



HOME ENERGY ASSESSMENT

4/21/2014



PREPARED FOR:

Martha Washington
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PREPARED BY:

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BuildGreen LLC

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Dear Martha Washington,

Thank you for choosing us for your home energy performance audit. We hope you have found our products and services helpful and the information our crew shared with you useful. This report provides information to help you understand your energy usage as well as tips and recommendations to help you save more on your energy bill.

Prepared by:

John Jones on behalf of **BuildGreen LLC**

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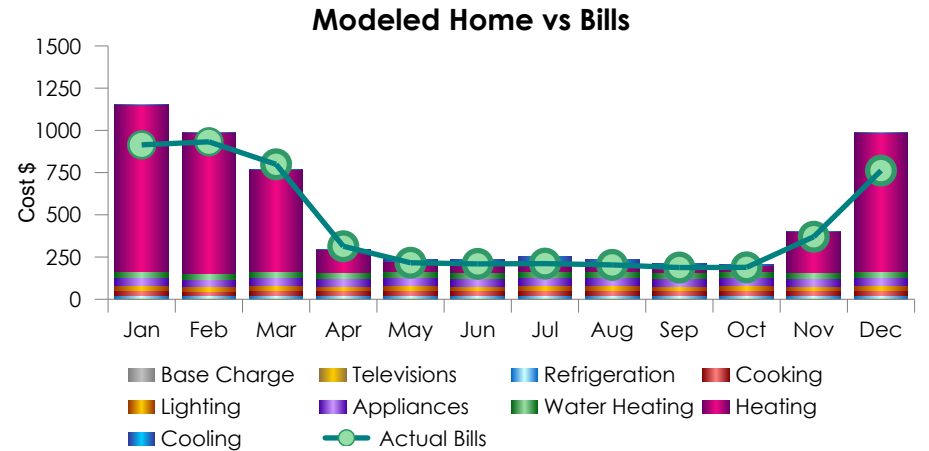
YOUR HOME PERFORMANCE CONCERNS

You reported the following concerns about the energy use and comfort of your home:

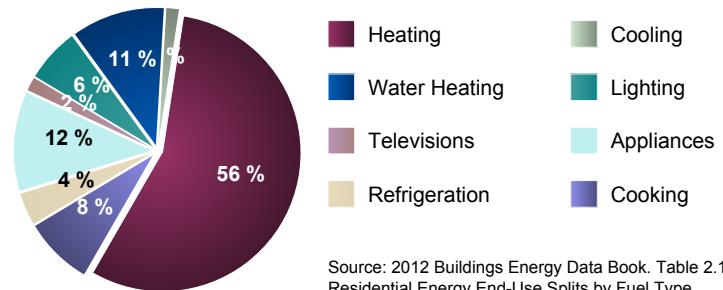
- Want to save energy and money.
- Interested in rebates for energy efficiency improvements.

YOUR HOME'S MONTHLY ENERGY USE

This graph shows how your energy usage can vary each month based on different factors such as weather. The data contained in this graph corresponds to the actual days in the month and not your billing cycle.



**THE USUAL SUSPECTS:
TYPICAL ENERGY USAGE BREAKDOWN**



Source: 2012 Buildings Energy Data Book. Table 2.1.5. 2010 Residential Energy End-Use Splits by Fuel Type. Your usage will vary.



UNDERSTANDING HOUSEHOLD ENERGY USE

HEATING & AIR CONDITIONING

Heating and cooling account for 54% of the average household's energy usage.*

WATER HEATING

Water heating is typically the second largest use of energy in your home, representing about 16% of your annual energy use.*

LIGHTING

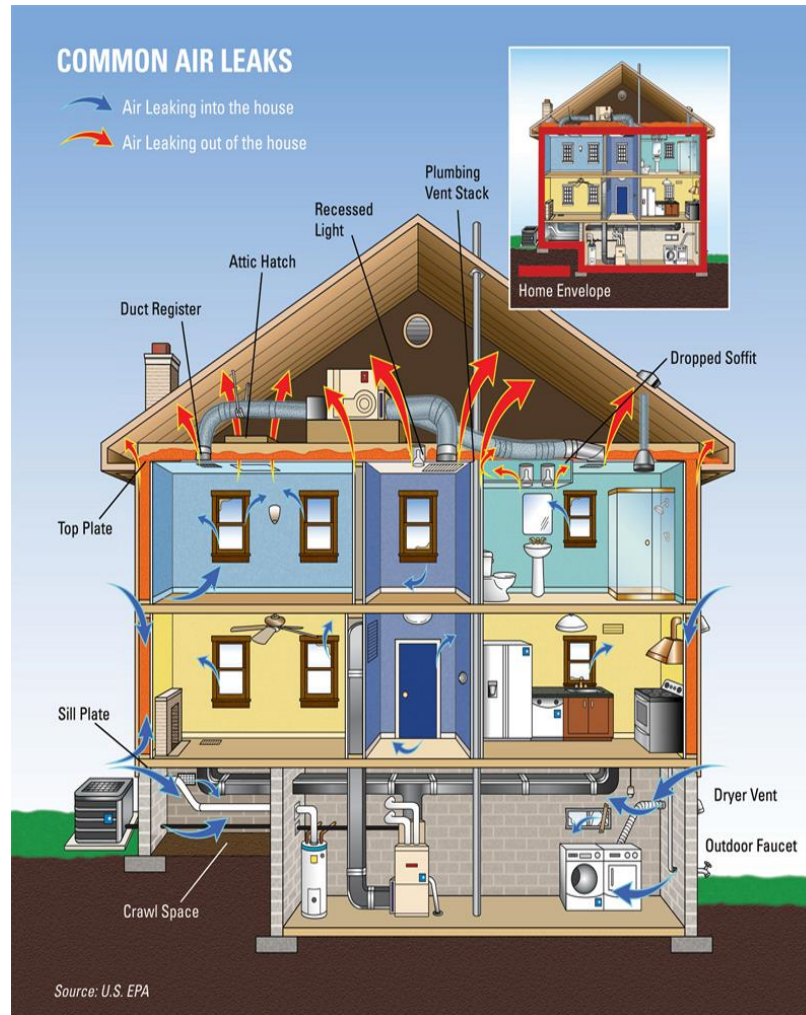
An average household spends about 6% of its annual energy budget on lighting.*

APPLIANCES

Replacing old appliances like refrigerators, freezers and clothes washers for newer ENERGY STAR® models can reduce your energy use for those appliances by 10-50%.*

WINDOWS & DOORS

Old, inefficient windows and doors are often among the primary reasons your home is uncomfortable and inefficient. Good seals around doors and windows create a tight building envelope that greatly enhance the performance of your home.



ATTIC & CEILING INSULATION

Installing the right type and depth of attic insulation helps reduce heating and cooling costs.

WALL INSULATION

Insulating the sidewalls of a home to the recommended R-value will accomplish three critical goals: reduce heat loss in winter and heat gain in summer resulting in lower energy use, reduce air leakage and keep walls closer to the range of optimal comfort.

AIR INFILTRATION & VENTILATION

Air infiltration contributes to drafts, uncomfortable temperature and moisture problems that affect the performance of building materials. To combat these issues, take steps to air-seal your home. Proper ventilation mitigates the presence of indoor pollutants such as molds, chemicals and gases.

FOUNDATION INSULATION

Exposed concrete or masonry wall systems lose a great deal of energy during the heating season. Insulate and properly air-seal the rim joist space.

*Source: 2012 Buildings Energy Data Book. Table 2.1.6. 2010 Residential Energy End-Use Splits by Fuel Type.



HOME FACTS & SUMMARY OF EXISTING COMPONENTS

About this home

Year Built: 1944
Number of Bedrooms: 2
Number of Stories: 2
Average Ceiling Height: 7.5 Ft
Conditioned Floor Area: 1650
Front of House Direction: South

Air-tightness

Ventilation Rate (ACH): 1.7
(ASHRAE 82-1989 standard is .35 ACH)

Roof, Attic and Foundation

Roof

Roof Material: Asphalt Shingles

Attic

Attic Type: Open Cavity
Attic Insulation: R-12

Foundation

Foundation Type: Basement
Foundation Insulation Value: Basement: R-None
Rim Joist Insulation Value: Basement: R-6

Wall Construction

Wall Type: Frame with Wood siding
Wall Insulation Value: R-10.5

Windows and Skylights

Window Type: Double-Pane, Clear, Wood Frame

Heating/Cooling Systems

Heating System

System 1 Fuel: Oil
Type: Boiler
Efficiency: 81% AFUE

Cooling System

System 1 Type: Room/Window Air Conditioning unit/s
Efficiency: 9.0 EER

Other Systems

Ducts

Hot Water System

DHW 1 Fuel: Oil
EF: .68
Type: conventional water heater



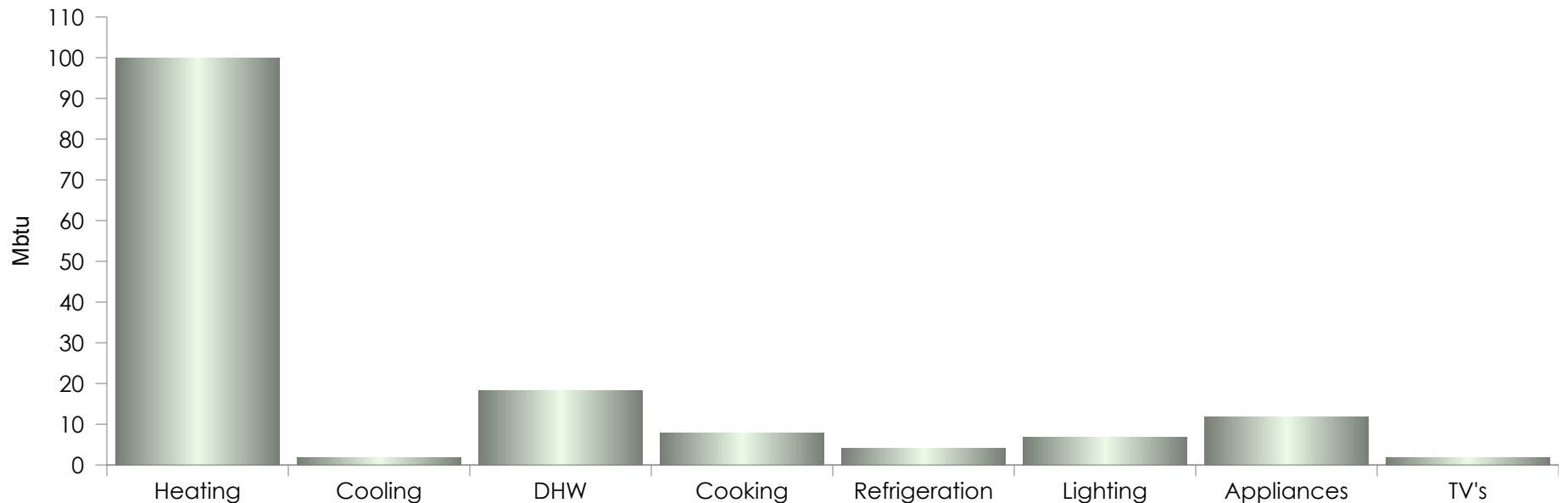
CURRENT ENERGY USE

This is a snapshot of how much energy your home is consuming and how the energy is being used. The chart shows the breakdown of consumption by the systems, lights, and appliances in your house.

Total kWh consumed per year: 6,935
Total annual electricity cost: \$971

Total Therms consumed per year: 1,315
Total annual fuel cost: \$3,638

System, Lighting, & Appliance Consumption





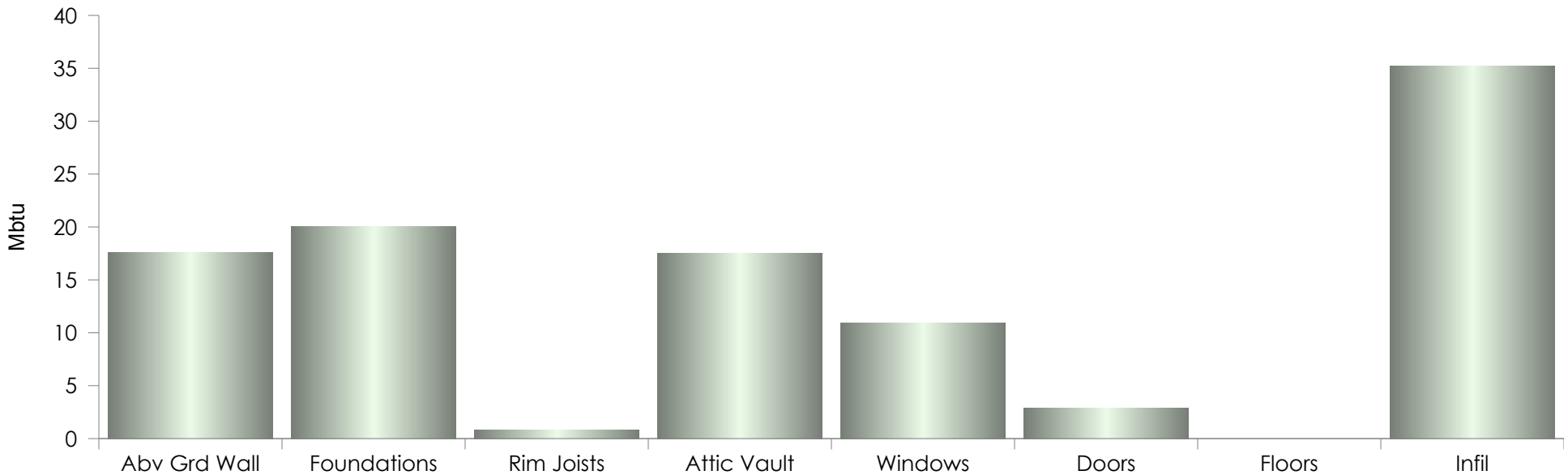
HEATING & COOLING LOADS

Here's how much you're spending on heating and cooling and where all that energy is going. The chart shows how energy flowing through the various components of your home contributes to heating and cooling loads.

Total cooling kWh consumed per year: 502
Total annual cooling cost: \$70

Total heating Therms consumed per year: 995
Total annual heating cost: \$2,576

Component Loads





YOUR IMPROVEMENT PACKAGE

Improvements	Base	Improved	Energy Saved MBtu	% Energy Saved	Annual Savings	Cost	Total Incent	Net Cost	SIR
Insulate attic	R=14.4	R=40.9	6.5	4.2%	\$169	\$1,279	-	\$1,279	2.5
Air seal	4308 CFM	1723 CFM	24.7	15.9%	\$621	\$4,823	-	\$4,823	1.9
Doors	U=0.46	U=0.21	1.7	1.1%	\$43	\$717	-	\$717	1.2
Insulate bsmt/slab	R=0.0	R=21.6	15.7	10.1%	\$406	\$2,223	-	\$2,223	3.5
Heating systems-all	Eff.=81%	Eff.=92%	6.9	4.5%	\$178	\$3,300	-	\$3,300	.8
Lighting	10% CFL (4 / 41)	90% CFL (37 / 41)	2.5	1.6%	\$135	\$74	-	\$74	12.2
Appliances	2164 kWh / 14 MBtu	2164 kWh / 14 MBtu	-	-	-	-	-	-	.0
Package Total			58.1	37%	\$1,552	\$12,417	-	\$12,417	2.0
Health & Safety					-	\$700	-	\$700	
Pkg + H&S + Added			58.1	37%	\$1,552	\$13,117	-	\$13,117	2.0

Procedures used to make these estimates are consistent with criteria established by the U.S. Department of Energy for residential assessments. Actual installation costs and savings realized from installing measures may differ from the estimates contained in this report. The cost and incentive detailed above are estimated by your energy advisor. Final costs and incentives may differ from these estimates based on the actual scope of work installed.



ESTIMATED IMPACT OF IMPROVEMENTS ON UTILITY BILLS

Utility Bill with Inflation

Current Bill

Year	0	5	10	15	20
Electricity	\$971	\$1,239	\$1,581	\$2,018	\$2,576
Fuel	\$3,638	\$4,643	\$5,926	\$7,563	\$9,652
Total bill	\$4,609	\$5,882	\$7,507	\$9,581	\$12,229

With Package

Year	0	5	10	15	20
Electricity	\$817	\$1,042	\$1,330	\$1,698	\$2,167
Fuel	\$2,240	\$2,859	\$3,649	\$4,657	\$5,944
Total bill	\$3,057	\$3,901	\$4,979	\$6,355	\$8,111

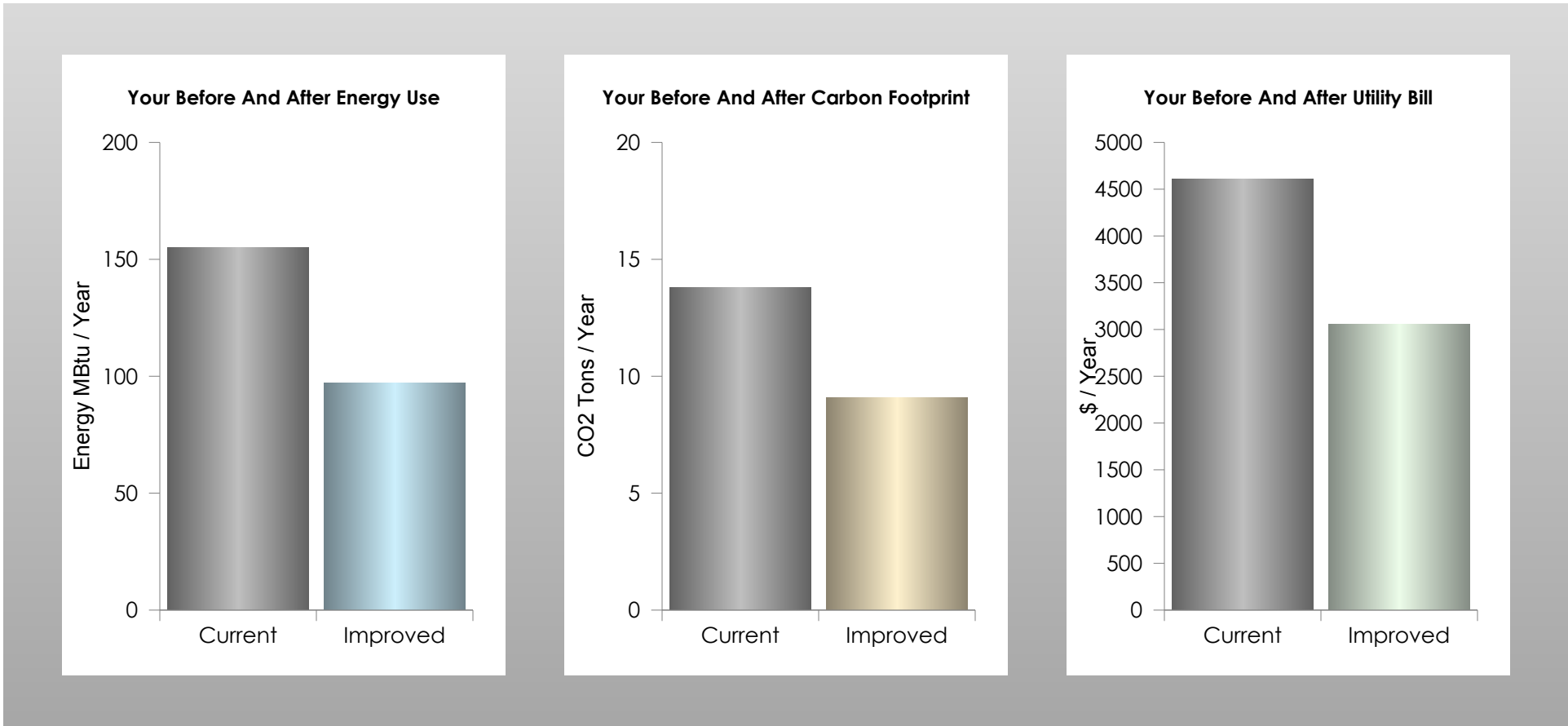
Estimated Savings

Year	0	5	10	15	20
Electricity	\$154	\$197	\$251	\$321	\$409
Fuel	\$1,398	\$1,784	\$2,277	\$2,906	\$3,708
Total bill	\$1,552	\$1,981	\$2,528	\$3,226	\$4,118



ENERGY IMPROVEMENT SUMMARY

View the results of the proposed energy improvements in these three charts, which show the energy saved, your reduced carbon footprint, and the savings in your utility bills.*



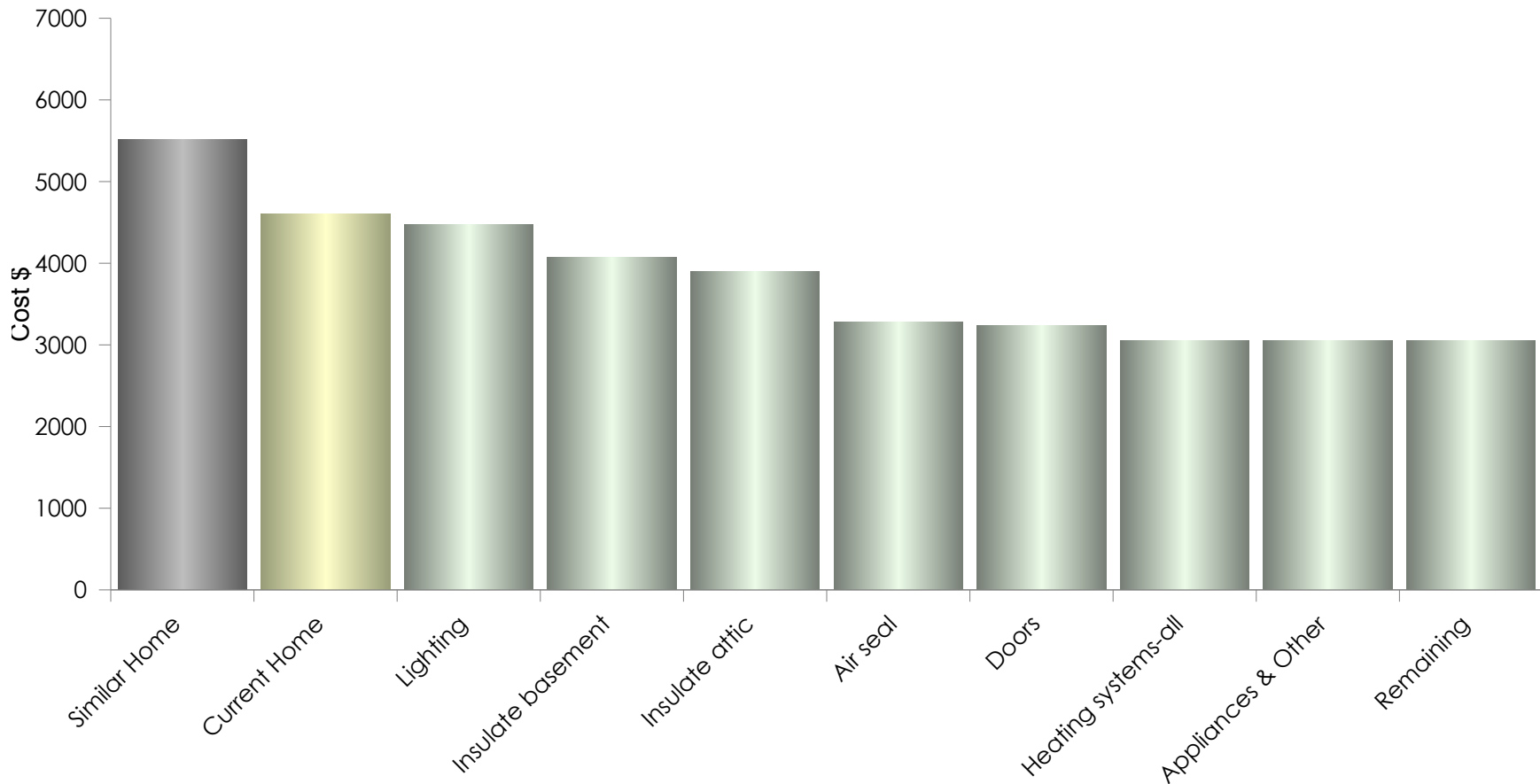
*Energy savings estimates are based on typical year and assume building and usage characteristics. Savings may vary depending on building usage, weather and building characteristics.



YOUR HOME'S ENERGY USE DECREASES WITH EACH IMPROVEMENT

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 suggested in the selected improvement package, your energy use would be reduced to the amount shown in the right-most bar on the graph.¹

Your Before and After Energy Use Compared to an Average Home



*Energy savings estimates are based on typical year and assume building and usage characteristics. Savings may vary depending on behavior, weather and building characteristics.



YOUR ATTIC AND CEILING INSULATION

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.

ATTIC: Current insulation: Depth: 8.0 in. R-Value: Nominal: R-16 Effective: R-12.4	ACTION: Replace Depth: 18.8 in. R-Value: Nominal: R-60 Effective: R-60.2	SAVE: an estimated \$169 on your energy bills each year.
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CEILING: Type: fiberglass Depth: 9.5 in. R-Value: Nominal: R-19 Effective: R-16.5	ACTION: No improvement has been selected.	SAVE:
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YOUR FOUNDATION INSULATION

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, slab, and crawl space will prevent most of this heat loss/gain.

<p>BASEMENT:</p> <p>Location: the basement is not insulated Type: -- R-Value: Nominal: R-0 Effective: R-0.0</p>	<p>ACTION:</p> <p>Location: interior walls Type: fiberglass R-Value: Nominal: R-13 Effective: R-21.6</p>	<p>SAVE:</p> <p>an estimated \$406 on your energy use.</p>
<p>Slab:</p> <p>Your house does not have a slab.</p>	<p>ACTION:</p> <p>Location: None Type: none recommended R-Value: R-0</p>	





AIR INFILTRATION

Energy efficiency is more than just saving money on energy bills, it is about protecting human health, increasing comfort, and preventing damage to your home. Older homes often allow in unconditioned air (infiltration) that contains moisture, odors, and particulate pollutants. Infiltration contributes to drafts, uncomfortable temperatures, and high humidity levels.

A common strategy in energy conservation is to tighten the building envelope with air-sealing as much as reasonably possible. In doing so, homeowners are advised to consider mechanical ventilation. Sealing the home also has the potential to increase the health concerns associated with radon. Homeowners are advised to consult agencies for the risks in their areas, perform suggested testing, and take mitigation action as may be required.

INFILTRATION:

Current Leakage:
0.0010 SqIn/SqFt
Current ACH50:
20.9

ACTION:

Target Improvement:
60% Leakage Reduction

SAVE:

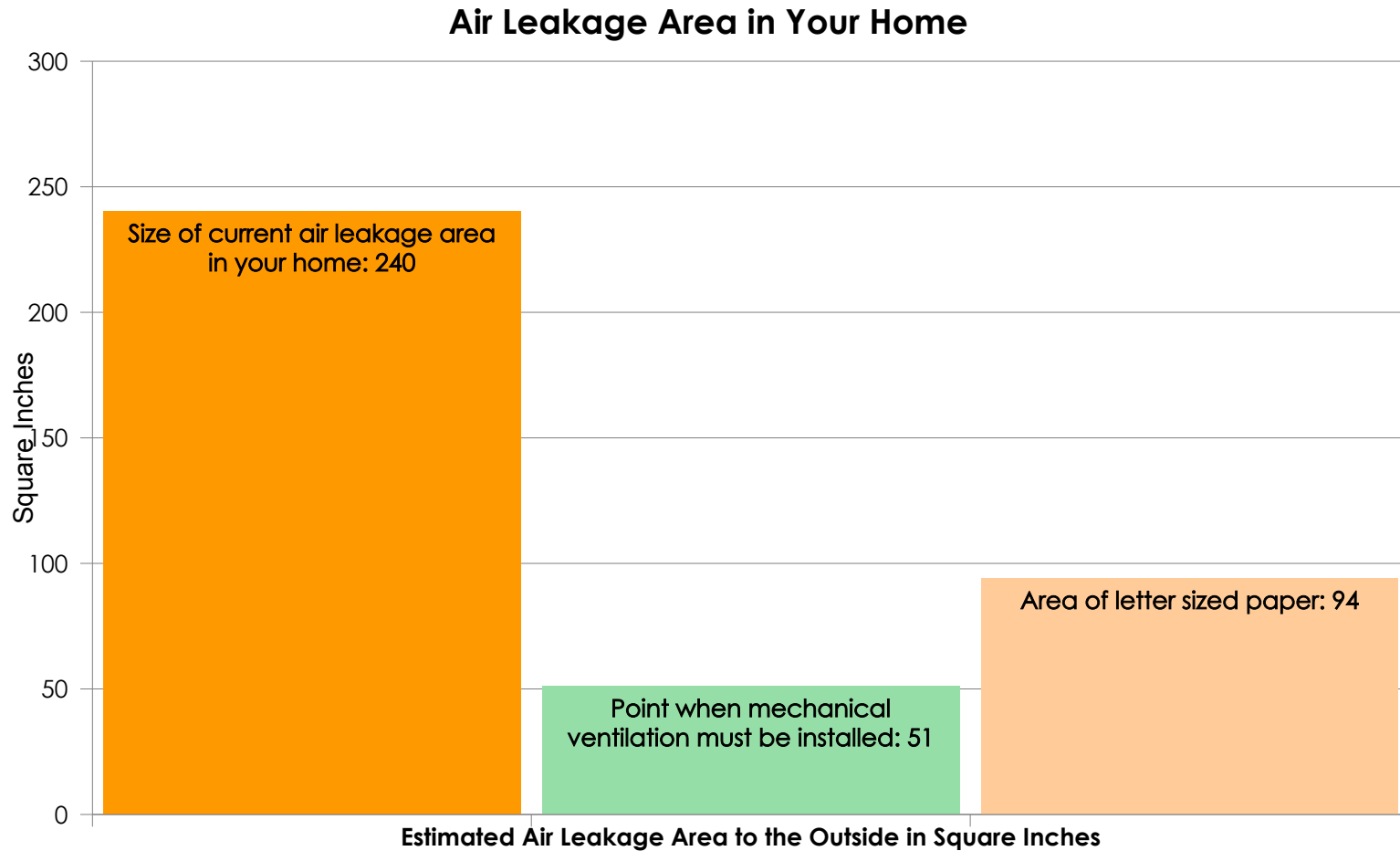
an estimated
\$621
on your energy bills each
year.





AIR LEAKAGE AREA IN YOUR HOME

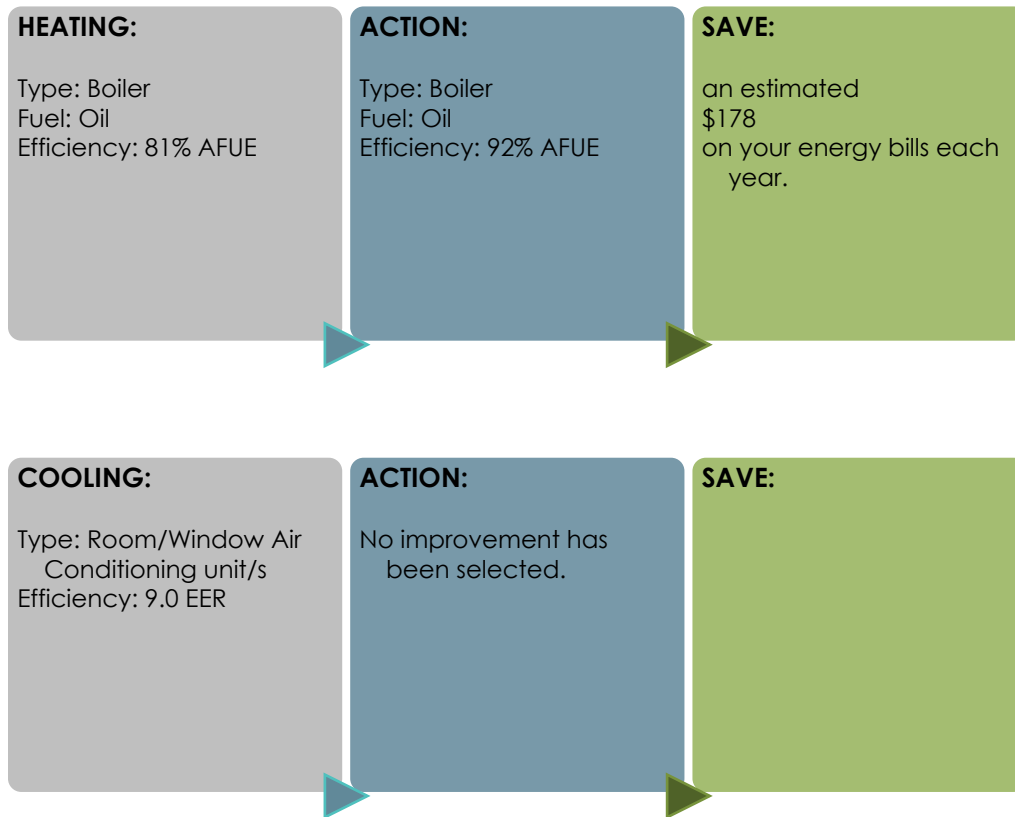
Air leakage allows conditioned air to escape increasing your energy costs. However, the movement of air through your home also removes odors, pollutants, and moisture. When taking steps to air-seal your home, keep in mind that proper ventilation and air distribution work to provide a safe, comfortable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



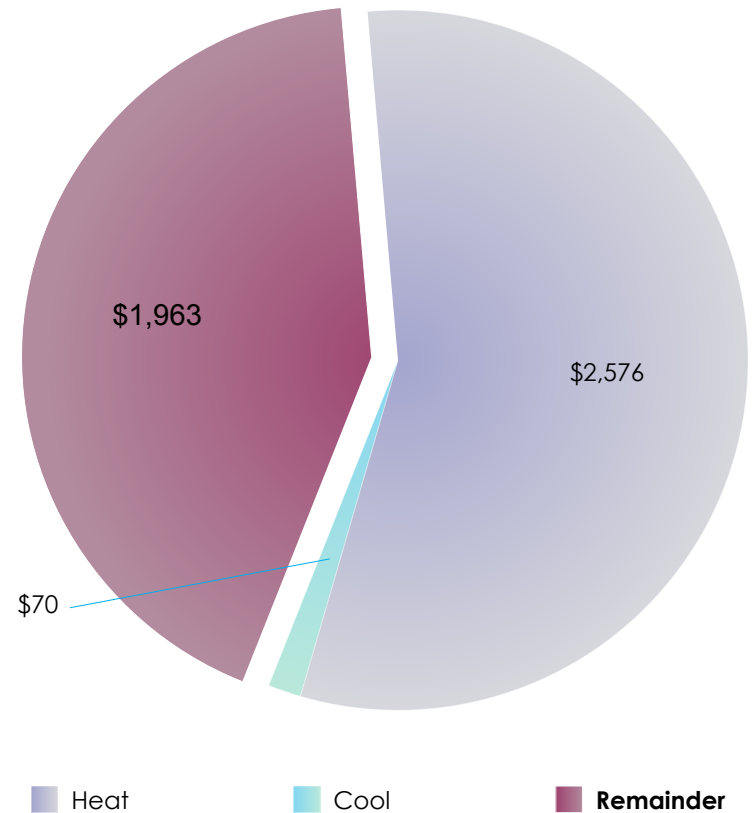


YOUR HEATING AND AIR CONDITIONING

Heating and cooling account for 54% of the average household's energy usage, making it the largest energy expense of most homes. A properly sized HVAC system is designed to provide heat comfortably and efficiently to a home. Heating systems are commonly oversized, resulting in energy waste, short cycling, reduced equipment life, maintenance issues, air quality issues, and discomfort.



Heating and cooling cost \$2646, or 57% of your annual energy bills.





SYSTEM DETAILS

The mechanical systems in your house may include heating and cooling systems, hot water systems, as well as ventilation. The following table provides a summary of your mechanical systems.

System	Fuel	Brand	Model	Type	System	Efficiency
Heating System 1	Oil	Unknown		Boiler	Generic 1992-Present	80.82 AFUE
Cooling System 1	Elec	Unknown		Room Air Conditioner	Generic 1992-Present	9 EER
DHW 1	Oil	Unknown		Tank Water Heater	Generic 1992-Present	76

Both heating and cooling systems can have their own forms of delivery. This table provides a summary of your heating and cooling delivery systems including the systems' insulation and leakage.

Delivery System	Location	Insulation	Leakage	Supply Static Pressure	Return Static Pressure
Heating 1 Delivery	Unconditioned Loc	N/A	N/A	0.0000	0.0000
Cooling 1 Delivery	N/A	N/A	N/A	0.0000	0.0000



DESIGN LOADS AND CONDITIONS

Design Loads

Design loads are instantaneous loads describing what is currently required from the mechanical systems to heat and cool the building, and what would be required if the recommended package of improvements was implemented. Design loads allow us to determine whether the current systems are appropriately sized, and what an optimal system would be given other efficiency improvements.

Base Heating Loads

Location	Heating Btu	% of Load
Walls	8,933	10.6 %
Floors	-	0 %
Foundations	9,306	11 %
Ceilings	8,899	10.5 %
Windows/Doors	7,009	8.3 %
Infiltration - Sensible	46,159	54.6 %
Infiltration - Latent	-	0 %
Internal - Sensible	-	0 %
Internal - Latent	-	0 %
Distribution	4,227	5 %
Total	84,533	100%

Improved Heating Loads

Location	Heating Btu	% of Load
Walls	8,933	21.4 %
Floors	-	0 %
Foundations	-	0 %
Ceilings	5,965	14.3 %
Windows/Doors	6,213	14.9 %
Infiltration - Sensible	18,464	44.3 %
Infiltration - Latent	-	0 %
Internal - Sensible	-	0 %
Internal - Latent	-	0 %
Distribution	2,083	5 %
Total	41,657	100%

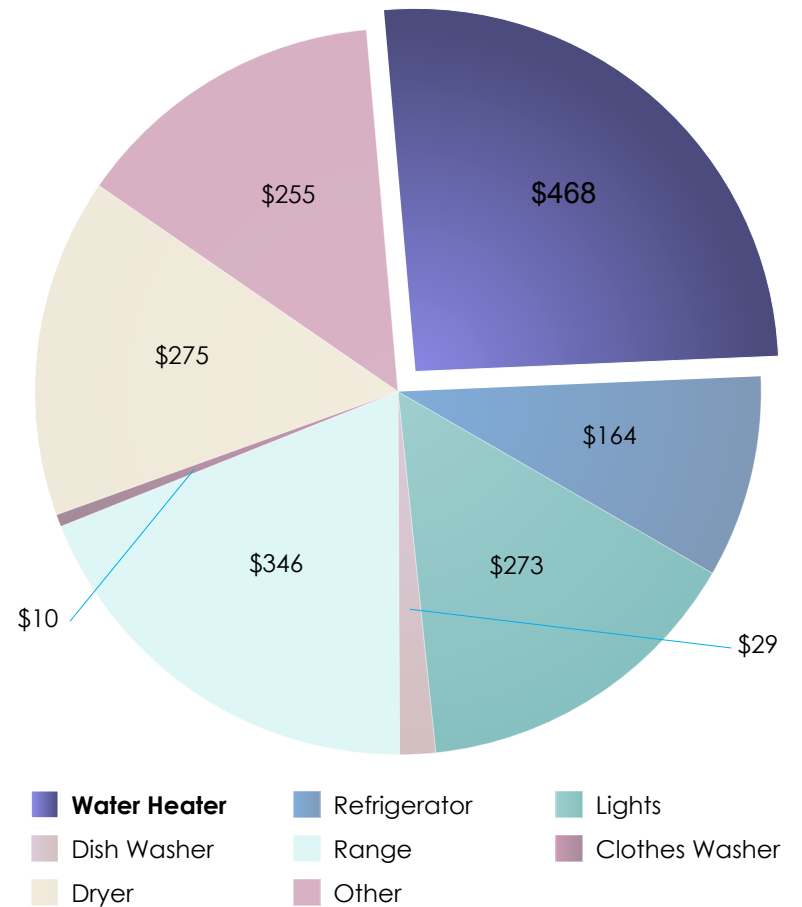


WATER HEATING

Conventional storage water heaters are the most common type of residential hot water system. High efficiency, sealed combustion units are achieving 90% - 96% thermal efficiency versus 80% efficiency for standard units.



It costs \$468 to heat your water, or 10% of your annual energy bills.





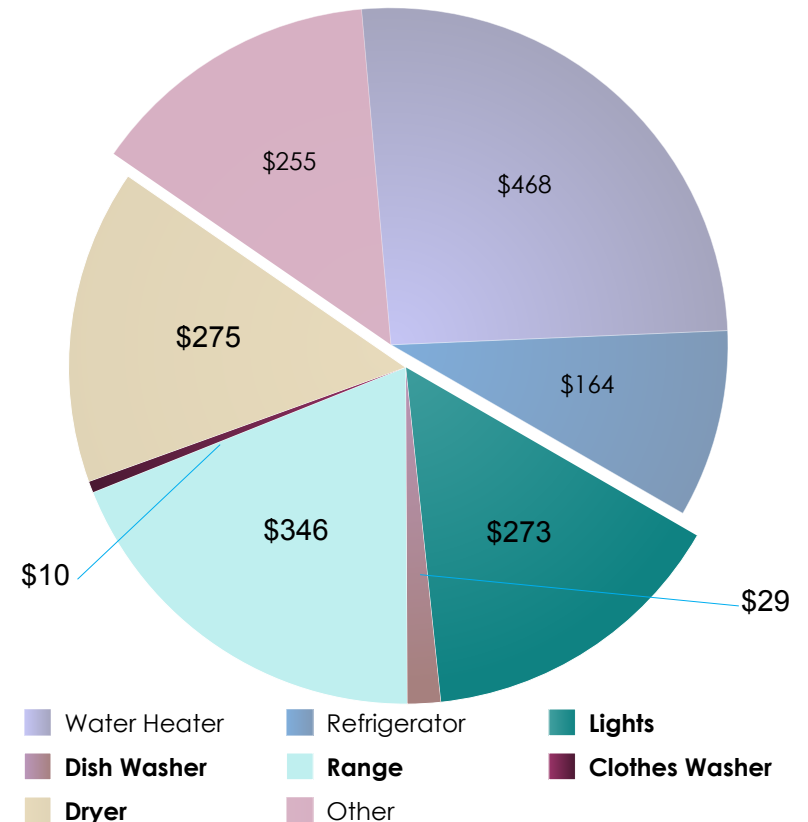
LIGHTING AND APPLIANCE USAGE

About 13% of an average household's energy is used for lighting, wet cleaning, and cooking. Of this, approximately half is used for lighting. Compact fluorescent bulbs, CFLs, can save you about \$30 or more in electricity costs over each bulb's lifetime and they last about 10 times longer and use about one-fourth the energy of traditional incandescent bulbs. Replacing old appliances with ENERGY STAR® models can also increase your savings.

LIGHTING: CFL Bulbs: 4 Incandescent Bulbs: 37	ACTION: CFL Bulbs: 37 Incandescent Bulbs: 4	SAVE: an estimated \$135 on your energy bills each year.
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USAGE: Dish washer: 100% Clothes washer: 100% Clothes dryer: 100% Range/Stove: 100% Other: 100%	ACTION: Dish washer: 100% Clothes washer: 100% Clothes dryer: 100% Range/Stove: 100% Other: 100%	SAVE: an estimated \$0 on your energy bills each year.
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Lighting and kitchen and washroom appliances cost \$933, or 20% of your annual energy bills.





APPLIANCE DETAILS

The following table provides the age and basic specifications of your major appliances. General notes or notes on the condition of each appliance appear if any where taken.

Item	Specs	Age	Notes
Dishwasher	EF: 0.24	24 Yrs	
Clothes Washer	MEF: 0.47	24 Yrs	
Dryer	Fuel: Propane	24 Yrs	
Range	Fuel: Propane	24 Yrs	
Refrigerator 1		24 Yrs	



COMBUSTION APPLIANCE ZONE (CAZ) TEST RESULTS

All combustion appliances were tested for gas spillage, carbon monoxide (CO) levels, and draft pressure. The charts on this page illustrate the results of the steady state worst case carbon monoxide level test for your home furnace, hot water heater, and oven. Any appliances that run on electricity do not emit CO and automatically pass the test.



* CO levels may be within Manufacturer's Specifications for this appliance. Your auditor will provide additional information regarding this issue.



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	0	Pass	0	Proceed with work

Individual Appliance Tests							
	Spill Worst Case	Draft Worst Case	CO Steady State	Spill Natural	Draft Natural	Steady State Natural	Result
Heater 1	Pass	0	0	0	0	0	Proceed with work
DHW 1	Pass	0	0	0	0	0	Proceed with work



ZERO-COST AND LOW-COST IMPROVEMENTS

Simply applying the solutions below can lower your energy use and costs while protecting the environment.

ZERO-COST SOLUTIONS

- Use a programmable thermostat to automatically adjust the temperature when you are not at home. The US Department of Energy suggests temperature settings of 68° in winter and 78° in summer.
- Wash clothes in cold water and let them air dry.
- Eliminate "Phantom Loads" by unplugging electronics when not in use.
- Clean your refrigerator's coils every six months.
- Use the light wash settings on your dishwasher and turn off heated drying.
- Turn off your lights when not in use.

INCENTIVES

- Check into Federal, State, and local incentives. Visit www.dsireusa.org and click on your state.



LOW-COST SOLUTIONS

- According to ENERGY STAR®, compact fluorescent lightbulbs (CFLs) are 75% more efficient and last up to 10 times longer than standard bulbs.
- Running ceiling fans counter-clockwise in the winter pushes warm air at the ceiling downward.
- Replace HVAC filters every month.
- Plug air leaks around doors and windows with caulking and weatherstripping.
- Old electric water heaters in unconditioned spaces may benefit from adding blanket insulation. Insulating hot water pipes will also help with energy efficiency.

YOUR COMFORT AND SAFETY

Gaps in insulation and air leakage contribute to a drafty and uncomfortable home.

VENTILATION/BLOWER DOOR TEST

A tight home, with regulated and filtered ventilation and humidity, is a healthy and safe home.

Your home's air tightness was tested with a blower door to measure leakage and ensure proper ventilation. While at your home, the energy technicians may have caulked, foam sealed and otherwise reduced air leaks. These improvements contribute to the home's overall energy efficiency and comfort.



SEAL IN CONDITIONED AIR

Leaky homes use more energy than well-sealed homes. Heated or cooled air can leak through gaps in ducts, making it hard to maintain constant temperature in conditioned spaces.



SEAL OUT OUTSIDE AIR

When cooled or heated air leaves the home and is replaced by outside air, the new air must be reconditioned. It is most effective to start by sealing areas at the high and low points of the home.



OTHER SAFETY CONCERNS

A leaking duct system can create serious safety problems in a home. These include pressure imbalances that reverse the flow of deadly flue gases and introduce them into the home.





PROPOSAL DETAILS

Items by Improvement	Units	Unit	Total Cost	Notes
Attic Insulation				
Attic Area 1 Cavity Insul. - R-60 Cellulose, Loose Blown	492.05	\$/ft ² Attic Floor Area)	949.58	
Knee Wall Area 1 Cont. Insul. - R-17 Isocyanurate, 2.5" thick	294.00	\$/ft ²	329.28	
Attic Total			1,278.86	.
Air Sealing				
Air Sealing - 60% Leakage Reduction	1,650.00	\$/ft ² Conditioned Floor Area)	4,823.13	
AirSeal Total			4,823.13	.
Door Replacement				
Door 1 - Fiberglass, Opaque, U-Value: 0.21	1.00	\$ Each	358.49	
Door 2 - Fiberglass, Opaque, U-Value: 0.21	1.00	\$ Each	358.49	
Door Total			716.98	.
Basement Insulation				
Basement Continuous Insul. - R-21.6 Isocyanurate, foil faced, 3" thick	928.65	\$/ft ²	2,052.33	



Items by Improvement	Units	Unit	Total Cost	Notes
Basement Rim Joist - R-21.6 Isocyanurate, foil faced, 3" thick	77.39	\$/ft^2	171.03	
Basement Total			2,223.35	.
Heating System				
Improved Heating System	1.00		3,300.00	
Heating Total			3,300.00	.
Lighting				
Efficient Lighting	33.00	/Each	74.25	
CFL Total			74.25	.
Lower Appliance Use				
AppUsage Total			-	.
Health and Safety				
CO Detectors - Install new CO detectors	1.00	\$	100.00	
Dryer Venting - Vent dryer	1.00	\$	100.00	
Moisture - Prevent moisture issues and repair damage	1.00	\$	500.00	
Health and Safety Total			700.00	
All Improvements				
Taxable Item Subtotal		\$	13,116.58	.
Subtotal		\$	13,116.58	.



Items by Improvement	Units	Unit	Total Cost	Notes
All Improvements Total		\$	13,116.58	.