to 5 with 1 representing the most important items that require action.

Assessment	Observation/Recommendation	Priority
Air Leakage (3319 CFM50)	Your home is 3 times leakier than it should be. The optimal ACH is .35. You should tighten the house to about 1114 CFM50. 'Test out' once air seal is complete.	1
Specific Air Leakage points	Exterior wall baseboards (Caulk). Fireplace damper system (Pressure cap). Exterior door sweeps. Window trim (Caulk). Office and baby's room baseboards.	1
Boiler	Acceptable	4
AC	Acceptable/ Have duct system tested for proper flow/seal	3
DHW	Acceptable/ Install insulation blanket to water heater	2
Insulation	Acceptable/ Ensure a secure installation of batts. Inside of attic	4
Doors	Requires improvement/ Seal around all trim work with caulk. Upgrade weather stripping and sweeps on exterior doors.	1
Windows	Requires improvement/Re seal around all trim work with caulk	2
Appliances	Acceptable	5
Lighting	Acceptable/ Continue to change incandescent bulbs to CFLs or LEDs	4
Health and Safety	None	5

OBSERVATIONS:

The following specific items were noted during your assessment:

- The home owner is looking to get ideas on how to help with increasing efficiency and decrease bills
- There is one fireplaces present in the home, which is never used
- Double pane windows have been installed throughout the home; including part of the basement
- The home is heated using a hot water boiler system and radiators
- Part of the total basement is finished.
- Basement is used as a playroom; lots of time spent downstairs
- Water heater is installed right near an exposed CMU block wall
- No insulation on any exposed hot/cold water lines in basement
- The main level fireplace is setup for gas and has a damper system. The door is missing/inoperable, and newspapers have been stuffed inside the chimney cavity.
- The attic space has been converted to storage space. The thermal envelope has been moved to the roofline. Insulation batts. are present in the roof, rafter cavities
- Gaps present around the flue penetrations through the foundation wall
- Smoke monitors present
- No CO monitors present
- Timer switch controls the bathroom exhaust fan

HOME ENERGY BASICS:

Air leakage and heat transfer are the biggest sources of home energy waste. Air leakage, or infiltration and exfiltration, occurs when outside air enters a house uncontrolled through cracks and openings, or conversely, when indoor air escapes. Heat transfer occurs naturally as heat flows from warmer to cooler spaces, often assisted by air leakage in and out of the house.

The ceilings, walls, and floors that separate the inside air (conditioned space) from the outside air (unconditioned space) form the air barrier and the insulation barrier for a home. The air barrier and insulation barrier together form the thermal envelope, represented by the orange line in the picture to the left.



The air barrier and insulation barrier are made of different materials. For most homes, the materials that form the ceilings, walls, and floor (such as drywall, sheathing, and decking) are relatively effective at stopping air leakage. Notwithstanding, to create a continuous air barrier, it is critical to seal all holes and seams between these materials with durable caulks, gaskets, and foam sealants. Properly air sealing such cracks and openings in your home can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment.

The insulation barrier usually consists of standard insulating materials, such as fiberglass batt or blown cellulose, which do not seal against air leakage. You need this insulation in your home to provide resistance to heat flow. The more heat flow resistance, called, “R-Value,” your insulation provides, the lower your heating and cooling costs.

It's a law of thermodynamics, hot always moves to cold. In the winter, heat flow moves directly from heated living spaces to adjacent unconditioned attics, garages, basements, and the outdoors. Heat flow can also move indirectly through interior ceilings, walls, and floors—or wherever there is a difference in temperature. During the cooling season, heat flows from the outdoors to the interior of a house. Properly insulating your home will decrease this heat flow by providing an effective resistance to the transfer of heat.

ENERGY EFFICIENCY ACTIONS

These actions are listed by order of importance to reducing energy usage, improving comfort, and maintaining improved long term performance of your home.

See how many boxes you can 'check complete' in the next section. The more boxes checked, the more money you'll save on energy bills, the more comfortable you'll feel in your home, and the more you'll do to reduce your carbon footprint.

1. Air sealing: Warm air leaking into your home during the summer and out of your home during the winter can waste a lot of your energy dollars. One of the quickest dollar-saving tasks you can do is caulk, seal, and weatherstrip all seams, cracks, and openings to the outside. You can save as much as 10% on your heating and cooling bill by reducing the air leaks in your home.

- ☐ Caulk and weather-strip doors and windows that leak air.
- ☐ Caulk and seal air leaks where plumbing, ducting, or electrical wiring penetrates through exterior walls, floors, ceilings, and soffits over cabinets.
- ☐ Install rubber gaskets behind outlets and switch plates on exterior walls.
- ☐ When the fireplace is not in use, keep the flue damper tightly closed. A chimney is designed specifically for smoke to escape, so until you close it warm air escapes- 24 hours per day!
- ☐ Gasket or seal attic access doors, trap doors and pull down stairs.



2. Insulation: The (DOE) Department of Energy recommends ranges of R-Values based on local heating and cooling cost and climate conditions in your area. For more customized insulation recommendations, visit www.energysavers.gov and check out the Zip Code

Insulation Calculator which lists the most economic insulation levels for your existing home based on your zip code and other basic information about your home.

- ☐ Use higher density insulation, such as rigid foam boards, in cathedral ceiling and on exterior walls.

- ☐ Ventilation plays a large role in providing moisture control and reducing summer cooling bills. Attic vents can be installed along the entire ceiling cavity to help ensure proper airflow from the soffit to the attic to make a home more comfortable and energy efficient.
 - ☐ Recessed light fixtures can be a major source of heat loss, but you need to be careful how close you place insulation next to a fixture unless it is marked IC- designed for direct insulation contact.
 - ☐ One of the most cost-effective ways to make your home more comfortable year-round is to add insulation to your attic. If the thickness of the insulation is less than 7 inches thick you will probably benefit by adding insulation in the attic.
 - ☐ You may also need to add insulation to your crawl space, unfinished basement or the floor above.
3. HVAC: Heating and cooling your home uses more energy and drains more energy dollars than any other system in your home. Typically, 45% of your utility bill goes for heating and cooling. No matter what kind of heating, ventilation, and air conditioning system you have in your house, you can save money and increase your comfort by properly maintaining and upgrading your equipment. But remember, an energy efficient furnace alone will not have as great an impact on your energy bills as using the whole-house approach. By combining proper equipment maintenance and upgrades with appropriate insulation, air sealing, and thermostat settings, you can cut your energy use for heating and cooling and reduce environmental emissions from 20% to 50%.
- ☐ Set your thermostat as low as is comfortable in the winter and as high as is comfortable in the summer. Install programmable thermostats when it is possible. Consult a heating and air conditioning contractor.
 - ☐ Clean and replace filters on furnaces once a month or as needed.
 - ☐ Clean warm-air registers, baseboard heaters, and radiators as needed; make sure they're not blocked by furniture, carpeting, or drapes.
 - ☐ Bleed trapped air from hot-water radiators once or twice a season; if in doubt about how to perform this task, call a professional.
 - ☐ Place heat-resistant radiator reflectors between exterior walls and radiators.
 - ☐ Turn off kitchen, bath, and other exhaust fans within 20 minutes after you are done cooking or bathing; when replacing exhaust fans, consider installing high-efficiency, low-noise models.
 - ☐ During the heating season, keep the draperies and shades on your south-facing windows open during the day to allow the sunlight to enter your home and closed at night to reduce the chill you may feel from cold windows.
 - ☐ During the cooling season, keep the window coverings closed during the day to prevent solar gain.
 - ☐ Long Term Savings Tip: Select energy efficient products when you buy new heating and cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage.
 - ☐ Ducts: One of the most important systems in your home, though it's hidden beneath your feet and over your head, may be wasting a lot of your energy dollars. Unfortunately, many duct systems are poorly insulated or not insulated properly. Sealing your ducts to prevent leaks is important if the ducts are located in an unconditioned area such as an attic or vented crawl space. If supply ducts are leaking, heated or cooled air can be forced out of unsealed joints and lost. In addition, unconditioned air can be drawn into return ducts through unsealed joints. In the summer, hot attic air can be drawn in, increasing the load on the air conditioner. In the

winter, your furnace will have to work longer to keep your house comfortable. Either way, your energy losses cost you money.

- ☐ If you use tape to seal your ducts, avoid cloth-backed, rubber adhesive duct tape, which tends to fail quickly. Researchers recommend other products to seal ducts: mastic, butyl tape, foil tape, or other heat approved tapes. Look for tape with the Underwriters Laboratories logo.

4. **Water Heating:** Water heating is the third largest energy expense in your home. It typically accounts for about 13% of your utility bill. There are four ways to cut your water heating bill: use less hot water, turn down the thermostat on your water heater, insulate your water heater, or buy a new, more efficient model.

- ☐ Install aerating, low-flow faucets and showerheads.
- ☐ Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period of time.
- ☐ Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings, but a setting of 120° F provides comfortable hot water for most uses.
- ☐ Insulate your electric hot-water storage tank, but be careful not to cover the thermostat. Follow the manufacturer specifications.
- ☐ Insulate your natural gas or oil hot-water storage tank, but be careful not to cover the water heater's top, bottom, thermostat, or burner compartment. Follow the manufacturer's recommendations.
- ☐ Insulate the first 6 feet of the hot and cold water pipes connected to the water heater.
- ☐ Install heat traps on the hot and cold pipes at the water heater to prevent heat loss. Some new water heaters have built-in heat traps.
- ☐ Although most water heaters last 10-15 years, it's best to start shopping for a new one if yours is more than 7 years old.
- ☐ Consider natural gas on-demand or tankless water heaters. Researchers have found savings can be up to 30% compared with a standard natural gas storage tank water heater.
- ☐ Consider Solar Water Heaters: Consult a professional for advice.

5. **Lighting:** Making improvements to your lighting is one of the fastest ways to cut your energy bills. An average household dedicates 11 % of its energy budget to lighting. Using new lighting technologies can reduce lighting energy use in your home by 50% to 75%. Advances in lighting controls offer further energy savings by reducing the amount of time lights are on but not being used.

- ☐ Look for the Energy Star label when purchasing these products.
- ☐ Turn off lights in any room you're not using, or consider installing timers, photo cells, or occupancy sensors to reduce the amount of time your lights are on.
- ☐ Use task lighting; instead of brightly lighting an entire room, focus the light where you need it. For example, use fluorescent under-cabinet lighting for kitchen sinks and countertops under cabinets.
- ☐ Consider three-way lamps; they make it easier to keep lighting levels low when brighter light is not necessary.
- ☐ Use 4-foot fluorescent fixtures with reflective backing and electronic ballasts for your workroom, garage and laundry areas.
- ☐ Use CFL's in all the portable table and floor lamps in your home. Consider carefully the size and fit of these systems when you select them. Some home fixtures may not accommodate some of

the larger CFL's. Change bulbs that are more frequently used first. If you are not using the fixture you will not save.

- ☐ Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy. Also, decorate with lighter colors that reflect daylight.
- ☐ Exterior lighting is one of the best places to use CFL's because of their long life.




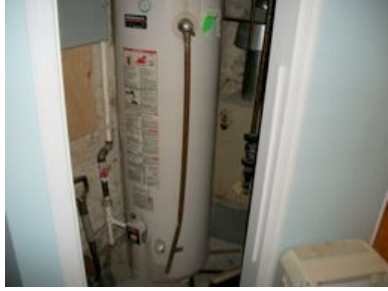



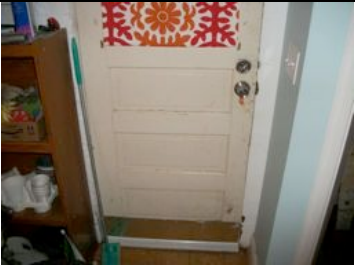


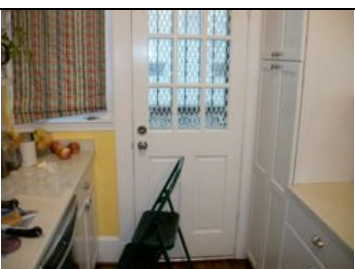
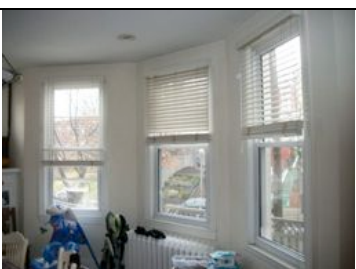
6. Appliances: Appliances account for about 20% of your household's energy consumption, with refrigerators, clothes washers, and clothes dryers at the top of the consumption list. When you're shopping for appliances, think of two price tags. The first one covers the purchase price-think of it as a down payment. The second price tag is the cost of operating the appliance during its lifetime. You'll be paying on that second price tag every month with your utility bill for the appliance. Refrigerators last an average of 13 years, room air conditioners and clothes washers, about 11 years each; dishwashers about 9 years. When you do have to shop for a new appliance, look for the Energy Star label, ENERGY STAR products usually exceed minimum federal standards by a substantial amount.













- ☐ Dishwasher: Most of the energy used by a dishwasher is for water heating. The EnergyGuide label estimates how much power is needed per year to run the appliance and heat the water based on the yearly cost of natural gas and electric water heating. Check the manual that came with your dishwasher for the manufacturer's recommendations on water temperature; many have internal heating elements that allow you to set the water heater in your home to a lower temperature (120° F). Scrape don't rinse, off large food pieces and bones. Soaking or prewashing is generally only recommended in cases of burned-on or dried-on food. Be sure your dishwasher is full, but not overloaded, when you run it. Let your dishes air dry; if you don't have an automatic air-dry switch, turn off the control knob after the final rinse and prop the door open a little so the dishes will dry faster.
- ☐ Refrigerator: The EnergyGuide label on new refrigerators will tell you how much electricity in kilowatt-hours (KWH) a particular model uses in one year. The smaller the number, the less energy the refrigerator uses and the less it will cost you to operate. In addition to the EnergyGuide label, don't forget to look for the ENERGY STAR label because they use at least 15% less energy than required by current federal standards and 40% less energy than the conventional models sold in 2001. Don't keep your refrigerator or freezer too cold. Recommended temperatures are 37° F to 40° F. for the fresh food compartment of the refrigerator and 5° F. for the freezer section. Make sure your refrigerator door seals are airtight. Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- ☐ Laundry: About 90% of energy used for washing clothes is for heating the water. There are two ways to reduce the amount of energy used for washing clothes: use less water and use cooler water. Unless you're dealing with oily stains, the warm or cold water setting on your machine will generally do a good job of cleaning your clothes. Switching your temperature setting from hot to warm can cut a load's energy use in half. Wash and dry full loads. If you are washing a small load, use the appropriate water-level possible. Clean the lint filter in the dryer after every load to improve air circulation. Periodically inspect your dryer vent to ensure it is not blocked. This will save energy and may prevent a fire. Manufacturers recommend using rigid venting materials, not plastic vents that may collapse and cause blockages. Look for the ENERGY STAR and EnergyGuide labels. ENERGY STAR clothes washers clean clothes using 50% less energy than standard washers. Most full sized ENERGY STAR washers use 18-25 gallons of water per load,











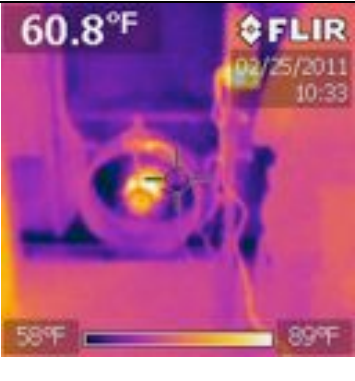

compared to the 40 gallons used by a standard machine. ENERGY STAR models also spin the clothes better, resulting in less drying time.

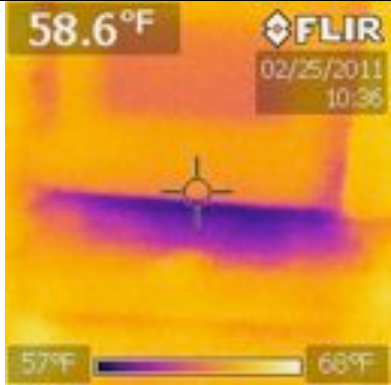
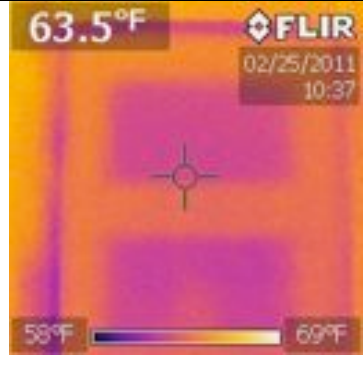

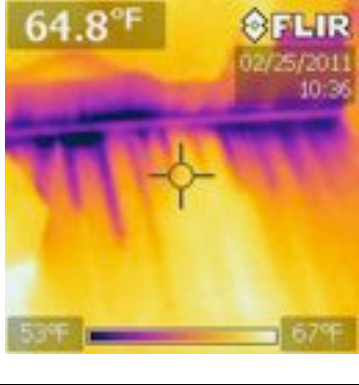
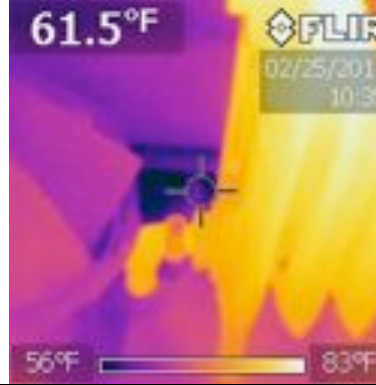

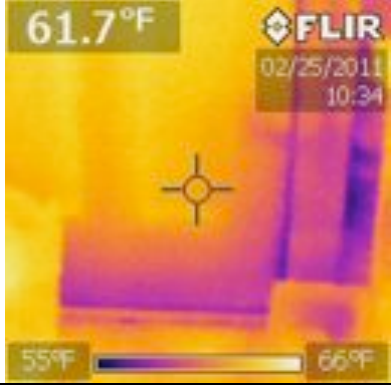
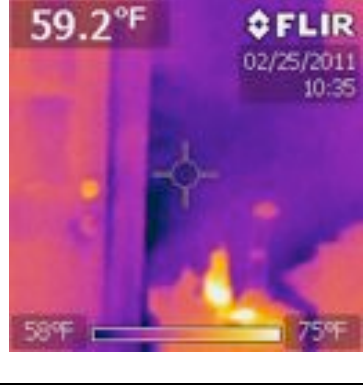
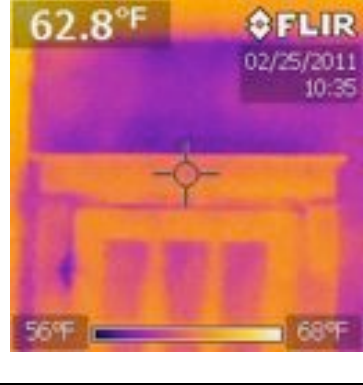
7. **Windows and Doors:** Windows provide views, daylighting, ventilation, and solar heating in the winter. Unfortunately, they can also account for 10% to 25% of your cooling bill. During the summer, your air conditioner must work harder to cool hot air from sunny windows. Install ENERGY STAR windows and use curtains and shade to give your air conditioner and energy bill a break. If your home has single-pane windows as almost half of U.S. homes do, consider replacing them. New double-pane windows with high-performance glass are available on the market. If you decide not to replace your windows, the simpler, less costly measures listed below can improve their performance.
- ☐ You can use a heavy-duty clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames during the cold winter months. Remember, the plastic must be sealed tightly to the frame to help reduce infiltrations.
 - ☐ Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
 - ☐ Close your curtains and shades at night; open them during the day.
 - ☐ Keep windows on the south side of your house clean to let in the winter sun.
 - ☐ Install exterior or interior storm windows; storm windows can reduce heat loss through the windows by 25% to 50%. Storm windows should have weatherstripping at all movable joints; and have interlocking or overlapping joints. Low-e storm windows save even more energy.
 - ☐ Long Term Tip: Look for the ENERGY STAR and EnergyGuide labels. When you are shopping for new windows, look for the National Fenestration Rating Council label, it means the window's performance is certified.
 - ☐ Remember the lower the U-value the better the insulation. A U-value of 0.35 or below is recommended.

PHOTO LOG:

		
Front:	Right:	Expansion tanks:
		
Water Heater:	Exposed band joist:	Flue penetration through foundation:
		
Basement rear entry door:	Basement rear entry door:	Main level gas fire place:
		
Newspapers stuffed into chimney damper:	Rear kitchen door:	Main level windows:

		
Basement windows:	Main level radiators:	Front entry door:
		
Front entry door sweep:	Bathroom fan:	Timer to the bathroom exhaust fan:
		
Entry door:	Ceiling fan penetration:	Second floor exterior wall baseboards:
		
Second level ventilation:	Door to converted attic space:	Door to converted attic space:

		
Converted attic space:	Air handler in converted attic space:	Insulated ducts in converted attic space:
		
Thermal bleeding at the exterior wall baseboards:	Thermal bleeding at the exterior wall baseboards:	Thermal bleeding at the exterior wall baseboards:
		
Thermal bleeding at window trim:	Thermal bleeding at window over fireplace:	Thermal bleeding from fireplace:
		
Thermal bleeding at entry door:	Thermal bleeding at front door threshold trim:	Thermal bleeding at window trim:

 <p>58.6°F FLIR 02/25/2011 10:36 57°F 68°F</p>	 <p>63.5°F FLIR 02/25/2011 10:37 58°F 69°F</p>	 <p>63.1°F FLIR 02/25/2011 10:35 56°F 99°F</p>
Thermal bleeding from attic entry door:	Thermal bleeding from attic entry door:	Thermal bleeding at the exterior wall baseboards:
 <p>64.8°F FLIR 02/25/2011 10:36 53°F 67°F</p>	 <p>61.5°F FLIR 02/25/2011 10:37 56°F 83°F</p>	 <p>66.2°F FLIR 02/25/2011 10:37 58°F 69°F</p>
Thermal bleeding at the exterior wall baseboards:	Thermal bleeding at the exterior wall baseboards near heat source:	Thermal bleeding at window trim:
 <p>61.7°F FLIR 02/25/2011 10:34 55°F 66°F</p>	 <p>59.2°F FLIR 02/25/2011 10:35 58°F 75°F</p>	 <p>62.8°F FLIR 02/25/2011 10:35 56°F 68°F</p>
Thermal bleeding at entry door seals and trim:	Thermal bleeding at entry door seals and trim:	Thermal bleeding at entry door trim:

RESOURCES & FURTHER INFORMATION:

Green.DC.gov

AccessGreen.com

EcoHouseUSA.com

Energy Efficiency & Renewable Energy Organizations

ACEEE - American Council for an Energy-Efficient Economy is a nonprofit collaborating with other groups to research and advocate the benefits of energy efficiency. www.aceee.org

ACORE - American Council On Renewable Energy is a non-profit focused on bringing renewable energy to the American mainstream. www.acore.org

ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers is the association of engineers that set recommendations and performs research for the HVAC sector. www.ashrae.org

ASE - Alliance to Save Energy is a non-profit advocating strategy for energy efficiency. www.ase.org
American Solar Energy Society. www.ases.org

DESIRE - Database for State Incentives for Renewable Energy is unquestionably the best web site listing federal, state, local and utility incentives for renewable energy and energy efficiency. A must-visit for anyone interested in the financial incentives for energy efficiency and renewable energy technologies on any level. www.dsireusa.org

Energy Star web site for the EPA's Energy Star program. Outstanding source of information regarding energy efficiency. www.energystar.gov

GBI - Green Building Institute is a unique non-profit organization with the mission, "to foster sustainable building practices through education and example."
www.greenbuildinginstitute.org

LBL - Lawrence Berkeley National Laboratory is a national lab conducting research for the Department of Energy. www.lbl.gov

NREL- National Renewable Energy Laboratory is a national lab conducting research for the Department of Energy's Office of Energy Efficiency and Renewable Energy. www.nrel.gov

RMI - The Rocky Mountain Institute is a non-profit organization conducting research and advocating cutting edge and market driven energy solutions. www.rmi.org

GLOSSARY:

Access Green- A District based Certified Business Enterprise that is one of the Mid Atlantic area's leading providers of energy efficiency and conservation solutions -- from residential to commercial, and from the private sector to work with governments. Access Green is also firmly committed to lifting up underserved communities through workforce development programs.

Air Barrier- any part of the building shell that offers resistance to air leakage

Air Exchange- the total building air exchanged with the outdoors through air leakage and ventilation

Air Sealant- items used to prevent air leakage including weather stripping, draft barriers, caulk, foam and insulation

Backer Rod- Backer rod is designed for use prior to caulking to fill gaps and openings larger than 1/2" x 1/2", prevents 3 point bonding, constructed of non-absorbent, closed cell polyethylene material

Blower Door- a device consisting of a fan, removable panel and gauges used to measure and locate air leaks

Btu (British Thermal Unit)- the quantity of heat energy required to raise the temperature of one pound of water one degree Fahrenheit

Ccf (Hundred cubic feet)- measure of natural gas roughly equivalent to 100,000Btus (See therm)

Carbon Footprint- the total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons or pounds of carbon dioxide (CO₂)

CFL Bulbs (Compact Fluorescent Lamp)- compared to incandescent bulbs, spiral and tubular CFL bulbs give off the same amount of visible light, use less power and have a longer life. Will save on average \$30 over the life of the bulb and 2000 times its weight in greenhouse gases

Combustion- burning or rapid oxidation, accompanied by release of energy in the form of heat and light

Combustion Appliance- any appliance that uses the combustion process to generate energy

DIY Projects- "do it yourself" projects in and around the home; typically requiring very basic knowledge or skills to perform the work.

Energy Factor (EF)- is an overall energy efficiency rating of a water heater, or how much hot water you get out for how much energy is put in.

Energy Information Administration (EIA)- provides policy-neutral data, forecasts, and analyses to promote sound policy making, efficient markets, and public understanding regarding energy and its interaction with the economy and the environment

Energy- a quantity of heat or work

Exfiltration- air flow out of a home to the outside (see Air Exchange)

Fenestration- window and door openings in a building shell

HERS – Home Energy Rating System

Heat- the measure of thermal energy, heat is exchanged by objects of different temperatures

Infiltration - air flow into a building from outside (see Air Exchange)

Insulation- material with relatively high thermal resistance

Joist-horizontal wood framing member that supports a floor or ceiling

Kilowatt- a unit of electric power representing a rate of 1,000 Joules / second

KWh (kilowatt hour)- a unit of electric energy equivalent to 3412 Btus.

Power- a rate of energy

Party Wall- is a dividing partition between two adjoining buildings (or units) that is shared by the tenants of each residence or business

Plumbing Chase- A hollow wall area accommodating piping used for drain waste or vent in plumbing systems

R-Value- a term predominantly used in the building industry to describe the thermal resistance properties of certain building insulation materials

Shell- a building's foundation, bottom floor, exterior walls and roof assembly

Smoke Stick- A means of making a smoke cloud to measure the velocity of air and to pinpoint areas of air leakage

Therm- unit of energy equaling 100,000 Btus

Thermal envelope- the continuous, insulated air barrier encompassing a living space, i.e. an enclosing wall, ceiling, or floor + insulation = thermal boundary

Unconditioned Space- a space that is neither directly nor indirectly conditioned space, which can be isolated from conditioned space by partitions and/or closeable doors

Vapor Retarder- any material, typically a plastic or foil sheet, which resists diffusion of moisture through wall, ceiling and floor assemblies of buildings