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**HOME ENERGY TUNE-UP® REPORT**

**500 Main Street, Bethesda, MD 20814**

Inspector: Steve Luxton    ID #: 13                      Report #: 291    Date: 12/02/05

This Tune-uP Report lists all major opportunities for upgrading the energy efficiency of your home and estimates the savings and costs for each recommendation. It also provides information about financing and finding contractors. **Implementing these recommendations will make your home more comfortable and more valuable, while lowering your energy bills.**

- **HOME ENERGY IMPROVEMENT OPPORTUNITIES - TABLE 1** provides an assessment summary of all major factors that affect the thermal comfort of your home and your energy bill --insulation, windows, the draftiness of the home, heating and cooling systems, the water heater, and major appliances. It lists the present condition of each measure, its age, a recommendation if appropriate, the estimated annual energy savings and the estimated costs to replace the measure.
- The **RECOMMENDATIONS** section discusses each of the measures recommended, as well as additional low-cost measures that are applicable to any home.
- The **IMPLEMENTATION** section lists the support that the Tune-uP program provides to help you make better choices when implementing the recommendations. This includes the advice of a technical expert whom you can call or e-mail, and a web site providing a comprehensive online contractor directory.
- **FINANCING** identifies the group of measures that everyone can afford to invest in because the monthly savings from lowered energy bills will exceed the monthly cost of the measures when financed. The section lists a few types of financing available for energy efficiency improvements and where to obtain them.

Tune-uP estimates are based on the data obtained from a detailed inspection of each part of the home by an unbiased, certified home inspector. These observations are analyzed using the Tune-uP software developed by CMC Energy Services. The savings estimates are based on accepted engineering equations and take account of local weather, energy prices and implementation costs. CMC's experience, inspecting over 250,000 homes since 1977, has proven the accuracy of these estimates. However, you should be reminded that the savings estimates do not take account of variations in the behavior of the occupants, weather changes and fluctuations in energy prices. Nor do the cost estimates reflect the complexity of the job or price variations among contractors and suppliers, or differences in tastes.

**CMC Energy Services does not offer any warranty, either expressed or implied, for the estimated savings or costs in this Report. Should you find a seeming error in the Report, please call CMC at (866) 336-5262. The liability of CMC Energy Services for any errors or omissions in this Report is limited to the fee paid for this Report.**

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**Table 1 - HOME ENERGY IMPROVEMENT OPPORTUNITIES**

Measures	Present Condition	Age / Life	Recommendation	Annual Savings	Cost
Insulation					
Roof	Inadequate Insulation		Insulate to R38	\$107	\$765
Roof #2	Insulated		None		
Outside Wall	Insulated		None		
Partition Wall	Insulated		None		
Floor	Insulated		None		
Floor #2	No Insulation		Insulate to R25	\$114	\$1,458
Air Seal-up	Excessive Air Leaks		Seal-up	\$278	\$240
Windows				\$200	\$5,883
Single Glazed	12 Poor		Replace w/Double glazed low-E		
Single Glazed	2 Good		Replace w/Double glazed low-E		
Double Glazed	1 Poor		Replace w/Double glazed low-E		
Double/Triple Glazed	1 Good		None		
Heating System	Fair	20 / 14	Consider Replacement – Age	\$215	\$2,160
Heating System #2	Fair	20 / 14	Consider Replacement – Age	\$72	\$2,160
Setback Thermostat	Not Present		Install	\$101	\$237
Setback Thermostat #2	Not Present		Install	\$35	\$237
Cooling System Central	Fair	20 / 14	Consider Replacement – Age	\$51	\$2,646
Cooling System Central #2	Fair	20 / 14	Consider Replacement – Age	\$26	\$2,103
Water Heater	Fair	10 / 11	Insulate Tank	\$14	\$35
Freezer	Good	20 / 12	Consider Replacement – Age	\$29	\$510
Washing Machine	Poor	15 / 10	Replace with Energy Star Model	\$37	\$760
Dryer	Poor	15 / 12	Replace	\$10	\$460

**Implementing all these recommendations would result in a reduction of Greenhouse Gases equivalent to not driving a car for 10.4 months.**

**Survey Notes:**

Heating: System #2 is for addition.

Central A/C: System #2 is for addition.

Appliances – Washing Machine: Dented and rusted.

Appliances – Dryer: Rusted and missing lint screen.

Roof: #2 is over addition.

Floors: #2 is the addition.

Windows: Most windows have worn or missing weather stripping. Two windows have cracked panes – 1<sup>st</sup> floor East.

Appliances – Refrigerator: Owner may bring refrigerator.

# **SAMPLE RECOMMENDATIONS**

All energy efficiency improvements are good for the environment. The improvements recommended in this Report are also a good investment, because they:

- Save more money in reduced energy bills than they cost,
- Increase the re-sale value of the house,
- Make the home more comfortable.

For each recommendation, we have summarized the main features of the recommendation. For more information, call us at (888) 203-5262.

## **Ceiling Insulation**

A well-insulated ceiling is a key way to reduce the loss of energy, make your home more comfortable and lower your energy bills. In addition, it helps protect your home from fire and moisture damage, and makes the home a quieter space in which to live. During warm weather, ceiling insulation can be particularly helpful in reducing the heat transfer from the hot attic to the rooms below. The recommended ceiling insulation for most geographic areas is 12 inches. Blown-in cellulose or fiberglass insulation are good choices of material for homes in which access to the attic is limited.

## **Insulating Floors**

To reduce heat loss to an unheated basement or crawl space, fiberglass bats installed between wood floor joists provide good insulation. For a crawl space, consider a ground cover to prevent the build-up of moisture under the home. If the house is on a slab, consider adding carpeting with a thick pad underneath to make the slab floor feel warmer. You may also insulate the outside perimeter of the home's floor slab with extruded polystyrene, down to a depth of two to four feet. Cover and protect insulation on the exposed part of the perimeter with flashing or a weatherproof stucco coating.

## **Finding and Sealing Air Leaks**

Many homes, especially older houses, have leaks that allow heated and cooled air to escape. Because a heating or cooling system has to work harder to compensate for lost energy, air leaks can be a significant waste of energy and money. They also can be a cause of discomfort, since they make the house drafty. There are some air leaks that you may be able to seal yourself, however, many homes have hidden air leaks that require a professional weatherization person to find the leaks and do the work. We recommend you employ a professional 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. If you have trouble finding a seal-up technician, we will try to help. Please contact CMC Energy Services at (888) 203-5262.

## **Window Replacement**

Glass is a very poor insulator, hence windows account for a large portion of the energy lost in a house. A single pane of glass loses fifteen times more heat than a section of insulated wall of the same area. With the addition of a second pane of glass, the amount of energy lost through windows is cut in half. And with a low-e glass second pane, the energy loss is cut by 60%. 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 sealed to the window frame, can reduce air-conditioning costs by up to 25%. While replacing windows is expensive, if the window moldings are poor, this may be your best solution. The National Fenestration Rating Council (NFRC) rates the energy efficiency of replacement windows. Look for their label before buying 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.

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### **Heating Systems**

Replacing a heating system is an expensive and complex matter. A well maintained heating system is expected to last from 20-25 years depending on the system type. If the heating system is nearing its end of life and is likely to have to be replaced within the next few years, it is better to do it now than to wait for it to break down in the middle of winter. Not only will you avoid the hassle of “no heat” for a number of days and nights, you will have the time to compare the bids of several contractors, make sure that they are bonded and insured, and check their references. It is important that a load calculation for the house be made to determine the proper size based on the actual conditions of the house. In most cases, older homes have heating systems that are oversized, particularly if any efficiency improvements have been made. If the home is heated with an older heat pump, replacing the heat pump is likely to save 30% - 50% of the heating/cooling bill, since today’s heat pumps are much more efficient than older ones. The Energy Star® heat pumps have a minimum heating system performance factor (HSPF) of 7. For gas or oil furnaces or boilers, the heating efficiency improvements will generally be 20% – 30%. The minimum efficiency for the Energy Star® label for gas and oil furnaces is 90%, and for boilers it is 85%.

### **Setback Thermostats**

Setback thermostats give you control over the temperature in your home, automatically turning down the heat when you don’t need it and turning it back up when you do need it. Households that turn down the thermostat when the house is unoccupied during the day and reduce the temperature at night when they sleep, save 15% - 20% on their heating and cooling bills. This is an inexpensive improvement that really saves. Homes with heat pumps will require a special thermostat.

### **Central Air Conditioners**

Most electric outages and shortages in the U.S. occur on hot summer days when electricity is used to cool both work places and homes (half of which are not occupied during the day). The alternative to building more electric plants is to improve the efficiency of our air-conditioners and to reduce the air-conditioning of homes when not occupied through controls. Older homes often have air conditioners that are still working with a Seasonal Energy Efficiency Rating (SEER) of 6 or 7. The minimum efficiency for an Energy Star® air conditioner is a SEER rating of 12. Central air conditioning systems are expected to last from 15-20 years. If you move into the home and wait for the air-conditioner to stop working before replacing it with an efficient one, you will be paying twice as much for your air conditioning electricity each day that you wait. It therefore makes economic sense to consider replacing your air conditioner when you move in.

### **Water Heater**

Replacement: The average life of water heaters is about 13 years. When moving into a house, you may consider replacing the water heater if it is 13 years old or older if you consider that you may have to make this purchase at some unknown, but surely inconvenient, moment within the next three years anyway. The savings from having an efficient water heater during those three years will pay for the difference between the cost of a conventional and high-efficiency model.

Repair: Whether a water heater should be repaired or replaced will often have to be decided by a technician. If the tank is leaking or if it is rusted or corroded, it will usually need to be replaced.

Tank Insulation: Most water heaters benefit from the installation of an insulating blanket around the outside of the tank. These insulating blankets are often referred to as water heater wraps, are designed and packaged for a range of tank sizes, and are available from most building supply or hardware stores. They reduce heat loss of the water stored in the tank during periods when no hot water is being consumed. Most homeowners can install this product themselves. If you choose to have a contractor install a water heater wrap, have it done in conjunction with other work in your house, to avoid the cost of a separate trip. Some gas water heaters have a

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warning label specifically warning against the installation of additional insulation. We do not recommend installation if there is a warning label referring to insulation, so check for this before installing a wrap.

### **Freezer**

If there is an old freezer in the house and you do not need it, get rid of it, as it uses nearly as much electricity as a refrigerator. If you do need it, consider buying a new one if it is more than 10 years old since today's freezers use about half the electricity used by older ones. Chest freezers use about 10% - 25% less electricity than upright freezers.

### **Washing Machine**

The energy used for washing clothes is primarily (90%) determined by the temperature and amount of water used, not by the efficiency of the washing machine. The primary efficiency of the front-loading versus the top-loading machines is that the front-loading machines use less water. They also have high speed spin cycles that remove more water from washed clothes, therefore saving energy in the dryer. In tests, we have also found that they clean clothes better, probably because the length of time for the soaking and washing cycles are longer.

Are the more efficient front-loading machines worth the higher price? As increasing numbers of manufacturers are offering front-loading machines the price differential is narrowing and the capacity of the front-loading machines is increasing. Whereas we hesitated to recommend them to families with a lot of laundry because of their small capacity (60% of the top loading machines) and the long cycles (double the average of the top loading) a few years ago, a number of American manufacturers have come out with higher capacity machines that have somewhat shorter cycles. Since the front-loading machines "wash whiter", "spin dryer" and are quieter than the top loading machines they deserve serious consideration.

To save energy, our primary advice is still to use cool water. Chemists tell us that with today's detergents, most laundry can be successfully washed in cold or warm water, and all can be rinsed in cold water. Thus we can cut our energy bill for laundry to 1/5<sup>th</sup> of its cost by just using cool rather than hot water.

### **Clothes Dryer**

The main difference between an efficient and an ordinary dryer is that the efficient one senses the amount of moisture in clothes and shuts off automatically when the clothes are dry. This feature can be especially effective when used in conjunction with a clothes washer that has a high-speed spin cycle.

## **OTHER TUNE-UP MEASURES TO CONSIDER**

### **Energy-Efficient Lighting Options**

There are many readily available alternatives to conventional incandescent lighting. 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 in the long run. To make your home's lighting even more energy-efficient, consider installing hardwired fluorescent lights in your study or den and in your kitchen. If you have outside lights, you may wish to consider putting them on a sensor so that they only go on when someone approaches the house.

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### Dishwasher

If you wish to replace an older dishwasher, pick one with an EnergyStar® label. These dishwashers are at least 30% more efficient than the 1994 standards and can be relied on to do the job using less energy. Other things to look for include:

- options for air drying rather than heat drying, to help reduce electricity use,
- the option of “energy-saver” or “short-wash” cycles, which reduce the amount of hot water used,
- for households with limited dishwashing consider purchasing a compact model instead of a standard size.

### Stove and Range

If you're considering the purchase of a new electric range, be aware of the differences in efficiency of the burners currently on the market. Solid disk elements and radiant elements take longer to heat up, 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. Whenever you can, elect to use a pressure cooker, microwave, or toaster oven, rather than a full-sized oven. These smaller appliances use less energy than a stove and can reduce cooking time.

### Reduce the Amount of Energy Lost Through Your Fireplace

Though attractive, a fireplace can be a major drain on energy in your home. A fire requires air to burn and will draw the warm air from your rooms to be replaced by cold outside air. Additionally, warm air may escape through the chimney to the outside when the damper is not completely closed. To eliminate this waste, the fireplace should have well-closing glass doors and, if possible, a direct source of outside air to draw from. If you do not use your fireplace, it is best to seal the damper in order not to lose warm air up the chimney.

## IMPLEMENTATION

Finding experienced, professional contractors and suppliers to implement home improvements can be difficult. CMC recommends you call contractors and suppliers you know, or visit [www.contractors.com](http://www.contractors.com) to obtain information about contractors in your area. The [Contractor.com](http://Contractor.com) web site contains over one million contractors listed by zip code and service type. It will allow you to 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.

A technical expert is available at the Tune-uP help-line to advise you. If you are unable to locate contractors and suppliers for all of the improvements recommended in this Report, CMC will try to locate one in your area. Just call CMC at (866) 336-5262.

Contractor and supplier information is provided to facilitate the implementation of the report recommendations. *CMC does not recommend or endorse any contractors or suppliers.* Should you have any questions concerning the listings, call CMC at (866) 336-5262.

## SAMPLE FINANCING

Table 2, below, lists improvements that have the greatest return on investment and that, if financed, can pay for themselves through energy savings. **These are the improvements that you can't afford to pass up.**

**Table 2 – IMPROVEMENTS THAT SAVE MORE THAN THEY COST**

Measures	Recommendation	Annual Savings	Cost
Air Seal-up	Get Seal-up	\$211	\$240
Setback Thermostat-Main	Install	\$101	\$237
Water Heater	Insulate Tank	\$14	\$35
Setback Thermostat #2	Install	\$35	\$237
Roof-Main	Insulate to R38	\$81	\$765
Floor #2	Insulate to R25	\$87	\$1,458
Freezer	Consider Replacement - Age	\$29	\$510
Heating System-Main	Consider Replacement - Age	\$107	\$2,160
Washing Machine	Replace w/ Energy Star Model	\$37	\$760
Heating System # 2	Consider Replacement - Age	\$72	\$2,160
<b>TOTALS</b>		<b>\$775</b>	<b>\$8,562</b>
<b>Monthly Savings &amp; Cost</b>		<b>\$65</b>	<b>\$51</b>

The last line of Table 2 shows what monthly savings and costs would be if you were to finance the energy efficiency improvements listed in the table at a 6% interest rate with a 30-year term. The cost is the amount that will be added to the monthly mortgage payments to pay for the improvements. The monthly energy savings is the estimated reduction in the monthly energy bill if all listed recommendations are implemented.

The annual savings estimates listed in Table 2 may differ slightly from those listed in Table 1. This is because the annual savings calculations in Table 2 take into account the interaction of all the energy efficiency improvements listed. If, for example, the efficiency of the heating system is improved and insulation is added, the savings from the improved heating system will be less because the improved insulation reduces the heating load, and likewise the savings from the improved insulation will be less because of the more efficient heating system.

The financing that can be obtained after a Home Energy Tune-uP<sup>®</sup> makes investing in energy efficiency improvements available to everyone, even those people who don't have money to invest. Energy improvements are unique because they create a stream of income in reduced monthly energy bills that will cover the monthly cost of the investment.

A few sources of financing include:

- For homes eligible for FHA loans, a new FHA Streamline (K) mortgage is available for energy efficiency upgrades. This is a low interest, 30-year mortgage that can be added on to any FHA loan. Financing energy efficiency improvements as part of your home

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mortgage is the best possible way to go. You have the advantage of: (1) low monthly payments due to a 30-year term and a relatively low interest rate, (2) interest that may reduce your taxable income, and (3) less paperwork than the 203k loan.

- For all homeowners, most 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.
- Some electric or gas utilities offer financing for energy efficiency improvements as well as rebates for energy efficient appliances and heating and cooling systems. Check your local or regional utility's web site for more information about financing and rebates that may be available to you.

For more information, or for the names of lenders interested in financing energy efficiency, call CMC at (888) 203-5262.