



YOUR LOCAL ENERGY EFFICIENCY PARTNERS

Welcome to Energy Smart!

You have taken the first step to improving the comfort, safety, and efficiency of your home. The following report details the findings from the Home Energy Assessment on May 23, 2022.

Call your local Energy Smart Colorado Resource Center with any questions or to discover available rebates that can help make these recommendations a reality.

Building type: **Single Family**
Year built: **1979**
Square footage: **2,000**
Primary heating fuel: **Natural Gas**
Number of bedrooms: **3**
Number of occupants: **3**

Home Energy Assessment

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Assessment overview:

With the age of the home there are several opportunities for improvement. Focus on air sealing, insulation in the crawlspace, and improving the hydronic heating distribution system (insulating pipes and improving the underfloor insulation). Read through the report for specific recommendations.

Your utility provider(s):



A Black Hills Energy Company





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Electric utility provider:
Holy Cross Energy
 Electric account #: XXXXX600
 Electricity cost per kWh: \$0.12
 Annual electric usage: 8,260 kWh
 Annual electric cost: \$991

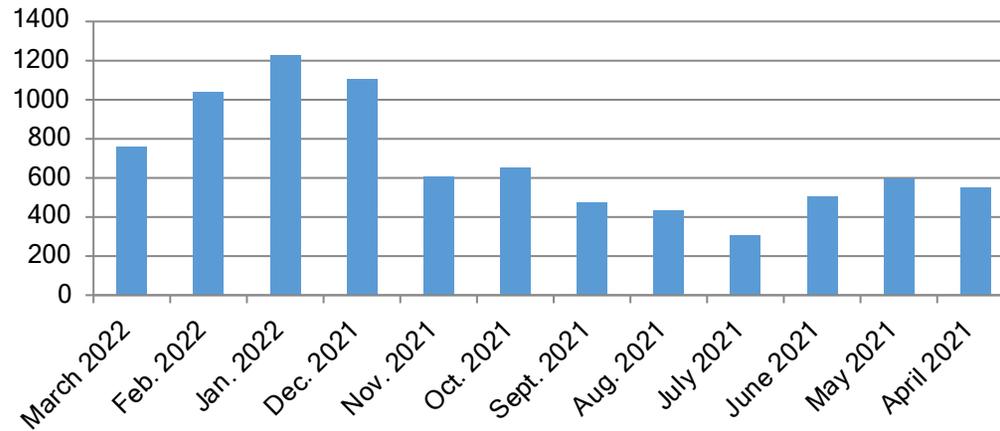
Gas utility provider:
Black Hills Energy
 Gas account #: XXXXX9094
 Gas cost per Therm: \$1.21
 Annual gas usage: 1,961 Therms
 Annual gas cost: \$2,373

Energy Usage

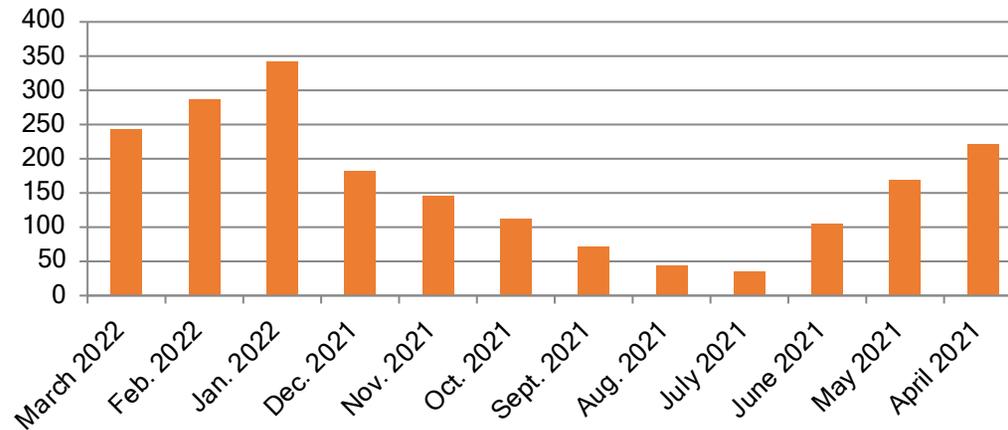
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Electric Usage (kWh)



Gas Usage (Therms)





Recommended Upgrades

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When your Analyst performed your Home Energy Assessment, information was collected to estimate annual energy savings on projects you might consider completing to save money on your energy bills. Below is a breakdown of those suggested improvements, the estimated costs and potential annual savings, which were calculated through software modeling. A Savings to Investment Ratio (SIR) of 1 or greater means that the resulting energy savings will pay for the cost of the project.

Energy Detail (estimated)	Existing Home	Improved Home	Units
Annual energy consumption	195.0	158.3	MMBTU
Annual electrical consumption	8,198	7,743	kWh
Annual gas consumption	1,671	1,319	THERMS
Potential PV system size to offset annual electric usage (estimated)	5.9	5.5	KW

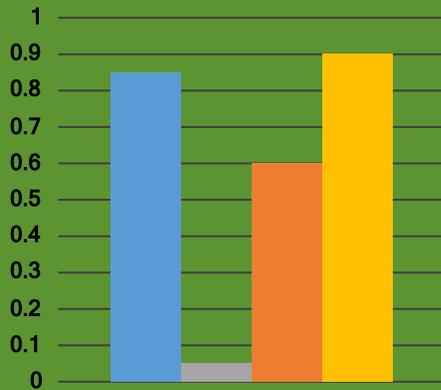
Recommended Improvement	Estimated Cost	Estimated Annual Savings	SIR
Replace incandescent lights with LEDs to save energy and replacement costs.	\$50	\$41	5.8
Reduce air leaks and weatherstrip doors to save energy and increase comfort.	\$1,000	\$253	3.8
Condition your crawl space to save energy and increase comfort.	\$2,000	\$28	0.3

Air Leakage

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Cubic volume: **18,600CF**
Blower door flow rate: **3,910CFM50**



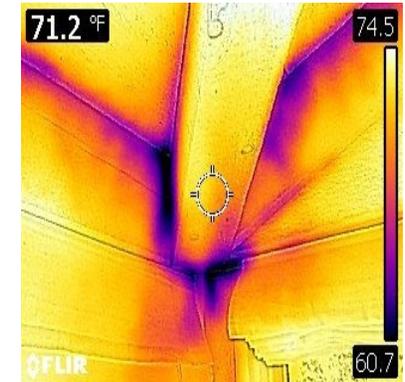
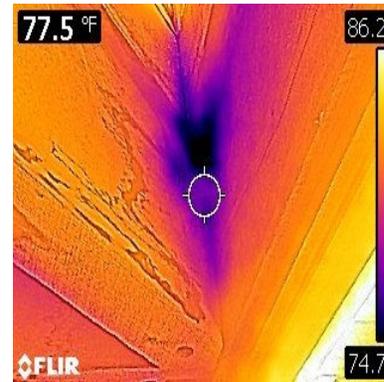
Natural Air Changes per Hour (ACHn)

- Your Home
- Tight Home
- Average Home
- Leaky Home

CF = Cubic Feet. The volume of air contained in a 1' x 1' x 1' cube.
CFM50 = Cubic Feet per Minute at 50 Pascals negative pressure. This number estimates how much air your home loses each hour.
ACHn = Natural Air Changes per Hour. Expressed in the chart above as 0.85, this means that about 85.00 % of the air in your home is lost to the outside every hour.

Energy Smart Tip:

Your analyst used a blower door fan to test for air leakage. This test helps determine how leaky or tight the home is relative to other homes. Your home's natural leakage rate is shown in the chart on the left. A very leaky home costs more to heat, while a very tight home may require continuous mechanical ventilation. Leaks can be repaired through attic floor sealing, caulking, weather stripping, and other means.



Recommendations:

The blower door test revealed the home to be very air leaky. Air sealing leaks is highly recommended. The largest areas of air leakage were found to be through wood panel walls and ceiling, and around beams that penetrate through walls, and through seams in the foundation walls.

Envelope - Foundation

Primary foundation:

Unvented Crawlspace

Percentage of total: **100%**

Existing R-value: **0**

Recommended R-value: **21**

Secondary foundation:

Percentage of total: %

Existing R-value: **0**

Recommended R-value:

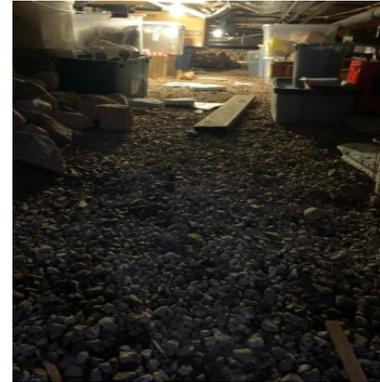
Upgrading Foundations – If your home is built over a vented crawlspace, you can improve energy efficiency, comfort and durability by upgrading the foundation to a “conditioned crawlspace.” This involves sealing and insulating the foundation walls and rim and installing a sealed vapor barrier on the ground.

Energy Smart Tip:

Your home’s foundation is a very important part of its thermal performance. Increasing the level of insulation on your foundation may be an important step to improve comfort. Sealing cracks and gaps can help to reduce “**stack effect**” – a thermodynamic process that contributes dramatically to heat loss in your home. As a result, it is recommended to always combine air sealing with any insulation project.



Remove rim joist fiberglass if spray foaming



Exposed crawlspace ground



Insulation for staple up not installed well or missing

Recommendations:

The crawlspace walls are uninsulated however there is a little bit of insulation underneath the floors. Recommendation would be to insulate around the perimeter of the foundation walls using spray foam insulation. Spray foam will also seal air leaks that are occurring around the rim joist area.

In addition, the insulation that is below the in-floor heating tubing should be better installed (currently the insulation is missing in some bays or has large gaps so that cold air can move behind the insulation). You may want to add more underfloor insulation to the areas that have in-floor tubing - fiberglass batts would be appropriate.

Install a sealed vapor barrier using 10 mill or greater polyethylene. This should be attached and sealed to the foundation wall and spray foam should extend over the edge of the vapor barrier.

Envelope - Walls

Primary wall construction:

Wood Frame

Exterior finish: **Wood Siding**

Existing R-value: **19**

Recommended R-value:

Recommended continuous R-value:

Secondary wall construction:

Exterior finish:

Existing R-value:

Recommended R-value:

Recommended continuous R-value:

Thermal bridging – This term refers to the transfer of heat through the structural components of your home, like wood or steel beams, or other framing elements.

R-value – Represents the capacity of an insulating material to resist heat flow. The higher the R-value, the greater the insulating power.

Energy Smart Tip:

Walls make up the largest percentage of surface area facing the outside environment. Improving wall insulation can be a challenge due to the limited space inside a wall and the difficulty accessing wall cavities. If wall cavities are exposed during a remodel, consider fully insulating them with fiberglass batts. Insulation can also be blown in through holes drilled through the exterior of the home. When replacing exterior siding, rigid insulation such as foam board can be installed to minimize heat loss while also improving the wall's R-value.



Not a continuous air barrier with all the gaps



Wood siding exterior



Drywall is a continuous air barrier

Recommendations:

The walls should be air sealed from the interior. There are a lot of leaks through the wood panel wall finish which is leading to heat loss. If ever replacing the exterior siding you might consider adding rigid foam insulation around the perimeter of the house. This will break thermal bridging that occurs through wall framing.

Envelope - Roof

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Primary roof:

Cathedral Ceiling

Construction: **Wood Frame**
Exterior finish: **Metal Roof**
Percentage of total: **100%**
Existing R-value: **34**
Recommended R-value:

Secondary roof:

Construction:
Exterior finish:
Percentage of total: %
Existing R-value:
Recommended R-value:

Upgrading roofs – Roofs are typically considered for energy improvements when there is easy access to the existing insulation, such as an attic floor, or when you are re-roofing your home. In some cases, rigid foam insulation can be added to your roof deck to increase its thermal performance, saving you money on utility bills and making your home more comfortable.

Energy Smart Tip:

Adding insulation to your attic can be one of the most cost-effective upgrades to your home. Be sure to air-seal all connections between the attic and living space before installing additional insulation. Also be sure to protect existing vents with baffles and complete any repair projects. And don't forget to insulate and weather-strip the attic hatch!



Not continuous air barrier wood panels



Continuous air barrier sheetrock



Continuous air barrier sheetrock

Recommendations:

Roof insulation is reported to be R19 with 3" of nail base - that would be a total assembly insulation value of approximately R34. No recommendations for additional insulation at this time but air sealing is recommended for any ceiling areas that are not sheetrock finished.

Existing window type:
2-pane, wood/vinyl fr.

Recommended window type:

Square footage (sf) of windows:

Front: **sf**
Right: **sf**
Back: **sf**
Left: **sf**

U-factor – This number refers to the ability of your windows to resist heat loss. It is the numerical reciprocal of R-value.

Low-e – These coatings are applied to glass when windows are manufactured and help to reduce the window's emissivity, which can improve insulating properties when properly applied.

Gas filled – Noble gasses are used as an air barrier between panes of glass to help increase a window's thermal performance. The seals that keep these gasses trapped inside can fail over time and should be inspected periodically.

Envelope – Windows & Doors

Your Energy Smart

Analyst:

Tyler Sweeney
(970) 310-1522



Energy Smart Tip:

Adding storm windows, insulating blinds or replacing your current windows can save energy and make your home feel more comfortable. When replacing windows, install energy efficient units with a U-factor of .28 or lower and ensure that the rough opening of the window is properly air-sealed with a low-expanding foam that is approved for doors and windows.



Recommendations:

Windows are older double pane units. If there are any windows that don't shut well and are resulting in air leakage then consider replacing those units. Otherwise the recommendation would be to install thermal insulated window treatments/honeycomb blinds and draw those down at night during winter months.

Heating & Cooling

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Heating system type:

Boiler-Infloor

Fuel: **Natural Gas**

Efficiency rating (AFUE): **93**

Recommended AFUE:

Secondary heating system:

Cooling system type:

None

Efficiency rating (SEER):

Recommended SEER:

Fireplace type: **Wood**

AFUE – Annual Fuel Utilization Efficiency is the measure of your heating system’s efficiency. Higher numbers are more energy efficient.

SEER – Seasonal Energy Efficiency Ratio is the measure of your cooling system’s efficiency. Higher numbers are more energy efficient.

Energy Smart Tip:

Your home’s heating and cooling systems were inspected for safety and efficiency. Older heating systems should be replaced with energy efficient, sealed-combustion units or highly energy efficient heat pumps. This is often a significant upgrade so considerations beyond energy savings should be made. ENERGY STAR certified equipment will provide the best efficiency and savings.



Staple-up insulation is not well installed and is not enough

Recommendations:

For now, continuing to use the existing boiler is probably the best course of action. If/when issues arise and repairs are needed, that would be the time to consider replacing the boiler. At that time an electric heat pump replacement system should be considered. Otherwise replacing with a high-efficiency sealed combustion unit with an AFUE of 96%+ would be the general recommendation.

Insulate all accessible pipes that run through the crawlspace using foam pipe insulation. Make sure the in-floor stapled-up insulation is well installed so that heat is not lost to the crawlspace. Add fiberglass batts to the staple-up for additional insulation where there is in-floor heating tubing.

Water Heating

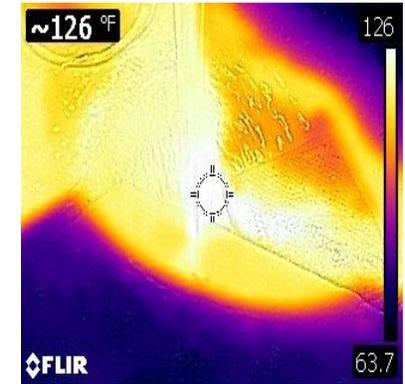
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Hot water system type:
Indirect
Fuel: **Natural Gas**
Set temperature: **126**
Solar thermal assist: **N/A**
Pipes insulated?: **No**
Existing EF:
Recommended EF:

Energy Smart Tip:

Many water heating systems are set to temperatures that are too high for safety and energy efficiency. Keep your water temperature at 120°F for optimum energy performance and to keep your family safe.



126 deg F hot water tank temperature

Recommendations:

The only recommendation for now would be to consider insulating the pipes that come off the tank. This will help reduce heat loss that is caused by convective loops within the pipes.

You might also turn the tank temperature setting down to 120 deg F or less for improved efficiency.

EF – Energy Factor is a metric used to compare the energy conversion efficiency of residential appliances and equipment. EF ratings vary by appliance size and type, but in general, bigger numbers are more energy efficient.

Health & Safety

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Combustion zone location:
Conditioned Space

Ambient CO:

Primary appliance:

- Worst case spillage:
- Worst case flue CO air free:
- Natural conditions spillage:
- Natural conditions flue CO air free:

Hot water appliance:

- Worst case spillage:
- Worst case flue CO air free:
- Natural conditions spillage:
- Natural conditions flue CO air free:

Secondary appliance:

- Worst case spillage:
- Worst case flue CO air free:
- Natural conditions spillage:
- Natural conditions flue CO air free:

CO – A byproduct of combustion, CO (Carbon Monoxide) is a colorless, odorless and tasteless gas that is slightly less dense than air. It is toxic to humans in concentrations above 35 ppm.

Worst case – Your Analyst tested your heating system under the "worst case" conditions for proper operation. If your appliance fails this test, a follow-up test is performed under "natural conditions" to determine if there is a safety risk.

Energy Smart Tip:

Energy Smart Colorado requires analysts to perform combustion safety tests on gas-fired equipment. Problems with furnaces, boilers or water heaters may include but are not limited to: poorly-tuned burners, combustion gas spillage (also called back drafting), gas leaks and improper venting. Any health and safety issues identified by your Analyst should be a top priority and must be repaired by a qualified professional before making efficiency upgrades to the home. ***Caution: improper air-sealing may create safety issues.**



Recommendations:

With combustion appliances in the Home be sure to have Carbon monoxide detectors installed on all floors of the home. And test and replace those detectors periodically per the manufacturers recommendations.

Lighting & Appliances

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Total # of lamps (bulbs): **24**

Incandescent or halogen lamps: **10**

LED or CFL lamps: **14**

Florescent tubes: **0**

Refrigerator ENERGY STAR: **No**
kWh usage per year:

Second fridge ENERGY STAR: **No**
kWh usage per year:

Freezer ENERGY STAR: **No**
kWh usage per year:

Dishwasher ENERGY STAR: **No**

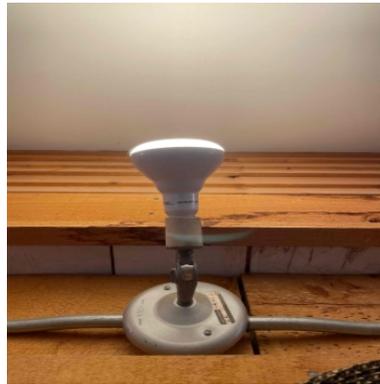
Clothes washer ENERGY STAR: **No**

Tips to reduce kWh base-load:

- 1) Use smart power strips for big energy users like home entertainment systems
- 2) Use laptop computers instead of big towers – they use up to 90% less power
- 3) Upgrade all of your appliances as they age to ENERGY STAR

Energy Smart Tip:

Replace incandescent and CFL lamps with LEDs. LEDs use about 20% of the energy and last up to 25 times longer than traditional incandescent bulbs. They also contain no toxic mercury and turn on instantly. Your refrigerator is usually one of the biggest consumers of electricity in your home. If your fridge is more than 10 years old, consider replacing it with an ENERGY STAR certified unit.



LED



Incandescent



Recommendations:

Replace the most frequently use lights that are still incandescent bulbs with LEDs.

If/when replacing appliances be sure to select high-efficiency energy star rated units.

Direct Installs

The following energy-saving items were installed during the assessment:

Quick Fix installed	Quantity	Cost
Bath aerators:	0	\$0.00
DHW blankets:	0	\$0.00
Kitchen aerators:	0	\$0.00
LED bulbs:	10	\$50.00
Pipe wrap:	0	\$0.00
Showerheads:	0	\$0.00
Thermostats:	0	\$0.00
Weatherstripping:	0	\$0.00
Thermostat setback:	0	\$0.00
DHW setback:	0	\$0.00
TOTAL		\$50.00
QF Annual Savings	\$	\$60.44
QF Annual Savings	kWh	503.7
QF Annual Savings	Therm	0

Costs, Loans and Rebates

1. The [Colorado Residential Energy Upgrade Loan \(RENU\) loan program](#) is a statewide residential loan program sponsored by the Colorado Clean Energy Fund in partnership with Colorado-based credit unions. It makes home energy upgrades easy and affordable by offering low-cost, long-term financing for energy efficiency and renewable energy improvements. Additional [clean energy lenders are linked here](#).

2. [Your electric utility provider](#) is Holy Cross Energy
[Click for electric rebates](#)



Your gas utility provider is Black Hills Energy

[Click here for gas rebates](#)



3. In addition to review the above links for rebates available through your utility provider, Energy Smart Colorado may also have local rebates available for your community.
[Click here for more info](#)

Your assessment invoice					
Assessment costs:		Partner contributions:		Your costs:	
Base cost	\$400.00	Electric utility copay	\$210.00	Your base cost	\$100.00
Additional costs	\$0.00	Gas utility copay		Additional costs	\$0.00
Quick Fix total	\$50.00	Energy Smart incentive	\$140.00	Additional Quick Fixes	\$0.00
				Program discount	\$0.00
Assessment total	\$450.00	Analyst payment	\$320.00	Your total	\$100.00

Energy Advising

Have Questions?

Energy Advisors at your local Energy Smart Colorado **Energy Resource Center (ERC)** can provide unbiased advice on the next steps toward making your home more comfortable and less costly to operate. They can help you with applicable rebates, incentives, contractors and best practices so you know you're making educated decisions that are right for **your** home.

Our Energy Advisors are expert consultants who can:

- Provide expert advice about energy upgrades
- Help you prioritize next steps for your home energy improvements
- Connect you with qualified contractors
- Assist you with applicable rebates and financing, and help you with the paperwork
- Connect you with your utility provider's incentive programs

Interested in Home Electrification (removing fossil fuels from your home)?

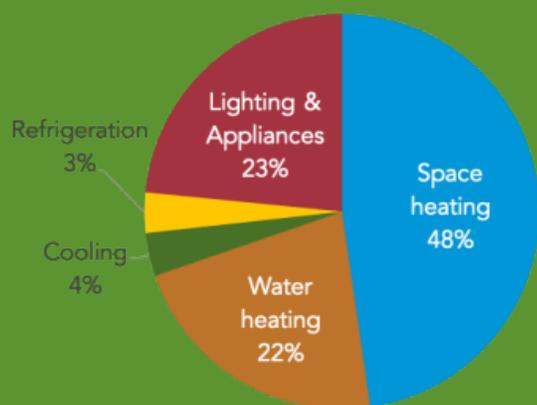
- Visit LoveElectric.org to learn more and to find rebates, installers, and additional resources

You may receive a call from an Energy Advisor offering to review this assessment with you.
We look forward to working with you!

Call to speak with an
Energy Smart Colorado Energy Advisor:
(970) 925-9775
(This is a free service!)

We're here to help!

How do our homes use energy?



Heating our homes accounts for the biggest portion of utility bills in our cold climate.

Source: U.S. Energy Information Administration, [2015 Residential Energy Consumption Survey](#).

Boyles Residence
266 Wildwood Lane, Aspen, CO 81611 Pitkin
edgarboyles@gmail.com
(970) 925-2222



YOUR LOCAL ENERGY EFFICIENCY PARTNERS

Your Home Summary

Your Energy Smart Analyst:
Tyler Sweeney
(970) 310-1522



Metric	Value	Metric	Value	Metric	Value
Building Type:	Single Family	Primary Roof:	Cathedral Ceiling	Combustion Zone Location:	Conditioned Space
Year Built:	1979	Construction:	Wood Frame	Ambient CO:	
Square Footage:	2,000	Exterior Finish:	Metal Roof	Primary Heating Appliance:	
Primary Heating Fuel:	Natural Gas	Percentage of Total:	100%	Worst Case Spillage:	
Number of Bedrooms:	3	Existing R-Value:	34	Worst Case Flue CO Air Free:	
Number of Occupants:	3	Recommended R-Value:		Natural Conditions Spillage:	
Electric Utility Provider:	Holy Cross Energy	Secondary Roof:		Natural Conditions Flue CO Air Free:	
Account #:	XXXXX600	Construction:		Hot Water Heating Appliance:	
Electricity Cost per kWh:	\$0.12	Exterior Finish:		Worst Case Spillage:	
Annual Electric Usage (kWh):	8,260	Percentage of Total:	%	Worst Case Flue CO Air Free:	
Annual Electric Cost:	\$991	Existing R-Value:		Natural Conditions Spillage:	
Gas Utility Provider:	Black Hills Energy	Recommended R-Value:		Natural Conditions Flue CO Air Free:	
Account #:	XXXXX9094	Existing Window Type:	2-pane, wood/vinyl fr.	Secondary Heating Appliance:	
Gas Cost per Therm:	\$1.21	Recommended Window Type:		Worst Case Spillage:	
Annual Gas Usage (Therms):	1,961	Front Window (sf):		Worst Case Flue CO Air Free:	
Annual Gas Cost:	\$2,373	Right Window (sf):		Natural Conditions Spillage:	
Cubic Volume (cf):	18,600	Back Window (sf):		Natural Conditions Flue CO Air Free:	
Blower Door Flow Rate (CFM50):	3,910	Left Window (sf):		Total # of Lamps:	24
Primary Foundation:	Unvented Crawlspace	Heating System Type:	Boiler-Infloor	Incandescent/Halogen Lamps:	10
Percentage of Total:	100%	Heating System Year Installed:	2009	LED or CFLs currently installed:	14
Existing R-Value:	0	Heating System Fuel:	Natural Gas	Florescent Tubes:	0
Recommended R-Value:	21	Efficiency Rating (AFUE):	93	Refrigerator ENERGY STAR:	No
Secondary Foundation:		Recommended AFUE (or equiv.):		Refrigerator kWh Usage per Year (est.):	
Percentage of Total:	%	Secondary Heating System:		Second Fridge ENERGY STAR:	No
Existing R-Value:	0	Cooling System Type:	None	Second Fridge kWh Usage per Year:	
Recommended R-Value:		Efficiency Rating (SEER):		Freezer ENERGY STAR:	No
Primary Wall Construction:	Wood Frame	Recommended SEER:		Freezer kWh Usage per Year (est.):	
Exterior Finish:	Wood Siding	Fireplace Type:	Wood	Dishwasher ENERGY STAR:	No
Existing R-Value:	19	Hot Water System:	Indirect	Clothes Washer ENERGY STAR:	No
Recommended R-Value:		Hot Water System Year Installed:	2009	Clothes Dryer ENERGY STAR:	
Recommended Continuous R-Value:		Hot Water System Fuel:	Natural Gas	Clothes Dryer Fuel Source:	Electricity
Secondary Wall Construction:		Set Temperature:	126	Heat Tape Length (ft):	
Exterior Finish:		Solar Thermal Assist:	N/A	Heat Tape Estimated kWh per month:	0
Existing R-Value:		Pipes Insulated?:	No	Hot Tub Capacity:	
Recommended R-Value:		Efficiency Rating:		Hot Tub Estimated kWh per month:	0
Recommended Continuous R-Value:		Recommended Efficiency:		If Electric Baseboard, Length (ft):	