TECH
DESIGN • BUILD • REMODEL



Recover Remodel Restore Renew Refine

A White Paper on... Improving Energy Efficiency

Executive Summary

- Look for contractors who participate in home ENERGY STAR programs and are willing to take the time and effort to address energy efficiency with you.
- Analyze your home energy usage.
- Seal ducts and ventilation systems.
- Insulate the house with ENERGY STAR home sealing.
- Choose ENERGY STAR rated products, especially heating and cooling units.
- Take a "Whole House Approach" to this issue.
- Seal Leaks, such as drafts around doors and windows.
- Make sure combustion appliances (furnaces, water heaters, etc.) are properly ventillated.
- Install a programmable thermostat.
- Tune up HVAC equipment yearly
- Change air filters regularly
- Consider upgrading heating and cooling appliances if they older and inefficient.

"Green Remodeling": Improve Your Home's Energy Efficiency with ENERGY STAR

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping homeowners save money and protect the environment through energy efficient products and practices. Results are already adding up. Americans, with the help of ENERGY STAR, saved enough energy in 2006 alone to avoid greenhouse gas emissions equivalent to those from 25 million cars — all while saving $14 billion on their utility bills.

Improving energy efficiency is an important factor in decisions related to home remodeling in the 21st century. Making your home more energy efficient with ENERGY STAR can help to reduce high energy bills and improve comfort. Many common home problems such as moisture on window panes, drafty rooms, peeling paint, mold, and damp basements among others can often be remedied by taking steps to improve energy efficiency.

Improving energy efficiency with ENERGY STAR is also an important first step in the growing trend of "green remodeling." That's because the energy used in homes often comes from the burning of fossil fuels at power plants, which contributes to smog, acid rain, and global warming. So, it stands to reason that the less energy used in homes, means the less air pollution generated.

ENERGY STAR is a great partner when considering home remodeling and can guide you in making your home more energy efficient — whether you do-it-yourself or hire a qualified professional. Take these steps to get started:

1. Analyze your home's energy use
2. Air seal and insulate with ENERGY STAR home sealing
3. Heat and cool efficiently
4. Choose ENERGY STAR qualified products
5. Take the whole house approach with home performance with ENERGY STAR

We will now review each of these steps in further detail.

Analyze your home's energy use

Auditing your home's energy use is easy. All it takes is five minutes and your last 12 months of utility bills. Simply go to www.energystar.gov and use the ENERGY STAR Home Energy Yardstick to compare your home's energy efficiency to similar homes across the country. You'll get recommendations for energy-saving home improvements from ENERGY STAR which form a basis of discussion with your professional contractor when determining home improvements.

Air seal and insulate with ENERGY STAR home sealing

Many homeowners opt for ENERGY STAR Home Sealing to improve their home's "envelope" or "shell" — its outer walls, ceiling, windows, and floors. This is often the most cost-effective way to improve a home's energy efficiency and comfort. ENERGY STAR Home Sealing includes:

- **Sealing Leaks.** It's pretty easy to find most air leaks and drafts because they are easy to feel — like those around windows and doors. But holes hidden in attics, basements, and crawlspaces are usually bigger problems. Sealing these leaks with caulk, spray foam, or weather stripping will have a great impact on improving resident comfort while reducing utility bills.

  The issue of sealing a home too tightly sometimes arises with homeowners; however, this is very unlikely in most older homes. A certain amount of fresh air is needed for good indoor air quality and there are specifications that set the minimum amount of fresh air needed for a house. If you are concerned about how tight your home is, hire a contractor who can use diagnostic tools to measure your home's actual leakage. If your home is too tight, a fresh air ventilation system may be recommended.

  After any home sealing project, it's a good idea to have a heating and cooling technician check to insure that your combustion appliances (gas- or oil-fired furnace, water heater, and dryer) are venting properly.

- **Adding Insulation.** It's one of those things that you may not think about until your house gets too hot or too cold. But insulation is a vital factor in keeping your home warm in the winter and cool in the summer. There are several common types of insulation — fiberglass (in both batt and blown

TECH
DESIGN • BUILD • REMODEL



Recover Remodel Restore Renew Refine

A White Paper on . . . Improving Energy Efficiency

forms), cellulose, rigid foam board, and spray foam. Reflective insulation is another insulating product which can help save energy in hot, sunny climates. When correctly installed with air sealing, each type of insulation can deliver comfort and lower energy bills during the hottest and coldest times of the year.

Insulation performance is measured by R-value — its ability to resist heat flow. Higher R-values mean more insulating power. Different R-values are recommended for walls, attics, basements and crawlspaces, depending on your area of the country. Insulation works best when air is not moving through or around it. So it is very important to seal air leaks before installing insulation to ensure that you get the best performance from the insulation.

The most obvious, and easiest, place to install insulation for the biggest savings is usually in the attic. A quick way to see if you need more insulation is to look across your uncovered attic floor. If your insulation is level with or below the attic floor joists, you probably need to add more insulation. The recommended insulation level for most attics is R-38 (or about 12–15 inches, depending on the insulation type) but in the coldest climates, insulating up to R-49 is recommended.

- **Sealing Ducts.** In houses with forced-air heating and cooling systems, ducts are used to distribute conditioned air throughout the house. In a typical house, however, about 20 percent of the air that moves through the duct system is lost due to leaks and poorly sealed connections. The result is higher utility bills and difficulty keeping the house comfortable, no matter how the thermostat is set.

  Because some ducts are concealed in walls and between floors, repairing them can be difficult. However, exposed ducts in attics, basements, crawlspaces, and garages can be repaired by sealing the leaks with duct sealant (also called duct mastic). In addition, insulating ducts that run through spaces that get hot in summer or cold in winter (like attics, garages, or crawlspaces) can save significant energy.

Some of these projects can be completed by skilled homeowners but it is also possible to hire a contractor who will use special diagnostic tools to pinpoint and seal the hidden air leaks in a home.

Heat & Cool Efficiently

Think about it. As much as half of the energy used in a home goes to heating and cooling. So making smart decisions about your home's heating, ventilating, and air conditioning (HVAC) system can have a big effect on your utility bills — and your comfort. If you want to take the heat off utility bills, just follow these easy steps:

Change your air filter regularly. Check your air filter every month, especially during heavy-use months during winter and summer. If the filter looks dirty after a month, change it. At a minimum, change the filter every 3 months. A dirty filter will slow down air flow and make the system work harder to keep you warm or cool which ultimately wastes energy and money. A clean filter will also prevent dust and dirt from building up in the system which can lead to expensive maintenance and/or early system failure.

Tune up your HVAC equipment yearly. Just as a tune-up for your car can improve your gas mileage, a yearly tune-up of your heating and cooling system can improve efficiency and comfort. Some steps like changing air filters regularly are easy for homeowners to initiate on their own but in some cases it is best to hire an industry professional to do the required check ups and any resulting maintenance.

Install a programmable thermostat.
A programmable thermostat is ideal for people who are away from home during set periods of time throughout the week. Through proper use of pre-programmed settings, a programmable thermostat can save you about $150 every year in energy costs.

Seal your heating and cooling ducts.
Ducts that move air to-and-from a forced air furnace, central air conditioner, or heat pump are often big energy wasters. Sealing and insulating ducts can improve the efficiency of your heating and cooling system by as much as 20 percent — and sometimes much more. Focus first on sealing ducts that run through the attic, crawlspace, unheated basement, or garage. Use duct sealant (mastic) or metal-backed (foil) tape to seal the seams and connections of ducts. After sealing the ducts in those spaces, wrap the ducts in insulation to keep them from getting hot in the summer or cold in the winter. Next, seal ducts that you can access in the heated or cooled part of the house.

Consider installing ENERGY STAR qualified heating and cooling equipment.
If your HVAC equipment is more than 10 years old or not keeping your house comfortable, you should have it looked at by a professional HVAC contractor. If it is not performing efficiently or needs upgrading, consider replacing it with a unit that has earned the ENERGY STAR. Installed correctly, these high-efficiency heating and cooling units can save up to 20 percent on heating and cooling costs. But before you invest in a new HVAC system, make sure that you have addressed the big air leaks in your house and the duct system. Sometimes, these are the real sources of problems rather than your HVAC equipment.

Remember that getting the proper size and a quality installation is essential to getting the most from your new equipment. When replacing HVAC equipment, bigger doesn't always mean better. If the unit is too large for your home, you will be less comfortable and might actually have higher utility bills. Oversized equipment will operate in short run cycles, not allowing the unit to reach efficient operation and remove humidity from the air — resulting in an uncomfortable home. Your contractor should determine the right size for your HVAC equipment by using ACCA/ANSI Manual J or an equivalent sizing calculation tool that takes into account specific information about your home.

Take the whole house approach with home performance with ENERGY STAR

A drafty home, rooms that are too hot or too cold, and high energy bills are all common issues for homeowners. Installing a new heating or air conditioning system, buying replacement windows, or adding more insulation may fix part of the problem. But the way to better results is through an integrated "whole-house" approach that looks at your house as a system.

What can we create for you?

www.techdesignbuild.com

TECH
DESIGN • BUILD • REMODEL



Recover Remodel Restore Renew Refine

A White Paper on . . . Improving Energy Efficiency

Home Performance with ENERGY STAR, a national program from the U.S. EPA and U.S. DOE, offers a comprehensive, whole-house approach to improving energy efficiency and comfort at home, while helping to protect the environment.

Contractors participating in a locally-sponsored Home Performance with ENERGY STAR program can help you cost-effectively improve your home's energy efficiency. These specially-trained contractors evaluate your home using state-of-the-art equipment and recommend comprehensive improvements that will yield the best results. They can also help you take advantage of Federal tax credits for energy efficiency improvements.

Diagnosing the Problem

Rather than focusing on a single component, such as single-paned windows, an old air conditioning system, or leaky ductwork, a participating contractor will assess how improvements to all of these components can work together to provide:

- Fewer drafts
- Consistent temperatures across rooms,
- Better ventilation and humidity control, and
- Lower utility bills

Common Recommendations

- **Sealing Air Leaks and Adding Insulation.** Many air leaks in homes are fairly obvious, such as around windows, doors, and electrical outlets. But others, like those in attics, around chimneys, and through recessed lighting fixtures, are often the more significant sources of energy loss in a home. Sealing air leaks is critical to improving the overall efficiency of your home and will make your heating and cooling system perform better. Along with air sealing, your contractor may recommend that you add insulation. Many older homes are not well-insulated, and some have no insulation at all. Properly installed insulation in walls, floors, and attics provides for more even temperatures throughout the house and results in a quieter, more comfortable living environment that is easier to heat and cool.
- **Sealing Ductwork.** Many homes have leaky ductwork and poor air flow, resulting in stuffy and uncomfortable rooms — regardless of the thermostat setting. The home performance contractor may recommend sealing your home's ducts with mastic, metal tape or spray-on sealant, and balancing the duct system to optimize air flow to all rooms. Insulating ductwork in attics, crawlspaces, and some basements can also help to ensure that your home will be more comfortable.
- **Improving Heating and Cooling Systems.** If your furnace or air conditioner is more than ten years old, your contractor may recommend that you replace it with a unit that has earned the ENERGY STAR label. Installed correctly, these high-efficiency units can save up to 20 percent on heating and cooling costs. But when it comes to heating and cooling equipment, bigger is not always better. A properly-sized unit will make your home more comfortable by providing more consistent temperatures and better humidity control. The contractor should also test combustion equipment, such as your furnace and hot water heater, to ensure that it is operating and venting properly.
- **Upgrading Lighting and Appliances.** Energy used for lighting and appliances can account for half of your home's total utility bill. As a result, the home performance contractor may recommend ENERGY STAR qualified products, such as refrigerators, dishwashers, electronic equipment, light fixtures, and compact fluorescent bulbs. An energy- and water-efficient hot water heating system may also be recommended. Once you've taken steps to increase your home's efficiency, you may also want to consider adding renewable energy systems, such as solar electric (photovoltaics) or solar hot water, to further reduce your utility bills.
- **Quality Assurance.** A local Home Performance with ENERGY STAR sponsor (a State Energy Office, utility, or nonprofit energy efficiency organization) is responsible for ensuring that participating contractors maintain high standards for quality. This typically includes providing specialized training for contractors and conducting quality assurance inspections to verify that Home Performance with ENERGY STAR projects get done right.

What can we create for you?