



Bringing Today's Energy Technology  
to Yesteryear's Homes

## Home Tune-up Report

Mr. M D

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Report prepared by:

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This Home Tune-uP report:

- Lists energy efficiency improvements and their estimated savings and costs;
- Identifies the group of improvements that save more than they cost;
- Explains each recommendation in detail;
- Provides information on implementation and contractor resources;
- Suggests additional energy efficiency measures;
- Gives guidance on indoor air quality; and,
- Provides information about financing and special tax incentives.

Implementing these recommendations will reduce your energy bills and make your home more comfortable and more valuable. It will also help the environment. The monthly energy savings realized by making the improvements listed in Table 2 will more than pay for the monthly cost of the improvements when financed. Thus investing in energy efficiency can be profitable from day one.

Inspection ID:	173
Structure type:	Detached
Date built (est.):	1986
# of bedrooms:	3
House size (sq. ft.):	2066
House volume (cu. ft.):	16520
Heating fuel:	Natural Gas
Price of heating fuel:	\$2.164/Therm
Price of electricity:	\$0.084/kWh

The estimates in this Tune-uP Report are based on data obtained from a detailed inspection of your home. The information was analyzed using CMC Energy Services' Tune-uP software, which takes account of local weather, energy prices and implementation costs. CMC's experience, based on more than 250,000 home energy inspections since 1977, has shown the accuracy of CMC estimates to compare favorably to others. Savings estimates do not take account of variations in the behavior of the occupants or future weather changes. Nor do the cost estimates reflect variations in the complexity of the job or price among contractors and suppliers.

**CMC Energy Services does not offer any warranty, either expressly or implied, for the estimated savings or costs in this Report. Should you find an error in the Report, please call us at 888-203-5262. The liability of CMC Energy Services for any errors or omissions in this Report is limited to the fee paid for this Report.**

## Energy Efficiency Improvement Opportunities

The following table summarizes the energy efficiency improvement opportunities available for your home and lists estimates of the annual savings, costs, and payback (cost divided by the annual savings). Details about each improvement opportunity are provided in the Recommendations section of the report.

**Table 1**

Feature	Recommendation	Annual Savings*	Cost	Payback (Years)
<b>Insulation</b>				
· Attic/Ceiling - Original House	Insulate to R 30	\$22	\$429	19
· - Attic Above Laundry	Insulate to R 30	\$9	\$90	10
· Floor - Crawl Space	Insulate to R 19	\$66	\$527	8
· - Crawl Space	Insulate to R 19	\$18	\$421	23
Air Sealup	Seal air leaks	\$88	\$909	10
<b>Windows and Glass Doors</b>				
· 6 Small Window(s)	Replace with double-pane, low-e	\$41	\$1,320	32
· 7 Medium Window(s)	Replace with double-pane, low-e	\$79	\$1,971	25
· 7 Large Window(s)	Replace with double-pane, low-e	\$104	\$2,587	25
<b>Window Shading and Films</b>				
· 20 Window Solar Shade	Install solar shade(s)	\$58	\$1,791	31
<b>Heating and Cooling Systems</b>				
· Gas Furnace - Crawl Space	Replace due to age	\$54	\$2,508	47
· Gas Furnace - Attic	Replace due to age	\$54	\$2,508	47
· Cooling System - Crawl Space	Replace due to age	\$52	\$2,328	45
· Cooling System - Attic	Replace due to age	\$52	\$2,328	45
<b>Heating and Cooling Distribution</b>				
· Duct/Pipe Insulation	Insulate	\$50	\$67	1
· Duct Repair - Attic	Repair ducts	\$99	\$135	1
<b>Appliances</b>				
· Clothes Washer - Kitchen Closet	Replace due to age	\$47	\$775	16
· Clothes Dryer - Kitchen Closet	Replace	\$11	\$475	43
· Water Heater - Utility Room	Replace	\$141	\$665	5
<b>Total</b>			<b>\$21,834</b>	

\*Total annual savings are not included since savings estimate assumes that all other conditions remain the same.

Implementing all these recommendations would result in an annual reduction of Greenhouse Gases equivalent to not driving a car for 6.2 months.

## Improvements that Save More than they Cost

The table below identifies the group of improvements you cannot afford to pass up because the monthly energy savings they create exceed their monthly costs when financed. Furthermore, they will make your home more comfortable while also increasing its value. (These estimates are based on a 30-year loan with a 6.00% interest rate.)

**Table 2**

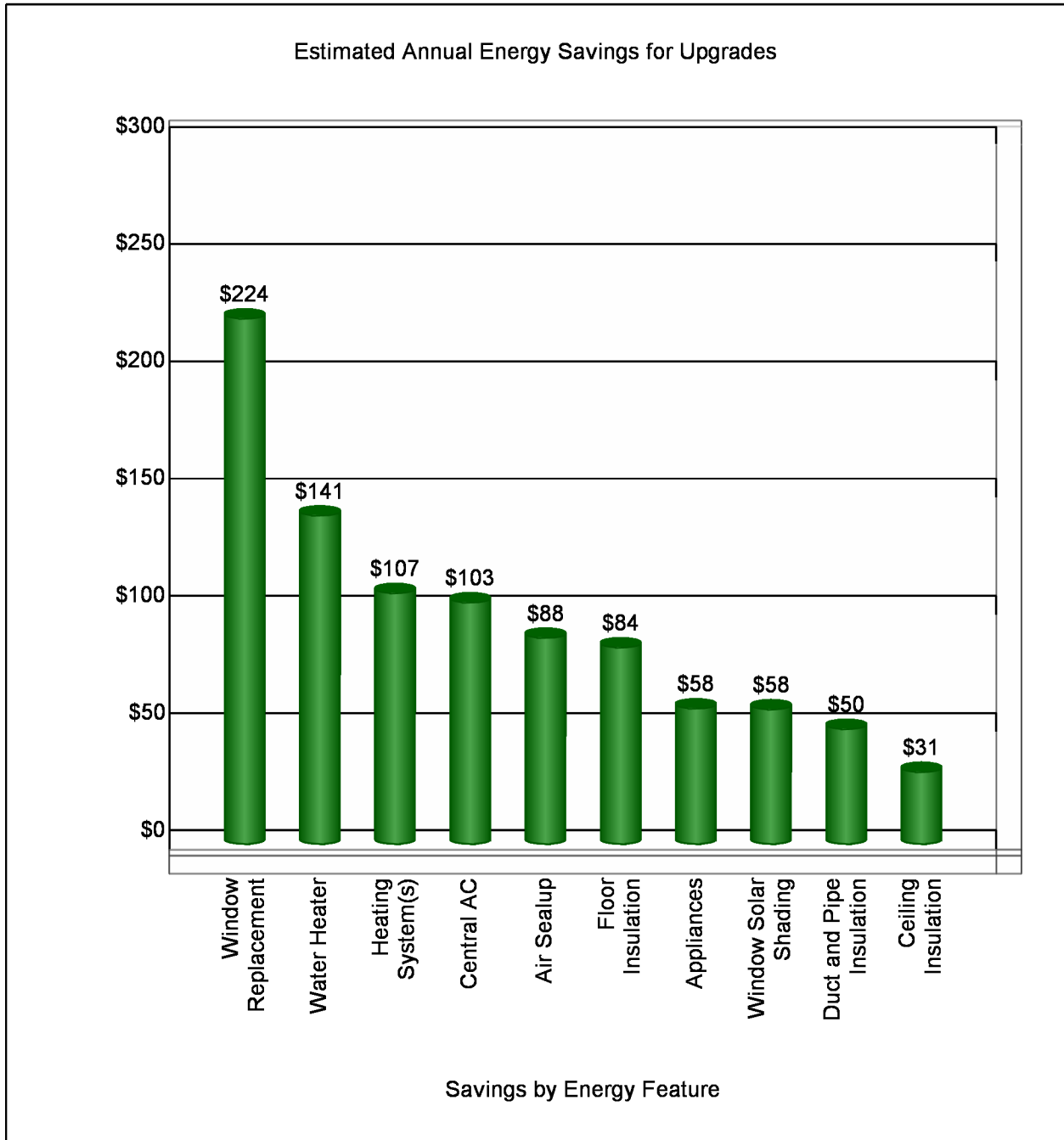
Feature	Recommendation	Annual Savings*	Cost	Payback (Years)
<b>Insulation</b>				
· Attic/Ceiling - Original House	Insulate to R 30	\$22	\$429	19
· - Attic Above Laundry	Insulate to R 30	\$9	\$90	10
· Floor - Crawl Space	Insulate to R 19	\$66	\$527	8
· - Crawl Space	Insulate to R 19	\$18	\$421	23
Air Sealup	Seal air leaks	\$88	\$909	10
<b>Windows and Glass Doors</b>				
· 7 Medium Window(s)	Replace with double-pane, low-e	\$79	\$1,971	25
· 7 Large Window(s)	Replace with double-pane, low-e	\$104	\$2,587	25
<b>Window Shading and Films</b>				
· 10 Window Solar Shade	Install solar shade(s)	\$33	\$950	29
<b>Heating and Cooling Distribution</b>				
· Duct/Pipe Insulation	Insulate	\$50	\$67	1
· Duct Repair - Attic	Repair ducts	\$52	\$135	3
<b>Appliances</b>				
· Clothes Washer - Kitchen Closet	Replace due to age	\$47	\$775	16
· Water Heater - Utility Room	Replace	\$141	\$665	5
<b>Total</b>		\$710	\$9,527	
<b>Monthly Savings and Cost When Financed**</b>		\$59	\$57	

\* The annual and monthly savings estimates displayed in Table 2 take account of the interaction between the measures and may therefore be less than the savings listed in Table 1. For example, if the efficiency of the heating system is improved and insulation is added, the savings from the improved heating system will be less because the added insulation reduces the heating load, and likewise the savings from the improved insulation will be less because the new heating system will be more efficient.

\*\* The total monthly cost is the monthly payment, including interest, required to pay for all the improvements listed in Table 2 when financed with a 30-year loan at 6.00%

## Recommendations

The major factors that affect the comfort of your home—and your utility bills—are insulation, windows, air leaks, heating and cooling systems, water heater and major appliances. Those features relevant to your home are discussed in this section to provide information you need to make informed decisions regarding your home. The chart below illustrates the annual savings associated with the upgrades you can make.



## Insulation - Attic/Ceiling

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<b>Location:</b>	Original House	Attic Above Laundry
<b>Existing insulation type:</b>	Loose - Fiberglass	Loose - Fiberglass
<b>Existing R-value:</b>	20	10
<b>Area (sq. ft.):</b>	976	113
<b>Attic floored:</b>	No	No
<b>Roof type:</b>	Pitched	Pitched
<b>Ceiling type:</b>	Flat	Flat
<b>Room to add insulation:</b>	Yes	Yes
<b>Recommendation:</b>	Insulate to R 30	Insulate to R 30
<b>Estimated cost:</b>	\$429	\$90
<b>Estimated annual savings:</b>	\$22	\$9

A well-insulated ceiling reduces energy loss, makes your home more comfortable, and lowers your energy bills. It helps protect your home from fire and moisture damage, and is an effective sound-proofing material. During warm weather, ceiling insulation reduces the heat transfer from the hot attic to the rooms below.

### Inspector Comments:

The attic pull-down stairs and house fan contribute to air leakage as well as lacking thermal integrity. Ideally, a foam board box should be placed over the openings to improve the problems associated with these systems. See detail at the end of the report.

### Homeowner Notes:

## Insulation - Attic Radiant Barrier

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<b>Location:</b>	Original House	Attic Above Laundry
<b>Radiant barrier:</b>	No	No
<b>Roof type:</b>	Pitched	Pitched
<b>Ceiling type:</b>	Flat	Flat
<b>Area (sq. ft.):</b>	976	113
<b>Recommendation:</b>	None	None
<b>Estimated cost:</b>	\$447	\$52
<b>Estimated annual savings:</b>	\$3	\$1

A radiant barrier is a layer of aluminum foil or aluminum chips installed on the underside of the roof or floor of an attic to reduce the transfer of heat from a hot roof to the insulation. When installed properly, a radiant barrier can block up to 95 percent of radiated heat from the roof. Not only will this help to reduce a home's cooling load but it will also reduce the overall temperature of the attic, making it better for storage. Radiant barrier effectiveness is reduced with dust build-up, so they are most effective when attached to the underside of the roof where dust cannot build up. The less common types of barriers, "chips" and multi-layer products, are more suitable for floor installation.

### Inspector Comments:

Please refer to the Insulation - Attic/Ceiling Report page for Inspector Comments pertaining to Radiant Barriers

### Homeowner Notes:



## Insulation - Outside Walls

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**Location:** Original House  
**Insulation present:** Standard R-11  
**Room to add insulation:** Good  
**Area (sq. ft.):** 1670  
**Recommendation:** None  
**Estimated cost:**  
**Estimated annual savings:**

Walls are the largest part of the house exposed to the outside, and older houses are often not insulated. Above-grade walls can be insulated through holes drilled from inside or outside the house. Loose cellulose or fiberglass insulation is blown into these holes by a contractor. Though more expensive than insulating the floor or ceiling, insulating walls will often more than pay for itself when financed through the mortgage and will make the house more comfortable.

### Inspector Comments:

None

### Homeowner Notes:

## Insulation - Partition Walls

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**Location:** Garage  
**Insulation present:** Yes  
**Area (sq. ft.):** 327  
**Recommendation:** Insulate to R 0  
**Estimated cost:**  
**Estimated annual savings:**

Partition walls separate a conditioned room from an unconditioned area such as a garage next to a kitchen, or two sections of a basement where one is conditioned and the other is not. To reduce heat loss from the conditioned to the unconditioned spaces, the walls between them should be insulated.

### Inspector Comments:

None

### Homeowner Notes:

## Insulation - Knee Walls

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<b>Location:</b>	Above Garage
<b>Insulation present:</b>	Yes
<b>Area (sq. ft.):</b>	96
<b>Recommendation:</b>	None
<b>Estimated cost:</b>	
<b>Estimated annual savings:</b>	

Knee walls separate the short wall of a finished attic room from the unconditioned roof area. While this is a relatively small portion of the total wall, it is important to insulate otherwise heat may be lost and the temperature in the room will be difficult to control. The top of the insulation in the knee walls should fit snugly against the angled roof in order to minimize air passage. Batt and blanket insulation are frequently used.

### Inspector Comments:

Only R-13 insulation installed in the attic kneewall(s). I recommend all attic kneewalls have R-19 insulation installed (see Detail at the end of the report). DEFINITION: Attic kneewall. (Any vertical or near-vertical wall in the building envelope that has conditioned space on one side and unconditioned attic space on the other).

### Homeowner Notes:

## Insulation - Floors

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<b>Location:</b>	Crawl Space	Crawl Space
<b>Floor construction:</b>	Over Vented Crawlspace	Over Vented Crawlspace
<b>Insulation present:</b>	No	Yes
<b>Existing R-value:</b>	0	11
<b>Floor joists are accessible:</b>	Yes	Yes
<b>Floor area (sq. ft.) or slab perimeter (ft.):</b>	544	544
<b>Recommendation:</b>	Insulate to R 19	Insulate to R 19
<b>Estimated cost:</b>	\$527	\$421
<b>Estimated annual savings:</b>	\$66	\$18

To reduce heat loss to an unheated basement or crawl space, fiberglass batts installed between wood floor joists provide good insulation. For a crawl space, consider a plastic ground cover to prevent the build-up of moisture under the home.

### Inspector Comments:

Most of the floor penetrations are not sealed, plate / wall penetrations, wiring and plumbing penetrations, HVAC penetrations, etc, recommend all be sealed before installing the R-19 insulation.

Only R-11 insulation installed. All areas should have R-19 insulation installed.

### Homeowner Notes:

## House Air Leakage

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<b>Est. air leakage condition:</b>	Average
<b>Number of fireplaces:</b>	1
<b>Fireplace glass doors present:</b>	No
<b>Chimney damper present:</b>	Yes
<b>Outside air source:</b>	Yes
<b>Recommendation:</b>	Seal air leaks
<b>Estimated cost:</b>	\$909
<b>Estimated annual savings:</b>	\$88

Many homes, especially older ones, have air leaks that allow heated and cooled air to escape when the air pressure differs between the inside and the outside of the home. Because these leaks allow unconditioned air to enter as conditioned air is lost, air leaks can be a significant waste of energy and money. They also make the house drafty. Many homes have hidden air leaks that require a weatherization technician to find the leaks and seal them. It is recommended that you find a seal-up technician who uses a blower door to help identify where the air is leaking and, after sealing the leaks, verifies the reduction in leakage. Homes with indoor air pollution caused by combustion heating, tobacco smoking, or moisture problems may require more ventilation than an average house.

### Inspector Comments:

Gaps / Daylight noted in the weather stripping or the weather stripping is damaged or loose (check all exterior doors).

Air leakage can be reduced by sealing all gaps and cracks along walls and ceilings that separate the interior from the exterior.

### Homeowner Notes:

## Windows and Glass Doors - Replacement

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Number of Windows	Window Size/Type/Condition	Recommendation	Cost	Savings
6	Small/Single/Good	Replace with double-pane, low-e	\$1,320	\$41
7	Medium/Single/Good	Replace with double-pane, low-e	\$1,971	\$79
7	Large/Single/Good	Replace with double-pane, low-e	\$2,587	\$104

Glass is a very poor insulator and during the winter much heat is lost through windows. A single pane of glass loses fifteen times more heat than a section of insulated wall of the same size. By adding a second pane of glass, the amount of energy lost through windows is cut almost in half. Using low-e glass for the second pane reduces energy loss by an additional 10%. In warm climates, the heat of the sun shining through windows accounts for up to half of the cooling costs. Solar tinted glass, or a solar film on existing windows, or a solar shade, can reduce total air-conditioning costs by up to 25%. Replacing windows is expensive, but if the window frames are in poor condition, this may be the best solution. The National Fenestration Rating Council rates the energy efficiency of replacement windows. The quality of the installation is as important as the quality of the product, therefore check references of the installer before signing a contract.

### Inspector Comments:

None

### Homeowner Notes:

## Windows - Solar Film

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Number of Windows	Side of House	Recommendation	Cost	Savings
3	Right	None		
10	Front	None		
7	Back	None		

Windows account for about 50% of heat gain in hot weather. Installing either solar film or solar shades on windows that receive direct sunlight will help to reduce heat gain. Solar window film applied directly to the interior glass deflects heat in the summer and can reduce solar heat gain by 30-40%.

### Inspector Comments:

None

### Homeowner Notes:

## Windows - Solar Shades

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Number of Windows	Side of House	Recommendation	Cost	Savings
3	Right	Install solar shade(s)	\$297	\$9
10	Front	Install solar shade(s)	\$950	\$33
7	Back	Install solar shade(s)	\$544	\$16

Mylar pull-down solar shades with solar tinting will reduce solar gain. If possible they should be sealed to the window frame. If not sealed, much of the rejected solar heat escapes into the room through the side of the shade. In climates with heating and cooling seasons, solar shades can be raised to capture the solar energy during the heating season. The most effective solar shades are those installed on the outside of the window since they reject the solar heat before it passes through the window.

### Inspector Comments:

None

### Homeowner Notes:



## Heating System

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<b>Location:</b>	Crawl Space	Attic
<b>Type:</b>	Gas Furnace	Gas Furnace
<b>Age/Design life (years):</b>	22/20	22/20
<b>Size (Btu/hr):</b>	75000	75000
<b>Efficiency (AFUE)</b>		
- Existing:	73	73
- ENERGY STAR®:	90	90
- Best Available:	95	95
<b>Percent of heat supplied:</b>	50	50
<b>Recommendation:</b>	Replace due to age	Replace due to age
<b>Estimated cost(1):</b>	\$2,508	\$2,508
<b>Estimated savings / yr (1):</b>	\$54	\$54
<b>Estimated cost(2):</b>	\$2,884	\$2,884
<b>Estimated savings / yr (2):</b>	\$66	\$66

(1) – Estimates for replacement with an ENERGY STAR® model.

(2) – Estimates for replacement with an industry best model.

A heating system is expected to last from 20-25 years, depending on the system. If the system is nearing the end of its life, it is better to replace it sooner rather than later to avoid being without heat for several days when it fails. This way, you will have time to compare bids, check references and ensure that the contractors are bonded and insured. A load calculation for the house should be made to determine the proper size based on the current conditions of the house since older homes often have heating systems that are oversized.

### Inspector Comments:

None

### Homeowner Notes:

## Central Cooling System

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<b>Location:</b>	Crawl Space	Attic
<b>Type:</b>	Split System	Split System
<b>Age/Design life (years):</b>	22/19	22/19
<b>Size (Btu/hr):</b>	24000	24000
<b>Efficiency (SEER):</b>		
- Existing:	8.8	8.8
- ENERGY STAR®:	14	14
- Best Available:	16	16
<b>% Cooling supplied:</b>	50	50
<b>Recommendation:</b>	Replace due to age	Replace due to age
<b>Estimated cost(1):</b>	\$2,328	\$2,328
<b>Estimated savings / yr (1):</b>	\$52	\$52
<b>Estimated cost(2):</b>	\$2,856	\$2,856
<b>Estimated savings / yr (2):</b>	\$63	\$63

(1) – Estimates for replacement with an ENERGY STAR® model.

(2) – Estimates for replacement with an industry best model.

Central air conditioning systems are expected to last from 15-20 years. Waiting for an older air-conditioner to stop working before replacing it makes little sense since the old one will cost twice as much to operate each day you wait. Older homes often have air conditioners with a Seasonal Energy Efficiency Rating (SEER) of 6 or 7, whereas the minimum efficiency for an Energy Star® air conditioner is a SEER rating of 14.

### Inspector Comments:

None

### Homeowner Notes:

## Ducts and Pipes Insulation

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<b>Length of uninsulated heating pipes (feet):</b>	0
<b>Duct and heating pipes recommendation:</b>	Insulate
<b>Duct &amp; heating pipes estimated cost:</b>	\$67
<b>Duct &amp; heating pipes est. annual savings:</b>	\$50
<b>Length of uninsulated ducts (feet):</b>	20
<b>Location of duct gaps:</b>	Attic, Crawl Space
<b>Duct repair recommendation:</b>	Repair ducts
<b>Duct repair estimated cost:</b>	\$135
<b>Duct repair est. annual savings:</b>	\$99
<b>Duct leakage test recommended?</b>	No
<b>Duct sealing recommendation:</b>	None
<b>Duct sealing estimated cost:</b>	
<b>Duct sealing estimated annual savings:</b>	

Uninsulated ducts or pipes passing through unconditioned spaces waste energy. Insulating them will often pay for itself within one year if you do it yourself and within two years if a contractor does it. Seal the joints and any gaps with mastic before insulating ducts. After insulating the ducts, seal the insulation seams with foil scrim kraft tape (FSK) or web tape. If you have steam pipes wrapped in asbestos and the outside sheathing appears to be flaky or parts are missing, do not attempt to do the job yourself; instead contact a qualified insulation contractor to do the work. If you don't feel comfortable making the repairs yourself, please note contractors often charge a minimum fee. Insulating ducts and pipes can usually be done as part of duct sealing, a home or a home seal-up or weatherization job, which can eliminate the minimum fee charge.

One of the easiest ways to save energy is to look for gaps in the joints of the ducts. If you can close these gaps and seal them with mastic, you will reduce the energy losses from the duct system. Some duct repair can be done easily by homeowners, but more extensive work should be done by a professional. If you don't feel comfortable making the repairs yourself, please note contractors often charge a minimum fee. Duct repair and sealing can usually be done as part of a seal-up or weatherization job or by insulation contractors, which can eliminate the minimum fee charge.

Leaky ductwork is a common problem. It wastes energy and can make it difficult to regulate a home's comfort. Sealing ducts can save a lot of energy; however, it may cost more to repair leaky ducts than it is worth if the ducts are inside a wall or in a conditioned space. A contractor who uses special instrumentation will have to find the hidden leaks and decide how best to seal them. Sealing ducts is usually done as part of a seal-up or weatherization job.

### Inspector Comments:

None

### Homeowner Notes:

## Programmable Thermostat

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**Estimated cost:**

**Estimated annual savings  
for day and night setback:**

**Estimated annual savings  
for night only setback:**

**Recommendation:**                      None    None

A programmable thermostat allows you to control the temperature by adjusting the temperature settings when no one is home or when you are sleeping. Setting the thermostat back during the day and night will save the most energy; however, if someone is home during the day, you may want to set the thermostat back only during the night to keep the house comfortable while occupied. A programmable thermostat is an inexpensive improvement that can save you 15% - 20% on heating and cooling bills.

### **Inspector Comments:**

Existing devices noted however they are not being used to save energy. Strongly recommend programming them in order to take advantage of there features.

### **Homeowner Notes:**

## Water Heater

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**Location:** Utility Room  
**Type:** Natural Gas  
**Age/Design life (years):** 9/13  
**Size (gallons):** 40  
**Unit recommendation:** Replace  
**Unit estimated cost:** \$665  
**Unit est. annual savings:** \$141  
**Insulation recommendation:** None  
**Insulation estimated cost:**  
**Insulation est. annual savings:**  
**Timer recommendation:** None  
**Timer estimated cost:**  
**Timer est. annual savings:**

The design life of most water heaters is 13 years. It is advisable to replace a water heater if it is older than its design life rather than waiting until it unexpectedly breaks down. If a water heater is not working properly, a technician should decide if the water heater should be repaired or replaced. It is recommended that you lower the temperature of the water heater to 120° F. This saves energy and reduces the chance of scalding. If the hot water supply is insufficient at this setting, increase the water heater temperature by 5 degrees Fahrenheit and try it for a few days. CAUTION: If your dishwasher does not have a booster heater and your dishes do not come out clean, you should raise the water temperature to the setting recommended by the dishwasher manufacturer.

Energy can be saved by installing an insulating blanket around the water tank to reduce standby heat losses. Savings are even more if the water heater is located in a conditioned space that requires cooling in the summer. Many homeowners can install this product themselves. CAUTION: If the tank has a warning label against the installation of additional insulation, do not install a wrap.

An energy saving option is an electric timer, which shuts off an electric water heater when hot water is not needed, thus reducing standby losses. This measure typically saves between 5%–12% of the energy used by the water heater, and, if self-installed, pays for itself in about a year. CAUTION: When installing the electric timer, turn off the breaker or disconnect the fuse. Exposed wiring can present an electrical hazard.

### Inspector Comments:

None

### Homeowner Notes:

## Refrigerator

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**Location:**  
**Age/Design life (years):** 1/10  
**Size (cubic feet):** 17  
**Condition:** Good  
**Annual cost to operate:** \$42  
**Recommendation:** None  
**Estimated cost:**  
**Estimated annual savings:**

Refrigerators consume more electricity than any other appliance in most homes, and today's efficient refrigerators use about 1/2 the electricity of those made 15 years ago. If the house has two refrigerators, see if you can substitute them for one larger one. When you buy a refrigerator, ask for an Energy Star® model. An Energy Star® model will use 10% less energy.

### Inspector Comments:

None

### Homeowner Notes:

## Clothes Washer

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<b>Location:</b>	Kitchen Closet
<b>Age/Design life (years):</b>	11/10
<b>Condition:</b>	Poor
<b>Recommendation:</b>	Replace due to age
<b>Estimated cost:</b>	\$775
<b>Estimated annual savings:</b>	\$47

The energy used for washing clothes is primarily (85%) determined by the temperature of water used, not by the efficiency of the washing machine. To save energy, use cool water. With today's detergents, most laundry can be successfully washed in cold or warm water, and all can be rinsed in cold water. Also, washing two small loads uses approximately twice as much energy as combining them into one full load.

Front-load washers use less water than top-load machines and have high-speed spin cycles that remove more water from washed clothes so they require less time in the dryer. In tests, front-load washers were also found to clean clothes better. Since the front-loading machines "wash whiter", "spin dryer" and are quieter than the top loading machines, they deserve serious consideration.

### Inspector Comments:

None

### Homeowner Notes:

## Clothes Dryer

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**Location:** Kitchen Closet  
**Age/Design life (years):** 11/12  
**Fuel type:** Electric  
**Condition:** Poor  
**Recommendation:** Replace  
**Estimated cost:** \$475  
**Estimated annual savings:** \$11

When purchasing a new dryer, consider purchasing an energy efficient one that senses the amount of moisture in clothes and shuts off automatically when the clothes are dry. Over drying not only wastes energy but can ruin your clothes. Using the high-speed spin cycle on the clothes washer removes more water and so clothes will require less time in the dryer.

### Inspector Comments:

None

### Homeowner Notes:

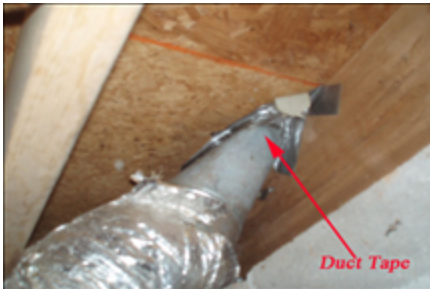
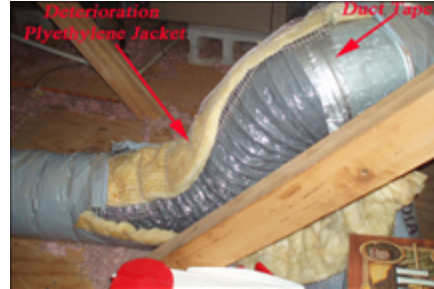


## General Notes and Pictures

Some of the ductwork joints have been sealed with duct tape which is known to peel off over time (some of the tape is peeling). All joints should be securely fastened and sealed with welds, gaskets, mastic adhesives, mastic-plus-embedded-fabric systems or tapes. Duct tape is not permitted as a sealant on any ducts.

Deterioration noted to the polyethylene jacket (falling off) in the attic area. Deterioration of flexduct significantly reduces overall energy efficiency. The crumbling of the flexduct can also result in condensation of the inner jacket.

Air leaks noted, where the ductwork connects to the air plenums and at joints. All of the ductwork needs proper sealing to prevent air leakage in nonconditioned areas.





## Implementation and Contractors

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Finding experienced, professional contractors and suppliers to implement home improvements can be difficult. CMC recommends you work with contractors and suppliers you know and trust. Contractor and supplier information is provided to facilitate implementation of the report recommendations. CMC does not recommend or endorse any contractors or suppliers. A technical expert is available at the Tune-uP help-line to advise you. Call 888-203-5CMC between 9 AM and 5 PM EST for assistance.

### Nationwide Contractor Resources

#### **Building Performance Institute**

BPI provides professional accreditation services for organizations and their professional staff in the building performance industry (envelope systems, mechanical systems, building evaluation, and multifamily buildings). Contractors who are professionally certified by BPI in their skill area have demonstrated competency through both written and field practical examinations. Contact BPI for more information or to locate a BPI certified contractor near you.

<http://www.bpi.org>

#### **North American Technician Excellence (NATE)**

NATE provides certification for contractors/technicians in the heating, ventilation, and air conditioning industry. The NATE certification tests are rigorous and taking them is voluntary. On the NATE website, you can locate a NATE certified contractor near you or obtain more information.

[http://www.natex.org/consumer\\_locator.htm](http://www.natex.org/consumer_locator.htm)

#### **Contractor.com**

Contractors.com specializes in online contractor listings with over one million contractors listed by zip code and service type. You can search for contractors in your area, review contractor profiles, read service ratings and testimonials provided by past clients of the contractor, visit the contractor Web sites, and submit projects to obtain free estimates from contractors.

<http://www.hometuneup.com/contractors.asp>

#### **Angie's List**

Angie's List is a word-of-mouth network for consumers. It's a growing collection of homeowners' experiences with local service companies. The people who join Angie's List are looking for a way to find trustworthy companies that perform high-quality work. There is a small membership fee to join the Angie's List network. Members can view Angie's List to find out what people in their area are saying about the companies they've hired in the area.

<http://www.angieslist.com>

### Local Contractor Resources

**No local resources currently available.**

## **Additional Energy Efficiency Measures**

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### **Lighting Options**

Compact fluorescent light bulbs use only one-third the electricity consumed by incandescent bulbs, yet last up to thirteen times longer. They produce less heat, are available in warm colors, and can be screwed into your existing light fixtures. While they cost more initially, their energy savings and long-life saves money and hassles in the long run. Consider installing hardwired fluorescent lights in your study or den and in your kitchen. Consider putting outside lights on a sensor so that they are lit only when someone approaches the house.

### **Ceiling Fans**

During the winter, ceiling fans set at slow speed can push warm air away from the ceiling and move it around the room, spreading heat evenly and making you feel more comfortable without creating a draft. During the summer, ceiling fans will move the air to make you feel cooler.

### **Laundry**

The energy used for washing clothes is primarily (85%) determined by the temperature of water used, not by the efficiency of the washing machine. To save energy, use cool water. With today's detergents, most laundry can be successfully washed in cold or warm water, and all can be rinsed in cold water. Also, washing two small loads uses approximately twice as much energy as combining them into one full load. Front-load washers use less water than top-load machines and have high-speed spin cycles that remove more water from washed clothes so they require less time in the dryer. In tests, front-load washers were also found to clean clothes better. Since the front-loading machines "wash whiter", "spin dryer" and are quieter than the top loading machines, they deserve serious consideration.

### **Energy-Saving Showerheads**

Energy-efficient showerheads have become common in recent years, having been required in new homes since 1994. A good quality efficient showerhead saves a significant amount of energy and water.

### **Fireplace**

A fireplace can be a major drain on home energy. To burn, a fire draws warm air from your rooms to be replaced by cold outside air. Warm air will escape through the chimney to the outside if the damper is not completely closed or sealed when not in use. The fireplace should have well-closing glass doors unless it has a direct source of outside air. If you do not use your fireplace at all, seal the damper [flue] with a specially designed inflatable plug or balloon inserted into the fireplace beneath the damper. This type of product is available at hardware stores or online and can pay for itself in one mid-winter heating bill.

### **Dishwasher**

ENERGY STAR® dishwashers are 30% more efficient than the 1994 standards. Models with an "energy-saver" or short-wash cycle option use less hot water. Reduce the total number of loads washed by running full loads. Turn off the drying heater so that dishes air dry.

### **Stove and Range**

Solid disk elements and radiant elements take longer to heat and use more electricity than halogen and induction elements. Self-cleaning ovens use less electricity than ovens without that feature because they are better insulated. Use a microwave, or toaster oven, rather than a full-sized oven or the stove. Smaller appliances use less energy than a stove and can reduce cooking time.

# Guidance on Indoor Air Quality

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## Weatherizing Your Home

Most older homes need to be weatherized to reduce energy loss. Measures such as installing storm windows, weather stripping, caulking, and blown-in wall insulation can reduce the amount of outdoor air infiltrating the home. Consequently, after weatherization, the home may have inadequate ventilation and concentrations of indoor air pollutants from sources inside the home can increase. Residents should be alert to the emergence of signs of inadequate ventilation, such as stuffy air, moisture condensation on cold surfaces, or mold and mildew growth (see [www.epa.gov/mold](http://www.epa.gov/mold)). If the house appears to be too tight, an air-to-air energy recovery ventilator should be installed to increase air circulation without losing much heat. Having an adequate air exchange rate is important for maintaining good indoor air quality.

## Reducing Toxins

Equally important is using less toxic materials in the home. Unfortunately, many home improvement products have significant “off-gassing,” where the chemicals leach out of the product and into the indoor air. Painting and carpeting are the two most common household improvements that people make when moving into a house, and both contain toxic chemicals

## Paints

There are serious health and environmental concerns surrounding paint. Using paints that are free of Volatile Organic Compounds (VOCs) such as benzene and toluene, free of heavy metals such as lead or cadmium, and/or made of post-consumer recycled content can aid in reducing exposure to toxics for both you and your environment. However, the fact that a paint is VOC free does not necessarily mean that it is free of toxins such as formaldehyde, ammonia, acetone or odor-masking agents. Fortunately, paints with reduced levels of VOCs, or even VOC-free, are available.

## Carpeting

Scientists have not yet determined whether the chemicals emitted by new carpets are responsible for causing a variety of symptoms in household residents. Therefore, if you are installing new carpet, you may wish to take the following steps:

- Ask the carpet retailer for information on emissions from carpet.
- Ask the retailer to unroll and air out the carpet before installation.
- Ask for low-emitting adhesives (if adhesives are needed).
- Consider leaving the premises during and immediately after carpet installation
- Make sure the installer follows the Carpet and Rug Institute's installation guidelines.
- Ventilate the house during and after installation to exhaust fumes to the outdoors for 48 to 72 hours after the new carpet is installed.
- Contact your carpet retailer if objectionable odors persist.
- Follow the manufacturer's instructions for proper carpet maintenance.

## Resources

The Environmental Protection Agency (EPA) has a consumer booklet, *The Inside Story: A Guide to Indoor Air Quality*. [www.epa.gov/iaq/pubs/insidest.html](http://www.epa.gov/iaq/pubs/insidest.html)

New American Dream has information on Green Seal certified paint manufacturers: [www.newdream.org/consumer/paint.php](http://www.newdream.org/consumer/paint.php)

## **Financing Energy Efficiency**

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Energy improvements are unique because they create a stream of income in reduced monthly energy bills that may cover the monthly cost of the investment. Financing energy efficiency improvements as part of your home mortgage is the best possible way to go—you have the advantage of (i) low monthly payments due to a 30-year term and a relatively low interest rate; and (ii) interest that is deductible from your income tax.

### **Nationwide Financing Resources**

#### **Streamlined (k) Limited Repair Program**

The Streamlined (k) Limited Repair program is ideal for financing energy-efficiency improvements and upgrades to existing homes. Homebuyers can finance up to an additional \$35,000 in their mortgage for improvements identified by a home inspector or an FHA appraiser. This loan can be issued by any FHA lender. HUD's Mortgagee Letter 2005-50 explains the program. For more information visit [www.hometuneup.com/step4.asp](http://www.hometuneup.com/step4.asp).

#### **Fannie Mae Energy Loan**

Some lenders offer an unsecured Fannie Mae Energy Loan for \$1,000 to \$20,000. The approval for this loan is fast and simple. The Energy Loan's 10 year term and interest rates are generally better than those offered by contractors or suppliers.

### **Local Financing Resources**

#### **Utility Rebate Program**

A number of utilities in your state offer special energy efficiency rebate programs. Program details may vary from what energy efficiency products or services qualify for rebates to how much the rebates are for. In some cases, utility rebates may cover most of the product or service cost. Visit your utility's website to find out if it offers energy efficiency rebates. Additional information may also be available at [www.dsireusa.org](http://www.dsireusa.org), a website dedicated to tracking state incentives for energy efficiency and renewable energy development.

#### **Utility Loan Program**

A number of utilities in your state offer special energy efficiency loan programs. Program details may vary from what energy efficiency measures qualify for a loan to what the rate and term of the loan are. In some cases, utility loans may be the most favorable loans available to homeowners. Visit your utility's website to find out if it offers energy efficiency loans. Additional information may also be available at [www.dsireusa.org](http://www.dsireusa.org), a website dedicated to tracking state incentives for energy efficiency and renewable energy development.



## Energy Efficiency Tax Credit

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Now is the time to improve the energy features of your house. During 2007, you can recoup your investment by lowering your energy bills and by saving up to \$500 on your tax bills.

- Replacing your older air conditioner, heat pump, or water heater could save \$300 from your tax bill;
- Replacing windows could save you a maximum of \$200; and
- Installing insulation may allow you to take a credit for 10% of the material costs.

The table below shows the required efficiency for equipment.

Equipment	Rating	Tax Credit
Central Air Conditioner	15 SEER	\$300
Heat Pump	HSPF 9, SEER 15	\$300
Furnace or Boiler	AFUE 95	\$150
Water Heater	80% efficiency	\$300
Main Circ. Fan	Max 2% of furnace energy use	\$50

- All purchases must be made during 2007;
- For IRS purposes, the costs are considered paid when the original installation of the item is completed;
- The tax credit can be claimed on your taxes only at the end of the year;
- You must keep your dated receipts for all eligible purchases; and,
- The energy efficiency improvements must be for your primary residence.
- For more information and links to IRS publications, visit the Home Tune-uP website at [www.hometuneup/taxcredit.asp](http://www.hometuneup/taxcredit.asp).

What is a Tax Credit?

There is an important difference between a tax credit and a tax deduction. A tax credit is subtracted directly from the total tax liability. On the other hand, a tax deduction is subtracted from income before total tax liability is computed. This means that a credit is much more advantageous to the taxpayer than a deduction. For example, a tax credit of \$500 is equivalent to a tax deduction of \$1,785 for someone in the 28% tax bracket.