



Bringing Today's Energy Technology  
to Yesteryear's Homes

# Home Tune-uP<sup>®</sup> Report

56 Channing Street N.W., Washington, DC 20001



Prepared by:  
Steve Luxton  
(866) 843-5500  
sluxton@cmcenergy.com



March 14, 2007

This Home Tune-uP report:

- Lists energy efficiency improvements and their 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:	408
Structure type:	Row house inside unit
Date built (est.):	1907
# of bedrooms:	3
House size (sq. ft.):	1542
House volume (cu. ft.):	15420
Heating fuel:	Natural Gas
Price of heating fuel:	\$2.018/Therm
Price of electricity:	\$0.087/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).

**Table 1**

Feature	Recommendation	Annual Savings*	Cost	Payback (Years)
<b>Insulation</b>				
· Roof/Ceiling - Main House	Insulate to R 38	\$163	\$1,364	8
· Basement Wall - Area 1	Insulate to R 13	\$38	\$794	20
· Floor - Below den	Insulate to R 19	\$43	\$295	6
Air Sealup	Seal air leaks	\$269	\$359	1
<b>Windows and Glass Doors</b>				
· 1 Oversized Window/Door(s)	Replace with double-pane, low-e	\$16	\$1,302	82
· 2 Mini Basement Window(s)	Replace with double-pane	\$12	\$140	11
<b>Heating and Cooling Systems</b>				
· Gas Boiler - Basement	Replace	\$57	\$3,441	60
<b>Heating and Cooling Distribution</b>				
· Duct/Pipe Insulation	Insulate	\$48	\$60	1
· Programmable Thermostat - Unit 1	Install	\$174	\$219	1
Water Heater - Basement	Replace Due to Age	\$141	\$703	4
<b>Total</b>			\$8,816	

\*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 4.1 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**

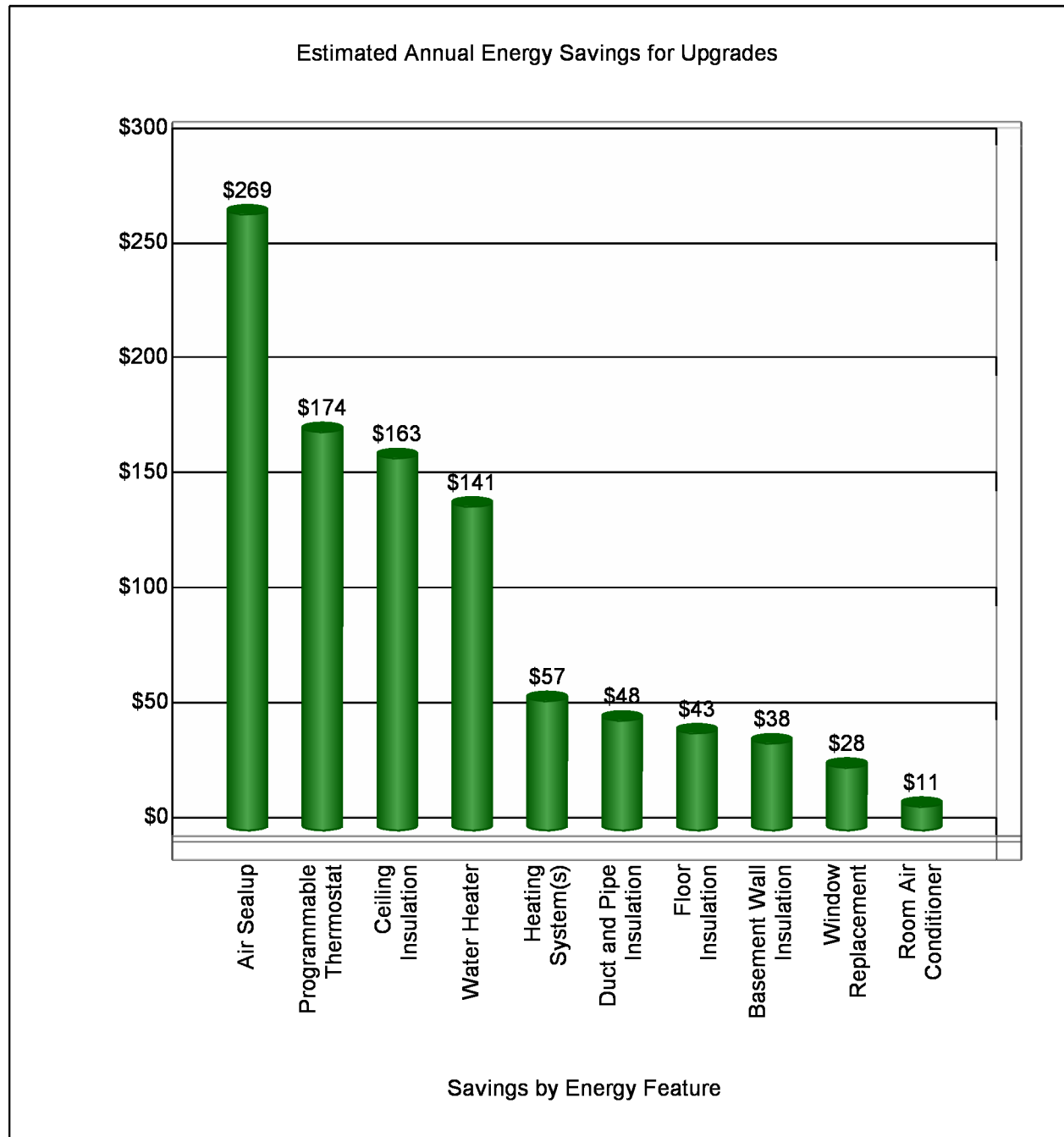
Feature	Recommendation	Annual Savings*	Cost	Payback (Years)
<b>Insulation</b>				
· Roof/Ceiling - Main House	Insulate to R 38	\$159	\$1,364	8
· Basement Wall - Area 1	Insulate to R 13	\$38	\$794	20
· Floor - Below den	Insulate to R 19	\$43	\$295	6
Air Sealup	Seal air leaks	\$266	\$359	1
<b>Windows and Glass Doors</b>				
· 1 Oversized Window/Door(s)	Replace with double-pane, low-e	\$15	\$1,302	84
· 2 Mini Basement Window(s)	Replace with double-pane	\$12	\$140	11
<b>Heating and Cooling Systems</b>				
· Gas Boiler - Basement	Replace	\$26	\$3,441	132
<b>Heating and Cooling Distribution</b>				
· Duct/Pipe Insulation	Insulate	\$45	\$60	1
· Programmable Thermostat - Unit 1	Install	\$66	\$219	3
Water Heater - Basement	Replace Due to Age	\$141	\$703	4
<b>Total</b>		\$812	\$8,677	
<b>Monthly Savings and Cost When Financed**</b>		\$68	\$56	

\* 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, Roof/Ceiling

---

<b>Location:</b>	Main House
<b>Existing Insulation Type:</b>	
<b>Existing R-value:</b>	0
<b>Area (sq. ft.):</b>	627
<b>Attic Floored:</b>	No
<b>Roof Type:</b>	Flat
<b>Ceiling Type:</b>	Flat
<b>Room to add insulation:</b>	Yes
<b>Recommendation:</b>	Insulate to R 38
<b>Estimated cost:</b>	\$1,364
<b>Estimated annual savings:</b>	\$163

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:

In addition to adding insulation, strongly recommend weather stripping the attic access hatch.



### Homeowner Notes:

## Insulation, Basement Walls

---

<b>Location</b>	Area 1
<b>Total wall area (sq. ft.):</b>	304
<b>Area to insulate (sq. ft.):</b>	304
<b>Basement Windows:</b>	2
<b>Recommendation:</b>	Insulate to R 13
<b>Estimated cost:</b>	\$794
<b>Estimated annual savings:</b>	\$38

Exterior basement walls should be insulated if the basement is heated. If the basement is partially below ground, the entire length of the walls should still be insulated. Since moisture not only makes insulation less effective, but can result in mold, insulation should be installed with a vapor barrier facing the conditioned area. Any other conditions causing dampness in the basement should be resolved before insulating.

### Inspector Comments:

The basement is currently not conditioned; however, future plans are to make the basement a conditioned living space.

Recommend weather stripping and sealing rear-access basement door.



### Homeowner Notes:

---

## Insulation, Floors

---

<b>Location:</b>	Main house	Below den
<b>Floor Construction:</b>	Over Conditioned Basement	Over Vented Crawlspace
<b>Insulation present:</b>	No	No
<b>Existing R-value:</b>	19	3
<b>Floor Joists are</b>	No	Yes
<b>Accessible:</b>		
<b>Floor area (sq. ft.) or slab perimeter (ft.):</b>	627	288
<b>Recommendation:</b>	None	Insulate to R 19
<b>Estimated cost:</b>	\$0	\$295
<b>Estimated annual savings:</b>	\$0	\$43

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:

Area below den needs to be enclosed to prevent air movement and energy loss.

Repair noted plumbing leak before insulating to ensure maximum effectiveness of the insulation.

### Homeowner Notes:

---

## House Air Leakage

---

**Est. air leakage condition:** Leaky  
**Recommendation:** Seal air leaks  
**Estimated cost:** \$359  
**Estimated annual savings:** \$269

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. CMC recommends 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:

Holes and cracks in the envelope were observed through out the first and second floors. Seal all holes and gaps, including light switches and electric outlets on outside walls.



Note open access panel

### Homeowner Notes:

## Windows and Glass Doors

---

Number of Windows	Window Size/Type/Condition	Recommendation	Cost	Savings
1	Oversized/Double/Poor	Replace with double-pane, low-e	\$1,302	\$16
2	Mini Basement Window(s)	Replace with double-pane	\$140	\$12

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:

There was fogging between the glass door window panes.

Den's sliding door needs to be repaired due to noted gaps and air leakage.



Sliding glass door

### Homeowner Notes:

---

## Heating System

---

<b>Location:</b>	Basement
<b>Type:</b>	Gas Boiler
<b>Age/Design Life (years):</b>	18/30
<b>Size (Btu/hr):</b>	80000
<b>Efficiency (AFUE)</b>	
<b>Existing:</b>	80
<b>ENERGY STAR®:</b>	85
<b>Best Available:</b>	90
<b>Percent of heat supplied:</b>	100
<b>Recommendation:</b>	Replace
<b>Estimated cost(1):</b>	\$3,441
<b>Estimated savings / yr (1):</b>	\$57
<b>Estimated cost(2):</b>	\$5,162
<b>Estimated savings / yr (2):</b>	\$107

(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:

---

## Ducts and Pipes Insulation

---

**Length of Uninsulated Ducts (feet):** 0  
**Length of Uninsulated Pipes (feet):** 50  
**Recommendation:** Insulate  
**Estimated cost:** \$60  
**Estimated annual savings:** \$48

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.

### Inspector Comments:

If basement remains unheated, recommend insulating pipes.



### Homeowner Notes:

---

## Programmable Thermostat

---

<b>Heating system type:</b>	Gas Boiler
<b>Estimated cost:</b>	\$219
<b>Estimated annual savings for day and night setback:</b>	\$174
<b>Estimated annual savings for night only setback:</b>	\$116
<b>Recommendation:</b>	Install

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:

None



### Homeowner Notes:

---

## Water Heater Replacement

---

**Location:** Basement  
**Type:** Natural Gas  
**Age/Design Life (years):** 17/13  
**Size (gallons):** 40  
**Recommendation:** Replace Due to Age  
**Estimated cost:** \$703  
**Estimated annual savings:** \$141

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. We recommend lowering 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.

### Inspector Comments:

None



### Homeowner Notes:

---

## **Implementation and Contractors**

---

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**

#### **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. For more information visit [www.angieslist.com](http://www.angieslist.com).  
[www.angieslist.com/](http://www.angieslist.com/)

#### **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.  
[www.hometuneup.com/contractors.asp](http://www.hometuneup.com/contractors.asp)

#### **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. For more information and to locate a NATE certified contractor near you visit [www.natex.org/consumer\\_locator.htm](http://www.natex.org/consumer_locator.htm).  
[www.natex.org/](http://www.natex.org/)

#### **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 skills area have demonstrated competency through both written and field practical examinations. For more information and to locate a BPI certified contractor near you visit [www.bpi.org](http://www.bpi.org).  
[www.bpi.org](http://www.bpi.org)

### **Local Contractor Resources**

**No local resources currently available.**

## **Additional Energy Efficiency Measures**

---

### **Appliance Energy Settings**

Use the energy-saving settings on all your appliances, such as refrigerators, dishwashers, washing machines, and clothes dryers.

### **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.

### **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.

### **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.

### **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.

### **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

---

### 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**

---

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**

#### **Residential Energy Star Appliance Rebate Program**

DC residents may receive a \$150 rebate on an Energy Star-rated washing machine, a \$100 rebate on an Energy Star-rated refrigerator and as many as two \$50 rebates on Energy Star-rated window air conditioners. Residents must purchase appliances by May 31, 2007 and submit proofs of purchase and residency.  
<http://dceo.dc.gov>

## Energy Efficiency Tax Credit

---

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.
- More information can be found on the following IRS publications (these links are posted on the Home Tune-uP website at [www.hometuneup/taxcredit.asp](http://www.hometuneup/taxcredit.asp)):
  - IRS 2006 [www.irs.gov/publications/p553/ch01.html#d0e1110](http://www.irs.gov/publications/p553/ch01.html#d0e1110)
  - IR-2006-34 [www.irs.gov/newsroom/article/0,,id=154657,00.html](http://www.irs.gov/newsroom/article/0,,id=154657,00.html)
  - IRS Notice 2006-26 [www.irs.gov/pub/irs-drop/n-06-26.pdf](http://www.irs.gov/pub/irs-drop/n-06-26.pdf)
  - Clarification of Notice 2006-26 [www.irs.gov/pub/irs-drop/n-06-53.pdf](http://www.irs.gov/pub/irs-drop/n-06-53.pdf)

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.