



ECO ENERGY AUDITS



Residential Energy Audit for:

John Doe
555 Main St
Brookfield, IL
February 20th, 2010

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Dear John,

Thank you for allowing me into your home to assist you with your energy concerns. This home energy report includes the following:

- Appliance Inventory
- Utility Bill Analysis
- Door Blower Test Results
- Thermal Images
- Recommended Improvements
- Improvement Analysis for your home

You will not only be able to improve the efficiency of your home but you will also have increased comfort, lower utility bills, improved home durability, improved indoor air quality and help the environment with the information contained in this report.

It was a pleasure meeting you – feel free to call me with any questions or concerns.

Sincerely,

Ray Hurley
Eco Energy Audits

PS – As much of my business comes from referrals, I would be grateful of any mention of my name to friends and associates.



Property Data

- Single Family/Cape Cod
- Property Faces East
- Detached Garage
- 65 years old (Built 1945)
- Roof – Good Shape, 5 years old
- 4 Bedroom, 2 bath
- 24,975 Cubic foot (conditioned area only)
- Occupied by family of two with three cats, one dog
- Radiant Heating – Natural Gas

Weather Conditions

- 37 degrees
- Raining

Homeowner Concerns

- Higher than preferred energy bills
- Comfort issues in several rooms

Outside Observations and Recommendations

Overall condition of the home is good, there is some small cracking in several areas but homeowner already is planning on re-doing stucco. Some other common and easy to remedy issues were observed:

Moisture:



- Standing water at downspout – we recommend sloping the ground so water is carried further away from foundation or a downspout extension to carry the water to a lower spot in yard

Plants/Debris



- English Ivy is growing as groundcover in the yard. It is an attractive but aggressive and fast growing plant. It is was observed growing on the house – most notably in window by dryer vent and on back doors



- Small debris pile against foundation - we recommend keeping yard waste away from home because of moisture and pests.



- Vents to crawl space below front porch are larger than required for the space and can allow access to area for rodents/pests. We recommend covering with screen or wire mesh from the inside. Inspection of crawl spaced revealed some animal waste and a dead squirrel.

HVAC and Appliance Inventory

Heater



- Recently replaced Burnham Independence Model
- 83.2 AFUE Efficient (annual fuel utilization efficiency) – this means that 83.2% of the energy in the fuel becomes heat for the home and the other 6.8% escapes up the chimney and elsewhere. AFUE doesn't include the heat losses of the duct piping, which can be as much as 35%. This is considered a mid-efficiency heating system.
- Boiler is appropriately sized and the flue is properly sloped (1/4" per 1")
- The pipes appear to be insulated with asbestos – we recommend hiring a licensed asbestos abatement company if you wished to remove or encapsulate. I've also enclosed EPA guidelines for asbestos in the home.

Water Heater



- Rheem Natural Gas Tankless Water Heater
- This is in excellent shape and very energy efficient and is a big reason why your average baseload for gas usage is very low.

Refrigerator

- Roper Mod#RT14DKXFW01
- Uses 1,073 kwh/Year
- Annual Cost \$115.19 to run
- Energy Star qualified model costs \$37.00 a year to operate
- You would save \$390 over 5 years with an Energy Star Model

Dishwasher

- Kitchenaid Model#KUDI24SEWH2
- A dishwasher 14 years or older costs an extra \$40 a year on your utility bills compared to owning a new ENERGY STAR qualified model.

Lighting

Some of your lights already have CFLs, but many do not. CFL and LED lights should be used as replacement bulbs as your current incandescent bulbs burn out. CFL bulbs have made great improvements in terms of light quality, dimming capability, and turn on faster than bulbs from just a couple years ago. Their price has also dropped dramatically. Your electricity usage is already very low so changing to CFLs is a low priority in terms of overall energy savings. Incandescent bulbs will start to be phased out and no longer available starting in 2012.

Utility Bill Analysis

Gas: Peoples Gas

- Your baseload (water heater, clothes dryer, etc) gas consumption is about 33 therms a month. Your gas usage in January and last February averaged about 363 therms, so 330 therms for heating. This is fairly high even with your tankless water heater and points to inefficiency in winter months.

Space Heating Usage 654 therms for Jan & Feb
Sq/ft of conditioned space – 2958
Heating Degree Days – 2,379 (in Jan and Feb)
Heat Usage (btus/ft²/hdd) 9.29

Heat Use avg:
5 = efficient
10=Inefficient
15=Very Inefficient

Electric: ComEd

Annual kWh used: 3,186
Annual Elec Cost \$342.00 (without fees)
Your electrical use is far below average.

Door Blower Test Results:

5800 cfm(cubic feet per minute) @ 50pa (fifty Pascal)

13.93 ACH (Air Changes Per Hour)@50pa

Estimated .774 Natural air changes per hour.

The air in your home is replaced every 78 minutes.

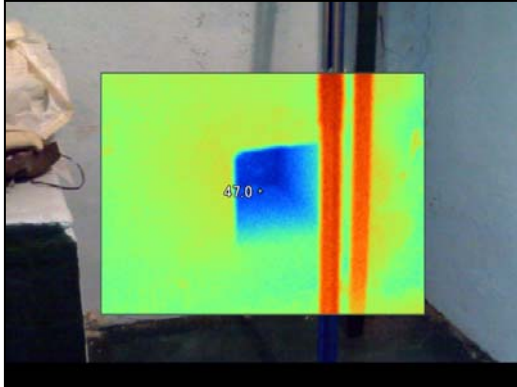
BPI Minimum Airflow Standard for your home is 2,365 cfm @ 50pa. You could your home 50% tighter and still be above the Minimum Airflow Standard (before mechanical ventilation would be required).

You have the equivalent opening of a 4.03 sq/ft hole in your home.

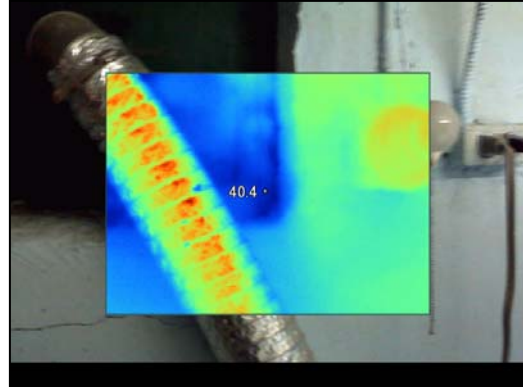
Your home is quite leaky but the good news is that there are a lot of opportunities to improve upon its performance.

Infrared Images & Recommendations

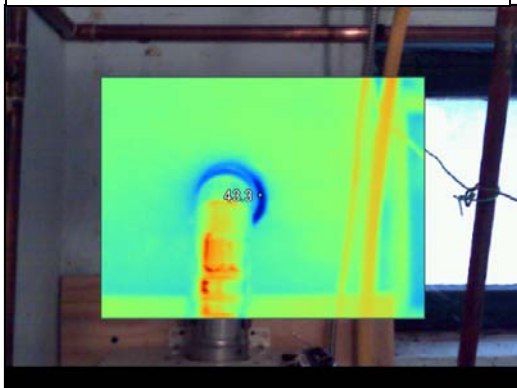
Basement



Access hole should be sealed with foam board insulation and foam (Great Stuff) sealant or caulk.



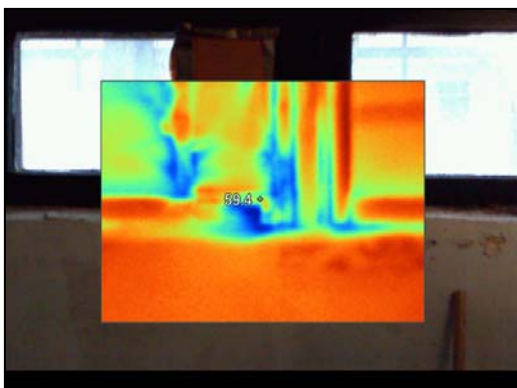
Dryer vent area should be air sealed with foam board and foam sealant.



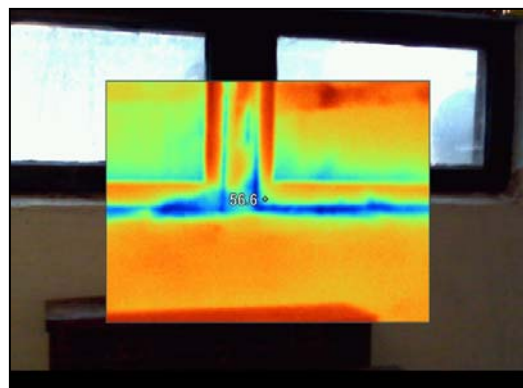
High temp caulk should be used to seal tankless water heater vent.



Insulate hot water pipes with self seal foam pipe insulation.

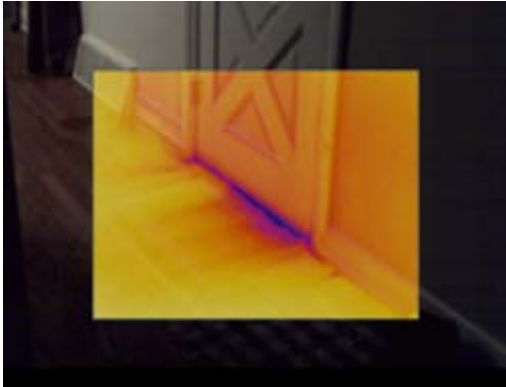


All basement windows should be sealed with caulk or foam sealant for larger gaps.

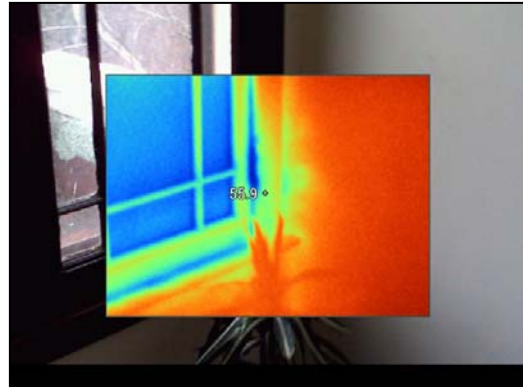


All basement windows should be sealed with caulk or foam sealant for larger gaps.

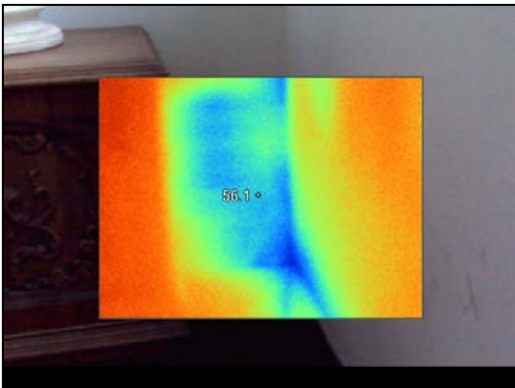
Living Area



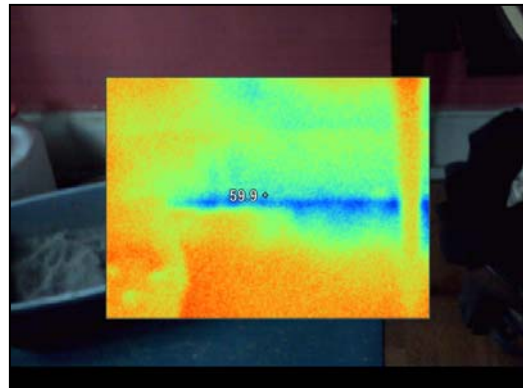
Leaky Front Door – Weatherstrip



Weatherstripping and caulk all windows that open.



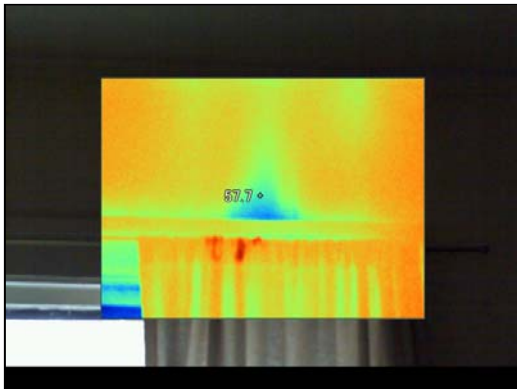
Missing insulation – leaky baseboard.



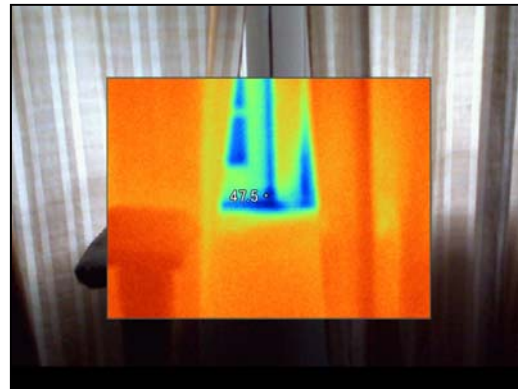
Caulk all baseboards on outside wall of 2nd floor.



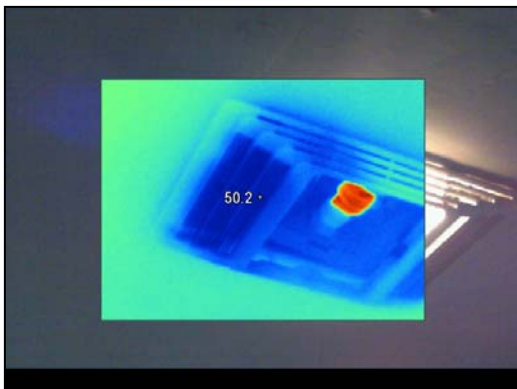
Weatherstrip and caulk windows.



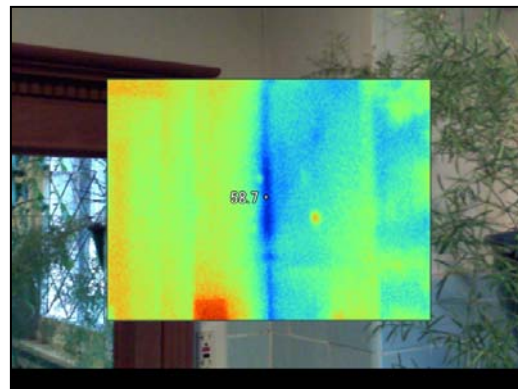
Many air leaks around windows – caulk.



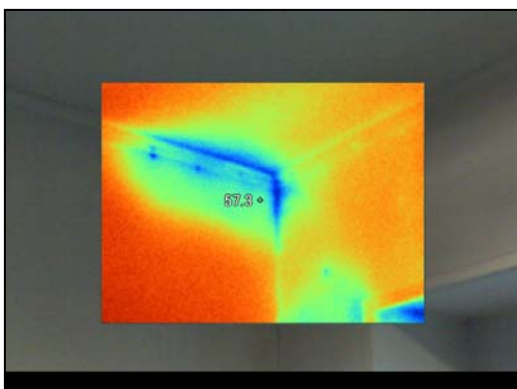
Weatherstrip and caulk windows.



Cold air leaking in fan – caulk gap between fan and plaster.

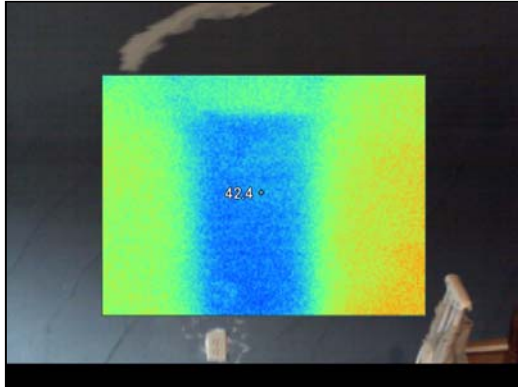


Air leaks in window bump out of bathroom.

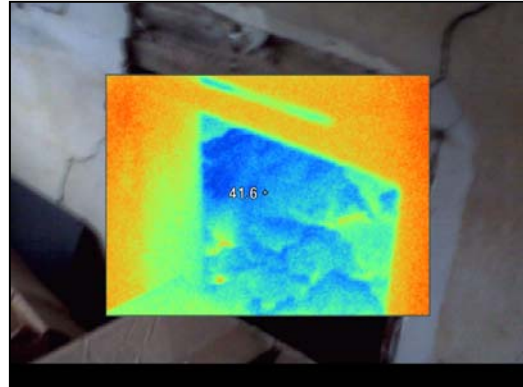


Air leaks on outside wall of bathroom – caulk.

Attic



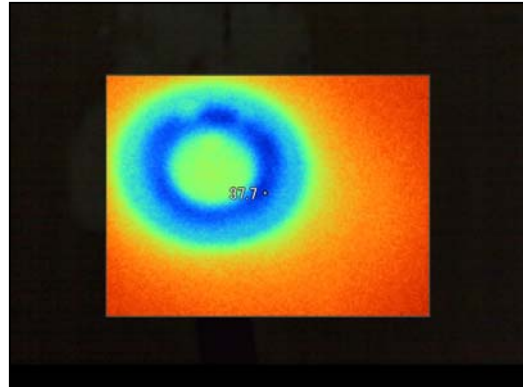
Missing insulation



Access hole to kneewall should be sealed with foam board insulation and foam (Great Stuff) sealant or caulk.



Rock Wool insulation in attic kneewall is in good shape and was installed very well. This product was produced late 50's and early 60's and most likely installed around that time. I contacted the manufacturer and there is no asbestos in this insulation.

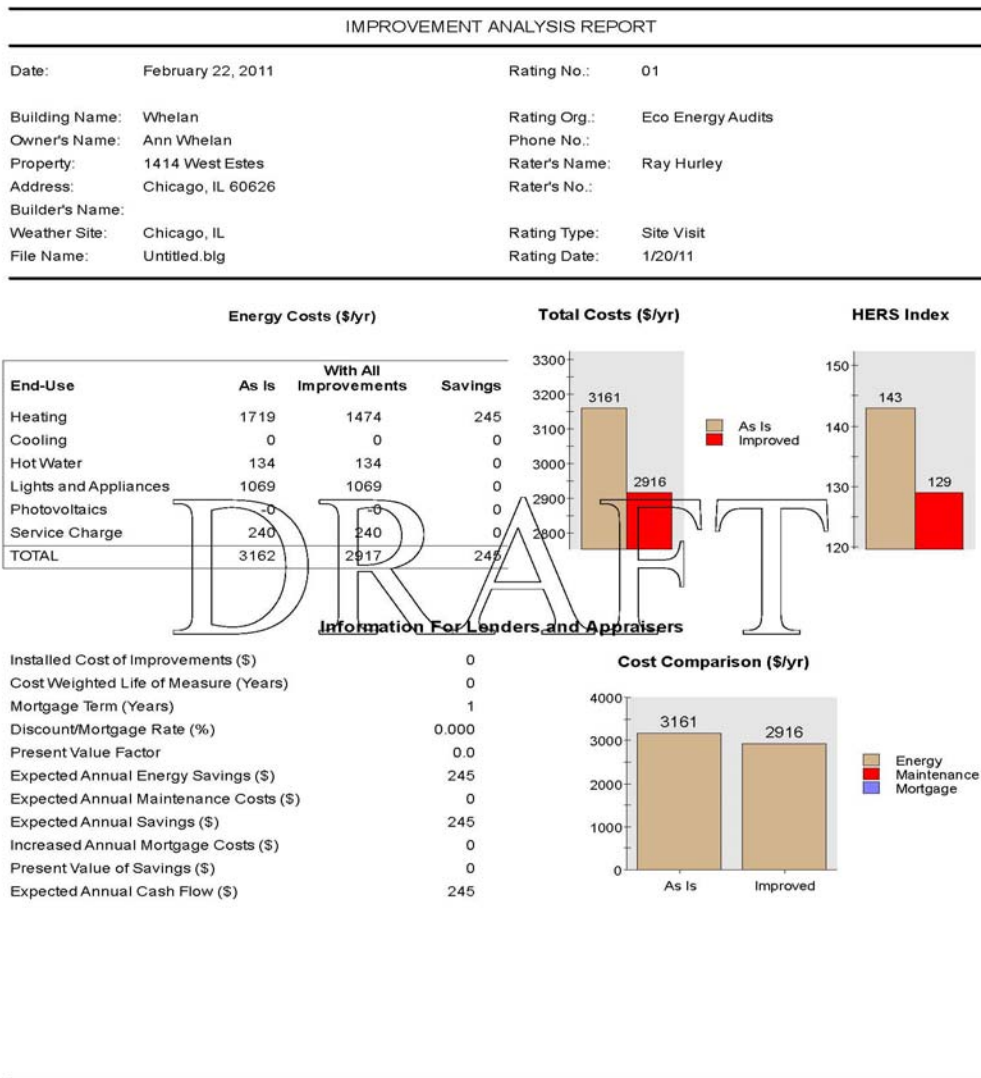


Caulk around can lights in attic.

Summary and recommendations:

I entered the measurements/data of your home into a residential energy analysis program called REM/Rate, to determine the effects of adding extra insulation into your walls during the stucco renovation. The energy saving benefits of this upgrade were negligible, especially compared to the cost of installation.

I did run an analysis of reducing the air infiltration into your home by 40% and here are the results:



REM/Rate - Residential Energy Analysis and Rating Software v12.7

This information does not constitute any warranty of energy cost or savings.
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As discussed during the audit the number one thing you can do to reduce your energy usage is to air seal your home. The gaps in the basement and 2nd floor should have the highest priority because of the stack effect. In the winter, the warm air in a heated building is lighter (less dense) than the cold air outside the building; that warm air wants to rise up and out. The flow of air leaving the top of the building draws cold air into cracks at the bottom.

In addition to the areas we covered in detail and marked with tape during the audit other air sealing recommendations are:

- Fix latches on windows
- Apply weatherstripping to all windows that open to create a tight seal when closed.
- Caulk to seal all gaps around windows and doors both indoors and out.
- Basements windows should be sealed shut if they are no longer used.
- Caulk baseboard along outside wall on second floor.
- Attic door is a large source of air leakage in your home – door should be weatherstripped. Foam board attached to the back of the door is also recommended.
- Access door to crawl in basement bathroom should have foam board glued to the back to increase the r-value.
- All access holes in the basement (see thermal images) should be sealed.
- Holes in attic walls and can lights should be sealed.

Other energy saving recommendations:

In additions to the recommendations throughout the report:



Save money and power by turning off computer and peripherals when not in use. These devices use power even when turned off so they should be plugged into a power strip that is turned off when not in use. All other source of “vampire” electrical use should be unplugged when not in use. These include radios, phone chargers, microwave, TV, VCR, etc.

Your question on a more energy efficient TV:

Generally, an LCD TV that is 40" or below will be more energy efficient compared to your current CRT TV. If you're looking to buy a newer TV set that consumes less energy, then you'll probably be choosing between an LCD and a plasma TV. Of the two, experts recommend the LCD TV for its energy efficient features, which can be negated if you choose a larger screen.

Your question on solar panels:

I did some research on installing solar panels on your coach house/garage and it is possible. Obviously cables would have to be run overhead or underground from the garage to the home but this seems to be a fairly common occurrence.