Home Performance with ENERGY STAR®

Audit Report

HOME PERFORMANCE WITH ENERGY STAR

Efficiency Vermont

Audit Date:

December 31, 2014

Prepared For:

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CONSTRUCTION COMPANY

This Report Includes:

- **Existing conditions**
  Current situation and general summary
- **Improvement costs and savings**
  Details about improvements costs and savings
- **Proposed improvements**
  Summary of proposed improvements
- **Resources**
  Information about the program, definitions, explanations, and additional details

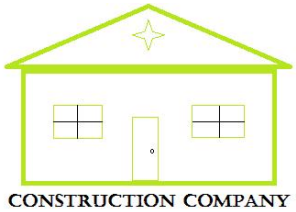
Dear Paul and Linda Ericson,

Thank you for choosing Contracting Construction to help you improve your home. It was a pleasure meeting you and talking with you about ways we can improve your comfort and lower your energy bills.

The improvements we recommend for your home will allow you to be much more comfortable and save approximately $167 per year.

This report is intended to explain a comprehensive set of recommendations for your home that work together to provide lasting benefits. I will contact you soon to follow up and discuss how we can best provide this service to you.

Sincerely,
Bobby George
555-555-7583
Bobby@sample.com



Existing Conditions

Building Size: 3,463 Sq Ft

Annual Energy Use:

Fuel:
Gas - 1,038 CCFs, $1,536

Electric: 6,256 kWh, $ 1,065

Total: $ 2,601

Heating, Btu/sq. ft./yr.:

This home: 24,944

Typical improved Vermont home: 30,000-40,000

ENERGY STAR new home: less than 20,000

Electrical, kWh/yr.

This home: 6,256

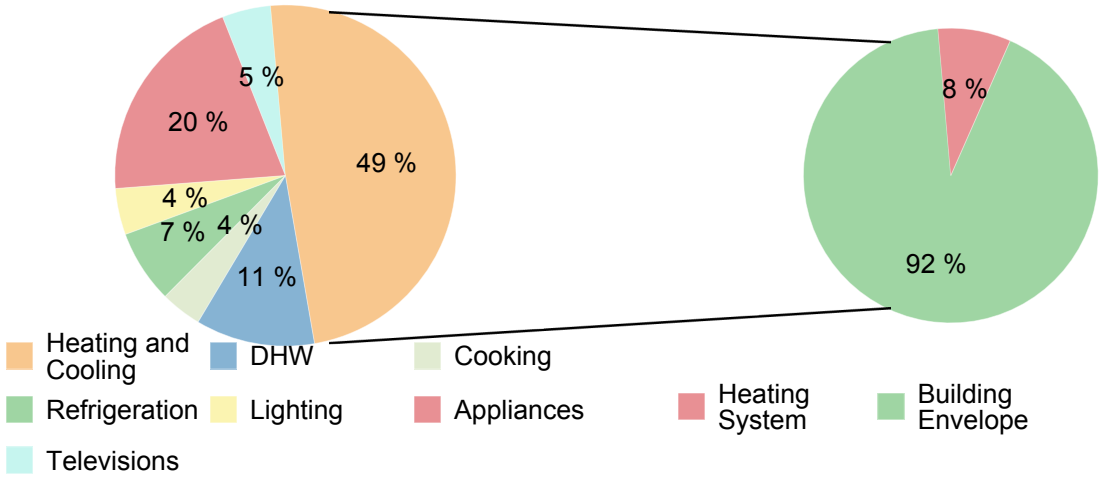
Average Vermont home: 7200

Owner Concerns

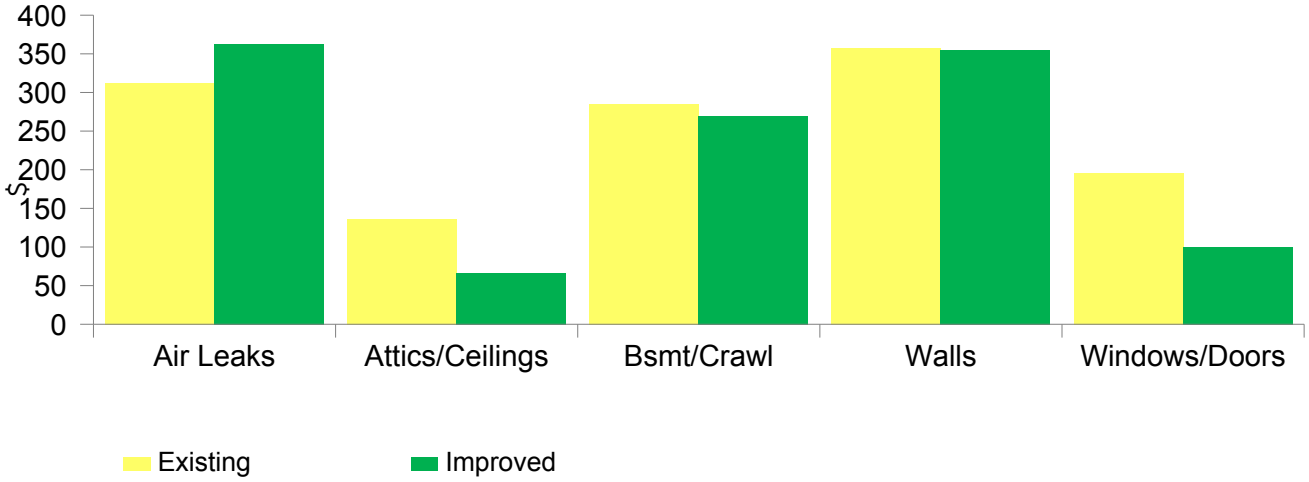
1	Want to save energy and money.
2	House feels drafty.
3	Homeowner suspects that the windows are leaky.
4	Interested in rebates for energy efficiency improvements.

This house has been built with white cedar wood and has square windows which allow enough light to enter the home. The house is equipped with a large kitchen and two modern bathrooms, it also has a fairly small living room, four bedrooms, a modest dining room, and a study.

Where does your money go?



How is your building losing heat?



The pie charts to the left show you the percentage of energy used in your home for different purposes. The smaller pie chart shows you what percentage of your heating and cooling energy is used for heating and cooling and how much is lost/gained to the building envelope and distribution. The bar chart at the bottom shows you how much money you are losing to different parts of the house before and after implementing improvements.

Improvement Package

With these proposed energy saving measures, you could save an estimated:

$109/year*
at current energy prices

>20 years
total simple payback

0%
Annual Return on Investment

863 lbs
Estimated annual CO2 (lbs) savings

These savings are ESTIMATES ONLY and can be influenced by many factors such as fuel prices, occupancy, or weather.

Improvement Projects	Estimated Total Cost	Estimated Incentive	Estimated Annual Savings
Moisture - Prevent moisture issues and repair damage	$100	-	-
Insulate basement	$500	$67	$16
Insulate attic	$3,200	$325	$52
Insulate vault / flat	$2,250	$86	$30
Windows	$16,900	-	$105
Air seal	$1,850	$1,000	-$94
Package Total	**$24,800**	**$1,478**	**$109**
Total Package Costs after Incentives:	**$23,322**	**-**	**$109**

Energy costs comparison over a 10 year period

Estimated energy costs without improvements
$34,852

Estimated savings after improvements
$1,443

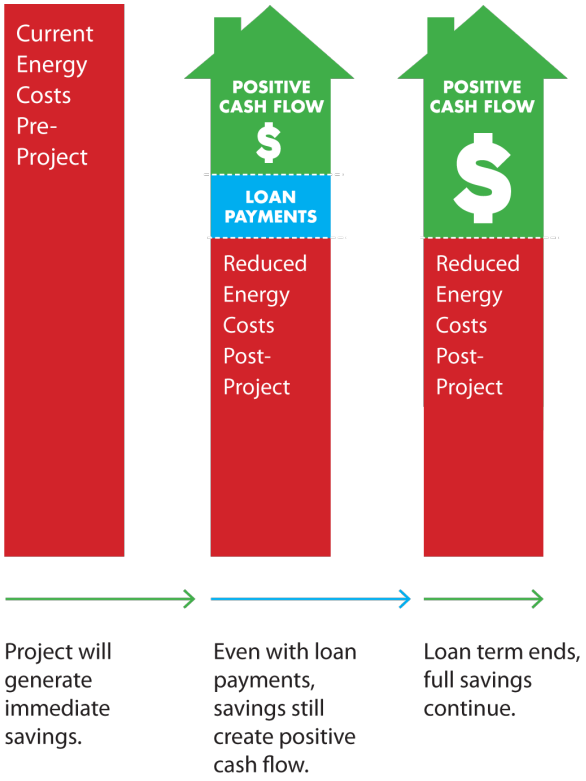
Estimated energy costs after improvements
$33,409

Based on 5% annual increase in fuel prices*

*In the last 10 years, average fuel prices in Vermont have increased more than 10% per year. All savings figures provided in this report are estimates, based on calculator tools grounded in building science.

Desirable Financing Scenario

How you can still save and keep a positive cash flow?

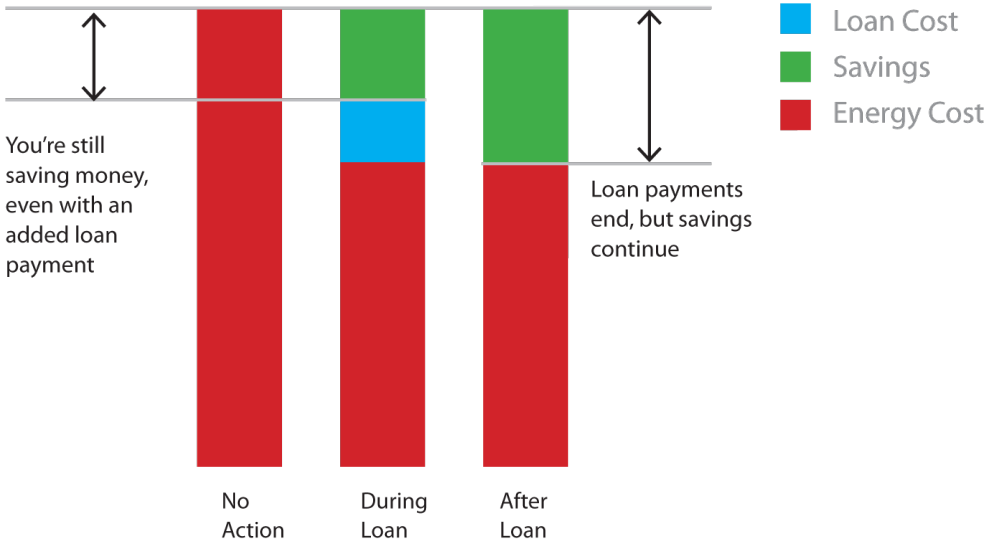


Net Savings = Postitive Cash Flow

Potential Financing Scenarios

	5 Years	30 Years
Total Project Cost	$24,800	$24,800
Efficiency Vermont Incentive	($1,478)	($1,478)
Total Customer Cost	$23,322	$23,322
Total Amount Borrowed	$23,322	$23,322
Financing Rate (%)	5%	5%
Total Cost to Homeowner	$27,021	$46,119
Annual Loan Cost to Homeowner	$5,404	$1,537
Annual Estimated Energy Savings	$109	$109
Annual Net Savings	($5,295)	($1,428)
Savings Over Loan Term	$546	$3,278

Estimated Costs vs Savings with a 30 Year loan



Proposed Improvements for Health and Safety

Existing Condition	Recommendation
Moisture/Mold Issue	Prevent moisture issues and repair damage

Efficiency Vermont's program requires that projects comply with specific health and safety standards. Your audit included assessments and tests to discover any pre-existing issues that might need to be addressed prior to your project. The detailed results of the tests are in the Resources section. While every effort has been made to be comprehensive, we cannot guarantee that all issues have been identified.

Attic Moisture

frosting on roofing nails indicates elevated attic moisture

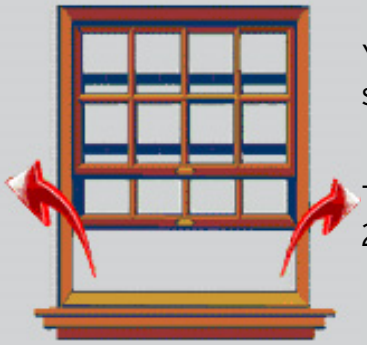
drip from roof, no perceivable leak, presumed condensation

A lack of ventilation in the home, combined with ceiling air barrier penetrations, are contributing to elevated moisture in the attic. Air-sealing and ventilation will help to address this issue.

Proposed Improvements for Reducing Air Leakage

Air Leakage Testing		ACH 50*
Current Condition	3550 CFM@50pa	6.7
Improvement Recommended	40% Leakage Reduction	3.7
Ventilation	**Base**	**Improved**
Mechanical	None	Exhaust - 116 CFM

*ACH50 (Air changes per hour at 50 Pascals) compares air leakage to the volume of the house. A higher number indicates a leakier house. Standards for new construction often call for 3 to 5 ACH.



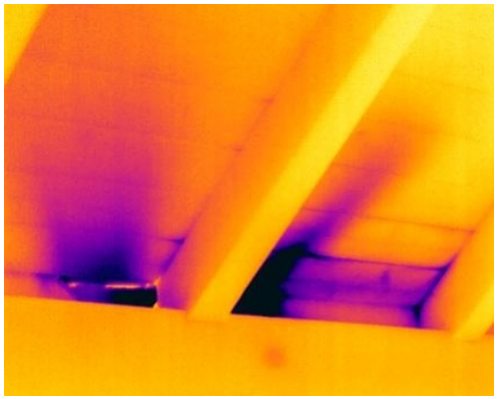
Your building leaks as much air as a single 200 square inch hole.

This is equivalent to leaving a standard 28" wide window open 7.1" all the time.

Air leakage allows conditioned air to escape increasing your energy costs. However, the movement of air through your home also removes odors, pollutants, and moisture. When taking steps to air-seal your home, keep in mind that proper ventilation and air distribution work to provide a safe, comfortable and durable home.

Air Sealing Opportunities

Band joists are a large source of air leakage in the home



Spot air leakage exists in building envelope transitions

Band joist air leaks contribute to uncomfortable floor drafts, and are one of the most accessible areas in the home to target for improvement. The ceiling is a critical area to air-seal to address moisture concerns prior to insulating. Spot air-sealing at envelope transitions will help improve comfort. Air-sealing the connecting garage walls and ceilings is important for health and safety.

Proposed Improvements for Attic/Ceiling

Location	Base Cavity Insulation	Base Cont Insulation	Sq. Ft.	Improved Cavity Insulation	Improved Cont Insulation
Attic Area 1	7.5 in.; R-25.5 Blown Cellulose (Loose)	N/A	812	17 in.; R-55 Cellulose loose blown (/in)	N/A
Ceiling Area 1	3 in.; R-10.2 Blown Cellulose (Dense)	None	196	9 in.; R-31 Cellulose dense pack (/in)	No Improvement
Ceiling Area 2	8 in.; R-27.2 Blown Cellulose (Dense)	None	280	0 in.; R-0 Cellulose dense pack (/in)	No Improvement

Insulation is your primary defense against heat loss/gain through your home's envelope. The effectiveness of insulation is based on its "R-Value", the standard measure of thermal resistance. A higher R-Value results in slower heat loss/gain, lower heating bills, and a more comfortable and greener home. Attic insulation is almost always the first priority in terms of a practical, cost-effective improvement to a home. Installing the right amount of attic insulation is a key to reducing heating and cooling costs.

Room exists to add more insulation after air-sealing

insulation has settled in the sloped ceilings

Proposed Improvements for Windows

Old and inefficient windows and doors, along with poor air sealing and insulation, are often the key reasons your home is uncomfortable and less energy efficient. They work together to create a tight building envelope that greatly enhances the performance of your home.

Window Replacements

Your decision to replace the windows in your home will yield energy savings and improve your comfort. An estimate of performance and cost has been made, but as this work is being done by another contractor, actual costs and performance improvements may vary.

Proposed Improvements for the Basement and Crawl Space

Location	Base Cavity Insulation	Base Cont Insulation	Sq. Ft.	Improved Cavity Insulation	Improved Cont Insulation
Basement	0 in.; R-0 Lo-Den. FG/Rock Batt	2 in.; R-10 Extruded Polyst. (XPS)	1035	2 in.; R-14 Other	No Improvement
Rim Joists	**Base Treatment**	**Base Insulation**	**Sq. Ft.**	**Improved Treatment**	**Improved Insulation**
Basement	Separately	4 in.; R-9 Lo-Den. FG/Rock Batt	106	Separately	10 in.; R-32 Other

Exposed concrete or masonry wall systems lose a great deal of energy during the heating season. The below-grade portion of the wall also loses large amounts of energy. Insulating the basement walls and crawl space will prevent most of this heat loss/gain.

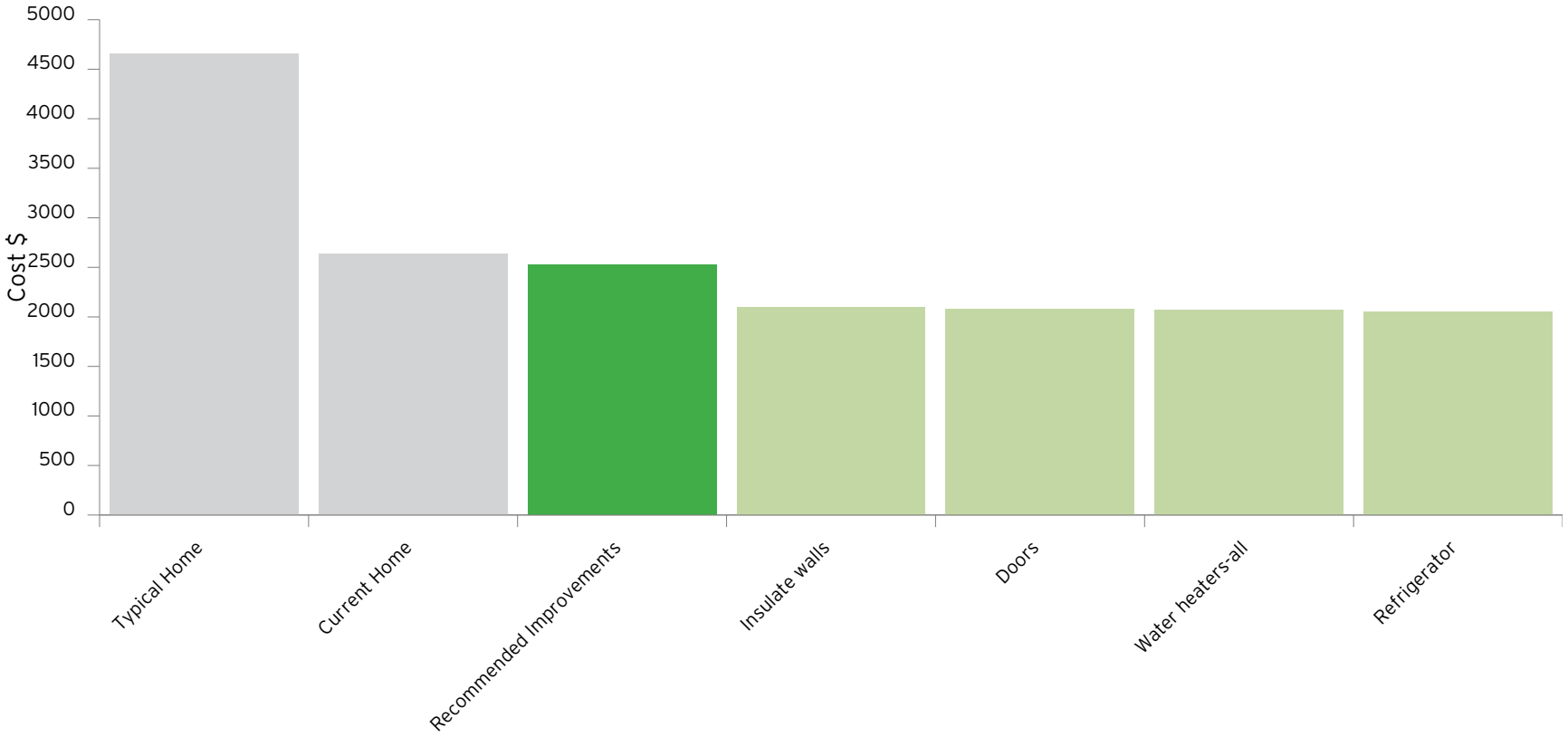
Band Joist Insulation

Band joist insulation can be upgraded once air-sealed

After the fiberglass is removed to air-seal the band joists, a superior cellulose insulation pillow will be installed for a net gain in thermal peformance.

Your Roadmap to Reduce Energy Costs

This chart shows your current energy use and the amount it will decrease as each improvement is made in your home. The left-most bars compare your home's usage (before improvements) to a similar home in your area. If you were to complete all of the improvements identified for your home, your energy use would be reduced to the amount shown in the rightmost bar on the graph.



Home Facts & Summary of Existing Components

About this home

Year Built: 1986
Number of Bedrooms: 4
Number of Stories: 2
Average Ceiling Height: 9.2 Ft
Conditioned Floor Area: 3463
Front of House Direction: East

Air-tightness

Ventilation Rate (ACH): 6.7
(ASHRAE 82-1989 standard is .35 ACH)

Roof, Attic and Foundation

Roof

Roof Material: Asphalt Shingles

Attic

Attic Type: Open Cavity
Attic Insulation: R-25.7

Foundation

Foundation Type: Basement
Foundation Insulation Value: R: None
Floor Insulation Value: 23
Rim Joist Insulation Value: Basement: 13.7

Wall Construction

Wall Type: Frame with Metal/vinyl siding
Wall Insulation Value: R-11

Windows and Skylights

Window Type: Double-Pane, Low-Gain LoE, Wood Frame, Argon Fill

Heating/Cooling Systems

Heating System

System 1 Fuel: gas
Type: boiler
Efficiency: 92%

Cooling System

System 1 Type: none installed
Efficiency: 0.0

Other Systems

Ducts

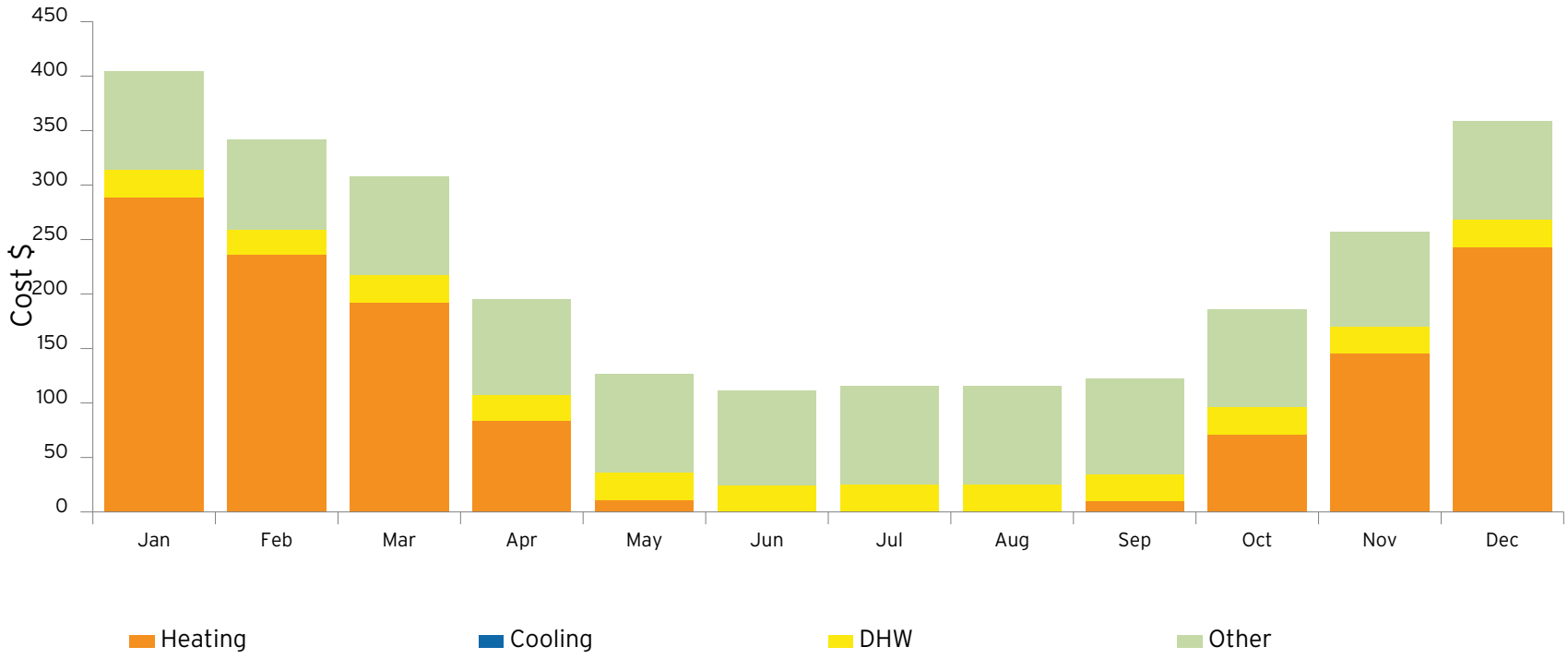
Hot Water System

DHW 1 Fuel: Gas
EF: 56%
Type: Indirect Tank

Where Do the Energy Efficiency Estimates Come From?

Information about energy features of your building, like insulation levels, has been entered into a software program that estimates how much energy your building would use, on average, based on those features. This is an energy model of your building, which is represented by bars in the graph below. That estimation is then compared to your building's historical energy usage projected onto an average weather year, represented by the green line below. The contractor compares these two and makes adjustments to the model to match your usage – that "match-up" is displayed below. In this way, the model is "customized" to your building and usage. The customized model then estimates energy savings after installation of recommended energy improvements, like more insulation or air sealing.

If historical fuel bills aren't available to customize the model, estimated energy savings figures are based solely on the present and recommended energy features of your building in a typical weather year with typical occupancy. In this scenario the green line will not be present in the graph.



COMBUSTION APPLIANCE ZONE (CAZ) TEST RESULTS

The data in the following tables are the results of our detailed testing of your home's combustion appliance zone and the individual combustion appliances.

Combustion Appliance Zone					
	Baseline	Worst Case	Pressure Result	Ambient CO	CO Result
CAZ 1	-0.2	-1.6	Pass	0	Proceed with work

Individual Appliance Tests							
System	Spill Worst Case	Draft Worst Case	CO Steady State	Spill Natural	Draft Natural	Steady State Natural	Leak Test
Heater 1	Pass	0	0	0	0	0	Pass

Definitions, Explanations and Links

Annual Fuel Utilization Efficiency (AFUE)
– The measure of seasonal or annual efficiency of a residential heating furnace or boiler. It takes into account the cyclic on/off op-eration and associated energy losses of the heating unit as it responds to changes in the load, which in turn is af-fected by changes in weather and occupant controls.

Annualized Return
– The return an investment provides over a period of time, expressed as a time-weighted annual percentage. This is the equivalent annual interest rate you would get if you put the same amount of money spent on the energy upgrade into a savings account.

Asbestos
– Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant, but is no longer used in homes. When asbestos-containing materials are damaged or disturbed by repair, remodelling or demolition activities, microscopic fibers become airborne and can be inhaled into the lungs, where they can cause significant health problems.

British Thermal Unit (Btu)
– The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit; equal to 252 calories.

Carbon Monoxide (CO)
– A colorless, odorless but poisonous combustible gas with the formula CO. Carbon monoxide is produced in the incomplete combustion of carbon and carbon compounds such as fossil fuels (i.e. coal, petroleum) and their products (e.g. liquefied petroleum gas, gasoline), and biomass.

Cashflow
– When financing energy efficiency improve-ments, cashflow is the difference between the average monthly energy savings and the monthly loan payment.

Combustion Appliance Zone (CAZ)
– A contiguous air volume within a building that contains a combustion appliance such as furnaces, boilers, and water heaters; the zone may include, but is not limited to, a mechanical closet, mechanical room, or the main body of a house, as applicable.

Compact Fluorescent Light bulb (CFL)
– A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These highly efficient lights consist of a gas filled tube, and a magnetic or electronic ballast.

Cubic Feet per Minute (CFM)
– A measurement of airflow that indicates how many cubic feet of air pass by a station-ary point in one minute.

Carbon Dioxide (CO2)
– A colorless, odorless noncombustible gas that is present in the atmosphere. It is formed by the combustion of carbon and carbon compounds (such as fossil fuels and biomass) and other methods. It acts as a greenhouse gas which plays a major role in global warming and anthropogenic climate change.

Energy Efficiency Ratio (EER)
– The measure of the instantaneous energy efficiency of room air conditioners; the cooling capacity in Btu/hr divided by the watts of power consumed at a specific outdoor temperature (usually 95 degrees Fahrenheit).

Energy Factor (EF)
– The measure of overall efficiency for a variety of appliances. For water heaters, the energy factor is based on three factors: 1) the recovery efficiency, or how efficiently the heat from the energy source is transferred to the water; 2) stand-by losses, or the percentage of heat lost per hour from the stored water compared to the content of the water: and 3) cycling losses. For dishwashers, the energy factor is defined as the number of cycles per kWh of input power. For clothes washers, the energy factor is defined as the cubic foot capacity per kWh of input power per cycle. For clothes dryers, the energy factor is defined as the number of pounds of clothes dried per kWh of power consumed.

Heating Seasonal Performance Factor (HSPF)
– The measure of seasonal or annual efficiency of a heat pump operating in the heating mode. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of heat delivered for every watt-hour of electricity used by the heat pump over a heating season.

Heat Recovery Ventilator (HRV) / Energy Recovery Venti-lator (ERV)
– A device that captures the heat or energy from the exhaust air from a building and transfers it to the supply/fresh air entering the building to preheat the air and increase overall heating efficiency while providing consistent fresh air.

Light Emitting Diode (LED) Lighting
– An extremely effi-cient semiconductor light source. LEDs present many ad-vantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, and smaller size.

N-Factor
– A factor of how susceptible your house is to wind, influenced by weather patterns, location, and the number of floors in the home. Used in the calculation of NACH.

Natural Air Changes per Hour (NACH)
– The number of times in one hour the entire volume of air inside the build-ing leaks to the outside naturally.

Payback Period
– The amount of time required before the savings resulting from your system equal the system cost.

R-Value
– A measure of the capacity of a material to resist heat transfer. The R-Value is the reciprocal of the conduc-tivity of a material (U-Value). The larger the R-Value of a material, the greater its insulating properties.

Radon
– A naturally occurring radioactive gas found in the U.S. in nearly all types of soil, rock, and water. It can migrate into most buildings. Studies have linked high con-centrations of radon to lung cancer.

Rim Joist
– In the framing of a deck or building, a rim joist is the final joist that caps the end of the row of joists that support a floor or ceiling. A rim joist makes up the end of the box that comprises the floor system.

Seasonal Energy Efficiency Ratio (SEER)
– A measure of seasonal or annual efficiency of a central air conditioner or air conditioning heat pump. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of cooling delivered for every watt-hour of electricity used by the heat pump over a cooling season.

Savings to Investment Ratio (SIR)
– A ratio used to deter-mine whether a project that aims to save money in the fu-ture is worth doing. The ratio compares the investment that is put in now with the amount of savings from the project.

About Efficiency Vermont's Home Performance with ENERGY STAR and Building Performance programs

Efficiency Vermont provides technical assistance, rebates, and other financial incentives to help Vermont households and businesses reduce their energy costs. We offer up to $2,100 or $5,100 in incentives per household or business, respectively, to help Vermonters pay for energy efficiency building improvements completed by a certified Home Performance with ENERGY STAR® or Building Performance contractor.

Efficiency Vermont's Role: Efficiency Vermont works with participating contractors who have been certified by the Building Performance Institute (BPI) and have received program training and support in order to offer incentives. To participate in Vermont's Home Performance with ENERGY STAR or Building Performance program, owners must use a program participating contractor and the Efficiency Vermont requires that work is subject to testing before and after completion by the contractor in order to verify incentive conditions have been met. Efficiency Vermont administers the program, performs quality assurance inspections on a percentage of the projects, provides training, and pays incentives. Efficiency Vermont reserves the right to conduct field inspections to verify installations.

Participating Contractors Role: Participating contractors are private independent contracting companies who work under a participation agreement to offer Efficiency Vermont incentives to their customers. Program contractors perform energy audits and subsequent work in accordance with program policies and procedures, including the Building Performance Institute (BPI) standards. The contractor must perform testing before and after completion of work in order to establish an effective scope of work, confirm air leakage reduction levels and evaluate combustion systems for safe operation. All results are reported by the contractor to Efficiency Vermont for review and approval.

Incentives: The incentive offer is available to customers of select Vermont utilities and may be subject to change without notice. If you are either a Vermont Gas customer or a Burlington Electric customer without Vermont Gas service, your incentive will be coming directly from Vermont Gas or Burlington Electric, respectively. In accepting financial incentives, the customer agrees that Efficiency Vermont holds the sole rights to any electric system capacity credits and/or environmental credits associated with the energy efficiency measures for which incentives have been received. These credits will be used for the benefit of VT ratepayers.

Disclaimer of warranties and endorsements: All participating contractors offer a one year's warranty on labor and materials from the date work is performed. Efficiency Vermont does not warranty the performance of installed equipment or materials either expressly or implicitly for fitness for a particular purpose, or that the equipment or materials or its installation complies with any specifications, laws, regulations, codes or standards. All savings figures provided in this

report are estimates, based on calculator tools grounded in building science. These estimates can vary depending on many factors, including number of occupants, number of days occupied, and how the building is used, and no building behaves exactly as predicted. Efficiency Vermont does not warranty savings estimates for accuracy or a percentage of the quoted estimate. No particular manufacturers, products, or system designs are endorsed through this program.

Complaint Resolution Policy: Customer disputes regarding any aspect of the energy efficiency work should be brought to and resolved directly with your contractor. If a resolution cannot be reached, Efficiency Vermont can help facilitate an agreement, but will not provide a guarantee or warranty for independent contractors' workmanship omissions or deficiencies, whether actual or purported.

If requested, Efficiency Vermont will perform an on-site inspection of any work at any stage of completion for the purposes of providing a third party, independent evaluation. After 90 days of test-out of the project, the inspection will be limited to (a) verifying that the measures reported on the final incentive form are present (b) verifying that the measures reported on the final incentive form are installed according to Building Performance Institute (BPI) and program requirements and (c) addressing any specific customer concerns related to the project work scope.

Safety and Building Codes: You and your contractor are responsible for ensuring that building improvements are installed, operated and maintained in compliance with all applicable laws, codes, regulations, rules, standards, and manufacturer's instructions. Home or building improvements for which incentives are paid must comply with BPI Technical Standards and other program specifications. Incentives will not be paid for any work that disturbs vermiculite insulation.

Renovation to any building built before 1978 must be performed by a contactor certified in lead safe practices as required by U.S. Environmental Protection Agency regulations. Any exposed foam plastic interior wall covering must be installed in compliance with the 2011 Vermont Residential Building Energy Standards.

Verification by Efficiency Vermont: Efficiency Vermont inspects a percentage of homes or buildings where incentives were paid to verify that the work performed is consistent with the work scope provided by the program participating contractor. Efficiency Vermont verification site visits do not encompass and shall not identify violations of any other law, code, or regulation, including but not limited to local building codes. You and your contractors are responsible for ensuring that all home or building improvements comply with all applicable local building codes in consultation with a local building inspector charged with certifying such compliance.