



Your Energy Audit

Home

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Audited Date

10-29-2013
10:30 AM

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Do these stick?
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Mike,

We've identified some really useful upgrades that should go a long way in addressing your comfort concerns in the home. As well as reduce your energy consumption and utilities. We have also outlined some great rebates offered through your electricity provider.

We look forward to making your home much more comfortable and efficient!

Mark Romano

Inside Your Report

- Cover
- Concerns
- Solutions for your home
- Upgrade Details
- Safety Tests
- Additional Notes
- Rebates & Incentives
- Tech Specs
- Glossary



Concerns

We listened to you!

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

Power Bills and Inconsistent Temperatures

Homeowner has been paying extremely high heating and cooling costs and the home is still not comfortable. Home seems drafty in the winter especially in the bonus room and very hot in the summer, mainly upstairs. Homeowner would like to save money on utilities and be more comfortable in the home.



Solutions for your home

Estimated Totals

Approximate Cost

\$ 8,800

This is an exact cost of your improvements

Estimated Savings

\$ 2,840/yr

This is an estimate of how much you could save starting in Year 1. Savings will only increase as energy prices rise over the years.

Impact of upgrades

Energy Reduction	39 %
Carbon (CO2) Savings	17 tons
Equivalent cars removed from the road	3.5/yr
Equivalent number of tree seedlings grown for 10 years	435

Details	Approximate installed cost	Approximate annual savings	SIR*
Thermostat Set Points	\$700	\$1,540	46.4
Replace Lighting with CFLs or LEDs	\$600	\$730	8.6
Add Attic Insulation	\$3,500	\$190	1.1
Seal Air Leaks	\$1,400	\$150	1.7
Insulate Basement Walls	\$1,200	\$150	2.6
Attic Fan Installation	\$700	-	-
Insulate Walls	\$700	\$80	2.5

* SIR is the Savings to Investment Ratio. Simply put, if the SIR is 1 or greater, then the energy savings from the item will pay for itself before it needs to be replaced again. This metric is used to help prioritize the recommendations by financial merit.



Thermostat Set Points

Benefits Estimate

Estimated Cost

\$700

Energy Savings

Approx. \$1,540

Why it matters

Installing a programmable thermostat (or correctly setting the one you currently have) will help you to use less energy when you're not at home or when you're sleeping.

Notes to Homeowners

The home currently has no programmable thermostats, these can save a ton of money. Once the improvements are made the home will be more comfortable and a more even temperature throughout. Then you will be able to set the thermostats accordingly and save money.

Now & Goal

Details	Now	Goal
Heating Setpoint: High (at home)	73°F	68°F
Heating Setpoint: Low (not at home/sleeping)	73°F	62°F
Cooling Setpoint: High (not at home)	73°F	85°F
Cooling Setpoint: Low (at home)	73°F	78°F



Upgrade Lighting

Benefits Estimate

Estimated Cost

\$600

Energy Savings

Approx. \$730

Why it matters

Compact Florescent Lightbulbs (CFLs) use 1/4 of the energy of regular incandescent lightbulbs and last 8 to 15 times as long. Light Emitting Diode (LED) bulbs use 12% of the energy of regular incandescent lightbulbs and last up to 50 times as long. Replacing incandescent bulbs with CFLs or LEDs will save significant energy and replacement costs over time.

Notes to Homeowners

Any lights that are now incandescent should be replace by a CFL or LED bulb. These types of bulbs use about 10% the electricity and last up to 5-10 times longer.

Now & Goal

Details	Now	Goal
% CFLs or LED		90%
Number of Light Bulbs	150#	



Insulate Attic

Benefits Estimate

Estimated Cost

\$3,500

Energy Savings

Approx. \$190

Why it matters

Gaps in your thermal barrier (insulation) and air barrier (pressure boundary) are a place of huge losses. Having an R value of up to R-49 with correct installation drastically reduces energy consumption and comfort in the home.



Current Insulation pictures including area that needs baffles at soffit.



Areas of Major Concern

1st picture is a gap from attic that goes into a wall between Master bedroom and Master bathroom. ****Major leak****

2nd picture is in main attic next to solar skylight.

Notes to Homeowners

Insulation in upper attic was pretty good for the most part. There were some gaps and baffles were missing at soffit vents. Lower attic insulation was very poor, many gaps and missing sections. Sealing all connections between attic and living space and adding insulation will greatly improve the efficiency and comfort of the home.

Notes to Contractors

While insulation looked good in upper attic, the top plates have not been sealed and there are many pathways for air to flow into home from attic space.



Insulate Attic

Benefits Estimate

Estimated Cost

\$3,500

Energy Savings

Approx. \$190

Why it matters

Gaps in your thermal barrier (insulation) and air barrier (pressure boundary) are a place of huge losses. Having an R value of up to R-49 with correct installation drastically reduces energy consumption and comfort in the home.

Now & Goal

Details	Now	Goal
Modeled Attic Area	2275ft ²	
Attic Insulation	5R Value	49R Value



Seal Air Leaks

Benefits Estimate

Estimated Cost

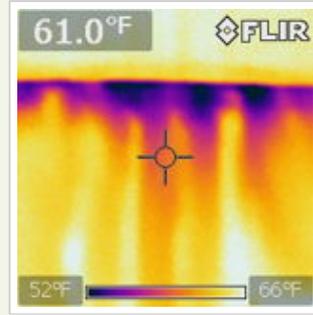
\$1,400

Energy Savings

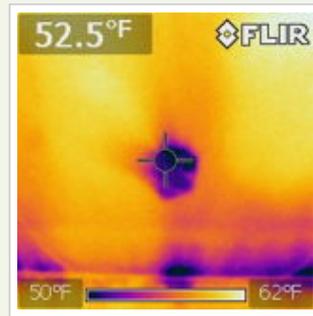
Approx. \$150

Why it matters

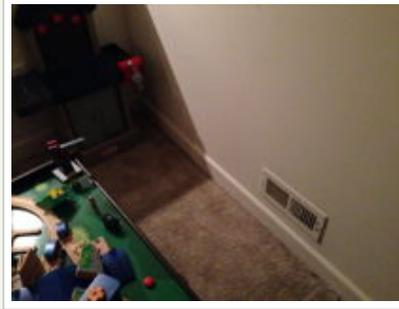
Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, we ran a blower door to depressurize the house. We could not get your home down to the 50pa (pressure point) we were trying to achieve. This home is very leaky which is pretty normal for a house build in 1967. Running the blower door and testing with a manometer allowed us to easily find the air leaks so we can take corrective measures. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.



Areas where air is leaking from the attic into the walls and where insulation is not making contact with the warm side of the wall.



Air leaking around a ceiling fixture



Areas where insulation is not properly installed and there is a thermal break at the base of the wall where insulation is not continuous. There is also air leaking under the floor in this area.



Seal Air Leaks

Benefits Estimate

Estimated Cost

\$1,400

Energy Savings

Approx. \$150

Why it matters

Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, we ran a blower door to depressurize the house. We could not get your home down to the 50pa (pressure point) we were trying to achieve. This home is very leaky which is pretty normal for a house build in 1967. Running the blower door and testing with a manometer allowed us to easily find the air leaks so we can take corrective measures. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.

Notes to Homeowners

There are many penetrations between attic and home. Openings where wiring goes down between wall, cans lights, bathroom fans, wall cavities and air conditioning vents. We used a blower door test as well as thermal imaging to identify areas that are leaking as well as exactly how much air is flowing in and out of your home.

Notes to Contractors

We will seal all top plates to stop air infiltration down interior and exterior walls. Seal all vents and fans as well as cover all can lights with insulated boxes before adding insulation.

Now & Goal

Details	Now	Goal
Air Infiltration	10000CFM50	5500CFM50
Equivalent NACH	1.39NACH	0.76NACH
Equivalent ACH50	20.8ACH50	11.4ACH50
Effective Leakage Area	550in ²	303in ²
Modeled Conditioned Air Volume	28880ft ³	

Insulate Basement

Benefits Estimate

Estimated Cost

\$1,200

Energy Savings

Approx. \$150

Why it matters

Insulating your rim joists will increase the overall temperature of your basement and make the floors above more comfortable. The estimate cost shown here is for a contractor sealing and installing R-20 foam insulation.



These are picture of the rim joists. They are neither sealed or insulated. That is basically a hole in your thermal boundary and pressure plain letting air infiltrate the basement and floor above.



Basement area where ceiling needs to be cut back to expose rim joist that is unsealed and uninsulated, then foam spray is applied to seal and insulate that space. Then sheet rock is to be re-installed and ceiling painted

Notes to Homeowners

No Insulation at rim joists. Major losses occurring with respect to conduction and convection. Makes 1st Floor cold and drafty. Much of the area that needs to be sealed is behind sheet rock ceiling which we discussed removing.

Notes to Contractors

Need to Insulate and Seal Entire Box Seal and Rim Joist area to an R-20.



Insulate Basement

Benefits Estimate

Estimated Cost

\$1,200

Energy Savings

Approx. \$150

Why it matters

Insulating your rim joists will increase the overall temperature of your basement and make the floors above more comfortable. The estimate cost shown here is for a contractor sealing and installing R-20 foam insulation.

Now & Goal

Details	Now	Goal
Modeled Basement Wall Area	160ft ²	
Cavity Insulation		20R Value
Continuous Insulation		20R Value



Attic Fan Installation

Benefits Estimate

Estimated Cost

\$700

Why it matters

Proper attic ventilation is key to proper function of the ac system, insulation and life of the shingles.

Notes to Homeowners

There is not adequate ventilation in the upper main attic. There is an open ridge vent where there is an existing fan in lower attic.

Notes to Contractors

I recommend installing a 1600 CFM powered attic fan in main attic and closing in ridge vent in same area as well as adding baffles to protect insulation where there are existing soffit vents. I also recommend closing ridge vent in area of existing fan so air will be drawn from soffit instead of through ridge.



Insulate Walls

Benefits Estimate

Estimated Cost

\$700

Energy Savings

Approx. \$80

Why it matters

Insulating your knee wall spaces can dramatically improve even temperature across the home and comfort level, as well as lower utility costs.



Current insulation pulling away from the wall and what it should look like after the improvements.

Notes to Homeowners

Improperly installed knee wall insulation is a major area of heat loss and gain. There are many areas where insulation is pulling away from the wall, or missing all together.

Notes to Contractors

Insulation need to be moved and the sheet rock sealed to the framing. Then the insulation needs to be re installed and ridged foam board sealed and installed to the exterior of the framing.

Now & Goal

Details	Now	Goal
Modeled Wall Area (including shared walls)	400ft ²	
Cavity Insulation	13R Value	20R Value
Continuous Insulation		20R Value



Health & Safety

What's This?

These tests are recommended by the Building Performance Institute (BPI). They can help identify potential health and safety concerns in your home.

Test Summary

- Ambient Carbon Monoxide ✓
- Natural Condition Spillage ✓
- Worst Case Depressurization ✓
- Worst Case Spillage ✓
- Undiluted Flue CO ✓
- Draft Pressure ✓
- Gas Leak ✓
- Venting ✓
- Mold & Moisture ✓

✓ Passed | ✗ Failed | ⚠ Warning

Notes to Homeowners

We tested the gas meter outside and didn't find any leaks. We also tested all the combustion appliances inside the home. We found all the appliances were burning cleanly and not putting off too high of a concentration of Carbon Monoxide (CO). We also found there was adequate pressure in the flue of each appliance to properly remove those combustion gases from the home.



Tech Specs

Property Details

Year Built:	2005
Conditioned Area:	3040 ft ²
House Volume:	28880 ft ³
# of Stories:	2
# of Occupants:	6
Home Style:	Single Family Detached
Tuck Under Garage:	No
# of Cars:	

Insulation & Air Leakage

Attic Insulation Type:	Fiberglass or Rockwool (batts or blown)
Attic Insulation Amount:	1-3
Foundation Type:	
Basement:	100 %
Crawlspace:	%
Slab on Grade:	%
Basement Wall Insulation:	Finished wall without Insulation
Crawlspace Insulation:	
Exterior Wall Construction:	Frame
Exterior Wall Cladding:	Brick Veneer
Wall Insulation:	Yes
Air Leakage:	10000 CFM50

Heating & Cooling Equipment

Details:	System 1	System 2	System 3
Type:	Both (Heating / Cooling)	Both (Heating / Cooling)	Both (Heating / Cooling)
Primary Energy Source:	Natural Gas	Natural Gas	Natural Gas
% of Total Load:	30% / 30%	35% / 35%	35% / 35%
Equipment:	Furnace / Central AC	Furnace / Central AC	Furnace / Central AC
Age:	6-15 yrs / 6-10 yrs	6-15 yrs / 6-10 yrs	6-15 yrs / 6-10 yrs
Capacity:	72 kBTU/h / 64 kBTU/h	60 kBTU/h / 72 kBTU/h	72 kBTU/h / 72 kBTU/h
Duct Location:	50/50 Crawlspace (unconditioned) - Conditioned Space	Attic (unconditioned)	Attic (unconditioned)
Duct Leakage:	15% - Somewhat leaky	15% - Somewhat leaky	15% - Somewhat leaky
Duct Leakage Value:	CFM25	CFM25	CFM25
Duct Insulation:	Fiberglass 2"	Fiberglass 2"	Fiberglass 2"

Water Heating

Energy Source:	Natural Gas
Type:	Standard tank
Age:	6-10
Location:	Indoors and within heated area
Temperature:	Low (120-130 F)

Doors

Door 1 Type:	Steel, insulated
Door 2 Type:	

Windows

Window Glazing:	Single pane
Window Frames:	Wood or metal clad
North Window Area:	30 %
East Window Area:	20 %
South Window Area:	30 %
West Window Area:	20 %
North Overhang:	2 ft
East Overhang:	2 ft
South Overhang:	2 ft
West Overhang:	2 ft
Skylight Area:	ft ²



Tech Specs (cont)

Refrigerators

Refrigerator 1::	
Size:	16-18 ft ³
Age:	6-10 years old

Appliances

Number of Freezers:	1
Cooking Range Fuel:	Natural gas
Dryer Fuel:	Electric

Lighting

Percent CFLs or LEDs:	0%
Approx # of light bulbs:	150

Thermostat Set Points

Programmable Thermostat Installed?:	
High Heating Setpoint:	73 °F
Low Heating Setpoint:	73 °F
High Cooling Setpoint:	73 °F
Low Cooling Setpoint:	73 °F

Utility Details

Electric Utility Name:	Georgia Power
Electric Utility Account Number:	—
Fuel Utility Name:	—
Fuel Utility Account Number:	—

Utility Bills

Primary Heating Fuel:	Natural Gas
Highest monthly summer electric bill:	\$700
Lowest monthly electric bill:	\$200
Highest monthly winter natural gas bill:	\$600
Lowest monthly natural gas bill:	\$100

Auditor's Contact Information

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Glossary

Annual Fuel Utilization Efficiency (AFUE) The measure of seasonal or annual efficiency of a residential heating furnace or boiler. It takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls.

Annualized Return The return an investment provides over a period of time, expressed as a time-weighted annual percentage. This is the equivalent annual interest rate you would get if you put the same amount of money spent on the energy upgrade into a savings account.

Asbestos Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant, but is no longer used in homes. When asbestos-containing materials are damaged or disturbed by repair, remodeling or demolition activities, microscopic fibers become airborne and can be inhaled into the lungs, where they can cause significant health problems.

British Thermal Unit (Btu) The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit; equal to 252 calories.

Carbon Monoxide (CO) A colorless, odorless but poisonous combustible gas with the formula CO. Carbon monoxide is produced in the incomplete combustion of carbon and carbon compounds such as fossil fuels (i.e. coal, petroleum) and their products (e.g. liquefied petroleum gas, gasoline), and biomass.

Cashflow When financing energy efficiency improvements, cashflow is the difference between the average monthly energy savings and the monthly loan payment.

Combustion Appliance Zone (CAZ) A contiguous air volume within a building that contains a combustion appliance such as furnaces, boilers, and water heaters; the zone may include, but is not limited to, a mechanical closet, mechanical room, or the main body of a house, as applicable.

Compact Fluorescent Light bulb (CFL) A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These highly efficient lights consist of a gas filled tube, and a magnetic or electronic ballast.

Cubic Feet per Minute (CFM) A measurement of airflow that indicates how many cubic feet of air pass by a stationary point in one minute.

Carbon Dioxide (CO₂) A colorless, odorless noncombustible gas that is present in the atmosphere. It is formed by the combustion of carbon and carbon compounds (such as fossil fuels and biomass). It acts as a greenhouse gas which plays a major role in global warming and climate change.

Energy Efficiency Ratio (EER) The measure of the energy efficiency of room air conditioners: cooling capacity in Btu/hr divided by the watts consumed at a specific outdoor temperature.

Energy Factor (EF) The measure of efficiency for a variety of appliances. For water heaters, the energy factor is based on three factors: 1) the recovery efficiency, or how efficiently the heat from the energy source is transferred to the water; 2) stand-by losses, or the percentage of heat lost per hour from the stored water compared to the content of the water; and 3) cycling losses. For dishwashers, the energy factor is the number of cycles per kWh of input power. For clothes washers, the energy factor is the cubic foot capacity per kWh of input power per cycle. For clothes dryers, the energy factor is the number of pounds of clothes dried per kWh of power consumed.

Heating Seasonal Performance Factor (HSPF) The measure of seasonal efficiency of a heat pump operating in the heating mode. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of heat delivered for every watt-hour of electricity used.

Heat Recovery Ventilator (HRV) / Energy Recovery Ventilator (ERV)

A device that captures the heat or energy from the exhaust air from a building and transfers it to the supply/fresh air entering the building to preheat the air and increase overall heating efficiency while providing consistent fresh air.

Light Emitting Diode (LED) Lighting An extremely efficient semiconductor light source. LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, and smaller size.

N-Factor A factor of how susceptible your house is to wind, influenced by weather patterns, location, and the number of floors in the home. Used in the calculation of NACH.

Natural Air Changes per Hour (NACH) The number of times in one hour the entire volume of air inside the building leaks to the outside naturally.

Payback Period The amount of time required before the savings resulting from your system equal the system cost.

R-Value A measure of the capacity of a material to resist heat transfer. The R-Value is the reciprocal of the conductivity of a material (U-Value). The larger the R-Value of a material, the greater its insulating properties.

Radon A naturally occurring radioactive gas found in the U.S. in nearly all types of soil, rock, and water. It can migrate into most buildings. Studies have linked high concentrations of radon to lung cancer.

Rim Joist In the framing of a deck or building, a rim joist is the final joist that caps the end of the row of joists that support a floor or ceiling. A rim joist makes up the end of the box that comprises the floor system.

Seasonal Energy Efficiency Ratio (SEER) A measure of seasonal or annual efficiency of a central air conditioner or air conditioning heat pump. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of cooling delivered for every watt-hour of electricity used by the heat pump over a cooling season.

Savings to Investment Ratio (SIR) A ratio used to determine whether a project that aims to save money in the future is worth doing. The ratio compares the investment that is put in now with the amount of savings from the project.