



# Green Building Starts Here

Retrofit Homeowners Manual





## From the Director...

Dear Home Owner,

Congratulations on your newly remodeled home! Your builder has made sure that your home has been remodeled to a high quality standard using conservation strategies and considering your indoor air quality.

Please read through this manual to learn about some of the many attributes of your recently remodeled home that make it energy efficient, water efficient, and cost efficient to operate and maintain. Understanding the elements chosen to be incorporated into your retrofit to earn a Build San Antonio Green "Energy Retrofit" Certification allows you to better continue benefiting from these elements into the future.

As with owning a car, owning a home requires some knowledge of how its components work, and knowing when and how to provide proper maintenance to keep those components working well. Because of this, we recommend keeping a folder of owner's manuals, warranties, receipts, operating instructions, maintenance schedules and maintenance records along with this Homeowner's Manual. Keep this Homeowner's Manual in a

Please contact Build San Antonio Green® at (210) 224-7278 if you would like to learn more about the green features of your home or about our green building programs.

Thank you,

Anita Ledbetter  
Executive Director

Build San Antonio Green®



# Contents

<b>Energy Efficiency</b>	
Energy Audits	5
ENERGY STAR® Appliances	5
Compact Fluorescent Lights	6
Ceiling Fans	7
Insulation and Radiant Barriers	8
ENERGY STAR® Windows	8
Ventilation	9
<b>Water</b>	
High Efficiency Toilets	11
Sinks and Showers	11
Tankless Water Heaters	12
Hot-Water-On-Demand	12
<b>Health and Materials</b>	
Carpet and Adhesives	14
Low-VOC Paints	14
Sealants and Adhesives	15
HVAC Filters	15
Fresh Air Intakes and Return Air Pathways	15

# Energy Efficiency

## Energy Audits

In order to determine the energy performance of your existing house and improve upon it, your builder was required to employ the services of a RESNET certified energy rater to perform an energy audit of the house before any improvements were made to the house. This required diagnostic is referred to as the "initial audit." A second series of tests were made, referred to as the "final audit," after all of the scheduled improvements were completed. Both of these audits resulted in separate scoring values which were used as the basis of determining the percentage of improvement with regard to energy use before and after construction work. The scoring values are called HERS Index scores (Home Energy Rating System). These scores are determined by a combination of the physical attributes of your house plus tested performance of air tightness and ductwork performance.

Before beginning your renovation or remodeling project, the RESNET Certified Rater performed some evaluations to determine the efficiency of the existing mechanical systems of your home. The rater's evaluation took into account factors such as window efficiencies, sizes, and locations related to the design and orientation of your house. The rater also evaluated insulation effectiveness, the efficiency of the cooling and heating system and condition and efficacy of ductwork (if present), as well as the efficiency of the water heater.

Specialized equipment was also used to test actual conditions of the home. Specifically, the equipment measures the ability of the building envelope (roof, walls, windows, and doors) to resist air infiltration or air leakage. The evaluation pinpoints where the problems were with an existing house's performance and allowed the rater to recommend significant and also fine-tuned solutions to specific shortcomings. This evaluation and recommendation for repairs resulted in the most effective result for the money needed for energy efficiency improvement.

For your reference, a copy of the results of these energy audits is included with this manual.

## ENERGY STAR® Appliances

ENERGY STAR® is a voluntary labeling program of the US Environmental Protection Agency (EPA) and the US Department of Energy that identifies energy efficient products. Qualified products exceed minimum federal standards for energy consumption by a certain amount, or where no federal standards exist, have certain energy saving features. Products that meet or exceed the requirements earn the right to display the ENERGY STAR® label.



All builder-installed equipment in your newly remodeled home is required to have the ENERGY STAR® label for all appliances and products that are recognized by the ENERGY STAR® program. There are over 50 categories of products that

are rated by the ENERGY STAR® program. However, not all appliances are considered by the program. For example, as of this writing (October 2009), there is no ENERGY STAR® rating for residential clothes dryers or portable generators. The complete list of qualified products can be found on the ENERGY STAR® website (see the link below). As your home ages, remember to replace appliances such as refrigerators, televisions, microwaves, dishwashers, washing machines, light fixtures, etc. with other ENERGY STAR® qualified products. ENERGY STAR® products will lower your household energy consumption and save you money on your monthly utility bills.

To find out more about ENERGY STAR®, refer to their website at: [www.energystar.gov](http://www.energystar.gov)

### When you see the ENERGY STAR® label, remember:

- The product exceeds minimum federal standards for energy consumption.
- It's in one of the over 50 categories of products rated.
- For more products to keep your home green, see [www.energystar.gov](http://www.energystar.gov).

## Compact Fluorescent Lights (CFLs)

The light fixtures in your house have been replaced with CFLs (Compact Fluorescent Lights) or LEDs (Light Emitting Diodes). Compact Fluorescent Lights are a type of fluorescent lamp ("lamp" is the term used for individual light "bulbs") that fits into a standard light bulb socket or plugs into a small lighting fixture. The most common CFLs appear as the same size as a traditional incandescent lamp, but shaped like a spiral tube. In comparison to incandescent lamps, CFLs have a longer rated life and use less electricity. CFLs may cost you more to buy, but save enough money in electricity costs to make up for their higher initial price within about 500 hours of use.

Nearly twenty percent of the energy used in a home is spent in electrical illumination. The replacement of all the incandescent lamps alone can result in noticeable savings. For this reason, the lamps in your newly remodeled home have been replaced with CFLs to help reduce your energy consumption and decrease your utility bills.

**Maintenance:** At the end of their extended life when they finally burn out and need to be replaced, please replace all lamps with ENERGY STAR® CFLs. CFLs can be found at your local hardware store and come in a multitude of shapes. Because of the small amount of mercury commonly found inside CFLs, do not throw burned out lamps with the household garbage. Instead, take the lamps to stores and facilities that have programs in place to accept burned out CFLs for safe disposal.

Also notice on the label whether or not the lamp you are buying can be installed in an enclosed fixture. Many bathroom and kitchen fixtures include a glass dome or "bowl" that has to be totally removed to exchange lamps. Installing CFLs in these types of fixtures trap excess heat that will shorten the life of your efficient CFL bulb. You should either replace or modify the lamp fixture so that heat generated by the fixture can easily escape. Remember to use light wisely and turn off all lights that are not being used. Adopt good conservation habits by installing occupancy sensors for closets, bedrooms and exterior lighting.

**Hint:** when looking for lamps make sure you look closely at "color." Warm white will compliment warm tones more and is more agreeable for indoor use, while cool white and day light will be more appropriate for outside lighting. Color should be indicated on the packaging.

#### Did You Know:

If every American home replaced just one light bulb with an ENERGY STAR Compact Fluorescent Light (CFL), we would save enough energy to light more than 3 million homes for a year and prevent greenhouse gases equivalent to the emissions of nearly 800,000 cars- EPA ENERGY STAR®

Also, make sure packaging has the ENERGY STAR® label.

Refer to your local utility website to see if they are offering any incentives or rebates for CFLs. The CPS Energy website is: [www.cpsenergy.com](http://www.cpsenergy.com)

## Ceiling Fans

The need to have your home's air conditioning system on for long periods of time can be greatly reduced with the aid of ceiling fans. Movement of air adds to the ability of the body to feel cool by encouraging the evaporation of sweat on the skin. Sometimes, simple air movement could allow you to feel cool enough to turn off the air conditioner, open the windows, and add to the air movement any outdoor breeze. For this reason, an ENERGY STAR® ceiling fan may have been provided in all rooms that required new fans.

**TIP:** If no one is occupying a room, save energy by turning the fan off when leaving the room. In some conditions, a ceiling fan may help circulate warm air in winter and cool air in summer and thereby save energy by reducing the time the mechanical system is in operation.

## Insulation and Radiant Barriers

The two primary challenges to reduce electric bills in a climate like ours are first, to minimize heat generation indoors and second, to keep outdoor heat from getting in. Solving the first challenge can be accomplished by making correct choices in cooking, lighting and other electrical usage. Solving the second challenge includes insulation, shading, sealants, and radiant barriers. Solving both challenges reduces electric bills and reduces the size of air conditioning the home requires to provide comfort.

**Insulation:** In the summer, heat entering the house through the roof and walls, requires about one-quarter of the house's electric load to combat. Most houses are under-insulated or have no insulation present. For this reason, a RESNET Certified Rater may have performed tests with an infrared camera to determine where heat loss was occurring. The infrared images were able to aid in determining the effective method and locations of insulation application as well as determining if the installation was effective. After the tests and results were performed, your builder took in consideration the recommendations from the energy rater and may have replaced and/or added insulation and weatherization where needed. Having proper levels of insulation can positively affect the energy performance of your house.

**Did You Know:**  
The average household spends more than \$2,200 a year on energy bills; nearly half of which goes to heating and cooling. Homeowners can save about \$180 a year by properly setting their programmable thermostats and maintaining those settings- EPA ENERGY STAR®

**Radiant barrier:** Solar radiation can be minimized using material that is designed to reflect radiant heat generated by the sun, which is called a radiant barrier. A radiant barrier not only reduces heat gain but can also prevent winter heat loss which results in reduced heating and cooling energy usage. For this reason, your builder may have installed plywood or OSB decking that has a highly reflective film applied to the side facing the attic, or another radiant barrier material.

## ENERGY STAR® Windows

The existing windows of your home may have been replaced with ENERGY STAR® rated windows or windows with equivalent performance. These windows are extremely efficient and best of all, were selected to provide thermal comfort for homes in our climate. The windows consist of Low-E double pane glass with improved framing material that reduces heat transfer. The efficiency of these windows improves the comfort level of your home thus lowering the energy use in your home and your energy bill. Also, because of their improved energy-efficient technology, the ENERGY STAR® qualified windows reduce condensation on

the windows as well as interior fading of furnishings.

If your existing windows remained in place, your contractor may have weatherized them which may contribute to a more comfortable house and lower energy bills.

To find out more about the ENERGY STAR® windows, doors, and skylights, refer to the website: [www.energystar.gov](http://www.energystar.gov)

## Ventilation

Each bathroom and laundry room included in your remodeling project features an ENERGY STAR® ventilation exhaust fan. The ENERGY STAR® fans use about 70% less energy than a conventional fan and their innovative technology allows the fan to operate quietly. A fan delay timer switch may also have been provided along with each exhaust fan. The fan delay timer switch will allow you to leave the fan on to remove moisture for a specific period of time, up to 60 minutes. The exhaust of moisture in your bathrooms is important because it helps to improve your home's indoor air quality. There is an adjustment device under the switch plate that allows for adjustment of the time the fan remains on after the light switch is turned off. For the average small bathroom, the time should be set for 20 minutes. Allowing the exhaust fan to remain on after a bathroom is vacated helps the air conditioner operation by removing much of the humidity in the room after bathing or after washing clothes. The automatic feature is desirable so you will not have to remember to return to the bath or laundry room to manually turn off the ventilation fan. Too much air removal can remove too much conditioned air.



# Water Efficiency

## High Efficiency Toilets

Because the water usage of toilets can account for nearly 30% of your home's total indoor water consumption, the toilets in your home have been replaced with EPA's WaterSense Dual-Flush High Efficiency Toilets (HET) as part of the green renovation and remodeling program. These WaterSense toilets will conserve water in your home thus reducing your water consumption. The HET consumes 1.28 gallons per flush on full mode which represents about 25% reduction in water consumption when compared to earlier models of toilets.

### Did You Know:

Over the course of your lifetime, you will likely flush the toilet nearly 140,000 times. If you replace older, existing toilets with WaterSense labeled models, you can save 4,000 gallons per year with this simpler, greener choice. -EPA WaterSense

## Sinks and Showers

Water can be wasted through inefficient sink fixture faucets, bathtub faucets, and showerheads. For this reason, the sink water fixtures in your home have been replaced with EPA WaterSense labeled or equivalent performance sink fixtures or aerators. These lavatory and kitchen sink fixtures and aerators have a low water flow of 1.5 gallons per minute (gpm) or less and they represent about 30% water reduction when compared to conventional faucets. The showerheads and bathtub faucets of your home have also been replaced with low water flow showerheads and bathtub faucets rated at 2.0 gallons per minute. These efficient faucets will significantly reduce the water consumption of your household and thereby save you money as well.

**Tip:** Refer to your local water utility website to see if they are offering any incentives or rebates for any future water fixture replacement. The SAWS website is: [www.saws.org](http://www.saws.org)

**Did You Know:**

If every household in America installed a WaterSense labeled faucet or aerator, we could save more than 60 billion gallons of water annually.-EPA WaterSense

## Tankless Water Heaters

If a new water heater or an additional water heater was needed in the expansion of your home, your remodeled home has been provided with a high-efficiency new water heater. The water heater has been chosen and located in your home to provide dependable fast and efficient supply of hot water needed. Your new water heater is highly efficient and can save you up to 15% in heating costs when compared to a standard model. As with your previous water heater, use common sense to avoid activating excessive hot water demand from many different hot water fixtures running all at the same time. Refer to the manufacturers' operations manual for more information and regular maintenance requirements of your new water heater.

## Hot-Water-On-Demand

Your home may be equipped with a water and energy conserving pump called a "Hot-Water-On-Demand" circulating pump. When activated manually by a button similar to a doorbell, the pump brings hot water from your hot water tank or instantaneous water heater to your fixture while returning cool water present in the plumbing lines back to the water heater. This avoids wasting of water while waiting for hot water to arrive. The "Hot-Water-On-Demand" pump automatically shuts itself off in a matter of seconds when it senses arrival of hot water to the fixture within the plumbing lines. If this device has been installed in your home, a copy of the operation guide should be found with this Homeowner's Manual for easy reference. Become familiar with the operations of this device by reading the operations manual.



# Health & Materials

## Carpet and Adhesives

If the addition to your home has been provided with installed carpeting, your builder has selected carpet, carpet padding, and carpet adhesives that have been certified by the Carpet and Rug Institute's Green Label. These selected Green Label brands release less VOC (volatile organic compound) than conventional materials and help reduce the amount of potentially harmful off-gassing chemicals that are released by most carpeting.

**Maintenance:** When replacing carpets in other areas of your home, please refer to the Carpet and Rug Institute's Green Label list to ensure you maintain the quality of your indoor air. Also consider the use of cork, bamboo, concrete, recovered wood, and tile flooring. These types of materials are considered environmentally superior to conventional flooring because they do not need to depend on the logging of trees or using non-renewable resources in order to produce the flooring. The growing time for harvesting cork and bamboo is considerably less than harvesting wood from trees. When possible, we encourage these types of flooring because of their durability. Bamboo and cork come in a variety of stains and patterns.

## Low VOC Paints

The wall paint used in the retrofitting of your home is formulated as low-VOC (Volatile Organic Compound) paint. This type of paint releases fewer airborne toxic chemicals than conventional paint and therefore improves your indoor air quality. VOC's may be harmful to everyone in your family, but children, pets, elderly people, and people with respiratory problems or compromised immune systems are particularly vulnerable.

**Maintenance:** When repainting in your home, choose paints with low or no VOCs. Low VOC paint lines such as the Harmony line by Sherwin-Williams and the Air-Care line of paint by Coronado Paint can avoid the problems associated with volatile organic compound exposure. Both of these paint formulations as well as many other low to no-VOC paints can be found at area hardware stores. However,

be aware that low VOC paint can sometimes still have other types of airborne chemicals such as ammonia, halogenated solvents, formaldehyde, and other harmful chemicals. If you are looking for paints that don't contain any VOC's or other hazardous chemicals, brands such as Safe Coat, Chem-Safe, Walker Paint, and Best Paint are

### Did you know:

Materials, paints and adhesives that contain VOC's continue to emit fumes once dry and in some instances for months after application. Thus, your indoor air quality is still being contaminated after application or installation. Because people spend more than 90% of their time indoors, maintaining healthy indoor air quality is essential to promote healthy living.

some of the recommended paint lines in this category. These types of paints may be harder to find, but they are the most ideal to use in your home, especially in children's rooms. Look online for locations that supply these products.

## Sealants & Adhesives

Sealants and adhesives have a significant impact on a home's indoor air quality because they often contain much higher VOC levels than the materials the adhesives are used with. Your builder has used sealants and adhesives that were listed on the Greenguard List of Certified Adhesives and Sealants. The Greenguard approved adhesives and sealants are Low-VOC or Zero-VOC products.

## HVAC Filters

If your home includes a central HVAC (Heating Ventilation and Air Conditioning) system, your builder has installed a filter rated at MERV (Minimum Efficiency Reporting Value) 8 or higher or equivalent in your HVAC unit. Paper pleated filters capture more dust and particulate matter than the average blue mesh filters. Although more advanced filters have a higher upfront cost (usually \$8 to \$15 depending on MERV rating) they help clean your home's air more efficiently. Carpeting is responsible for tenaciously hanging on to a wide range of particles, chemicals, germs, dirt and allergens in the home. Consider carpeting as little of your home as possible. Area rugs are easier to clean more thoroughly.

**Maintenance:** Replace your HVAC filters regularly as recommended by the HVAC manufacturer's instruction manual. When shopping for replacement filters, take the time to read the information printed on the filter to find out what services each filter provides. Some filters are better for families with sensitive allergies while others are good for families with pets. Try to purchase replacement filters that have MERV 8 rating or higher. If a MERV media filter is not compatible with your HVAC system check for alternative filter rating systems at common local home improvement stores. The higher the rating, the more efficient your filter will be at removing particulates from your home. These types of filters can be found at your local hardware stores. If possible, use HEPA filters for your home HVAC systems as well as for your vacuum cleaner bags.

## Fresh Air Intake and Return Air Pathways

This home may have been equipped with fresh air intakes and return air pathways as part of the HVAC system. Return air pathways and fresh air intakes are crucial for both the proper operation of the HVAC system and the comfort of the residents.

Return air pathways help balance the pressure inside of the house and reduce air infiltration and leakage. This keeps conditioned air in the living space where it is desired. Because of

the reduced infiltration promoted by return air pathways, contaminants from outside the conditioned space are less likely to enter the home. It also reduces the load on the HVAC system, allowing it to function more efficiently, contributing to lower energy costs.

Fresh air intakes are important to promoting a better indoor environment for the residents of the home. Because the home is very energy efficient and has little natural air leakage, there is a chance that chemicals emitted from building materials are not able to escape and can build up in the home

over time. The fresh air intake allows air with fewer contaminants into the HVAC system (filtered at the intake) to promote better indoor air quality for the residents.

**Maintenance:** The grille that allows fresh air into your home is located on the exterior of your house. The grille should be located at one of your gable near the roof top. This fresh air grille looks like a conventional return air grille and it must have a filter installed at all times.

The size of your filter is most likely a 10"x10"x1" or 12"x12"x1" pleated filter. This filter should be checked every six month and it must be replaced with a new one at least once a year. By changing the filter once a year, you will ensure the "fresh air" coming in to your house is being properly filtered.

Tips to Keep Your Home Healthy:

- Use organic and/or unscented cleaning products to avoid irritation.
- Use only non-toxic pest control.
- Check all finishes on furniture, floors, and walls to make sure they are low-or no-VOC.
- Keep the difference between outdoor temperature and indoor temperature as little as comfortably possible - large differences create humidity which leads to mold growth.



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