

Home Audit Report

Basic Information

Home Facts

Recommendations

Client:

Address:

Home Size: **3698 square feet**

Year Built: **1965**

Assessment Date: **February 5, 2014**



www.GreenHomeAES.com
1051 E. High Street
Mundelein IL 60060
224-475-0290



We are Building Performance Institute (BPI) certified professionals here at Advanced Energy Services LLC. Our home energy auditors are Certified Building Analysts as well as Certified Envelope Professionals. We carefully follow the guidelines set by BPI and as adopted and promoted vigorously by the US Department of Energy as well as the US Environmental Protection Agency. We are also a certified Participating Contractor to perform home assessments and energy related home improvements for North Shore Gas, Peoples Gas, Northern Illinois Gas and Commonwealth Edison.

Assessment Date: February 5, 2014

Auditor: Mark Olmon

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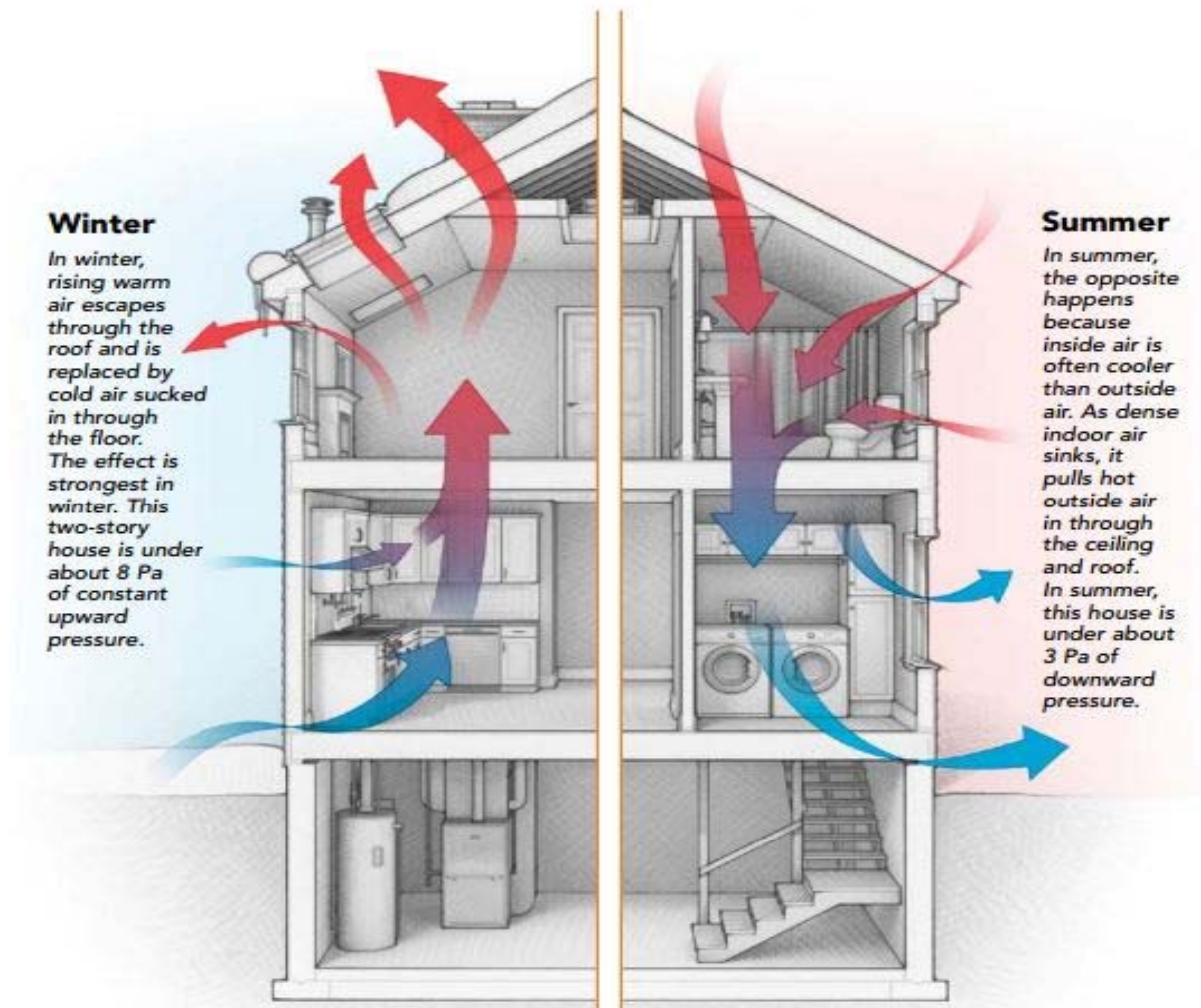
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The Stack Effect - Residential Structures



In winter, valuable heated air rises in your home creating higher pressure at the upper level, then forces its way out through cracks and openings. Colder air then is drawn into the home at the lowest level to replace the warm air that escaped. The end result? You feel drafts and see higher energy bills. Air leaks aren't limited to windows, doors and walls. Air can travel through cavities between interior and exterior surfaces until it finds an outlet. These are called bypasses. These indirect leaks, often found in attics and basements, can be the largest source of energy waste in your home. Bypasses are difficult to locate, and may require a professional to locate and correct. **It is important to seal air leaks throughout the house before adding insulation.**

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Common Air Leaks in Residential Construction



AIR SEALING

Many air leaks and drafts are easy to find because they are easy to feel, like those around windows and doors. But holes hidden in attics, basements, and crawlspaces are usually the bigger problems. These hidden leaks can make your home feel uncomfortable, waste energy, and cost you more money than necessary.

ADDING INSULATION

Insulation helps keep your home warm in the winter and cool in the summer. There are several common types of insulation—fiberglass (in both batt and blown forms), cellulose, rigid foam board, and spray foam. Insulation performance is measured by R-value—its ability to resist heat flow. The new EPA Energy Star recommendation for this climate zone for attic insulation is now R-49. Because insulation works best when air is not moving through it, **it is important to seal air leaks before installing insulation to ensure that you get the best performance.**

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About this home

Number of bedrooms	4	
Stories above ground	2	
Interior average floor to ceiling height	8.00	(vaults in average height)
Conditioned floor area (incl. basements)	5066	sf
Direction faced by front of house	North	
Homeowner concerns	Master Bed & Closet cold over garage Kitchen cold & drafty Laundry chute very cold & drafty	



Home construction & existing insulation details

Roof type	R-0	/ Multiple gables, asphalt shingles
Attic type	Unconditioned	
Attic insulation	R-18	/ 3" Batt & 4" Loose Fill
Foundation type / insulation	Full basement	/ None
Floor insulation above basement	R-0	/ None
Exterior walls	R-13	/ Brick veneer on 2x4 wall
Window age & type	1965	/ Wood Thermopane
Window performance	/ Average	
Number of skylights	None	



Mechanical systems

Heating type	Attic-Gas furnace, 80% AFUE	
Heating combustion venting	Natural Draft	
Cooling type	Central electric air conditioner	
Cooling efficiency value	10 SEER	
Water heater type	(2) Gas .55 EF	
Water heater comb. venting	Natural Draft	
Air duct location	Unconditioned	
Are ducts insulated / sealed?	Yes	/ No

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Testing results

Conditioned volume (incl. basements)	39096	cubic feet
Air leakage rate at CFM50 test pressure	6380	cfm at CFM50 Pascal's
Air leakage rate at natural pressure	431	cfm at normal condition

1716 Basketballs of air you have heated or cooled are pushing out of your home every minute, 24/7!! SO, the same volume of outside air is being sucked into your house from lower points of leakage in the home – you now have to heat or cool this unconditioned outside air continuously!!

Air changes per hour at natural pressure	0.66	
Combustion Appliance Zone(CAZ) limit	-3.0	Maximum safe pressure difference
CAZ worst case pressure difference	-3.0	With all exhaust fans running
Is worst case CAZ within BPI limits?	PASS	
Do furnace gases draft out safely?	N/A	
Do water heater gases draft out safely?	PASS	
Any gas pipe leaks detected?	NONE	



Indoor Air Quality

To ensure the health safety of a home's occupants, ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) publishes acceptable standards for the indoor air quality of a home. This standard formulates the minimum direct Mechanical Ventilation Rate (MVR) cfm requirement of fresh air to be continuously introduced into residential homes. Since 1989 the Building Performance Institute (BPI) has endorsed this standard for all homes. The standard has been updated in 2010.

If we are able to achieve a reduction in air infiltration greater than 63% mechanical ventilation will likely be required.

If additional ventilation is required for this home please discuss options with us.

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Analysis

This home has a current air exfiltration (leaking out of home) rate of 431 cfm under normal conditions. The recommendations listed are designed to reduce air loss up to 108 cfm, increase comfort and maximize energy conservation. This home is quite a bit leakier than most homes of similar size. This is due to the variety of framing techniques and the age of the home. Air sealing in the attic spaces along with increasing the insulation values offer fast return on investment. Encapsulating the attic HVAC trunks will reduce energy loss. Caulking under back wall shoe molding in office and Master and weather-stripping the garage door will reduce drafts. Adding foam sealant in the crawl space rim joists will reduce cold spots in kitchen and mudroom floors. Adding wall insulation around the master closet will reduce temperature extremes in the closet. All 3 bath fans must be ducted with insulated duct to outside air, through gable wall caps for this home. Upgrading a furnace, ac or water heater to Energy Star units will additionally reduce annual energy bills.



Recommendations & Cost Summary

TOTAL \$6,383

AIR SEALING & VENTILATION IMPROVEMENTS

\$3,864

Air seal recessed can lights & bath fans
Air seal top wall plates & mechanical penetrations in attic
Air seal master closet end wall (storage) w/1" thermax
Air seal master closet sidewalls w/insulation blanket (R10)
Air seal attic pulldown stair & insulate w/Thermadome
Install roof jack & insulated duct for fan
Install weatherstrip & sweep on garage & master closet door

Air seal crawl rim joists w/2 part foam - R14 (2")

Air seal Heat trunks w/insulation blanket (R19)

INSULATING IMPROVEMENTS

\$2,519

Add attic insulation dam at attic stair
Add Cellulose in main attic to R-49 value from R-19
Create & repair (2) kneewall access in drywall wall of master
Air seal master front kneewalls w/insulation blanket (R10)
Install cover plate foam insulators as accessible
Caulk under back wall exterior baseboards - Mbed & Office

FUTURE - Upgrade Furnace, AC & Water Heater To Energy Star rated units*

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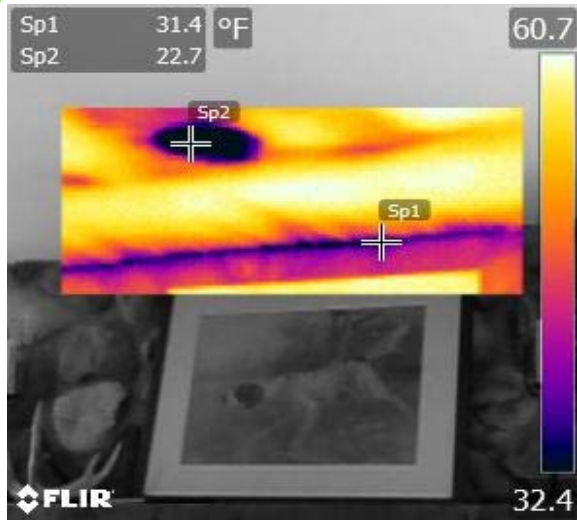
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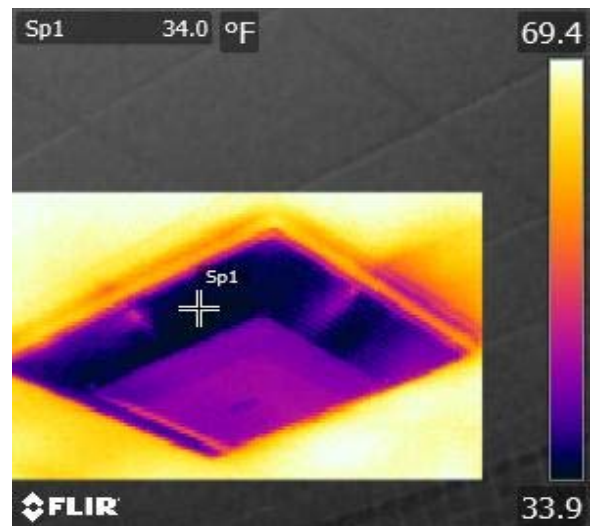
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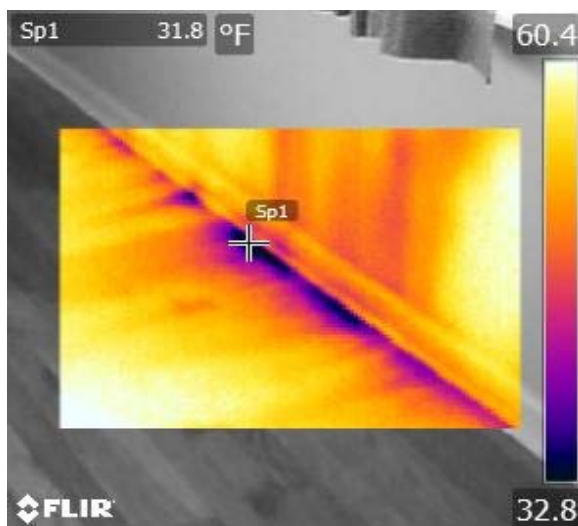
Audit Photos



Attic leakage through can lights



Attic leakage through bath fan



Air leakage through bedroom baseboard



Attic leakage through master closet door

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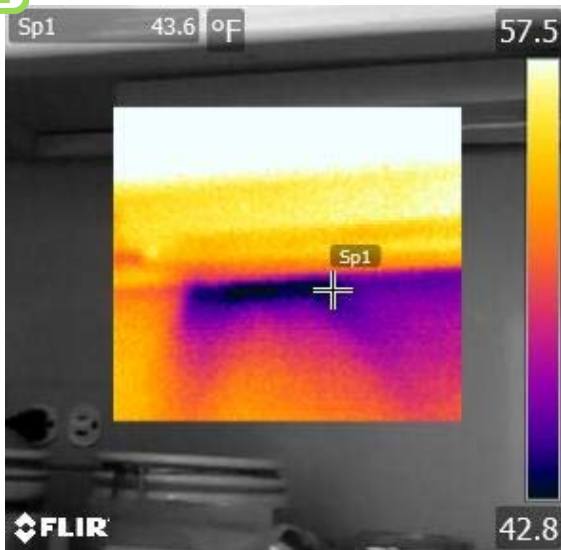
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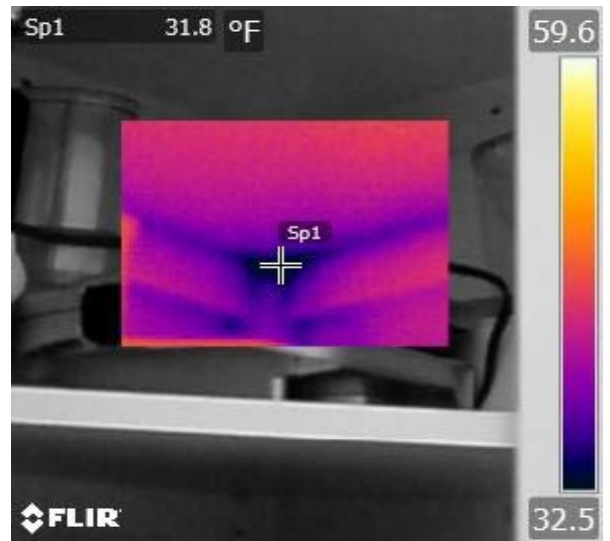
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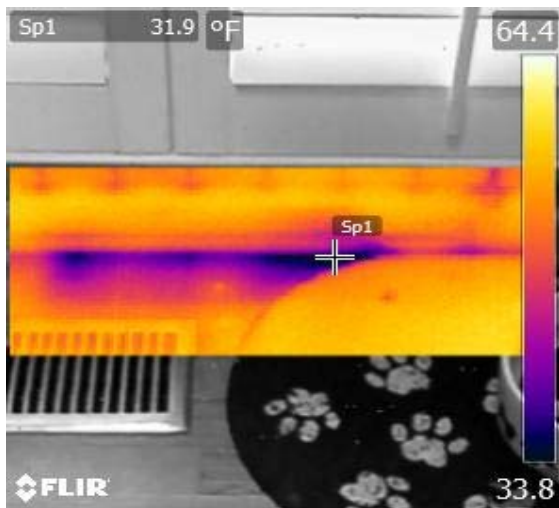
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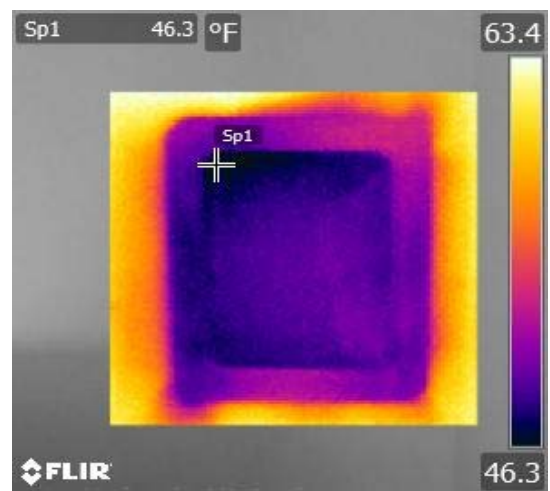
Air leakage behind kitchen cabinet



32 degree inside kitchen cabinet



32 degree air at dogbowl



Attic leakage through laundry chute

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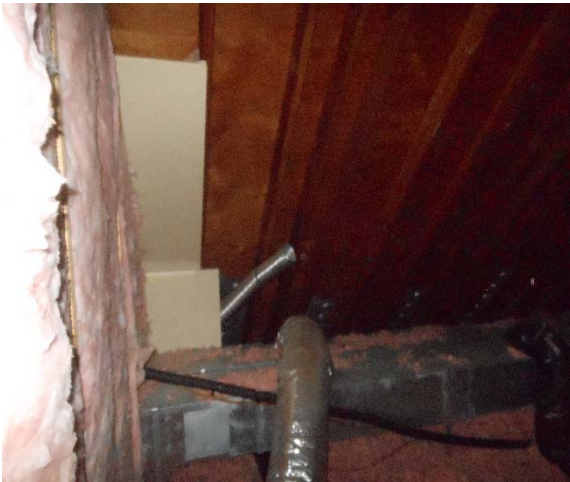
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Audit Photos



Bath fan exhausting moisture directly into attic - must go outside



Inadequate insulation levels throughout



Attic leakage through pipe penetrations



Wrapping HVAC trunk lines will reduce energy loss into attic air