

# City of Hailey Planning Department

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**TO:** Mayor and City Council  
**FROM:** Mariel Platt, Planner  
**RE:** Hailey's Sustainable Building Advisory Committee Recommendation  
**DATE:** April 26, 2010

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The committee was created in December 2008, to develop recommendations on sustainable building practices and development for the Council to consider. The committee's recommendation is based on information collected over the past 16 months including feedback from several community workshops and presentations, research of the strengths and weaknesses of existing above-code building programs and financial savings gained from energy efficiency design and construction.

The committee has found that case studies show it is reasonable to expect a 10-20% increase in energy efficiency for new construction for approximately 1% more than baseline construction costs. In some cases it could be even less. The paybacks are often less than 5 years.

According to the "U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy," a report prepared by Global Insight for the U.S. Conference of Mayors in 2008, efforts to increase energy efficiency in residential and commercial buildings increases demand for green building work and generates new employment opportunities for electricians, HVAC technicians, carpenters, plumbers, roofers, laborers and insulation workers. Simultaneously demand for green building materials are stimulated which provides additional sources of jobs in associated manufacturing industries.

Buildings are responsible for approximately half of U.S. energy consumption and carbon emissions annually. Forty-three percent of U.S. carbon emissions and 76 percent of U.S. electricity consumption happen in buildings, through heating, cooling, lighting, hot water and appliances.

Therefore, the committee's recommendation:

- addresses energy efficiency as a high priority
- incorporates other components, such as water conservation, waste management, and indoor air quality
- addresses building size
- addresses new construction and current building stock through additions and alterations
- addresses both commercial and residential construction
- attempts to provide the greatest amount of flexibility in design and compliance.
- incorporates existing procedures and processes as much as possible to simplify the proposed recommendation, for both the public and the Building Department
- considers cost and return on investment as a primary factor

The recommendation suggests all commercial and residential new construction and additions be designed and built in a manner that increases the energy efficiency by 10% compared to the current

code using Home Energy Performance System (HERS). The recommendation suggests that all new construction address 1) water conservation, 2) waste management, 3) indoor air quality, and 4) durability and assurance. A points menu has been drafted to address the size of construction. The committee recommends energy audits be conducted for all building alterations requiring a building permit and affecting the building envelop, excluding certain exemptions, as well as all additions over 500 square feet. However, they do not recommend anything additional be required for alternations.

Reviewing and refining the recommendation is an ongoing process. The following table illustrates completed activities and proposed future steps for the Council to consider.

	<b>Phase I</b>		<b>Phase II</b>		<b>Phase III</b>
√	Research	√	Develop initial recommendation		Staff will share the recommendation with various stakeholders for continued feedback and comments
√	Outreach and education	√	Present outline of recommendation to the Council for further direction and feedback		Staff will work with the committee to address stakeholder feedback.
√	Set priorities and goals				Presentation to Council to address stakeholder comments.

**Hailey Sustainable Building Advisory Committee's  
Recommendation**

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**April 26, 2010**

## INTRODUCTION

Buildings are responsible for approximately half of U.S. energy consumption and green house gas (GHG) emissions annually and are growing faster than any other sector<sup>1</sup>. Forty-nine percent of total annual U.S. GHG emissions and 72 percent of U.S. electricity consumption happen in buildings<sup>2</sup>. Residential and commercial structures account for one-third of all natural gas consumption and the majority of electricity use in the U.S<sup>3</sup>. This is a direct result of the built environment's heating, cooling, lighting, hot water and appliance demands<sup>4</sup>.

Energy Security and Global Demand: Energy use has grown steadily over the past century as population and economic activity has grown. The U.S. Department of Energy projects U.S. energy demand to grown by 11% by 2030, based on extrapolation of current trends<sup>5</sup>. While the world is not expected to run out of oil, coal, or natural gas anytime soon, the unprecedented demand and gradual depletion of the most accessible and least costly fossil-fuel reserves will significantly affect both production costs and basic economics of supply and demand. There is national acknowledgement that greater energy efficiency is required to meet future environmental uncertainties and energy demands.

Climate Change and Energy Prices: Due to carbon emissions and climate change and their relationship with non-renewable energies and hydro-electric energy, additional price uncertainties are created. Drought prone areas, such as the intermountain west, are projected to have decreasing water flows and levels<sup>6</sup>, subsequently resulting in decreasing amounts of electricity that can be generated<sup>7</sup>. Currently the majority of Idaho's power comes from hydroelectric sources. In 2009 alone, Idaho Power increased rates by 17%. In July alone an average increase in rates of 10.2% occurred. This was the largest rate increase of the five that occurred in 2009 and was implemented based on expected increases in energy costs caused by things such as reduced river flows. Several of the cost increases were initiated to encourage energy conservation. Conservation saves customers money in the long run, because it keeps Idaho Power from having to develop or purchase additional energy, which most likely would increase rates beyond the rate increases seen in 2009. Beyond physical induced climate changes, climate change legislation, such as proposed federal "cap and trade" requirements for GHG emissions and EPA regulations of GHG emissions, can be expected to further increase the cost of energy.

Local Supply and Demand: Intermountain Gas and Idaho Power have stated additional natural gas pipelines and additional transmission lines will be needed to serve future growth in the Wood River Valley. Lance McBride of InterMountain Gas stated the Wood River Valley gas consumption is significantly higher than anywhere else in the state. The average Idaho home

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<sup>1</sup> U.S. Green Building Council

<sup>2</sup> American Planning Association, , "Planning for a New Energy and Climate Future". Planning Advisory Report 558, 2010.

<sup>3</sup> American Planning Association, , "Planning for a New Energy and Climate Future". Planning Advisory Report 558, 2010.

<sup>4</sup> Cutting carbon emissions in half by 2030 Research group has plan to make buildings more efficient. *SHAWN DELL JOYCE Mt. Express October 7, 2009.*

<sup>5</sup> U.S. Energy Information Administration (EIA) Annual Energy Outlook 2009.

<sup>6</sup> Climate Impact Group – Hydrologic Climate Change Scenarios for the Pacific Northwest Columbia River Basin and Coastal Drainages March 24, 2010 (<http://www.hydro.washington.edu/2860/>)

<sup>7</sup>"Drought Endangers Crops and Energy Supply" Independent Mail. Kitz miller 2007

consumes on average 3.2 therms per/day, while Wood River consumption is 16 therms per/day. Providing additional transmission and pipeline infrastructure will increase energy rates for all energy consumers in the Valley. Increasing efficiencies in our current building stock and requiring greater efficiency in new buildings will delay such needs while providing additional capacity for future growth.

Buildings could be vulnerable to the same price instability experienced with oil, which made inefficient vehicles less marketable and their resale values plummet. However, unlike a car, a home is an investment for most people. This, coupled with the fact that most buildings have a life span of about 75 years<sup>8</sup>, creates an opportunity to significantly reduce energy usage at the time a building is designed and throughout its construction. Otherwise, financial and natural resources used now to construct a home, may be subject to costly retrofits or possibly demolition (retrofits can be more expensive than new construction, depending on the magnitude of changes made), in order to reduce the cost of energy bills in the future. A building built more energy efficiently today will be better suited to weather future price instabilities and maintain its financial integrity.

In an effort to plan for the future of energy and be more economically and environmentally sustainable, the committee considered ways to increase the energy efficiency of buildings, beyond the minimum standards of today's building code, as well as address other impacts created by the built environment, such as water consumption and poor indoor air quality. Numerous cities and counties around the U.S. have adopted codes or programs that go beyond the minimum standard. The committee's recommendation continues to support the notion of Hailey as a leader in local and regional efforts toward increasing resource and energy conservation and best practices in sustainable development.

## **FINANCIAL ASSESSMENT**

### **Cost to applicants**

Return on Investment (ROI) and Internal Rate of Return (IRR) are excellent evaluation tools to use when prioritizing capital budget projects. Clearly, the dollars should be invested in the projects that offer the "biggest bang for the buck." The benefits of doing the improvements sooner rather than later are numerous, starting with improved cash flow, and a better living environment. In the end, a decision *not* to install more efficiency energy equipment and implement related energy-saving measures is a decision to continue paying higher utility bills. By increasing energy efficiency of new buildings owners will see a positive impact on the overall financial expenditures. Energy efficiency projects can literally pay for themselves; the bottom line is that financing energy improvements is simply a good decision.

Third party verification using HERS does have costs associated with it, but often times the cost of making well informed improvements identified by HERS provides a greater ROI than making best-guess improvements. A certified energy audit cost approximately \$450 for homes 4500 sq ft or less with one heating system. On average, a HERS energy audit pays for its self within one to three years. HERS performance modeling and testing for new homes costs approximately \$450

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<sup>8</sup> 2008 Buildings Energy Data Book, Buildings Technologies Program, Energy Efficiency and Renewable Energy, U.S. Department of Energy, page 3-12

to \$1200, depending on home size, complexity of the home design, and number of heating system. According to the USGBC, a 12.2% increase in energy performance beyond the current 2006 International Energy Conservation Code (IECC), equates to an average annual savings of \$276 in Hailey's climate zone. With 12.2% energy performance increase (not the recommended 10%), the average ROI by conducting a HERS is between 1.6 and 4.3 years. Research conducted by Sustainably Built, LLC of Boulder, indicates a HERS score of 60, with no renewables, increases the upfront cost by 1.75 %<sup>9</sup>. A recent cost analysis, conducted by Boulder County Building Department, of a 37 HERS point improvement (112 to 75, or approximately a 37% decrease in energy usage) required a \$7000 expenditure in energy improvements. The improvement created \$2000 of annual energy savings per year which resulted in a 3.5 year simple payback period.

Two HERS energy audit demonstrations recently conducted on existing homes in the Wood River Valley suggest a HERS score improvement of approximately 30 could be realized with relatively short payback periods. These analyses do not include rebates, tax credits or other incentives. The following examples illustrate the degree to which improvements can increase energy efficiency and for what cost (attached is a report further elaborating on the results of the audit for these two homes).

Initial HERS Score	Cost of recommended Improvements	New HERS score	Annual utility savings	Simple payback period
141	\$6,220	112	\$1,768	3.5 years
119	\$4,583	87	\$334	13 years

It is anticipated that the cost to retrofit is comparatively greater than when a building is designed and built to achieve the same level of energy efficiency. Therefore, the payback for new construction would be achieved in an even shorter period of time.

Attached is a table of existing financial incentives offered by various entities that are currently available.

## **JOB CREATION**

Green building codes can create jobs. A recent study by the American Institute of Architects (AIA) suggest that the American Clean Energy Security Act, which mandates significant energy improvements, would create or save 270,000 jobs if the building-related provisions become law<sup>10</sup>. California's 2011 mandatory green building code, CALGREEN, is expected to create jobs for residential energy specialist, green building consultants, and industry specialist with knowledge of "green" building outcomes.

According to the "U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy," a report prepared by Global Insight for the U.S. Conference of Mayors in 2008,

<sup>9</sup> Complying with Boulders Energy Codes – 3 Paths to Reach HERS 70, 60, 35, 10 (<http://www.sustainablybuilt.com/content/complying-boulder-energy-codes-0>)

<sup>10</sup> AIA website: March 24, 2010 (<http://www.aia.org/press/releases/AIAB080770?dvid=&recspec=AIAB080770>)

efforts to increase energy efficiency in residential and commercial buildings increases demand for green building work and generates new employment opportunities for electricians, HVAC technicians, carpenters, plumbers, roofers, laborers and insulation workers. Simultaneously demand for green building materials are stimulated, which provides additional sources of jobs in associated manufacturing industries.

The existing stock of energy inefficient buildings offers an opportunity to reduce total electricity demand and create jobs for the professions listed above. The energy audit demystifies energy efficiency and related improvements and provides basic education to homeowners on how to save energy and money. Requiring HERS energy audits on existing homes for applicable alterations and additions would give the homeowner the knowledge to make future improvements. Without this knowledge, the homeowner may never be aware of the energy saving that can be gained from retrofits or improvements and therefore would never pursue them had they not had an audit. It also rates the home, so future buyers have access to information on the home's energy performance. This allows the audit to be reviewed, so when the current owner or future owner(s) decide they would like to make improvements, the information is available and the cost savings are detailed.

The implementation of Boulder County's energy and construction recycling requirements have created entirely new construction related industries such as energy consulting, energy analysis and construction waste recycling, while also significantly spurring the solar industry. Boulder professionals believe the code revisions have created jobs and helped maintain the strongest housing market in the country,<sup>11</sup> through the worse housing bubble in the last century.

## **THE COMMITTEE RECOMMENDATION**

The Committee recommendation:

- addresses energy efficiency as a high priority
- incorporates other components, such as water conservation and indoor air quality
- addresses building size
- addresses new construction
- addresses the current building stock through additions and alterations
- addresses both commercial and residential construction
- attempts to provide the greatest amount of flexibility in design and compliance
- incorporates existing procedures and processes as much as possible to simplify the proposed recommendation, for both the public and the Building Department

The components of the recommendation to address the above ideas are the following:

- I. Energy Performance with Home Energy Rating Systems (HERS) 3<sup>rd</sup> Party Verification/Inspection
- II. Water, Indoor Air, Construction Waste, Durability and Assurance
- III. Building Footprint
- IV. Administration
  - In-lieu Fees
  - Exemptions

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<sup>11</sup> The 30 Strongest Housing Markets in the County. Business Week, September 2008.

## V. Continuing Education and Outreach

There are numerous opportunities to incorporate phasing of the proposed recommendation on various levels. The Committee does recommend initial phasing of the increase in energy performance, but other elements or components can also be phased in at a later date or ramped up over a period of time, depending on direction from the Council.

The following is a description of the various components of the recommendation and why they were included.

### I. Energy Performance using Home Energy Rating System (HERS) 3<sup>rd</sup> Party Verification

The committee recommends a 10% increase in energy performance, above current code, for all new construction, verified using HERS conducted by a third party home energy rater. Idaho adopted the 2009 IECC and will require all municipalities to do the same by January 1, 2011. The 2009 IECC is approximately 10% more efficient than the 2006 IECC (current code used by municipalities throughout Idaho).

#### RECOMMENDED ENERGY STANDARD

2010	2011	2012	2013
10% better than 2006 IECC	10% better than 2009 IECC	10% better than 2009 IECC	20% better than 2009 IECC

#### COMPARISON TO CURRENT CODE (2006 IECC)

2010	2011 (state requires local jurisdictions to adopt 2009 IECC on January 1 <sup>st</sup> )	2012	2013
10% better	20% better	20% better	30% better

The Council could reassess the 2014 requirement at a later date, based on whether the state adopts the 2012 IECC, which requires local jurisdictions to do so by 2014 and if so, what the energy efficiency increase from the 2009 IECC to the 2012 IECC was.

HERS is a whole systems approach for performance testing that models the entire home and all elements that affect energy efficiency, such as insulation levels, window efficiency, wall-to-window ratios, the heating and cooling system efficiency, the solar orientation of the home, and the water heating system. HERS can be used to establish an existing home's energy performance as well as forecast the energy performance of planned homes and verify the performance after the home is built.

The data gathered by the home energy rater is entered into a Residential Energy Services Network (RESNET) accredited computer program and translated into rating score. The home receives a score between 0 and 100, where 100 is equal to a home built to the IECC 2006 code and lower scores are more efficient and higher scores are less efficient. An estimate of the home's energy usage and associated costs can also be provided in the report.

The benefits to using HERS over the traditional prescriptive method of verification are as follows:

- Determines the most cost-effective energy efficiency measures and proper equipment sizing.
- The performance path provides the most flexibility for the building and design community.
- The HERS tool incorporates various design and construction elements such as orientation, overhangs, window placement, ceiling systems, that is not contemplated in Res-check.
- HERS requires a more integrative design process, versus a linear design process. Studies have shown the integrative design process creates increased energy efficiencies for the least amount of money<sup>12</sup>. Input from the building community indicates architects, specifically in the Wood River Valley, fail to address “energy” outcomes or infrastructure in their designs. This creates large hurdles for implementing cost-effective energy efficiencies. Performance standards would promote designers to evaluate the energy efficiency outcomes of their design choices and work with contracts and mechanical engineers to meet those goals.
- HERS is a nationally recognized energy performance label that allows comparison between homes.
- HERS is the tool of choice for most locally adopted above-code building programs and is used as a method of verification in LEED for Homes and ENERGY STAR programs.
- HERS provides quality assurance and verification, peer review and testing.

HERS can also be used as a tool to address new buildings to ensure that energy efficiency is considered and basic principles are incorporated into the design and construction of new homes. Although new construction will be a small percentage of the buildings in Hailey for many decades, it may be the most feasible time to build a higher performing building. Retrofits or after construction improvements are often much more costly than planning for a higher performing building. For instance, when you buy a more energy efficient furnace for an existing home the cost may be about \$300 more than a conventional furnace; however, the return on investment is within 3-5 years and afterward, the building owner continues to save money and energy (refer to the attached Energy Star furnace spreadsheet). If you were retrofitting an existing building with a new energy efficient furnace the cost would be \$1,400, instead of the cost difference of \$300. Building a home or commercial building right the first time prevents unnecessary retrofits and energy expenses for the next 75 years (average life span of a building) or for the life of the appliance, depending on what energy efficient building component is evaluated.

New Construction - Home Energy Rating System (HERS) Recommendation – At the time of building permit application a pre-construction HERS Index score shall be submitted by a certified Home Energy Rater, (a third-party certifier) that demonstrates how the building will be in compliance with energy performance levels outlined in the above table. Upon completion of the plan review, the energy rater will work with the builder or designer to identify the energy efficiency improvements needed to ensure the home will meet the HERS Index performance levels set out the above table. The rater will conduct onsite inspections, including a blower door

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<sup>12</sup> International Initiative for Sustainable Built Environment (iISBE) “The Integrated Design Process”. Nils Larsson. January 31, 2004.

test (to test the leakiness of the house) and a duct test (to test the leakiness of the ducts). Results of these tests, along with inputs derived from the plan review, are used to generate the HERS Index score for the home.

**The following third party inspection and submittals to building department would be submitted:**

- An Energy Rater would perform a pre-drywall inspection including a duct blaster test (if applicable) to ensure the ability of the residence to achieve the required HERS Index rating.
- Prior to the installation of the wall or ceiling finish materials the owner or contractor t submit verification of the Energy Rater's inspection to the Building Department that would certify that the building has been constructed in conformance with the RESNET model (envelope sealing).
- Upon completion of construction and prior to final building inspection approval an Energy Rater must perform a final inspection which includes a blower door test and submit documentation to the Building Department certifying (a final HERS certificate) that the residence meet the performance levels outlined in Exhibit A.

Hailey began enforcing an energy code in 1991. According to the 2000 U.S. Census, over 74% of the existing buildings in Hailey were built before 1990. It is anticipated that the existing building stock will continue to represents a large proportion of buildings in Hailey for many more decades. The proportion of newly constructed buildings remains relatively insignificant when trying to address overall energy efficiency. Generally, homes built before 1991 can expect to see the greatest energy efficiency improvements, with higher returns on investment than homes built more recently. By requiring energy audits on existing buildings, the committee hopes it will raise awareness and provide home owners with information that could be used at anytime to increase the energy performance of their building. It would also begin to establish an energy rating for existing homes, so prospective buyers would be informed and future owners could make improvements if desired.

Alterations and Additions – Energy Audits – Alterations that affect the integrity of the building envelope and that require a building permit or additions of 500 square feet of conditioned space or larger are recommended to conduct a certified energy audit prior to building permit issuance. Audits must be performed by a Building Performance Institute (BPI) certified professional or RESNET accredited Home Energy Rating System (HERS) rater and would be completed before building permit submittal. An Audit Certificate is part of permit documentation.

Exemptions: The following projects are not required to conduct a certified energy audit:

- Window replacements.
- Bathroom remodel projects limited to the replacement of fixtures and cabinets.
- Kitchen remodel projects limited to the replacement of cabinets, counter tops, plumbing fixtures, and appliances.
- Electrical work associated with permits issued only for electrical work
- Plumbing associated with permits issued only for plumbing.
- Replacement of HVAC appliances associated with permits issued only for appliance replacement.
- Reroofs

## **II. Water, Indoor Air, Construction Waste, Durability and Assurance**

The following are residential and commercial components for new construction only, along with a brief explanation of why they are recommended:

- Water conservation – installing water conserving fixtures in the home and landscaping methods and technologies outside the home.
  - Conserving water is an important goal due to limited water resources explained in a recent study by the United States Geological Survey, a dry, high desert climate, and higher than average consumption for the state of Idaho.
- Waste Management - recycling of clean wood waste and cardboard (the two most prevalent construction materials that can be recycled at Ohio Gulch)
  - The National Association of Home Builders (NAHB) estimates that the construction of a typical 2,000 square foot home generates about 8,000 pounds (four tons) of waste, occupying roughly 51 cubic yards of landfill space. This equates to an average of about four pounds of waste per square foot of conditioned space (NAHB Research Center, 2001, [www.nahbrc.org](http://www.nahbrc.org)).
- Indoor Air Quality – Existing requirements determined by ASHREA 62.2
  - Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home. At this time, no additional indoor air quality requirements are recommended because the upcoming requirements in the 2009 IECC will adequately address indoor air quality.
- Durability and Assurance: plans must include installation specifications in an effort to minimize errors and a signed document that states products were installed to manufacturer specifications.
  - Durability is the ability of a material, product, or building to maintain its intended function for its intended life expectancy with intended levels of maintenance in intended conditions of use (NAHB Research Center, 2001, [www.nahbrc.org](http://www.nahbrc.org)). Often times it isn't the product or the materials used, but the installation of those materials that can lead to energy loss, mold, water damage, etc. Additional requirements are recommended to increase the likelihood that products and materials maintain their expected longevity to help conserve both financial and natural resources by avoiding premature replacement or reconstruction.

## **III. Building Footprint**

The proposed recommendations address home size through a points system for residential new construction and residential additions only. Applicants can choose from a menu of options to pick and choose the points that make the most sense for their design and meet their needs. The points cover all components of a “green” building program. The points are generated using a linear equation, which takes into account the number of bedrooms and square feet of a home, in an effort to avoid over penalizing large families that require larger homes. The larger the home and the fewer the number of bedrooms, the greater the number of points would need to be selected from the menu. The points menu was created using Boulder, Colorado’s points document as a template and tailoring it to fit Hailey and the goals identified by the committee.

#### **IV. Administration**

- **In-lieu Fees**

In-lieu fees are suggested as an option for special circumstances and in the event that a new home cannot achieve the stated HERS score. Fees could be paid in-lieu of points, HERS score, or base requirements. The money generated from any fees could be used for city initiated sustainability projects that have a public benefit or to fund a rebate program to provide financial assistance to those that wish to improve the energy efficiency of their building.

- **Exemptions**

LEED certification for new commercial construction and LEED for new homes has been listed as an exemption from complying with the commercial and residential new construction components of the recommendation. Residential new construction requirements are recommended to qualify for an exemption if a home receives National Association of Home Builder's (NAHB) Green Building Program certification. Home Performance with Energy Star has been listed as an exemption from complying with the energy audits required for residential additions and for the energy audits and points required for residential alterations.

#### **V. Continuing Education and Outreach**

There are numerous funding sources and opportunities for education and outreach pertaining to the recommendation. All of the events took place over the last year were done for little to no cost. The Idaho Office of Energy Resources has offered any training we feel might be necessary, free of charge. In house training can also be provided by staff, to better educate the design and building industry of any new program that may stem from the recommendations.

### **ABOVE-CODE BUILDING TRENDS**

#### **Local**

Blaine County created a similar committee to develop recommendations for the Board of County Commissioners to consider shortly after Hailey's advisory committee was created. To date the County's committee has yet to present their recommendations to the Board of County Commissioners; however, it is anticipated that their recommendation will also include 3<sup>rd</sup> party verified HERS as well as other "green" building components such as water, waste, indoor air quality, etc. The City of Ketchum has also begun to discuss above-code building programs. In February 2010, representatives from Hailey and the County joined Ketchum's Planning and Zoning Commission and planning staff to share our experiences and knowledge regarding the process and above-code building.

The real estate community is also following the trends. Common place in larger cities, the Sawtooth Board of Realtors have recently incorporated a "green features" section to the multiple listing services (MLS). Sellers can now list any green features the home may have and attach certification documents such as a HERS score or LEED certification to the MLS. Areas such as King County, Washington have been tracking the data since 2007 and have recognized that green certified homes made up 33% of the new homes market and were on the market for 24% less time compared to non-certified homes (Daily Journal of Commerce, February 18, 2010).

## State

Idaho adopted the 2009 IECC and will require all municipalities to do the same by January 1, 2011. The 2009 IECC is approximately 10% more efficient than the 2006 IECC (current code used by municipalities throughout Idaho).

Moscow, Idaho, has had a voluntary residential program since late 2006. Qualifying homes must be built under the National Association of Home Builder's (NAHB) green building program standards. They also allow for fast tracking of NAHB programs. Moscow's building official plans on adopting a mandatory green building code in 2-3 years.

## National

With global acknowledgment of climate change and finite energy resources, governments around the globe and within the U.S. are making policy changes to curb green house gas emissions and ensure our future energy demands are met. The American Recovery and Reinvestment Act, included \$110 billion in renewable energy and energy efficiency projects as well as energy infrastructure, transportation and transit, and green job creation. The U.S. Department of Energy is working on a 2012 code, which is 30% more efficient than the current code used in Hailey. If the 2012 code is adopted by Idaho State in 2013, local adoption would most likely be required by 2014. National legislation efforts have begun to address the future of building codes requiring states to adopt the 2012 code and a code that could be 50% more stringent than the current code used in Hailey by 2015. To date nothing has been passed.

Many non-profits and professional organizations have pledged to promote sustainable, higher performance buildings. In December 2005, the Board of Directors of the AIA issued a Position Statement adopting what has become known as "The 2030 Challenge," a concept originally introduced by architect Ed Mazria, of Santa Fe, New Mexico to make all buildings "carbon neutral" by the year 2030.

*The AIA recognizes a growing body of evidence demonstrates that current planning, design, construction, and real estate practices contribute to patterns of resource consumption that seriously jeopardize the future of the Earth's population. Architects need to accept responsibility for their role in creating the built environment and, consequently, believe we must alter our profession's actions and encourage our clients and the entire design and construction industry to join with us to change the course of the planet's future.*

Twenty-four of the largest and most influential architecture, engineering and development firms based in the U.S., which are responsible for a combined \$100 billion in building construction annually, have joined forces with Architecture 2030, a leading nonprofit research organization. The building sector leaders are calling on Congress to pass the building energy reduction targets in Section 241 of the American Clean Energy Leadership Act of 2009 and incorporate timelines to reach carbon-neutral buildings by 2030.

On the municipal level 1,017 US cities have endorsed the Mayors Climate Protection Agreement. Over 300 communities and states around the nation have adopted voluntary or mandatory above-code building programs (Britt Makela). Of those, at least 17 utilize HERS as

part for their mandatory program, either as a stand alone energy performance requirement or as part of a required Energy Star program.

### **CREATION OF THE COMMITTEE**

In February 2007, the Hailey City Council passed Resolution 2007-2 endorsing the Mayors Climate Protection Agreement and later committed to achieving a 15% reduction in CO2 emissions from City government operations and related activities by 2015. As outlined as a long range action item in the draft Climate Protection Plan and presented to the Hailey City Council with the Mayor's Climate Protection Resolution, HELP has been working towards creating incentives for commercial and residential buildings hoping to make green building easier and more attractive in Hailey, while promoting and incentivizing buildings and buyers to build to a higher standard of energy efficiency and sustainability than what is currently required. In May 2008 Council passed ENERGY STAR for residential buildings program, where building permit fees are deferred until a Certificate of Occupancy; and in January 2009 Council passed fast tracking LEED and ENERGY STAR building programs, where these types of programs receive priority review and meeting scheduling.

In November 2008, HELP requested that the Council create an ad hoc advisory committee, the Hailey Sustainable Building Advisory Committee, to address the building and development techniques and practices. Given the length of time that the committee has been meeting, participation rates have been good. The committee members represent a wide-range of professionals and interested citizens, such as architects, non-profits, contractors, sub-contractors, builders, and energy performance specialists/consultants. The following is a statement created by the committee, which has been used as a guiding principle, to help direct their work over the past 16 months:

*Beginning with the construction phase, the buildings built during our lifetime will impact the environment and economy that our grandchildren inherit.*

*Communities worldwide are recognizing the need to reduce the impacts of construction, increase energy efficiency and promote sustainability in all residential and commercial buildings. The Hailey Sustainable Building and Planning Advisory Committee composed of City officials and local professionals has been formed specifically to respond to this need.*

*The committee has been given the task of proposing, for adoption into City Ordinance, construction techniques and policies to benefit all new construction projects and remodels. Only those techniques and policies which are clearly advantageous, cost effective and offer an exemplary return on investment will be considered by the committee. Implementation of the committee's recommendations will responsibly reduce energy costs and enhance property values with a minimal initial investment. By taking action now we can ensure that buildings built today will be comfortable, affordable and sustainable in the decades to come.*

The committee's objectives were:

- Conduct background research

- Identify and prioritize goals/policies and corresponding actions /implementations
- Develop a timeline for achieving goals
- Develop and implement community involvement and information strategies
- Communicate regularly with HELP committee members and/or Building and Planning Staff
- Present information to the Council as necessary

## **RESEARCH**

The committee began their work by researching other municipalities' Green Building, or "above code" programs to evaluate their appropriateness for Hailey and to avoid "reinventing the wheel." The committee has evaluated their implementation process, effectiveness, community receptivity, costs, city administrative capacity, success of improvements, return on investment benefits to the project owners and pride of being a role model community. The municipalities and programs that have been reviewed are:

1. Aspen/Pitkin County
2. Jackson Hole area
3. Teton County, Idaho
4. Austin, Texas
5. Boulder City, Colorado
6. Boulder County, Colorado
7. Eagle County, Colorado
8. Telluride, Colorado
9. Energy Star
10. LEED
11. HERS
12. NAHB
13. Taos, New Mexico
14. Santa Fe, New Mexico

## **EDUCATION AND OUTREACH EFFORTS**

After the Committee members felt comfortable with their level of knowledge and understanding of other programs and what may work well in Hailey, they focused on stakeholder education and outreach. Presentations were given by the committee to the following professional groups:

- Local American Institute of Architects (AIA) chapter
- Wood River Contractor's Association, and
- Sawtooth Board of Realtors.

During these presentations the Committee provided information on their goals and objectives as well as general information on what types of programs have been adopted around the nation. A key component was a questionnaire that was passed out following the presentation and discussion, which helped the committee obtain feedback on citizens' desires and goals as well as concerns and issues for introducing and possibly implementing a higher standard for construction.

Following these presentations the Committee worked with the County's sustainable building committee, Blaine County Build Smart, to provide region-wide outreach and education through a series of events.

**“Green Building -The Real Story: A Presentation and Forum for the Wood River Design and Building Industry.”**

Held in June 2009 the evening focused on green building, and among other topics, addressed the challenges, benefits, examples of other municipalities' programs, and the financial cost and savings. The presentation by the Britt/Makela Group, Inc., who has experience at the national level in high performance buildings, code development, training, data analysis, architecture, building science, low-impact energy efficient building design, and land use, addressed the difficult issues associated with green building programs and provided information of interest to the building and design industries as well as the general public.

Following the presentation was a stakeholder's forum comprised of various professionals. The forum attempted to determine and address the major issues and concerns felt by stakeholders. A report detailing the results of the forum was presented to the Council during the summer 2009. This feedback, along with the feedback from the questionnaire, was used in developing the committees' respective recommendations.

**“The Integrated Design Process Using Home Energy Rating Systems (HERS) to obtain greater Energy Efficiency,”**

Hosted in October 2009 by the two Committees and the AIA, the event was presented and facilitated by David Neiger of Populus Sustainable Design Consulting, in Boulder CO. The presentation covered HERS and then split the audience up into groups that were each given a HERS score that they were required to obtain using the REMRATE software developed by RESNET, who created HERS. This gave each participant an opportunity to better understand the process of HERS and how the tool is used to achieve a higher performance building. The following day, David presented Boulder City and Boulder County, CO's experience with adopting and implementing a green building program to Hailey's Mayor and City Council and Blaine County Commissioners.

**“Home Performance with Energy Star”**

In March 2010, Tim O'Leary with the Idaho Office of Energy Resources presented Home Performance with Energy Star, an energy performance program for existing homes, to Hailey and Blaine's committee members, interested city staff, and others that were identified by the committees to find value in such a presentation.

**SETTING PRIORTIES AND FORMULATING THE RECOMMENDATION**

Beginning summer 2009, the Committee focused on discussing the various components of the “above code” building programs and incentives that were researched during the first phase of the Committee's work. Attached is the “Priority Ranking” document, which is a list of each component discussed and its average rank of priority, determined by the Committee's participating members. Each component was then discussed in length and determined whether it would be included in the recommendation, to what degree, and why. The summary and conclusion of each component discussed was then approved by all participating committee

members, in a consensus based processes. From this summary staff outlined a draft building program. The Committee met over several weeks to further refine the draft to match the intent of the committee's objectives and the desirability of certain components identified as high during the priority setting exercise.

## **EXISTING BUILDING DEPARTMENT ENERGY REQUIREMENTS**

Currently plan reviews and inspections required by the City of Hailey are the minimum requirements as adopted by the State of Idaho with amendments. These adopted codes consist of the 2006 editions of the International Building Code (IBC), the International Residential Code (IRC), the International Energy Conservation Code (IECC) and the 2003 edition of the American National Standards Institute for accessibility (ANSI A117.1). Inspections for Electrical, Plumbing and Mechanical are all done by the State of Idaho.

At this time, the most popular method to show compliance with the energy code is by using a software program known as Rescheck for residential construction and Comcheck for commercial. This program provides the applicant with a compliance certificate showing that the building envelope meets or exceeds the minimum requirements of the energy code. This certificate is submitted to the building department along with the construction documents where the plans examiner reviews the information. This certificate is then used as an inspection tool in the field to verify that all the construction components indicated on the certificate are installed in the field. This inspection is referred to as an Energy Code inspection and is typically performed after the framing inspection and prior to covering insulation with sheetrock.

## **IMPLEMENTATION CONSIDERATIONS**

### **Staffing**

No additional staffing needs are anticipated if 3<sup>rd</sup> party verification is pursued. The building department will no longer have to inspect for compliance with the International Energy Conservation Code (IECC), which will provide additional time to verify that other items are met (i.e. base requirements and points). It is anticipated that any recommended program will require more time initially; adjusting to change, produce new applications and materials, and develop an efficient process.

The recommendation proposes that any points chosen by the applicant, also be proven by applicant that the point has been met. This will minimize the amount of administration needed. Details regarding acceptable methods of verification will be provided after each point on the points menu.

The base requirements will be verified by the Building Department either during the plan review or during the field inspection. Waste management will be verified by identifying that the appropriate bins are in place and being used during the final inspection. Interior water conservation will be verified by the applicant providing labels of the water usage of all toilets, faucets, and showerheads (toilets water usage is listed in all tanks) during a final inspection. Indoor air quality will be verified by the checking that an HRV system has been installed during a final inspection. Durability and assurance will be verified by the Building Department checking the plans to ensure that installation details are listed on the plans and by requiring the contractor

to sign a statement that all items were installed to manufacture's specifications, during the building plan review.

**Timing**

The development and implementation of changes to building codes and building department requirements are timely. With the reduced volume of permits being submitted to the building department and the building industry experiencing a slow down, there is more time available for education and outreach and for adaptation to new changes. It is easier for all parties involved to adapt during a slower building season compared to facing changes when both the building industry and the building department are faced with multiple projects and deadlines. In addition, if the Council adopts the recommendation or a variation of the recommendation before 2011, there will be time to provide outreach and education to the community and prepare the building department before the building season starts.

## Existing Financial Tools and Incentives

The following are lists of existing financial incentives offered by Hailey, the federal government, the state government, and Idaho Power:

### Hailey Incentives

Program	Eligible Activities	Financial Information
Community Audits and Retrofit Rebate Program (CARRP) – Provided by the EECBG Grant award received.	Energy Audits and Energy Efficiency Improvements (insulation, lighting, HVAC, shower/faucet upgrades, weather sealing, ENERGY STAR appliances, solar powered appliances, and replacement of windows and doors with Energy Star windows and doors).	50% of Energy Audit and 30% of the material for the retrofit, up to \$2,000.

### Federal Tax Credits – data gathered from the U.S. Department of Energy’s website ([www.energysavers.gov](http://www.energysavers.gov))

Product	When	Where	Tax Credit
Biomass stove	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
HVAC (Central AC, Air Source Heat Pumps, Furnaces and Boilers, Advanced Main Air Circulating Fan)	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
Insulation and air sealing products	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
Metal and Asphalt Roofs	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
Non-solar Water Heaters (gas, oil, propane, and electric heat pump)	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
Exterior Windows, doors, and skylights and Storm Windows and Doors	2009 and 2010 only	Primary and existing residences only	30% of cost, up to \$1,500
Geothermal Heat Pump	Must be “placed in service” by December 31, 2016	Primary residences and partial credit to vacation homes; no rentals. New and existing homes	30% of cost, with no upper limit.
Solar Energy Systems (solar water heater and PV electric systems)	Must be “placed in service” by December 31, 2016	Primary residences and partial credit to vacation homes; no rentals. New and existing homes	30% of cost, with no upper limit.
Residential small wind turbines	Must be “placed in service” by December 31, 2016	Primary residences and partial credit to vacation homes; no rentals. New and existing homes	30% of cost, with no upper limit.
Fuel Cells	Must be “placed in service” by December 31, 2016	Primary residences. New and existing homes.	30% of cost, up to \$500 per 0.5 kW.

**Idaho State Incentives – data gathered from Database of State Incentives for Renewable and Efficiency and the Idaho Office of Energy Resources websites ([www.dsireusa.org](http://www.dsireusa.org) and [www.energy.idaho.gov](http://www.energy.idaho.gov))**

<b>Program Name</b>	<b>Type of Program</b>	<b>Eligible Activities</b>	<b>Financial Incentive Info.</b>
Idaho Office of Energy Resources Energy Efficiency and Renewable Loan Program	Loans	Duct/air sealing, insulation, water heaters, lighting, furnaces, AC units, heat pumps, and renewable energy systems for all building types.	\$1,000 - \$100,000 with a 4% interest – 5 yr. term.
Renewable energy equipment sales tax refund	Sales tax refund	Renewable energy for commercial, industrial, and residential	100% of refund on sales tax.
Idaho Income tax deduction	Tax deduction	Caulking, weather-stripping, insulation, doors, and windows on residences.	100% cost of labor and materials
Residential Alternative Energy Tax Deduction	Tax deduction	Passive Solar Space Heat, Solar Water Heat, Solar Space Heat, Photovoltaics, Wind, Biomass, Geothermal Heat Pumps for residences.	40% deduction up to \$5,000 the first year. 20% deduction for following three years, up to a total deduction of \$20,000.
State Energy Efficient Rebate Appliance Program	Cash Rebate	13 different kinds of ENERGY STAR appliances for residences.	\$25-\$300 rebate.

**Idaho Power Incentives – data gathered from Idaho Power’s website ([www.idahopower.gov](http://www.idahopower.gov))**

<b>RESIDENTIAL</b>		
<b>Program</b>	<b>Eligible Activities</b>	<b>Financial Information</b>
ENERGY STAR HOMES NW	Cash rebate to builders, contractors or subcontracts who build an ENERGY STAR home.	\$400
Home Improvement program	Cash rebate for attic insulation	\$0.15 per-square-foot
Home products Program	Cash rebate for ENERGY STAR appliances (washer, refrigerator, ceiling fan and light kit, light fixtures)	\$15-\$50
Ductless Heat Pump	Cash rebate for the installation of ductless heat pumps	Up to \$1,000

<b>COMMERCIAL and INDUSTRIAL</b>		
<b>Program</b>	<b>Eligible Activities</b>	<b>Financial Information</b>
Easy Upgrades	Simple energy-saving retrofits to existing buildings.	Up to \$100,000 cash rebate.
Custom Efficiency	For large and complex projects that improve the efficiency of electrical systems and processes.	Cash rebate for up to 70% of the cost.
Building Efficiency Program	Cash rebate for lighting, photo controls, occupancy sensors, exit signs, HVAC, complex cooling systems, economizers, reflective	Cash rebate up to \$100,000.

	roof treatment, windows, window shading, energy management controls, demand control ventilations, variable speed drives,	
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Energy Efficient Mortgage (EEM) recognizes that energy efficient homes cost homeowners less to operate on a monthly basis than standard homes because they use less energy. Home buyers who chose energy efficient homes can afford to spend more on their housing expenses because they will likely spend less on their energy costs. The EEM allows borrowers to qualify for a larger mortgage as a result of the energy savings. The EEM benefits those buying new, energy efficient homes or those purchasing existing homes that need energy improvements.

The EEM benefits the borrower in several ways. First, the estimated energy savings are added to the borrower's income to allow the home buyer to qualify for a larger total mortgage amount. Second, by increasing borrowing power, the EEM allows borrowers to include the costs of energy improvements into the total mortgage amount. 100% of the energy improvements, typically up to 15% of the value of the home, can be financed and paid for over the life of the mortgage, reserving the borrower's cash for more immediate, move-in costs. Third, the value of the home is adjusted by the value of the energy efficient improvements (Residential Energy Services Network: [www.natresnew.org](http://www.natresnew.org)). Currently, Wells Fargo's program will loan up to 4% of the value of the home.



## Priority Ranking

### Committee Survey Results

August 19, 2009

**High scores** = Component the Committee would like to see in a new building program at some level. Components with high desirability will be reviewed further and determined whether they are more suitable for a customized program or if the component can be found in an established program.

**Low scores** = Components the Committee feels are not worthwhile or beneficial to a new building program. These will be discussed to determine if they should be removed from consideration and why.

Program Components	Desirability Rating 1-5 <i>(1=low desirability, 5=high desirability, score is an average of 10 members' ratings)</i>
New Construction – Residential	4.6
New Construction - Commercial	4.6
Energy	4.6
Building size - Residential	4.1
Water	4.0
Additions – Residential	4.0
Incentives	3.8
Additions – Commercial	3.7
Indoor Air Quality	3.7
Third Party Inspections (review independently of actual certification program(s))	3.6
Remodels – Residential	3.6
Material and Resources	3.5
Remodels – Commercial	3.4
Building size – Commercial	3.4
Waste Management	3.4
In-lieu fees option	3.3
Phasing	2.9
Exemptions	2.5

*Please consider variables that may affect each program component when rating. Some variables that may affect each component include, but are not limited to the following:*

- *administrative capacity*
- *benefit*
- *ease of implementation*
- *ease of compliance*
- *products/service availability*
- *cost*





### Life Cycle Cost Estimate for an ENERGY STAR Qualified Gas Residential Furnace

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Enter your own values in the gray boxes or use our default values.

What fuel do you use to heat your home?	Gas	
Gas Rate (\$/therm)	\$0.90	
What Census region do you live in?	BOISE, ID	
How large is your home? (in square feet)	1,800	Include only heated space
When was your home built?	1990-1999	
When was your existing furnace installed?	New Unit	Select 'New Unit' to compare new furnace options

	New ENERGY STAR Qualified Unit	New Conventional Unit
Uninstalled Cost per Unit (estimated retail price)	\$1,400	\$1,100
Annual Fuel Utilization Efficiency (AFUE)	90%	78%
Use with programmable Thermostat (Yes/No)	Yes	Yes

[Thermostat Usage Guidelines](#)

You have selected the programmable thermostat option, your savings are calculated based on ENERGY STAR suggested thermostat usage shown in the link above, your actual savings may vary.

#### Annual and Life Cycle Costs and Savings for a Gas Furnace

	ENERGY STAR Qualified Unit	Conventional Unit	Savings with ENERGY STAR
<b>Annual Operating Costs</b>			
Energy cost	\$402	\$464	\$62
Energy Consumption (MMBTU)	45	52	7
Energy Consumption (Therms)	447	516	69
Maintenance cost	\$0	\$0	\$0
<b>Total</b>	<b>\$402</b>	<b>\$464</b>	<b>\$62</b>
<b>Life Cycle Costs</b>			
Operating costs (energy and maintenance)	\$5,095	\$5,879	\$784
Energy costs	\$5,095	\$5,879	\$784
Maintenance costs	\$0	\$0	\$0
Purchase price	\$1,400	\$1,100	-\$300
<b>Total</b>	<b>\$6,495</b>	<b>\$6,979</b>	<b>\$484</b>
		Simple payback of initial additional cost (years) <sup>1</sup>	4.8

\* Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.

<sup>1</sup> A simple payback period of zero years means that the payback is immediate.

#### Summary of Benefits for a Gas Furnace

Initial cost difference	\$300
Life cycle savings	\$784
Net life cycle savings (life cycle savings - additional cost)	\$484
Simple payback of additional cost (years)	4.8
Life cycle energy saved (MMBtu)	124
Life cycle air pollution reduction (lbs of CO <sub>2</sub> )	14,489
Air pollution reduction equivalence (number of cars removed from the road for a year)	1
Air pollution reduction equivalence (acres of forest)	1
Savings as a percent of retail price	35%



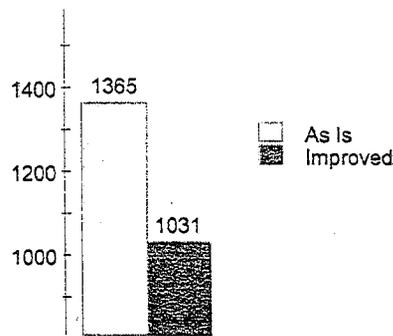
## IMPROVEMENT ANALYSIS REPORT

Date: March 22, 2010	Rating No.:	
Building Name:	Rating Org.:	The Energy Auditor
Owner's Name: Carroll Brown	Phone No.:	208-721-2524
Property: 360 Silver Star	Rater's Name:	Brian J Bennett
Address: Hailey, ID 83333	Rater's No.:	
Builder's Name:		
Weather Site: Sun Valley, ID	Rating Type:	Verified Condition
File Name: Carroll Brown Hers.big	Rating Date:	3-10-2010

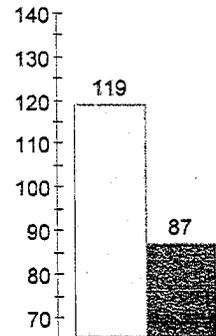
**Energy Costs (\$/yr)**

End-Use	As Is	With All Improvements	Savings
Heating	871	538	334
Cooling	0	0	0
Hot Water	180	180	0
Lights and Appliances	316	316	-0
Photovoltaics	-0	-0	0
Service Charge	0	0	0
<b>TOTAL</b>	<b>1367</b>	<b>1034</b>	<b>334</b>

**Total Costs (\$/yr)**



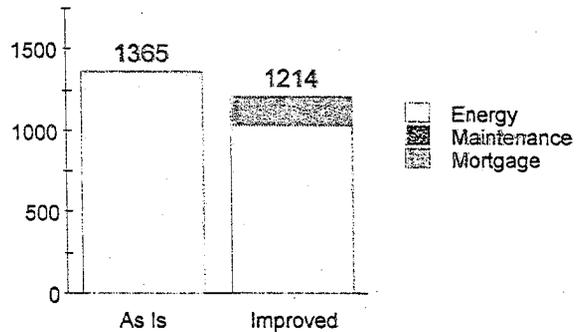
**HERS Index**



### Information For Lenders and Appraisers

Installed Cost of Improvements (\$)	4583
Cost Weighted Life of Measure (Years)	30
Mortgage Term (Years)	25
Discount/Mortgage Rate (%)	0.000
Present Value Factor	30.0
Expected Annual Energy Savings (\$)	334
Expected Annual Maintenance Costs (\$)	0
Expected Annual Savings (\$)	334
Increased Annual Mortgage Costs (\$)	183
Present Value of Savings (\$)	10008
Expected Annual Cash Flow (\$)	150

**Cost Comparison (\$/yr)**



**IMPROVEMENT ANALYSIS REPORT**

**Recommended Improvements**

Component	Life	Cost	Yr Savings	PV	SIR	SP	Index
<b>1. Infiltration:</b> Existing: 0.6-1.0/0.3-0.5 ACHnat Proposed: 0.4/0.4 As Specified Measure: Achieve 0.4ACH	30	320	156	4371	14.7	2.05	106
<b>2. Equip 1: HEAT:</b> Existing: 80AFUE Gas Furn 80k Proposed: 92AFUE Gas Furn 80k Measure: 80->95%, 30kBTuh	30	2400	96	484	1.2	24.96	94
<b>3. Window 5: 4 East</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	345	16	122	1.4	22.14	93
<b>4. Window 2: 1 east</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	345	16	122	1.4	22.14	92
<b>5. Window 1: 1 South</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	552	22	104	1.2	25.25	90
<b>6. Window 3: 2 East</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	276	12	98	1.4	22.15	88
<b>7. Window 6: 5 East</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	207	9	73	1.4	22.15	88
<b>8. Window 4: 3 East</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	138	6	49	1.4	22.15	87

**Criteria**

Ranking Criteria: Present Value	Maximum \$ Limit: No Limit
Cutoff: 0	Measures: Interactive

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## IMPROVEMENT ANALYSIS REPORT

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Carroll Brown Hers.big

Page 3

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The home's energy efficiency is rated using the HERS Index as defined in the RESNET "Mortgage Industry National Home Energy Rating Systems Accreditation Standards," 2006. An Index of 100 represents a home that meets current energy codes. A lower index indicates the home uses less energy than a code home, a higher Index indicates the home uses more energy than a code home. The rating considers all energy use in the home. The rating should be used only for comparison, since it assumes average climate and thermostat settings, quantities of hot water, and internal loads for a typical household. Energy costs are based on local energy prices at the time of rating. If energy efficiency improvements are made to the home, or energy prices change significantly, the rating and annual energy costs may change. Although every effort has been made to provide accurate information, this rating does not constitute a warranty, expressed or implied, about the energy efficiency or operating costs of the house. Estimated savings are calculated assuming that the improvements are implemented in the order listed, and in accordance with all local codes and standards. The cost estimates for improvements are established by the local HERS provider.

# Home Energy Retro-Fit

Carroll Brown  
380 Silver Star  
Hailey, ID 83333

by:  
Brian J Bennett  
The Energy Auditor  
208-721-2524

March 22, 2010

## Home Energy Retro-Fit

The Home Energy Retro-Fit 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.

The Energy Auditor 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 The Energy Auditor, which provided you this service.

## Energy Retro-Fit Table

The Energy Retro-Fit table shows a package of energy retrofits for you to consider. Both the individual and total annual savings are based on the whole package. You can see how good of a financial choice these measures are by looking at the last column.

Feature to improve	Change from	Change to	Estimated cost	Annual savings	SIR*
Infiltration:	0.6-1.0/0.3-0.5 ACHnat	0.4/0.4 As Specified	\$320	\$156	14.7
Equipment:	80AFUE Gas Furn 80k	92AFUE Gas Furn 80k	\$2400	\$96	1.2
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$345	\$16	1.4
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$345	\$16	1.4
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$552	\$22	1.2
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$276	\$12	1.4
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$207	\$9	1.4
Window:	Single - Mtl w/Storm	Dbi/LoE/Arg - Vinyl	\$138	\$6	1.4
<b>Total</b>			<b>\$4583</b>	<b>\$334</b>	
<b>Monthly Finance Cost**, Monthly Savings</b>			<b>\$15</b>	<b>\$28</b>	

\* SIR is Savings to Investment Ratio: this is an economic measure for investments. A SIR > 1 is a positive investment, while SIR < 1 loses money.

\*\* The monthly finance cost is the monthly payment, including interest, that will pay for all the tabulated improvements when financed with a 25-year mortgage at 0.00%.

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The home's energy efficiency is rated using the HERS Index as defined in the RESNET "Mortgage Industry National Home Energy Rating Systems Accreditation Standards," 2006. An Index of 100 represents a home that meets current energy codes. A lower Index indicates the home uses less energy than a code home, a higher Index indicates the home uses more energy than a code home. The rating considers all energy use in the home. The rating should be used only for comparison, since it assumes average climate and thermostat settings, quantities of hot water, and internal loads for a typical household. Energy costs are based on local energy prices at the time of rating. If energy efficiency improvements are made to the home, or energy prices change significantly, the rating and annual energy costs may change. Although every effort has been made to provide accurate information, this rating does not constitute a warranty, expressed or implied, about the energy efficiency or operating costs of the house. Estimated savings are calculated assuming that the improvements are implemented in the order listed, and in accordance with all local codes and standards. The cost estimates for improvements are established by the local HERS provider.

## 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.

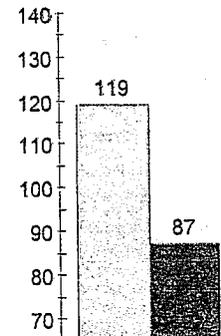
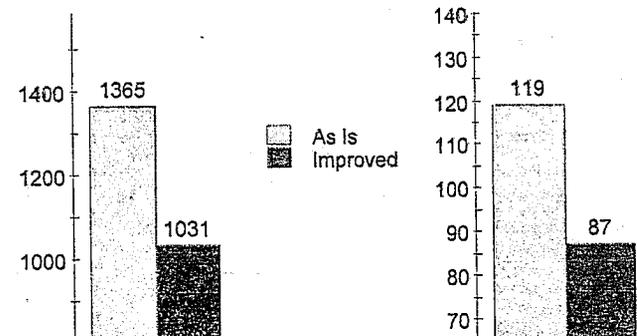
The HERS Index bar chart provides a snapshot of your home's energy efficiency before and after retrofits. The HERS Index shows the energy efficiency rating of your home, similar to the way a miles per gallon rating shows the efficiency for a car.

Energy Costs (\$/year)

Total Costs (\$/year)

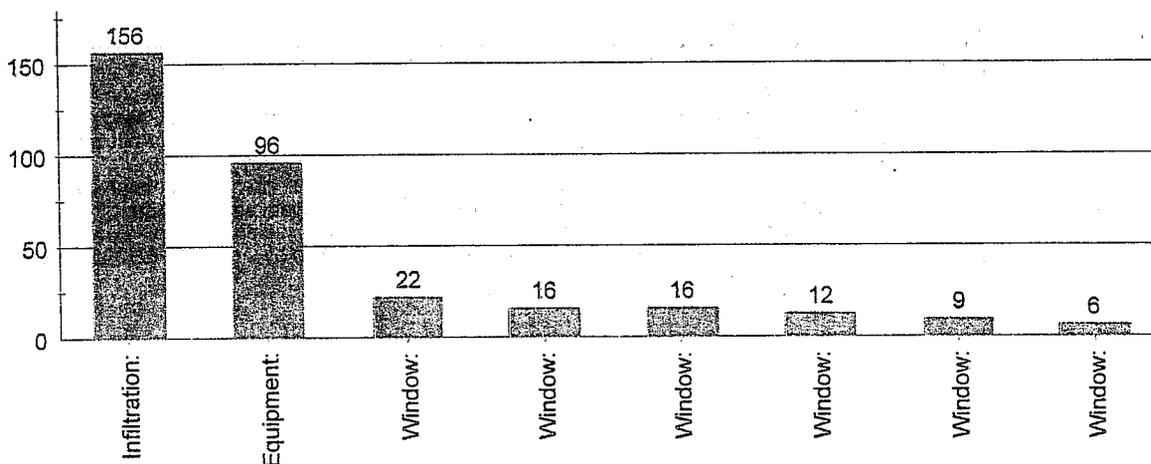
HERS Index

End-Use	With All		Savings
	As Is	Improvements	
Heating	871	538	334
Cooling	0	0	0
Hot Water	180	180	0
Lights and Appliances	316	316	-0
Photovoltaics	-0	-0	0
Service Charge	0	0	0
<b>TOTAL</b>	<b>1367</b>	<b>1034</b>	<b>334</b>



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.

Annual Savings for Retrofits (\$/year)





**IMPROVEMENT ANALYSIS REPORT**

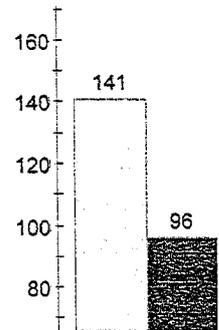
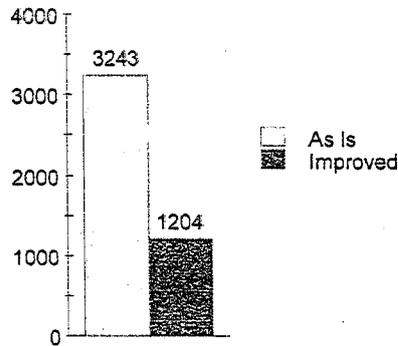
Date:	March 22, 2010	Rating No.:	
Building Name:	Test example 1	Rating Org.:	The Energy Auditor
Owner's Name:	Shana Sweitzer	Phone No.:	208-721-2524
Property:	Almond	Rater's Name:	Brian Bennett
Address:	Hailey, ID 83333	Rater's No.:	
Builder's Name:			
Weather Site:	Sun Valley, ID	Rating Type:	Verified Condition
File Name:	Shana Sweitzer.bld.big	Rating Date:	03/3/2010

**Energy Costs (\$/yr)**

**Total Costs (\$/yr)**

**HERS Index**

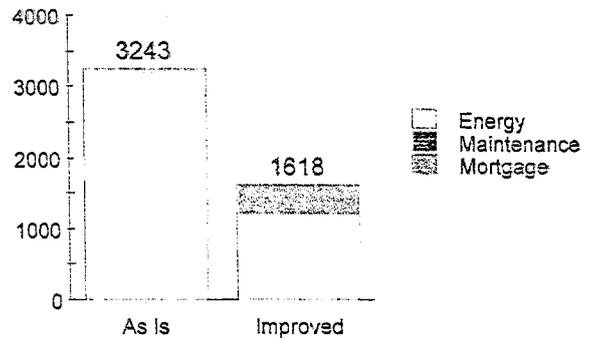
End-Use	As Is	With All Improvements	Savings
Heating	2552	603	1949
Cooling	0	32	-32
Hot Water	271	271	0
Lights and Appliances	302	302	0
Photovoltaics	-0	-0	0
Service Charge	120	0	120
<b>TOTAL</b>	<b>3245</b>	<b>1207</b>	<b>2038</b>



**Information For Lenders and Appraisers**

Installed Cost of Improvements (\$)	10360
Cost Weighted Life of Measure (Years)	30
Mortgage Term (Years)	25
Discount/Mortgage Rate (%)	0.000
Present Value Factor	30.0
Expected Annual Energy Savings (\$)	2038
Expected Annual Maintenance Costs (\$)	0
Expected Annual Savings (\$)	2038
Increased Annual Mortgage Costs (\$)	414
Present Value of Savings (\$)	61129
Expected Annual Cash Flow (\$)	1623

**Cost Comparison (\$/yr)**



IMPROVEMENT ANALYSIS REPORT

Recommended Improvements

Component	Life	Cost	Yr Savings	PV	SIR	SP	Index
<b>1. Equip 1: HEAT:</b> Existing: Gas Fire Place**** Proposed: 36k 14seer 8.5hspf Measure: ASHP	30	4500	1469	39563	9.8	3.06	140
<b>2. Frame Flr 1: Main Floor</b> Existing: Uninsulated Proposed: R-30 Measure: Frame Floor R-30	30	818	227	6004	8.3	3.60	125
<b>3. Ceiling 1: Main Ceiling</b> Existing: R-19 Blown, Attic Proposed: R-38 Blown, Attic Measure: Increase By R-19	30	902	72	1252	2.4	12.57	120
<b>4. Window 2: Glass Door</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	759	50	742	2.0	15.17	112
<b>5. Window 1: 1 east</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	552	36	535	2.0	15.24	110
<b>6. Window 7: 5 east</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	552	36	530	2.0	15.30	107
<b>7. Window 8: 1 West</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	552	36	526	2.0	15.36	105
<b>8. Window 3: 2 east</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	414	27	392	1.9	15.42	103
<b>9. Window 9: 3 West</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	345	22	325	1.9	15.46	101
<b>10. Window10: 3 West</b> Existing: Single - Mtl w/Storm Proposed: Dbl/LoE/Arg - Vinyl Measure: Low_e	30	345	22	323	1.9	15.50	99

IMPROVEMENT ANALYSIS REPORT

Test example 1

Page 3

Component	Life	Cost	Yr Savings	PV	SIR	SP	Index
<b>11. Window 4: 3 east</b>	30	207	13	193	1.9	15.53	98
Existing: Single - Mtl w/Storm							
Proposed: Dbl/LoE/Arg - Vinyl							
Measure: Low_e							
<b>12. Window 5: 4 east</b>	30	207	13	192	1.9	15.55	97
Existing: Single - Mtl w/Storm							
Proposed: Dbl/LoE/Arg - Vinyl							
Measure: Low_e							
<b>13. Window 6: 2 West</b>	30	207	13	192	1.9	15.57	96
Existing: Single - Mtl w/Storm							
Proposed: Dbl/LoE/Arg - Vinyl							
Measure: Low_e							

**Criteria**

Ranking Criteria: Present Value	Maximum \$ Limit: No Limit
Cutoff: 0	Measures: Interactive

The home's energy efficiency is rated using the HERS Index as defined in the RESNET "Mortgage Industry National Home Energy Rating Systems Accreditation Standards," 2006. An Index of 100 represents a home that meets current energy codes. A lower Index indicates the home uses less energy than a code home, a higher Index indicates the home uses more energy than a code home. The rating considers all energy use in the home. The rating should be used only for comparison, since it assumes average climate and thermostat settings, quantities of hot water, and internal loads for a typical household. Energy costs are based on local energy prices at the time of rating. If energy efficiency improvements are made to the home, or energy prices change significantly, the rating and annual energy costs may change. Although every effort has been made to provide accurate information, this rating does not constitute a warranty, expressed or implied, about the energy efficiency or operating costs of the house. Estimated savings are calculated assuming that the improvements are implemented in the order listed, and in accordance with all local codes and standards. The cost estimates for improvements are established by the local HERS provider.

# Home Energy Retro-Fit

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by:  
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The Energy Auditor  
208-721-2524  
March 22, 2010



## Home Energy Retro-Fit

The Home Energy Retro-Fit 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.

The Energy Auditor 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 The Energy Auditor, which provided you this service.

## Energy Retro-Fit Table

The Energy Retro-Fit table shows a package of energy retrofits for you to consider. Both the individual and total annual savings are based on the whole package. You can see how good of a financial choice these measures are by looking at the last column.

Feature to improve	Change from	Change to	Estimated cost	Annual savings	SIR*
Equipment:	Gas Fire Place****	36k 14seer 8.5hspf	\$4500	\$1469	9.8
Frame Floor:	Uninsulated	R-30	\$818	\$227	8.3
Ceiling:	R-19 Blown, Attic	R-38 Blown, Attic	\$902	\$72	2.4
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$759	\$50	2.0
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$552	\$36	2.0
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$552	\$36	2.0
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$552	\$36	2.0
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$414	\$27	1.9
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$345	\$22	1.9
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$345	\$22	1.9
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$207	\$13	1.9
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$207	\$13	1.9
Window:	Single - Mtl w/Storm	DbI/LoE/Arg - Vinyl	\$207	\$13	1.9
<b>Total</b>			<b>\$10360</b>	<b>\$2038</b>	
<b>Monthly Finance Cost**, Monthly Savings</b>			<b>\$35</b>	<b>\$170</b>	

\* SIR is Savings to Investment Ratio: this is an economic measure for investments. A SIR > 1 is a positive investment, while SIR < 1 loses money.

\*\* The monthly finance cost is the monthly payment, including interest, that will pay for all the tabulated improvements when financed with a 25-year mortgage at 0.00%.

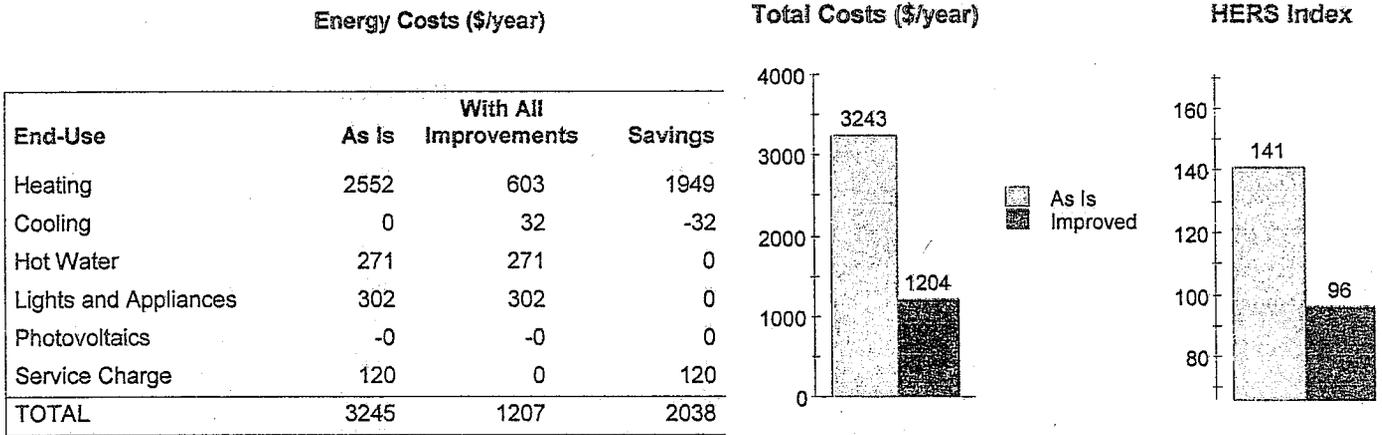
The home's energy efficiency is rated using the HERS Index as defined in the RESNET "Mortgage Industry National Home Energy Rating Systems Accreditation Standards," 2006. An index of 100 represents a home that meets current energy codes. A lower index indicates the home uses less energy than a code home, a higher index indicates the home uses more energy than a code home. The rating considers all energy use in the home. The rating should be used only for comparison, since it assumes average climate and thermostat settings, quantities of hot water, and internal loads for a typical household. Energy costs are based on local energy prices at the time of rating. If energy efficiency improvements are made to the home, or energy prices change significantly, the rating and annual energy costs may change. Although every effort has been made to provide accurate information, this rating does not constitute a warranty, expressed or implied, about the energy efficiency or operating costs of the house. Estimated savings are calculated assuming that the improvements are implemented in the order listed, and in accordance with all local codes and standards. The cost estimates for improvements are established by the local HERS provider.

**Energy Costs by End-Use**

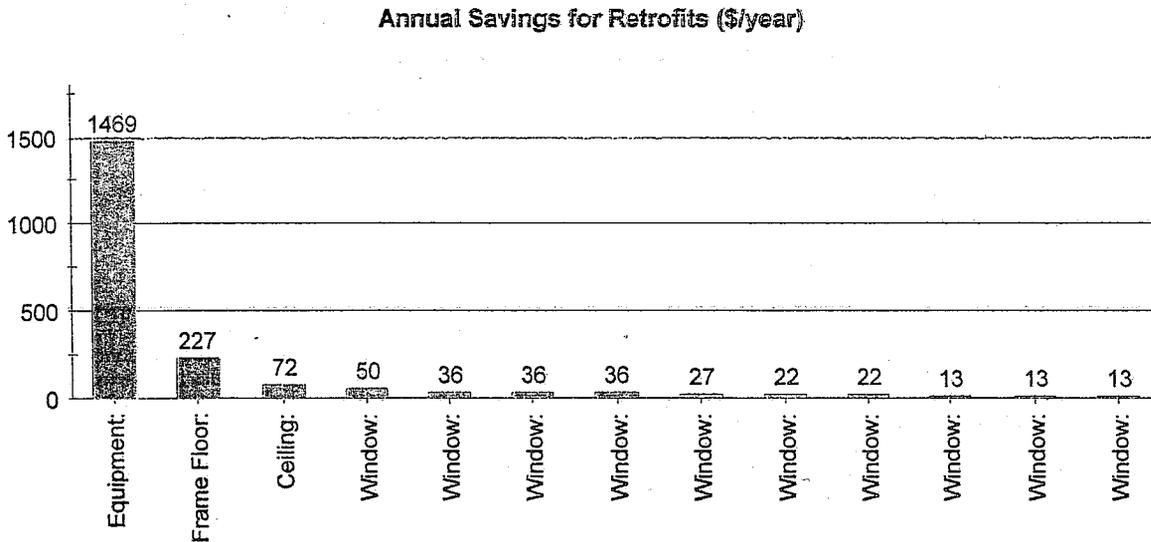
The Energy Costs table compares the "before" and "after" annual energy costs to show energy cost savings. It groups retrofits by "end-uses," which are broad categories of how energy is used (or generated) in a home. Note that Photovoltaic panels (PV) generate energy, so as a result this "end-use" shows 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 HERS Index bar chart provides a snapshot of your home's energy efficiency before and after retrofits. The HERS Index shows the energy efficiency rating of your home, similar to the way a miles per gallon rating shows the efficiency for a car.



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.



	Sq/Ft	Year Built	Heating Fuel	Aprox Annual energy Usage	Problems Found	Initial HERS Score	Recommendations	Final HERS Score	Estimated Savings	20 Year Savings
Carol	1700	70s	Natural Gas	\$1,367	Possible CO Issue, air Infiltration, Low Grade Windows,	119	Correct Combustion Air, Caulk and Seal, Replace Windows	87	\$334	\$6,680
Shana	1200	70s	Propane	\$3,245	Low Attic Insulation, No Insulation in Crawl, Air Infiltration, Expensive heating Fuel	141	Insulate Attic & Crawl Space, Air Seal Living Space, Change Heating Equipment	96	\$1,949	\$38,980

