

**Pebble
Ripple**

Home Energy Saving Proposal

For Jim and Alison Wilson

November 14, 2010

Author
Peter Carlson

Table of Contents

Introduction	2
The Problem.....	2
Objectives	2
Solutions	3
Methods	3
Resources	4
Schedule	4
Qualifications	5
Costs.....	5
Conclusions	5
References.....	6

Introduction

This proposal describes the research to lower the energy consumption and improve the comfort of your home. Although you do not spend much on energy, you want to make your home more energy efficient. You find some of the rooms uncomfortable because of temperature variations. As the seasons change, you're forced to rearrange your main bedroom: in winter you have to add more blankets and close the heavy drapes.

To realize these improvements, we need to address the more important recommendations from your energy audit: insulating and sealing the crawl space; insulating the exterior walls; and insulating the attic with the best material. You will see the results of the research in a report containing the analysis of the options and specific suggested solutions.

The environment will benefit. Let's set an example in the neighborhood. We'll both feel we are better citizens: let's do it.

In this proposal, I show you why these recommendations need to be addressed and what our goals should be. I describe how I will tackle the problems, not only analyzing the information but also balancing the complex trade-offs. To help you justify the work, I provide you the costs, the resources we'll need—a snazzy thermometer—and a timeline showing when the report will be delivered.

The Problem

You already made an excellent first step by organizing an energy audit under the Home Performance with ENERGY STAR® program ("Home performance," n.d.). The 20-page report was good (Wallace, 2010), but you are overwhelmed with the large number of recommended actions. How do you prioritize them? Are you sure they make sense for your particular situation?

Indeed, the actions in the report are complex. Let's look at some of them.

One action involves insulating the crawl space. I agree this is controversial: research shows this is not always the best option. For example, Pass (2004) shows that venting a crawlspace usually *increases* the humidity.

Another action was insulating all the exterior walls. You were surprised that the audit rated this at a low priority, giving it little attention. You can be assured, however, that the practice is well established (Lstiburek, 2010).

Another implied action was improving the attic insulation. You are concerned that the current fiberglass insulation has health risks.

Objectives

To help you to understand the complexities and decide what to do, the report will tackle each of the selected actions from the audit. The report will also predict the difference in energy consumption.

Solutions

For the *crawl space*, the report will describe

- typical insulation methods;
- the best ways to cope with dampness;
- whether venting is needed and, if not, how to handle the furnace; and
- how the recommendations from the energy audit apply to your situation.

For the *exterior walls*, the report will indicate whether insulating all the exterior walls is effective, and will specify some of the better methods. We'll then know if your rooms will be less chilly. To crosscheck the need for insulation, I will report the calculated R-value (Resistance-value) from a simple test where I measure surface temperatures (Pedersen & Hellevang, 2010).

For the *attic*, the report will identify the better insulation materials health-wise and for the environment.

The report will tell you the predicted difference in *energy consumption*, not so much in financial terms, but as a percentage improvement.

Methods

Not only will I investigate the theory behind the solutions, I will also apply that knowledge in a practical way.

- Research the current best practices for insulating crawl spaces and exterior walls, balancing the competing needs such as moisture control and insulation.
- Investigate whether fiberglass is a health risk or damaging to the environment, and, if so, suggest alternatives. I will be conscious of vendors spinning the facts.
- Analyze multiple viewpoints, by looking at architecture journals; engineering journals and handbooks; medical journals and reports; and periodicals from the building industry. The analysis will include calculations specific to your house.
- Gather typical costs and rebates, including information from your local energy provider. We want to save as much money we can.

I will focus on the last 20 years for fundamental science facts, the last 10 years for the latest trends, and the current tax year (2010) for determining rebates.

I will include the following sources.

- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) publications
- U.S. Department of Energy (DOE) publications
- American Lung Association reports
- Epidemiology journals
- Guidelines from university departments, applying ASHRAE and DOE principles
- Magazines for remodeling, building design and energy saving
- Your energy audit report

The above work is secondary research. You will also get the benefit of primary research when I measure the wall temperatures in your house, perform the calculations and verify the insulation levels.

I will provide you a report of our findings. You will be able to choose the best approaches. You will see targets for the improvements, such as predicted changes in energy consumption. You will see ways to prove that the improvements were successful, such as controlled measurements of temperature differences.

Resources

A handheld infrared thermometer will be used to determine the surface temperatures in the house. A recommended model is the Ryobi Tek4 4V Professional Infrared Thermometer (<http://www.ryobitools.com/catalog/tek4/measurement/RP4030>).

Schedule

Before beginning the work, I recommend we spend half an hour in discussion to refine your objectives. If convenient, I can also perform the surface temperature measurements at this time. During the preparation of the report you will have the opportunity to receive a progress report showing the status of my work. The schedule of activity is shown in the following chart.

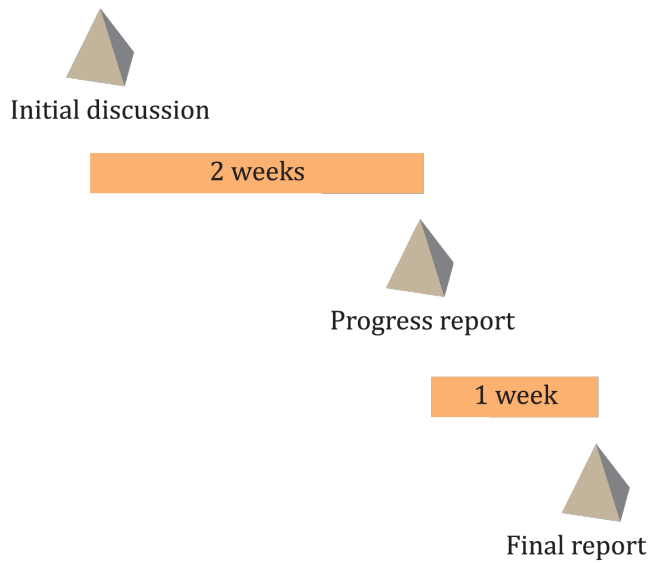


Figure 1. Schedule of activity

Qualifications

I have been following the latest trends in energy saving and feel passionate about saving the environment. As you know, I have been working for 30 years; I also have a curiosity that adds to my multi-faceted experience. I have a PhD in Engineering, so I am well suited to performing the complex analyses required for a project like this.

Costs

My labor rate is \$40 per hour. I estimate that the labor for the analysis and report will be one person-week. The total labor cost is \$1600. Including the thermometer (\$70), the total cost is \$1670.

The report will suggest solutions that are within your budget of \$5,000 to \$10,000.

Conclusions

In the end you will be able to determine what work you should ask the contractors to undertake. I want to take some of the worry out of your future decisions. From my report you will see the specific recommendations, backed by a full analysis of the science and the multiple options. Thank you for reading this proposal.

References

- Home performance with ENERGY STAR. Retrieved from Georgia Power website:
http://www.georgiapower.com/energystar/home_performance.asp
- Lstiburek, J. W. (2010, August). Don't be dense with insulation. *ASHRAE Journal*, 54-57.
Retrieved from <http://www.ashrae.org>
- Pass, K. (2004, September). To vent or not to vent. *Professional Remodeler*. 8(9), 31-34.
Retrieved from <http://www.housingzone.com>
- Pedersen, C., & Hellevang, K. (2010, March). *Determining insulation and air infiltration levels using an infrared thermometer (AE-1373 [Revised])*. Retrieved from North Dakota State University website:
<http://www.ag.ndsu.edu/pubs/ageng/structu/ae1373.pdf>
- Wallace, J. (2010, January). *Energy assessment report prepared for Jim Wilson, property address 2120 Tree Lane, Atlanta, GA 30324*. Atlanta: Green Summit Consulting.