



# Green

SOLUTIONS GUIDE



## TABLE OF CONTENTS

Introduction . . . . .	2
Your Plan's Green Features . .	4
Your Site & Planning . . . . .	5
Construction Ideas . . . . .	6
Insulation & Temperature . . .	7
Ventilation . . . . .	8
Windows . . . . .	9
Lighting . . . . .	10
Water . . . . .	11
Appliances & Finishes . . . . .	13
VOCs . . . . .	15
Landscaping . . . . .	16
Product Ideas . . . . .	17
Certification . . . . .	19
Resources . . . . .	20

## INTRODUCTION

Green building is a fast growing trend in residential building. Generally speaking, green building results in a home that has a more efficient use of energy, water and materials. In the long run, green building results in lower energy consumption within the home, improved resident health due to better indoor air quality and a reduced impact on the environment. Green building is also about building homes that last. Sustainable and durable building practices and finishes mean less maintenance for homeowners.

Individuals are choosing to build green homes for a variety of reasons, not just to save the environment. In fact, studies show that most people are choosing to “go green” to save money on their electricity and water bills or to improve the indoor air quality for family members with asthma or allergies. And with an increased popularity, green building products are cropping up for each step of the building process, so it’s easy to “go green to save green”.

This booklet will assist you in planning for your home construction project by highlighting green options you may choose to include throughout the building process. Some options are mutually exclusive, for example, you wouldn’t install two environmentally friendly water-heating options. And everyone is interested in a different level of green building in his or her new home.

## **INTRODUCTION [ cont. ]**

If you'd like to take green to the extreme, with all the bells, whistles and latest technology, talk with your builder because there are far more options than we have space to include here. You can also contact us directly for a consultation or certification.

If you are concerned about family members with allergies or asthma, consider asking your builder to review the building guidelines for the American Lung Association Health House program.

Our recommendations are based on the National Association of Home Builders' Green Home Building Guidelines. The National Association of Home Builders was founded in 1942 and represents home builders from around the country, tracking trends, organizing an annual convention and providing best practice guidelines to improve the industry.

We'll group our suggestions to various stages of the homebuilding process. After reading this guide, consider establishing what level of green building you'd like to pursue and assemble your building team accordingly. Ensure they are ready and able to deliver on the type of home you want to build.

## SATER PLAN FEATURES

Sater home plans have been designed and updated to enhance energy efficiency of your new home. So even if you know nothing about green building you aren't starting at square one. With a Sater plan in hand, you're ahead of the game.

Many Sater plan features that make our homes so attractive, such as covered entries, expansive verandahs and roof lines, make our homes efficient in the way they protect the home and foundation from the elements.

The architectural notes within the plan are continuously updated to ensure your home is constructed to current standards for energy efficient and sustainable building. The plans are designed to be high quality homes that will stand the test of time, for your family and any family that may eventually buy your home. Even if you choose to do nothing suggested in this booklet, these updates will save you money on your utility bills and mean your home is built to last.

The layout of the floor plans is generally energy efficient in terms of ventilation, with open floor plans allowing air to circulate freely throughout the living spaces. Most bedrooms have multiple windows or doors to allow cross ventilation. These windows and doors throughout the home offer natural lighting to minimize the use of electricity for lighting purposes throughout the day, while a roof overhang shields from too much heat entering the home.

## SITE & PLANNING

Consider selecting a site to minimize the impact on the environment. If you've already purchased your site, don't turn the page just yet, because we'll also cover preparation and development.

Choose a site that is not in an environmentally sensitive area. This should be relatively easy to establish through your local agencies or by going through a site footprinting process.

The most environmentally friendly site selection is one that avoids developing on open green space. This means using a redevelopment site, an area that was previously used for another purpose, like a parking lot, or another home. However, most people choose an empty site in a newer community or neighborhood to build a new home.

When determining how your home will sit on your lot, do so in a way that will maximize the sunlight and ensure your home takes advantage of this free and efficient lighting option.

Before lot clearing, consider having an arborist come to your site to help you decide what trees are in the best shape for keeping. While you may think you want to level the lot, consider how many times you've seen a neighborhood with dozens of brand new homes surrounded by trees that aren't much sturdier than toothpicks. Is that really appealing to you? If not, try to keep some of the mature trees on your property and relocate hardy young trees when possible. Not only will they provide shade, they'll also help your home maintain a good scale and will greatly enhance the streetscape.

## CONSTRUCTION IDEAS

Here are a variety of ideas to make your construction process more environmentally friendly and to improve the indoor air quality of your home for the long run.

- Have your builder mask the HVAC outlets during construction and vacuum out the ducts, boots and grilles before the system is run, this will reduce your exposure to construction dust and particulate debris.
- Moisture-resistant backerboard should be used under tile surfaces in wet areas to impede potential mold and mildew growth.
- Ask about your builder's moisture management practice to ensure that building materials that arrive onsite are not stored in a manner that leaves them exposed to water and that wood is checked for moisture level before it is sealed into the home.
- Keep plumbing supply lines out of exterior walls (when possible).
- Reduce the materials wasted during construction by using materials that are pre-finished, such as pre-finished siding, exterior trim or finished windows.
- Ask your builder if it is feasible to have framing done offsite for walls or roof trusses. It might also be possible for pre-cut wood to be ordered for framing.
- Reusing materials may also be possible on your construction site. Consider employing bins to sort waste and facilitate reuse of materials that would otherwise be disposed.
- Ask your builder about the feasibility of recycling construction waste on or offsite.

## INSULATION & TEMPERATURE

Complete and proper insulation is absolutely key in creating even temperatures throughout the home and minimizing the energy use of the heating and cooling systems. Regular insulation can be installed in a way that leaves gaps, cracks or doesn't quite fit right in unusually shaped places. It can also settle over time. One of the best types of insulation is spray polyurethane foam insulation, which can more efficiently seal the entire building envelope.

After your home has been sealed with solid insulation, you'll need to seal all of the bordering areas: windows, doors, vents and ducts with caulking and weather-stripping. Also get a tight seal between your garage and your home to minimize indoor air pollution.

Check the Energy Star rating of the heating and cooling systems you are considering for your home and ensure you select systems of the correct size. If you use systems that are too large, the humidity of your home will be improper and if you choose systems that are too small, it will require a lot of electricity to run. Use filters on your systems with a MERV rating of nine or higher, and change them at the proper intervals. Install a humidistat to control the humidification level of the home.

One alternative heating option is radiant floor heating. This system installs heating elements under the floor, which stabilize the temperature throughout your home and allow you to keep the thermostat 2-3° cooler than normal heating systems.

## VENTILATION

Proper ventilation throughout your new home is the key to the best indoor air quality possible. Indoor air is at least as polluted as the outdoor air, but in some cases indoor air has been found to be 100 times more polluted than outdoor air.

Mechanical ventilation in your home should be at least (get out a calculator):

$$7.5 \times \begin{array}{l} \text{(number of} \\ \text{bedrooms in} \\ \text{your home)} \end{array} + 7.5$$

The number represents the ideal cubic feet per minute of air that should circulate in your home. Another item to consider when selecting a heating or cooling system is to ensure return ducts are present in rooms with doors (except bathrooms, closets, kitchens and utility rooms) to facilitate proper airflow.

Exhaust fans and proper venting are very important to ensure minimal pollutants and irritants inside the home. Bathrooms and kitchen ranges should be vented to the outdoors using Energy Star-rated, well insulated systems. Your heating and cooling equipment/ mechanical rooms and fireplaces are also important ventilation areas.

## WINDOWS

When selecting windows for your new home, choose energy efficient windows appropriate to your location. Many companies offer low-emissability (low-e) glass in their windows, which have an invisible metallic layer between the panes of glass to increase their energy efficiency. Energy Star estimates the reduced sunlight through the window also means up to 75% less fading of furnishings, wall paint and artwork.

Energy Star zones have been established and ratings are available for each window as to its appropriateness for a certain area. The Energy Star website (see Resources) can locate your zone for you. Use the Energy Star guidelines to help you select the windows that are right for you.

For example, in the Northern Climate Zone, where homes are heated more than cooled, efficient windows hold onto heat, so that you can sit next to the window in the winter without feeling chilly.

In the Southern Climate Zone, where homes are cooled more than heated, efficient windows help block the heat of the sun entering your home. For hurricane susceptible areas, energy efficient windows are now being offered with impact glass.

## LIGHTING & HOME AUTOMATION

Skylights are also energy efficient in harnessing natural lighting in areas where windows are not possible, allowing the use of natural instead of artificial lighting. Skylights have come a long way in recent years and now feature advanced coatings to significantly reduce fading. Consider planning for tubular skylights in rooms with small or no windows, such as closets and baths.

New federal legislation is phasing out incandescent light bulbs. They will be replaced by compact fluorescent light bulbs (CFLs) and light-emitting diodes (LEDs). These new lighting options are more energy efficient and now have the same features consumers expect of traditional bulbs, such as better color and the ability to be dimmed.

Lighting control systems are impressive, user-friendly and energy efficient by helping you control your use of lighting. Here are some examples:

- Dimming switches can create mood lighting and electricity bill savings throughout your home.
- Motion sensors can activate lights only when needed, especially in places they're mistakenly left on, such as outdoors or in your closet. Motion sensors can also be used to illuminate walkways at night, acting as a dim nightlight as needed.
- A total lighting control system can create a timed system that can be pre-set with timers, vacation and safety modes to suit your situation.

## WATER

Toilets consume the most water, 30-40%, of anything in your home, which is why we've dedicated a whole page of our guide to their selection.

The water use of toilets was mandated to 1.6 gallons per flush in 1994. Since this low water usage has decreased the flush power of toilets, researchers have been working for many years to create toilet innovations, with three kinds leading the pack today:

The dual-flush toilet uses different amounts of water to flush liquid and solid waste. Overall, these toilets use 30% less water than their single flush counterparts.

Another innovation is pressure assist toilets, which have the most powerful flush possible using only 1.6 gallons of water per flush. However, to use pressure assist toilets, you will need at least 25 pounds per square inch of water pressure in your new home.

Power assist toilets plug into a regular outlet and use electricity to augment water flow and facilitate the flushing process. These toilets are substantially quieter than regular toilets, but also are more expensive.

## WATER USE

Water use in your home generally falls under two easily defined categories: your electricity bill and your water bill. You can save money on both by preparing your new home with advance planning and careful product selection.

Regular water heaters use energy throughout the day to keep a large tank of water hot and ready to use, even if no one will be home for hours. Tankless water heaters work rapidly to heat water, as it is needed. Some systems are for your whole house, while others are designed for use in rooms where hot water is needed such as one in each bathroom and the kitchen.

Conserving the amount of water you use is very easy with the help of Energy Star water conservation estimates on new appliances, such as dishwashers or clothes washers. Also, flow statistics are readily available to guide your selection of showerheads, faucets and toilets.

As a general rule of thumb, 2.5 gallons per minute is an efficient flow for a showerhead, while 2.2 gallons per minute is an efficient flow for sink faucets.

## APPLIANCES & FINISHES

Finish off your home with a durable roof. Consider tile, which has a very long lifespan, or other long-lasting materials such as concrete shingles, depending on the overall look that best suits the plan you are building.

Use energy efficient appliances in the kitchen (refrigerator, range, oven, dishwasher) and in the laundry room (washer and dryer). Check the Energy Star label and prepare to be surprised: even the latest, most high-tech appliances have outstanding energy ratings! Also check the ratings on your ceiling fans.

Many building materials available have recycled content or are reclaimed, indigenous or renewable. Using these types of materials throughout your new home will reduce the impact its construction has on the environment.

Reclaimed wood is a great option for rustic beam work, among other applications. The reclaiming process involves the careful disassembly of wooden structures, such as bridges, buildings or railroads, around the world. The wood is carefully treated and refinished to restore its hidden beauty.

Consider other durable finishes, such as manufactured quartz, in addition to finishes with recycled content.

## FINISHES [ cont. ]

Using certified sustainably grown wood or bamboo, which grows very rapidly, will provide you with peace of mind that you are not contributing to deforestation. Cork is a unique material that is both sustainable and moisture resistant.

Locally made products, of any kind, use less energy to transport to your new home. And you get to support a business or tradesperson in your community.

Recycled paint is now widely available in two forms: rebledened, with 100% recycled paint available in a palette of neutral colors and reprocessed, where recycled paint is mixed with new material, available in a wide range of colors. The use of rebledened paint for exterior applications is not recommended. No matter what paint you choose, chose one with a low-VOC content.

There are all sorts, a nearly endless amount, of unique products for your new home that have recycled content. For example, recycled tile is available in a myriad of colors, shapes, textures and combinations.

Consider countertops or floors made of crushed, recycled glass secured in a grout-like substance. You can select the colors of glass you would like and choose small or large pieces.

The variety of innovative, environmentally friendly products gives you more options to include in your new home, while expressing your creativity.

## VOCs

“VOC” is the abbreviation for volatile organic compounds. While they sound complicated, generally anything that has “fumes” is probably releasing VOCs. This includes a wide range of products like paint, carpet, printers, glues and permanent markers.

The United States Environmental Protection Agency estimates that VOC concentrations inside are two to five times higher than the levels outside. Different VOCs have different levels of toxicity, but generally VOC exposure has deleterious health effects and should be minimized. Exposure impacts range from a headache or sore throat for mild exposures to cancer for significant exposure to the most toxic of VOCs.

Fortunately, you’re in a position to control the amount of VOCs that will be in your new living environment. Ask your builder to use low or no VOC paint, wallpaper and sealants. Also, the wood and wood composites used in your home should have low formaldehyde emissions.

Carpet, carpet padding and floor covering adhesives should hold the “Green Label” from the Carpet and Rug Institute. However, because carpet can trap allergens and dirt, avoiding carpet altogether is a better option. When carpets are used, try to arrange for them to be unrolled outside your home prior to installation or installed long before move in to avoid exposure to the VOCs they will release.

## LANDSCAPING

What's better than landscaping that's lush without labor? As you consider landscaping, try to limit the water, energy and effort that will be required to care for your selections. Choose native, drought-resistant and regionally appropriate grass, trees, flowers and plants. Then group the plants that require similar amounts of watering in neighboring areas to minimize trenching needed for irrigation. This technique is called hydrozoning.

Choose a non-spray or drip irrigation system that allows for customized irrigation flows for each of your different areas. Have you ever seen a house with the sprinklers on during a rain shower? Consider getting an automated irrigation system that accounts for weather patterns and precipitation.

You can also collect rainwater to use for landscaping purposes. The best rainwater collection systems use gravity to distribute the water.

Particularly in regions where water restrictions are common, planning the landscape for your new home using these suggestions will make it much more likely to survive than traditional landscaping.

Your local university likely has an extension office that will be able to advise on appropriate plants for the area in which your new home is located.

## PRODUCTS

It's easy to integrate products that will enhance the energy efficiency and indoor air quality of your home, as well as minimize the impact on the environment. While the initial investment in these products will be greater than standard products, not only will they save you a tremendous amount of money on your utility bills, they will also increase the resale value of your home compared to one that is not energy efficient.

### INSULATION

Spray foam insulation, such as InsulStar by NCFI, can perfectly seal your entire home without any gaps, cracks or missing areas. With an analysis of our most popular plan, Sunningdale Cove (#6660), overall savings with InsulStar instead of fiberglass insulation ranged from \$10,200 in Phoenix to \$5,000 in Chicago.

### ROOFING

Concrete tile roofs are the most common type of roof shown on a Sater home. While they may be more expensive initially, they can reduce the cost of cooling your home. Also, they are much more durable, so they won't need replacing. Consider MonierLifetile, which offers an Energy Efficient Roof System.

### WINDOWS

Andersen's new Low-E4™ glass is offered in a wide variety of styles and finishes while being energy efficient and drying with fewer water spots.

## PRODUCTS

An Andersen study of identical homes found that using Low-E4 windows instead of regular dual-pane windows reduced cooling costs by 25% and heating costs by 10%. This may vary geographically depending on your specific climate.

### SKYLIGHTS

Who doesn't love skylights? They're like art for your ceiling and they're energy efficient. Skylights allow you to use natural daylight during the daytime hours instead of switching on a bulb. Companies such as Velux have made them more efficient than ever, with energy star ratings and special coatings to reduce heat coming through the windows and limit the fading to furnishings below.

### APPLIANCES

There seems to be a limitless number of energy efficient appliances in every category. Check the Energy Star ratings on all the appliances you plan to install in your new home. Companies such as Whirlpool are leading the pack to ensure that household appliances such as washers, dryers, refrigerators, stoves, ovens, dishwashers and many more are energy efficient while still packing the state-of-the-art features you depend on.

### LIGHTING CONTROLS

Lutron offers advanced lighting control systems that will improve your energy consumption for lighting. Their products include dimmers, timers and total home control systems.

### HOME ORGANIZATION

ORG recently launched EcoElements, environmentally friendly home organization solutions. Through this option the panels that make up ORG's variety of organization systems are made of 100% recycled materials. An additional option offers 100% recycled material panels with no urea formaldehyde.

## CERTIFICATION

Several different national groups offer programs to certify the energy efficiency or green building level within a home.

### HERS RATINGS

A Home Energy Rating System (HERS) rating can be obtained even before a home is built using a modeling program to estimate its energy consumption using the construction plans.

### LEED CERTIFICATION

The Leadership in Energy and Environmental Design (LEED) green building rating system is a program of the U.S. Green Building Council. They are in the process of developing residential rating guidelines at this point, but in early 2008 a system that will rate homes as Certified, Silver, Gold and Platinum will be established. Certification is available for completed homes and the process involves completing an application and verifying the integration of green systems throughout the home.

### NAHB GUIDELINES

The National Association of Home Builders (NAHB) recently established its Green Home Building Guidelines, which offers information on rating a home. A scorecard is completed and verified with a local agency to obtain formal certification. Homes are categorized as Bronze, Silver and Gold.

## **RESOURCES**

Contact these sources for more information and additional resources regarding green building:

National Association of Home Builders  
<http://www.nahb.org/page.aspx/category/sectionID=222>

Energy Star  
[www.energystar.gov](http://www.energystar.gov)

American Lung Association  
[www.healthhouse.org](http://www.healthhouse.org)

LEED  
<http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

## **PRODUCT RESOURCES**

Andersen: [www.andersenwindows.com](http://www.andersenwindows.com)

Lutron: [www.lutron.com](http://www.lutron.com)

MonierLifetile: [www.monierlifetile.com](http://www.monierlifetile.com)

InsulStar: [www.insulstar.com](http://www.insulstar.com)

Velux: [www.velux.com](http://www.velux.com)

Whirlpool: [www.whirlpool.com](http://www.whirlpool.com)

ORG: [www.orghomesolutions.com](http://www.orghomesolutions.com)