



# ULTIMATE

## ENERGY SOLUTIONS

This comprehensive Home Energy Audit is nationally recognized and performed to standards of the Building Performance Institute (BPI)

Ultimate Energy Solutions, LLC certifies that these national standards were applied throughout this energy audit, and that the information herein is sound to the extent the home could be tested. All recommendations are based on scientific testing and on the experienced opinions of the energy rater, though energy savings are not guaranteed, and the work of contractors, affiliated or otherwise, is not under warranty from Ultimate Energy Solutions LLC.

March 3, 2010

SAMPLE CLIENT  
123 Crown Point Way  
Crown Point, IN 46307

## RECOMMENDATIONS

Prioritized by importance and sequence – **TACKLE ITEMS IN ORDER PRESENTED**

These suggestions for your home's improvement are cost-benefit-prioritized and based on our inspection and test results. We will encourage you to contact our affiliated contractors to complete these steps, though we do not warranty or guarantee their workmanship, or the results obtained by any other outside contractor.

Please use this entire Home Performance Package to inform whichever contractor you do hire, and feel free to contact us for continued support and any other energy issues that may arise in the future. We will return one time at your request once the work recommended below has been completed, to perform combustion safety test and inspect the quality of the work.

\*SP=Est. Simple Payback, accounting for utility cost savings. Remember that these items will also improve comfort, safety, durability and home resale value.

\*ALL FINANCIAL INCENTIVES ARE LINKED FROM THE FRONT PAGE OF OUR WEBSITE: [www.ultimateenergysol.com](http://www.ultimateenergysol.com)

### **SUMMARY:**

The good news is: this home has some very straightforward opportunities for improvement! The blower door test demonstrates that your home is almost twice as air leaky as necessary to maintain air quality. We recommend starting with air sealing as the biggest opportunity for overall improvement.

### **Simple Air Sealing:**

These are steps that are possible to do yourself or through a handyman, and should be guided by the images in the *Infrared Inspection Report*. Use weather stripping on moving parts (doors and windows), siliconized caulk on small gaps and cracks, canned spray foam on larger gaps/holes or around penetration of pipes/cables, and rigid foam board insulation on larger air pathways. Using the *Infrared Inspection Report*, focus on:  
Doors and Windows, Baseboards and Trim, and the Basement/Crawl and exterior penetrations.

**Natural Gas Leaks:**

SAFETY ISSUE: Natural gas leaks were detected, tagged, and photographed. Have a plumber or handyman seal these with joint compound, or replace valves or joints.

**Carbon Monoxide Detectors:**

SAFETY ISSUE: Make sure you have CO detectors installed and maintained near the sleeping areas, HVAC equipment, and the kitchen.

**Attic Airsealing and Insulation:**

The attic floor is allowing heat flow at present, through the inadequate insulation and through penetrations. The attic is the first place we advise starting because, since hot air rises, if you can stop it from leaving the home, you also put a leash on the home's intake of new air to replace it. At present, you have an inadequate layer on the floor and walls of the attic spaces, making these attics outside the thermal barrier. But there's also a lot of penetrations and ways for air to be shared between the living space and these attic spaces, which can trump any insulation that is there. This is crucial because the top floor is where all the hottest, moist air goes in cold months, creating a high pressure area where air is constantly trying to (and succeeding at) escaping the house. Your home needs an **airtight plane at the attic floor/walls**(sealing all gaps, holes, penetrations around pipes/electrical/ducts with spray foam) that is then well-insulated. R-38 (12" if fibrous insulation) for ceilings and R-19 (6") for walls is a good amount, as long as it is installed correctly (more is even better, though you don't need more than R-50/R25). Any floorboards should be taken up, and the insulation below swept aside, so any air pathways can be airsealed with foam/caulk. Then the insulation can be put back and added to until there are 12". Your eave vents will need to be protected from this higher level of insulation with **soffit baffles** at the underside of the roof decking. The **recessed can lights** should also be made airtight during this process, with airtight rigid foam boxes air-sealed to the attic floor.

Any walls should also be relieved of any flimsy insulation, airsealed, and then re-insulated with either **foam or batt insulation** covered with rigid foam board insulation, sealed at every joint. The vaulted ceilings may be difficult to get to, but can be foamed once soffit baffles have been run up through them. THIS MEASURE IS ELIGIBLE FOR THE CHICAGOLAND NATURAL GAS SAVINGS REBATE AND THE FEDERAL EE TAX CREDIT. FOR MORE INFORMATION, VISIT OUR WEBSITE. **Approximate Cost: \$\_\_\_\_\_**; **SP: 8-16**

**Crawlspace:**

Air is presently leaking through the crawlspace ceiling due to unsealed joints in the paneling. Also, if the insulation contained in the cavity is not fully in contact with the floor above, the air gap there severely decreases the effectiveness of the insulation. The sure-fire things to do here would be: take down the paneling and batts, air seal the floor above at any penetrations or joints (maybe with a continuous spray of 1-2" part foam) and fill the cavities with enough insulation so it is flush with both the top and bottom surfaces. Then reinstall the paneling and seal along each joint. Or, just seal all the joints with foam, if you happen to know the insulation inside is flush.

**Approximate Cost:** \$ \_\_\_\_\_; **SP: 6-12**

**Garage Airsealing:**

**SAFETY ISSUE:** The garage is located under living space, and is in the lowest pressure point in the house, which means air gets sucked in the house from the garage after air escapes through the home's top floor. This is obviously a concern because of the nature of garages: they hold cars, chemicals, etc. Not the kind of stuff you want to be breathing. Never warm up your car in the garage, door open or shut. Seal any possible gaps in drywall (for example, at the bottom), penetrations around pipes/conduit/cables, and any holes with spray foam (the kind that comes in a can).

**Energy Efficient Lighting:**

Some of your lights have Compact Fluorescent bulbs, but many do not. CFLs, or even halogen (hotter) or LEDs (more expensive) would save considerably on electricity for the building.

# ULTIMATE ENERGY SOLUTIONS

## INFRARED INSPECTION REPORT

as part of a Comprehensive Home Energy Audit

Pictures would be included of different areas of your home where the Thermal Imaging camera picks up Leakage, cold air, missing insulation and Moisture behind walls.

Prepared for:

Sample Client  
123 Crown Point Way  
Crown Point, IN 46307

## DIAGNOSTICS SUMMARY

### **BLOWER DOOR TEST:**

\*At Present:

**5300 CFM@50 Pascals Fan Open**

\*Equivalent Cumulative Area of Leakage:

**530.00 in(2)**

\*Estimated Present Natural Air Changes per hour:

**0.65 Natural Air Changes per hour (NACH)**

\*Air Tightness Limit According to BPI's Building Airflow Standard

**2875 CFM@50 Pascals      0.35 NACH**

Presently, it appears to be that all the air in your home is replaced every

**93 minutes**

Based on our diagnostics, we recommend making the home up to

**46% tighter**

(before mechanical ventilation is required)

Your home requires

**210 CFM minimum for ventilation**

(once mechanical ventilation is required)

### **COMBUSTION ANALYSIS AND SAFETY:**

\*Your equipment PASSED worst-case depressurization testing.

\*NATURAL GAS LEAKS were detected, tagged, and photographed.

\*Unsafe levels of CARBON MONOXIDE were detected.

\*SPILLAGE of combustion gas was detected during testing.

### **UTILITY BILL ANALYSIS:**

\*Average Base Load per Day (hot water, cooking, drying)

**0.87 Therms**

\*Average Heat Load per Day (winter months)

**11.91 Therms**

Current Base Load is about average for a home of this type. Energy used in winter months indicates some inefficiencies in the heating system, which includes the heaters, ducts, insulation, and microclimates of the house.

## COMBUSTION ANALYSIS & SAFETY

### WORST-CASE DEPRESSURIZATION TEST:

A “worst-case” scenario was created for your gas combustion appliances (furnace, boiler, water heater) with the home’s own exhaust systems and air handler, and the results were compared with BPI standards for safety.

\*Combustion Appliance Zone (CAZ) Baseline Pressure, and Worst Case Pressure

**0 Pascals                      -2 Pascals**

\*Worst-Case Depressurization Test Results:

**All combustion appliance zones PASSED testing.**

### CARBON MONOXIDE AND FLUE GAS SPILLAGE:

\*Unsafe levels of Carbon Monoxide (CO) were emitted by the following:

**Boiler                      81 ppm**

**Water Heater              34 ppm**

\*Spillage of combustion gas was detected during testing.

See the Recommendations Report on more about this important safety issue.

### COOKING SAFETY:

SAFETY ISSUE: your kitchen’s cooking range does NOT appear to be exhausted to outdoors. Have exhaust ventilation installed.

\*Steady state CO emissions from the oven exceeded 300 ppm. See the Recommendations Report for more about this important safety issue.

### COMBUSTION ANALYSIS:

Appliance	CO emission	Spillage	Draft Pressure (Pa)	Running F	%Efficiency
Boiler	81	no	-9.5	630	72
Water Heater	34	yes	-7.8	491	78
Furnace (FL2)	24	no	forced	310	92



## **ENERGY COSTS BY END USE**

The Energy Costs table compares the “before” and “after” annual energy costs to show energy cost savings. It groups retrofits by “end-uses,” which are broad categories of how energy is used (or generated) in a home. Note that Photovoltaic panels (PV) generate energy, so as a result, this “end-use” shows negative costs, if present.

The Total Costs bar chart gives a visual sense of how the annual operating costs of your house could change by incorporating all the listed energy retrofits.

The bar chart below displays the annual energy cost savings (\$ per year) associated with the energy retrofits you choose. Some retrofits interact with one another, and the total savings offered by each can change if the package of combined retrofits changes. For example, if you increase the insulation of your home, the energy savings you can gain from installing a more efficient furnace will be less than if you only install the furnace. However, the total savings will be greater if you choose both retrofits.

## **Home Energy Retrofit**

The Home Energy Retrofit report lists changes, or retrofits, that you can make to your home to save energy and money. Acting on the energy retrofit recommendations will make your home more comfortable, more valuable, and more affordable.

ULTIMATE ENERGY SOLUTIONS, LLD recommends these retrofits based on data gathered in a detailed inspection of your home. If you desire more detail on the retrofits or the cost estimates, contact ULTIMATE ENERGY SOLUTIONS, LLC, which provided you with this service.

## **Energy Retrofit Table**

The Energy Retrofit table shows a package of energy retrofits for you to consider. The energy savings associated with each retrofit does not consider interactions with other retrofits in the table. This means when, considered as a package, individual energy savings will most likely decrease due to interactive effects. You can see how good of a financial choice these measures are by looking at the last column.

Insert table here.....