The energy score measures the estimated total energy use (electricity, natural gas, propane, heating oil) of this home for one year. The lower the score, the less energy required for normal use. Actual consumption and costs may vary. Measured in kilowatt hours per year (kWhe/yr).

The carbon score measures the total carbon emissions based on the annual amounts, types, and sources of fuels used in this home. The lower the score, the less carbon is released into the atmosphere to power this home. Measured in metric tons per year (tons/yr).
What is the Energy Performance Score?

A Certified Score The Energy Performance Score calculation is based on a home energy assessment. Anyone may use the EPS assessment methodology for evaluating energy performance and upgrades of a home, but only a certified EPS analyst has been trained and qualified to conduct an EPS.

Energy

Energy Score Calculation The Energy Score is based on a home's shape, size, insulation levels, air leakage, heating and cooling systems, major appliances, lighting, and hot water heating. Occupancy, behavior, indoor temperature, and regional weather are standardized to calculate normal energy use. A home's actual energy use will vary with behavior, weather, and changes to the home.

Measurements Defined
Electricity is measured in kilowatt hours (kWh). Natural gas is measured in therms. Oil and propane are measured in gallons (gal). Units of energy can be converted from one to another. Total energy use is represented in kilowatt hour equivalents.

$1\text{ kWh of energy equals}$

$100$-watt light bulbs burning for one hour.

$1\text{ therm of natural gas } = 29.3\text{ kWh}$

$1\text{ gallon of heating oil } = 40.7\text{ kWh}$

$1\text{ gallon of propane } = 28.0\text{ kWh}$

Energy Costs - Fuel costs are based on prices at the time this report is issued* and do not include taxes, surcharges, or fees for renewable energy.

Benchmarks Defined
After Upgrades indicates the improvement in the predicted energy use if the lower and higher cost Recommended Energy Upgrades are implemented.

Maine Average is the average energy use of households in Maine.

Maine Target is equivalent to 50% of the Maine average energy use.

Carbon

Carbon Score Calculation The Carbon Score is based on the greenhouse gas emissions for the annual amounts, types, and sources of fuels used in the home. For electricity, the carbon emissions are based on electricity consumed and the mix of sources used in the sub-region. For natural gas, heating oil, and propane, carbon emissions are based on the therms or gallons used in the home.

Measurements Defined
While site energy is used to determine a home's annual energy consumption, source energy is used to calculate the home's associated carbon emissions. This is reflected in the sub-region emissions factor for electricity.

Benchmarks Defined
† With energy from renewable sources indicates the carbon emissions produced if the homeowner chooses to offset the carbon emissions associated with electrical use. Check with your utilities to learn more about these options.

After Upgrades indicates the predicted carbon emissions if all of the Recommended Energy Upgrades suggested on the Energy Analysis Report are implemented.

Maine Average is the average carbon emissions of households in Maine.

Maine Target is equivalent to 50% of the Maine average carbon emissions.

* Estimated energy costs are based on the following rates.

Electric = $0.15/kWh

Oil = $3.75/gal

Natural Gas = $1.47/therm

Propane = $3.39/gal
If the totals from your utility bills are:

- **lower** than the Energy Score, you are using less energy than would be average for your home. Reasons for this may include housing fewer people than would be average in this home, and/or the occupants of this home are using energy more conservatively than is typical.
- **similar** to the Energy Score, you are using a typical amount of energy for the condition of your home.
- **higher** than the Energy Score, you are using more energy than average for your home. Reasons for this may include housing more people than would be average in this home, and/or occupants in this home are using more energy than is typical. There may be no- and low-cost ways that you can use to save energy.
### Summary of Energy Performance Related Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Notes</th>
<th>Current Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Leakage</strong></td>
<td>Major leakage areas include: Plumbing penetrations, Fireplace damper</td>
<td>The air leakage rate for your home is considered good @ .31 ACH (air changes per hour). An Energy Star rated home must have .35 ACH or less.</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Ceiling and Attic</strong></td>
<td>Cellulose</td>
<td>There is no access into the attic. The attic is insulated with approximately 24&quot; of cellulose.</td>
<td>Excellent</td>
</tr>
<tr>
<td><strong>Ducts</strong></td>
<td></td>
<td></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Walls</strong></td>
<td>Poorly installed insulation, Blown in, Cellulose, 2x6</td>
<td>The 12&quot; thick walls are insulated with cellulose. The cellulose is not dense packed, and several voids were found in the walls and sloped ceilings.</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Floors/ Foundation Walls</strong></td>
<td>Slab</td>
<td>This house is built on a slab which has radiant heat in the floor.</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td>Double pane, Low E</td>
<td>The windows are all of good quality and thermal shades have been installed, but some air leakage was detected around the casings when tested.</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Water Heating</strong></td>
<td>Gas, Storage tank</td>
<td>As there are only two occupants in this building, installing a propane on demand tankless system should be considered.</td>
<td>Average</td>
</tr>
<tr>
<td><strong>Lights and Appliances</strong></td>
<td>Electric range, Energy Star washing machine, Gas clothes dryer</td>
<td>The refrigerator is a top freezer 2001 model. The washing machine is Energy Star rated, and the dryer runs on propane. All bathrooms have exhaust fans</td>
<td>Average</td>
</tr>
<tr>
<td><strong>Heating</strong></td>
<td>Gas, Radiant, Boiler, 90%+ efficient</td>
<td>This home has radiant heat installed in the slab, as well as the second floor bathrooms.</td>
<td>Average</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td></td>
<td></td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
This home is considered to be “Super Insulated” as the insulated exterior walls are twelve inches thick, and according to the homeowner, there is 24” of cellulose insulation in the attic.

Having an attached garage can be a very serious situation if CO being produced by vehicles (or any combustion appliance) accumulates to unhealthy or dangerous levels. Installing a garage ventilation system and CO detectors within the home are strongly recommended, as well as air sealing where the garage and living areas meet.

Adding a supplemental heating source, such as a ductless air source heat pump, would make the home more comfortable and easier to heat.

Suggested RDI measures would include air sealing around leaky door and window trim, and installing a draft block into the base of the fireplace. Installing outlet gaskets and plugs would also be beneficial.

Annual Fuel Use:

Propane (3 year average)  940 Gallons / year

Electric (2012)  9164 KWH/yr* Average use double December - February
These recommended upgrades will improve the energy performance of this home. The cost for the upgrades will vary with the size and complexity of the home and the scope of work required. The Approximate Annual Savings are based on the estimated energy reductions with each upgrade.

<table>
<thead>
<tr>
<th>Notes</th>
<th>Approximate Annual Savings</th>
<th>kWh Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Sealing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attic/Ceiling Insulation</td>
<td></td>
<td></td>
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<tr>
<td>Duct Sealing</td>
<td></td>
<td></td>
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<tr>
<td>Duct Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floors/Foundation Walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Heater Upgrade</td>
<td>Install a tankless water heater.</td>
<td>$257</td>
</tr>
<tr>
<td>Solar Water Heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appliances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating System Upgrade</td>
<td>Install an ENERGY STAR heat pump. (HVAC System 2)</td>
<td>$502</td>
</tr>
<tr>
<td>Solar PV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Financial Incentives

See web site for more sources of financial assistance.

See http://www.dsireusa.org/ for incentives in your area.

DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council.
Current Conditions Observed by Auditor

The air leakage rate for your home when tested with the blower door was 1533 CFM50. The CFM50 or "Cubic Feet per Minute @ 50 Pascals" is the amount of air being blown out of the home needed to bring the house to a negative pressure of 50 Pascals. By dividing the CFM50 reading by ten, we get the approximate size of all combined holes, or openings in the home going to the exterior, in square inches. The approximate size of all combined holes located between the living area and exterior in your home is 153 square inches, or approximately one square foot.

The largest areas of infiltration found were:
- The bump out ceiling cavity and main house first floor ceiling connection.
- The kitchen recessed lights located in the sloped ceiling.
- Around some of the door and window casings.
- The fireplace damper.
- Electrical outlets and switches on exterior walls.
- The fireplace damper.

Building tightness limit information:

The blower door CFM50 measurement is used to estimate the house's natural ventilation rate. This, in turn, is used to calculate the amount of mechanical ventilation recommended by the latest residential ventilation standard (ASHRAE standard 62.2 2007) to ensure good indoor air quality. The calculation takes into account the regional annual weather pattern (temperature and wind); the height of the building; the square footage and volume of the living space; and the number of occupants (listed as the number of bedrooms + 1).

The current recommended mechanical ventilation rate for your home fully occupied with four occupants is 29 CFM.

The current recommended mechanical ventilation rate for only two occupants is 14 CFM.

*There is a HRV system installed in this home which meets these ventilation requirements.

Recommended Upgrades Detail

- Seal / insulate the bump out ceiling cavity and first floor ceiling connection as possible.
- Seal and insulate around the kitchen recessed lights located in the sloped ceiling.
- Using the blower door for guidance, seal all leaky door and window casings as necessary.
- Install a draft block into the base of the fireplace.
- Add gaskets and plugs to all electrical outlets and switches on exterior walls.

Deep Energy Retrofit Options

Energy Upgrade Description
**Air Sealing**

Air sealing is one of the most cost-effective energy upgrades you can make and should be done before installing insulation. Cold air can infiltrate small cracks and openings during the winter, while hot outdoor air can over-heat your home in the summer resulting in drafts, moisture, and indoor air quality issues. There are many types of air leaks and many strategies for sealing them. You can undertake this work yourself or hire a contractor who can use a blower door to identify and measure the effectiveness of various air sealing measures.

After your home is sealed, it is important to make sure that there is adequate ventilation to maintain proper indoor air quality and to prevent back drafting of combustion appliances. An EPS Auditor or qualified professional will identify any potential ventilation problems.

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**No-Cost or Low-Cost Strategies**

**Close your fireplace damper** when your fireplace is not in use (but first allow the fireplace to cool completely). If you have fireplace doors, keep them closed.

**Put bathroom ventilation fans on a timer or on a humidity sensor** which will automatically switch off the fan when the room is dry.
Ceiling and Attic

This IR picture shows a cool area in the second floor bathroom floor where there has been problems with the water pipes freezing. The cool air appears to be coming from the connecting bump out ceiling.

This is an infrared picture of the first floor ceiling / bump out connection. The dark areas are cooler, suggesting infiltration into the ceiling cavity from the vented bump out ceiling cavity.

Current Conditions Observed by Auditor

There was no access into the attic space. The homeowner stated that there is approximately 24” of blown in cellulose existing, or approximately R-75. This amount of insulation goes well beyond the Maine code requirement of R-49.

Recommended Upgrades Detail

Insulate / seal the connection between the bump out ceiling and first floor ceiling cavity as possible, as access will be challenging.

Deep Energy Retrofit Options

Energy Upgrade Description

Ceiling & Attic Insulation Attic or ceiling insulation is one of the most cost-effective upgrades you can make and should be done after air sealing in the attic. Attic or ceiling insulation slows heat loss through the roof in the winter and also slows heat gain through the roof in the summer. The insulation is usually installed on the floor of an unfinished attic (the ceiling of the finished room below) and under the roof if the attic space is finished. Insulation is measured with an R-value, and the higher the R-value, the more effective the insulation value. Insulation is made of different materials and comes in several forms: batts, loose-fill or blown-in, foam, and rigid. Each type of insulation varies in terms of advantages, applications, and pricing.
Energy Upgrade Description

**Duct Sealing and Insulation** Heating and cooling duct work that leaks into unconditioned space can be a major source of energy loss. Sealing and insulating your ducts helps to save energy by more effectively directing the heat or cooling to desired locations. Insulating ducts in semi-conditioned spaces such as basements may or may not be necessary depending on the circumstances.

Ducts should always be sealed before insulating.
Walls

Current Conditions Observed by Auditor

The twelve inch thick walls and twenty four inch thick sloped ceilings have been insulated with blown in insulation, but the insulation is not dense packed, and several voids were discovered when scanned with the IR camera.

Recommended Upgrades Detail

Using the IR camera to target poorly insulated walls and sloped ceilings, re-insulate these areas with “dense packed” blown in cellulose insulation.

Deep Energy Retrofit Options

Energy Upgrade Description

**Wall Insulation** Insulating walls will help you to keep heat inside your home during the winter and slow heat gain into your home during the summer. Retrofitting walls with insulation is generally more work and more costly than insulating an attic ceiling or a floor. Walls may be insulated from the outside or inside and this is more easily accomplished during remodeling work which involves removal of or painting either of these surfaces.
Floors/Foundation Walls

Current Conditions Observed by Auditor

This home was built on an insulated slab.

Recommended Upgrades Detail

See the second story bathroom floor section above.

Deep Energy Retrofit Options

Energy Upgrade Description

**Floor Insulation** Floor insulation is mainly a cold climate energy saving measure. The importance of floor insulation varies with the type of foundation in the home. The lowest floor cavity in a home should only be insulated if the basement or crawlspace below it is unheated. In a heated basement or crawlspace the insulation will be found in a different location. Slab floors on-grade or in a basement can be retrofitted with insulation above the slab if no insulation was installed beneath the slab before it was poured.
Current Conditions Observed by Auditor

The windows are double pane with low E glass. The windows tested well under pressure, but some infiltration was discovered around the door and window trim or casings. Thermal shades having a rated R value of R-4.6 have been installed to all windows but the skylights.

Recommended Upgrades Detail

- Air seal around doors and window casings as necessary as described in the air leakage section above.
- Install thermal shades with tracks (having a rated R value of R-5.1) to the skylights.
- Install an interior storm window over the fixed window in the master bedroom.

Deep Energy Retrofit Options

Energy Upgrade Description

**Windows** Older windows can be responsible for drafts, heat loss in winter and heat gain in summer. They can significantly impact your comfort and energy use for heating and cooling. Storm windows can help eliminate some of these issues. High efficiency, double-paned, low-e, argon-filled windows with insulated frames can help save energy, make rooms more comfortable and also makes them quieter.

**No-Cost or Low-Cost Strategies**

**Capture free solar heat.** On cooler days, open curtains to catch the heat from the sun and warm your home.

**Block the sun in hot weather.** To keep your home cool, adjust window coverings to block the sun's hot summer rays. In the evening, open windows to catch cool breezes.

**Plant trees, bushes, and trellises that block unwanted sun in the summer.** Strategically located plants on the east, west, and south sides of a house can provide natural cooling through shade. Deciduous plants will shade in summer and allow more light in winter. Plants can also form windbreaks to protect your home from winter winds. Be sure to plant away from the house so you do not trap moisture against the building.
Water Heating

Propane water heating system.

Current Conditions Observed by Auditor

The domestic hot water is now being supplied by the propane boiler.

Recommended Upgrades Detail

Consider installing a propane on demand water heating system. This system will be very beneficial during the warmer months when heating the home is not necessary.

Deep Energy Retrofit Options

Energy Upgrade Description

**Water Heater Upgrade** The life cycle of water heaters is approximately 12-15 years. If your water heater is older, consider replacing it with a newer, more efficient one. All new tank water heaters have a built-in insulation layer to conserve energy. Solar water heating may also be an option: it can provide as much as 75% of your hot water needs and offers significant savings over time.

**Solar Water Heater** Installing a solar water heater on a roof that received adequate sunlight can be a relatively cost-effective means of reducing your energy costs over the long term. These systems can preheat the water going to your hot water heater and significantly reduce, and at times eliminate, the need for additional water heating.

No-Cost or Low-Cost Strategies

**Lower your water heater thermostat to 120 degrees**, or the lowest setting that is acceptable to you for bathing and dishwashing.

**Don't let the hot water run** while shaving or washing dishes.

**Install high-efficiency showerheads and faucet aerators.** New showerheads are required to meet a 2.5 gallon per minute standard; the lower the number, the more you will save. If you have a pre-1992 showerhead, it could be using 5.5 gallons of water per minute or more. Look for low-flow aerators of 2.5 gallons or less to fit bathroom and kitchen faucets.

**Turn off hot water during vacations.** Turn your electric water heater off at the breaker panel if you are leaving town for more than a couple of days. But don't do this during freezing weather. If you have a natural gas water heater, turn it to the "low" or "vacation" setting, but do not turn it off.
**Current Conditions Observed by Auditor**

- The washer and dryer are energy efficient, but the refrigerator is over ten years old.
- A humidifier is used in the master bedroom. (The fixed window located over the bed was wet from condensation).
- The hot tub is considered to be an energy efficient model.
- There are three bathroom exhaust fans which were tested for CFM output during the audit.
- First floor half bath: 80 CFM
  Second floor full bath: 66 CFM
  Second floor master bedroom bathroom: 32 CFM
- The kitchen has a recirculating system only, as the Jenn Air stove exhaust system is not working.
- This home has an HRV system installed.
- There are 16 incandescent lights in this home, and 32 CFL's.

**Recommended Upgrades Detail**

- Install a humidistat to monitor the relative humidity in the master bedroom while occupied. Use the humidifier only when the relative humidity falls below 45%.
- Repair the Jenn Air stove ventilation system.
- Consider insulating the boxed in dryer vent hose, which runs through the closet.
- Replace the remaining incandescent lights with CFL's.

**Deep Energy Retrofit Options**

- When replacing the refrigerator or any other appliance, choose Energy Star rated models.

**Energy Upgrade Description**

- Older appliances can use significantly more energy than newer, energy efficient appliances. Look for ENERGY STAR refrigerators, freezers, dishwashers, clothes washers, and air conditioners. Even within ENERGY STAR there are more and less efficient models and you should look for the most efficient appliance that fits your budget and needs. If you consider the full life cycle costs, more efficient appliances often make up for any difference in price within a few years of operations.

**No-Cost or Low-Cost Strategies**
**Hang your clothes outside to dry** whenever possible to reduce the use of your energy-intensive electric or gas dryer.

**Eliminate unnecessary lights** and replace incandescent bulbs with energy-saving compact fluorescents (CFLs) or LED lights. You can save at least 75% of the energy used for lighting. CFLs that emit a warm color similar to incandescent bulbs (soft white color) and that turn on more quickly are now available. It is important to handle and recycle broken and burned out CFLs appropriately as they contain small amounts of mercury. Motion detectors and timers can eliminate unnecessary lighting outside and in infrequently used rooms.

**Wash laundry in cold water whenever possible.** Ninety percent of energy used for washing laundry goes toward heating water. Only run the washer when you have a full load.

**Use the dishwasher energy-saver mode** and run the dishwasher only when it is full.

**Eliminate Phantom Loads.** Many home electronics such as computers, televisions, and battery chargers use energy when not in use or turned off. Unplug these or plug them into a power strip that can be turned off when not in use.
The house is heated with a radiant floor heating system. The fireplace is rarely used. There is a combustion air inlet installed.

### Current Conditions Observed by Auditor

<table>
<thead>
<tr>
<th>Condition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Conditions Observed by Auditor</td>
<td>This house has a fireplace that is rarely used. The house is heated</td>
</tr>
<tr>
<td></td>
<td>with a propane radiant floor heating system.</td>
</tr>
</tbody>
</table>

### Recommended Upgrades Detail

Consider installing a ductless mini split air source heat pump to supplement the heat supplied from the propane boiler. The heat pump will add energy efficient supplemental heat in the winter, and supply air conditioning in the warmer months.

*I have listed the existing boiler as being two systems in order to show the potential energy savings of installing a ductless heat pump. I have also included the website to the Efficiency Maine fuel comparison calculator. This will allow you to compare how energy efficient heat pumps are when compared to heating with oil, or other fuels.*

http://www.efficiencymaine.com/pace/compare-heating-options

### Deep Energy Retrofit Options

#### Energy Upgrade Description

**Heating System Upgrade** Older, poorly maintained, and less efficient furnaces and heat pumps use more energy than newer, high-efficiency models. You may achieve energy savings by upgrading your system. Additionally, you should have your existing system periodically inspected to identify potential problems and extend the life of your system. When upgrading a heating system, you should also have any connected duct system inspected for air leaks.

**No-Cost or Low-Cost Strategies**

**Turn down the heat.** A good energy-saving setting when you are at home is 67-68 degrees and 55 degrees at night or when you are away. Each degree you lower your thermostat saves an estimated two percent (2%) on your heating bill. In summer, turn off your heating system or raise the thermostat setting to save on air conditioning.

**Higher heat is not faster heat.** Turning the thermostat higher will not warm your house faster; it just wastes energy. Lowering the air conditioning setting won't cool your house faster either.

**Use a programmable thermostat.** Older, manual thermostats are often not as accurate as new electronic models, and they require that you manually set them back each night. Some programmable thermostats have smart features such as preprogrammed "night" and "vacation" energy-saving settings that lower the temperature automatically. Different heating systems require different thermostats. Check the owner's manual to be sure that your thermostat and heating system work effectively together.
Cooling is not the predominant energy use in a home in our climate zone. However, older, poorly maintained cooling equipment will still use more energy than newer, more efficient equipment. Heat pumps should be commissioned and regularly maintained to maximize their efficiency potential. Air conditioners should be inspected and serviced by a professional to help extend the life of the system.

**No-Cost or Low-Cost Strategies**

**Block the sun in hot weather.** To keep your home cool, adjust window coverings to block the sun’s hot summer rays. In the evening, open windows to catch cool breezes.

**Use air movement to cool people during hot days.** When it’s warm, use natural ventilation or window and ceiling fans to keep cool. Remember that fans cool people, not rooms. If these are insufficient, consider installing a whole house fan which will vent warm air from the home and pull in cooler outside air throughout the house at night.

**Plant trees, bushes, and trellises that block unwanted sun in the summer.** Strategically located plants on the east, west, and south sides of a house can provide natural cooling through shade. Deciduous plants will shade in summer and allow more light in winter. Plants can also form windbreaks to protect your home from winter winds. Be sure to plant away from the house so you do not trap moisture against the building.