

SCOPE OF WORK – Energy Analysis for SmartRegs

Phase I	Bidding and Pre-Testing
Phase II	Energy Improvements and Post-Testing

Phase I - to be completed within six weeks after start date of contract (February 19, 2010)

1. Case Study Selection (week 2) (to be performed by all parties)
 - Select five or more units that represent “typical” Boulder housing types. These units will be used as case studies. Units will be chosen from different eras to gather more varied data.
2. Unit Analysis (to be performed exclusively by Populus)
 - Perform a unit energy audit to determine what upgrades are necessary.
 - Onsite data collection and testing: air infiltration (blower door) and duct leakage testing of case study units to generate pre-improvement Home Energy Rating System (“HERS”) ratings.
 - HERS Energy Modeling of 5 case study existing units.
 - Create improvement analysis worksheet to quantify impacts (in terms of HERS score, GHG reduction, energy consumption and cost) of the 20 +/- selected National Green Building Standard (“NGBS”) measures on each case study unit.
 - Adjust 5 case study HERS energy models and test the effect of different unit sizes on NGBS improvement measure impacts (2 unit size adjustments per case study = 10 additional energy models). Unit size was selected as the key variable that will change the improvement’s effect on GHG emissions and energy consumption reduction.
3. Bidding (to be performed exclusively by What’s Working)
 - Gather competitive bids for improvement measures from at least three subcontractors by trade for each project.
 - Bids will be for work such as weatherstripping on windows and doors, caulking siding, air sealing and adding insulation.
 - Subcontractor bids will be from licensed subcontractors and not reflect any discounts in order to obtain accurate data.
4. Subcontractor Agreement Requirements: Agreements with subcontractors performing the energy efficiency upgrades must contain the following requirements: [to be performed exclusively by the What’s Working]
 - Subcontractors must have a City of Boulder Contractor’s license, in accordance with Chapter 4-4 “Builder Contractor License,” B.R.C., 1981.
 - Subcontractors will have insurance in the limits outlined in Section XVI of this Agreement and are required to name the City as an additional insured.
 - Subcontractors are responsible for obtaining all necessary permits required by the Boulder Revised Code, 1981.
 - Subcontractors must agree to indemnify the City, as stated in section XV of this Agreement.

- Ten percent (10%) of the calculated value of the work to be performed by the subcontractor shall be retained by What's Working until such work is completed and inspected to the satisfaction of What's Working; see Section V(B) of this Agreement.

5. Data and Cost Analysis

- After completing the case studies, analyze true costs for each measure.
- Creation of deliverables: graph data and summarize data

Phase I results will include, but not limited to:

The initial energy analysis of the property,
Improvement measures selected,
Estimates of costs, GHG savings, and more to reach 20 points and/or HERS 120,
Initial results of research questions

Phase II – to be completed within eleven weeks after start date of contract (March 26, 2010)

1. Work Implementation (to be performed exclusively by What's Working)

- Coordinate contractor work and scheduling
- Meet with and help liaison between unit owner and contractors
- Oversee improvements to ensure quality work

2. Testing (to be performed exclusively by Populus)

- Incremental and post-improvement air infiltration and duct testing of case study units

3. Reporting

- Final reporting of improvement measure impacts and final HERS scores

Research

During and after the case study analysis, What's Working and Populus will work to determine answers to the following:

Is a HERS score of 120/20 point from NGBS realistic?

Action: Survey existing building auditors in town to learn if this score too high or low. In addition, the energy modeling performed on the case study homes, along with actual cost data, will assist the project team in determining whether HERS 120 is realistic for the existing housing stock in Boulder.

How much will it cost to get a HERS score before and after the work? Also, how much will it cost to have someone test a house for 20 points in NGBS?

Action: There are many companies that offer HERS ratings in Boulder. As some landlords in Boulder own multiple units of rental housing, it is likely that these landlords could negotiate reduced fees for a large volume of HERS rating services. Vendors may reduce their pricing in relation to this project. What's Working is also looking at other computer programs (such as NREL's B-Opt program) to model home performance.

What is the cost of getting to 120 based on the current HERS score of a home? Or cost of getting to 20 points?

Action: The research from the case studies will help in answering this question. Costs will be in a range as no two homes are the same. In addition to the case studies, we will seek data from professionals in the area who have been implementing similar measures.

What financial incentives are available?

Many programs such as ClimateSmart, the proposed Cash for Clunkers and private loans may be available to help property owners pay for upgrades. In addition, Xcel Energy, as well as the Governor's Energy Office, will be offering rebates for energy efficiency upgrades during 2010.

Summary of studies that show the measured impacts of energy efficiency retrofits

What is the ROI for each of these measures?

The return on investment is measured monthly based on the total cost of the measure and the resultant energy savings. The "cost of money" will be determined based on Climate Smart loans, bank financing or cash investment.

How does a landlord choose and prioritize measures?

Working with a RESNET Home Energy Rater will provide helpful energy efficiency guidance that landlords can use to prioritize improvement measures for each individual home. In addition, programs such as the Xcel home performance program are instructive in this regard. This program consists of three mandatory measures:

1. Air sealing and weather-stripping
2. Attic insulation & bypass sealing (Add R-19 or insulated to R-38)
3. CFLs –quantity of 20

There are also 15 additional optional measures available. Homeowners can choose two or more from this list. As an added incentive, all of these measures are eligible for rebates from Xcel.

Results of studies that estimate the impact of occupants' behavior

Possible impact of proposed code on rent costs

Policy recommendation – including adjustments (if needed) to the HERS level and the NGBS level

Recommendation for how this program should be measured for effectiveness.