

Examples of Hidden Adverse Conditions That Waste Energy Uncovered During an Ecobuilt Efficient Buildings Energy Investigation

1. Problem in a bedroom area/third floor office:

It is normal and customary construction procedure to locate cold air return ducts low or high on the wall. Your cold air return duct in the third floor office/bedroom is located in the middle of the wall.

The insulated flex duct used for the cold air return pulled loose because someone improperly installed it by duct taping it to wall studs. We found the duct lying on the bottom of the attic floor. The effect of the duct and vent not connected creates a condition similar to a 30" wide by 6" high open window year round in this room. Your complaint that this room is cold in winter and extremely hot in summer supports this finding.

The attic temperature in the summer can reach 100+ degrees. The cold air return duct lying on the attic floor sucks in the 100 + degree air into the central air conditioning system. Additional heat during the cooling season comes from the open vent in the office/ bedroom. These two problems cause the central air conditioning system to work full time.

In the winter, the dislodged duck from the vent sucks in cold air from shaded outdoor attic areas plus cold air coming from the vent in the office/bedroom, further taxing the heating system similar to the heat overload on the air conditioning system in the summer.

2. An Attic Problem

Above the electrical mechanical room in the open attic area are water pipes that supply the two main bathrooms and second floor kitchen sink. NOTE- We never saw water pipes in an attic area before. If you apply insulation to the roof, it will adversely compound the freezing potential of the attic water pipes.

If you insulate the entire roof instead of insulating the attic floor, you are greatly increasing the cubic feet of building area for heating and cooling unnecessarily.

3. Inadequate Hot Water Capacity

The hot water heater is only 2 years old, but the indirect system hooked to the steam boiler is insufficient. The capacity of the hot water heater is only 46 gallons and inadequate, for the large number of people living in the cottage.

4. Not So Unique Fireplace Problem

The southwest corner bedroom of the original house has a fireplace blocked off but not by humans. A closer inspection revealed bird's nests developed over long periods-of-time that have sealed it somewhat. You can feel a small draft going up the chimney. This is not the first fireplace that we've found birds, it is common.

Examples Taken From A Competitor's Mechanical Testing Report

Example 1:

“Based on the projected savings and the relative ease with which insulation can be added to your basement exterior walls, attic knee walls and attic space, we recommend you obtain a price quote to add insulation in these spaces. Before you follow through with additional insulation in any of the areas mentioned in this section, be sure to perform any air sealing that you intend to complete. We make this recommendation because air leakage can decrease the relative effectiveness of insulation. Air sealing is covered in the next section.

If you don't plan to finish the basement, you can drape R11 batts from the walls without finishing them. The largest portion of the savings will come from insulating the walls and band joists that are above grade.

In addition to the financial savings, insulating these surfaces should add comfort to the rooms affected.”

Three Major Recommendations Missing From Example 1:

1. Insulate the basement ceiling to prevent cool air from dropping down into the basement.
2. Do not store belongings in an attic. Objects interfere with air circulation and ventilation. They also hold heat in warm temperatures that will eventually conduct down through the ceiling into the living space, even through attic floor insulation.
3. Moisture makes fiberglass insulation less effective and it allows mold to grow. Basements tend to be damp; therefore draping batt insulation is not advisable.

Example 2:

“You also mentioned comfort issues in the family room behind the garage and the front bathroom. The thermal imaging report points out some areas of leakage and insulation issues that are specific to these rooms. It's important to note that leakage and insulation issues in other rooms will also affect this room due to the nature of the stack affect (hot air rising, cold air entering through basement leaks). Sealing all leaks could aid in this room.”

Two Major Recommendations Missing From Example 2:

1. Most likely the garage wall that joins with the family room and the front room are not adequately insulated thereby making the rooms cold in the winter and hot in the summer.
2. Thermal imaging: “points out some areas of leakage and insulation issues” but does not identify the specific locations or remedy. It reflects temperature difference but not why. Could be water or moisture leak. Thermal imaging can not tell the difference between water and/or moisture leaks versus air leakage or insulation issues.

Example 3:

“You indicated that your furnace is approximately 30 years old. It’s beyond predicted end of life estimates of 12-15 years. I recommend replacing it as soon as possible. The biggest long term money savings option is to replace it and the A/C with a ground source heat pump. This is my recommendations if you can afford the expense.”

Two Major Recommendations Missing From Example 3:

1. Implementing recommendations for air sealing and added insulation affect a buildings Heat Loss/Heat Gain calculation. Perform Heat Loss/Heat Gain Calculations after making energy saving improvements for “right size” equipment replacement. Failure to calculate Heat Loss/Heat Gain for equipment replacement without energy savings measures can also result in “same size” incorrect equipment replacement.
2. Also, the life expectancy of a furnace is 25-30 years, not 12-15. Hot water heaters have a 12-15 year life expectancy.