

# Green-It-Yourself:

## Smart Ideas for Home Improvement



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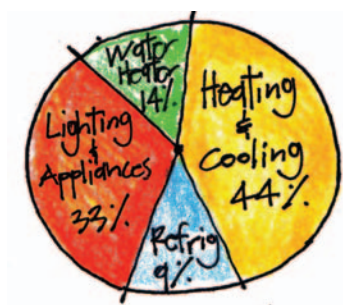
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Choosing to renovate your home is an environmentally friendly decision. You can reuse existing resources and help preserve undeveloped land. There are many simple, Do-it-Yourself tasks as well as projects you can do with the help of a professional to make your house more comfortable, save money on utility bills and improve your property value.

To stay green, focus on the following:

### Energy Efficiency

Conserving energy makes the air cleaner, reduces greenhouse gases, prevents acid rain and preserves our land from being gobbled up by additional power plants. The typical home uses almost half its energy on heating and cooling, a third on appliances, lighting and equipment (TVs, computers, washers), and the last quarter on just the hot water heater and refrigerator! Insulation, weatherizing, tuning up or replacing your old appliances and making landscaping and design decisions based on the solar orientation of your home can make a huge difference.



### Water Conservation

Water conservation reduces water demand, which allows rivers and streams to maintain adequate water levels, which in turn sustains healthy ecosystems. Groundwater reservoirs, which are vulnerable to depletion, are also preserved. Saving water also saves energy by reducing the amount used to purify, pump and treat. Simply put, there's a lot that happens to get water to your tap besides the reservoir levels. You can save water and not even miss it by choosing drought tolerant plants and low flow fixtures and appliances.



### Green Materials

The materials and furnishings you put into your house can be made from materials that cause minimal impact to the environment and are healthy for you. Choosing products made from renewable resources or recycled content, and made without harming the atmosphere and water will help generations to come.



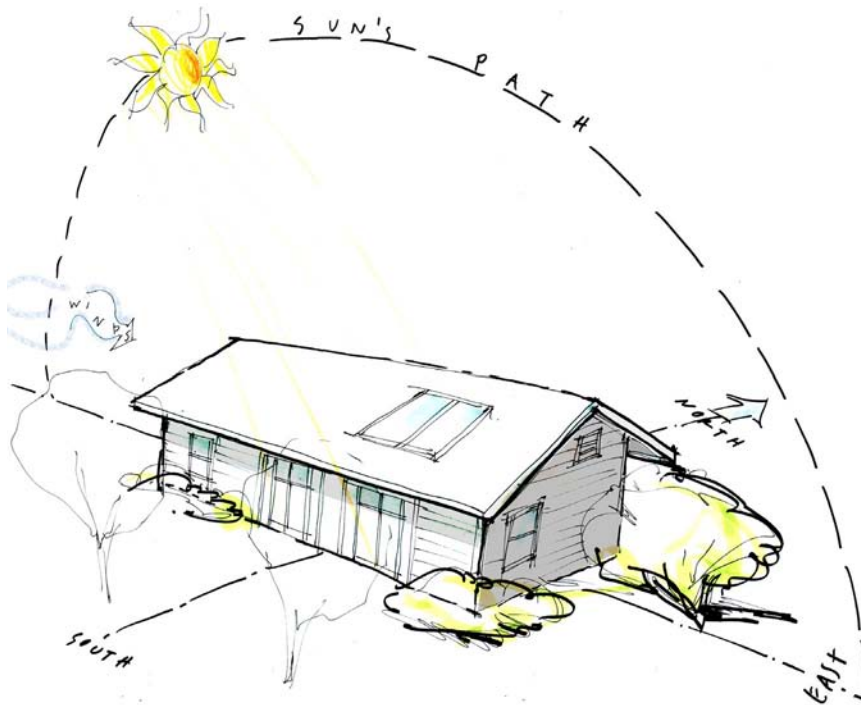
# Energy Efficiency

## HEATING AND COOLING

Almost half of the energy use in a typical home is devoted to heating and cooling. There are many simple things you can do to control how the environment impacts your heating and cooling needs.

### How your house relates to the sun

Ideally sited homes use little energy to heat or cool, take advantage of solar gain, and use natural ventilation to either insulate or cool. How is your house sited? What can you do to improve its existing orientation?

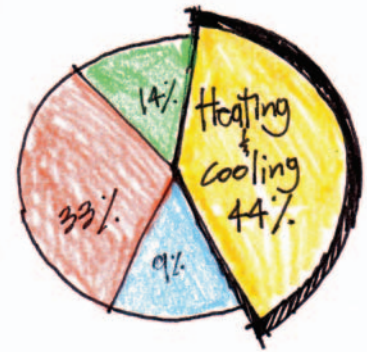


**South facing:** This is the preferable orientation for windows with a roof eave or awning. The low winter sun naturally heats your home, while the higher summer sun can be blocked by roof overhangs or a deciduous tree (one that has leaves in summer and drops them in the fall/winter).

**West facing:** This side of your house needs a lot of attention. In summer, the long days bake your exterior finish, causing peeling or cracking paint. Your home can also overheat if your windows are not protected with shades, awnings or plantings. In winter, most of the driving rain from our winter storms comes from the west. It is important to maintain this side of your home as any water intrusion can lead to mold, mildew, dry rot and insect infestations resulting in big cost issues.

**North facing:** This is the cool side of your house. Windows on this side provide great reflected light, which reduces glare in your eyes or on your computer or TV.

**East facing:** This is the morning side of your house. It doesn't overheat like the west side, but it does get low-angled sunlight, which causes glare.

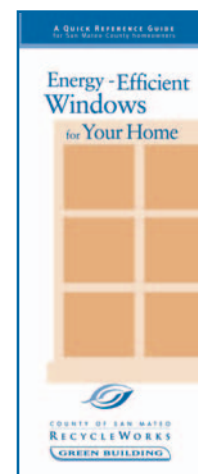


### Fact:

Window coverings that fit tightly to the window or floor can cut 1/3 to 1/2 of the heat loss. Open them on sunny winter days, close them on winter nights.

### Fact:

Tree lined streets are 5 degrees cooler than tree-less streets. Well placed trees can save 25% on your heating and cooling bill. An average tree can remove several pounds of pollutants and some 15 pounds of carbon from the air per year. They collect solar energy (keeping the heat off your house), produce oxygen, regulate humidity and temperature, filter air and water, recycle nutrients and provide wildlife habitat.



### Resource:

See the RecycleWorks' brochure – *Energy-Efficient Windows for Your Home*.



### Fact:

Attic insulation alone can save 20-35% in heating and cooling costs.

### Fact:

Attics get very hot (over 100 degrees). By simply venting the attic with louvers or roof vents you can keep your house much more comfortable all summer.

### Fact:

Ceiling fans consume about 98% less energy than central air conditioners.



*Cotton batt insulation made from recycled denim.*

You can **naturally cool** your house in the summer by taking advantage of cool outdoor temperatures at night and by keeping the heat at bay as much as possible during daylight hours. Here's what to do: At night when the temperature drops, open windows and bring in cool air with fans or a whole-house fan (one which is mounted in the attic and draws the interior air to the outside). As soon as the sun comes up or the air starts to heat up, shut the windows and shades and keep doors closed.

## INSULATION

Insulation in a home controls how much heat is gained in summer and how much is lost in winter. Many homes in the Bay Area built before the 70's have little or no insulation. Insulation comes in various forms (see chart for comparison) and is rated in terms of 'R-value,' which is the material's resistance to heat transfer. Higher numbers are better.

Ideally your home should have R-30 insulation in the attic and R-19 in the exterior walls and lower floor (R-30 is about 7" thick, R-19 is about 6" thick). Simply adding attic insulation will make a dramatic difference in your home's comfort and save you money on energy bills.

How much do you have? If you have attic access you can measure the thickness – most insulation is roughly R-3 per inch. Exterior walls may be checked by removing an outlet box and seeing what is in the stud bay. If you have access to your crawl space you can see if there is any under the floor.

What kind do you have? See the following chart for identifying what you have and what you can add to your attic, exterior walls and under the floor.

Type	R-value per inch	Thickness	What to look for	Installation
Batts, Fiberglass	3.2	1" – 13"	Formaldehyde-free, recycled glass content, non-respirable particles	Cut to fit between framing, easy to do. Wear face mask and protective clothing.
Batts, Cotton	3.2	3 1/2" – 12"	Recycled content, least-toxic flame retardants	Cut to fit between framing, easy to do.
Batts, Mineral wool (waste from steel production)	3.2	3" – 8"	Recycled content	Cut to fit between framing, much heavier than fiberglass. Wear mask and protective clothing.
Wet spray or poured-in Cellulose	3.5	Varies	Recycled content, non-toxic fire retardants	Professional installation. Blown-in with machine. Fills all voids. Trim off excess.
Blown-in or poured-in foam open-cell polyurethane	3.6	Varies	Blown with carbon dioxide or water (not using CFCs or HCFCs)	Professional installation. Sprayed on, expands, sawn off excess. Fills all voids and cavities better than any other.
Expanded polystyrene (EPS) rigid foam board	4.0	1/4" – 10"	Expanded with pentane. Don't get the extruded version (XPS) as it uses HCFCs – ozone depleting chemicals.	Cut and glued or nailed in place

What other way can you tighten up your house from heat loss?

- Caulk any cracks in your exterior and around the window and door frames. Install gaskets under cover plates to prevent leaks at electrical switches and outlets.
- Weather strip around window sashes and doors to tightly seal your operable units from wind and water infiltration.
- Make sure your ducts are insulated and do not have any leaks or gaps so as not to lose your valuable heated and cooled air.

## HEATING & COOLING SYSTEMS

Anytime your furnace or air conditioner is running, it's using energy and costing you money. You can make them work less by doing the following:

- Install a programmable thermostat. This will let you set temperatures for different times of the day so you are only heating and cooling when needed. Keep it turned down when you are away and at night while sleeping.
- Change your filters. Replacing them every 3 months will keep your furnace and air conditioner running efficiently.
- Install a high efficiency furnace. New furnaces are 90%+ efficient. A new unit will pay for itself in reduced energy bills.
- Shade your air conditioner compressor. It will stay cooler and not have to work as hard.
- Install a Radiant 'Hydronic' Heating system, the most efficient and healthy way to heat a home. Hot water runs through plastic tubing in your floor, radiating heat into a room instead of blowing warm air and dust around.

## ENERGY FOR LIGHTING AND APPLIANCES

The second largest energy load in your home is for powering lighting and appliances. There are many things you can do to reduce this load.

**Replace your old appliances.** Newer Energy Star™ rated appliances use less energy than older models. Plus, there are often rebates available from PG&E for turning in your old ones!

**Use appliances and office equipment off-peak.** If you can work it into your schedule, use your dishwasher, washer, dryer, printer and shredder at night to reduce energy demand in your area and keep the need for new power plants down.

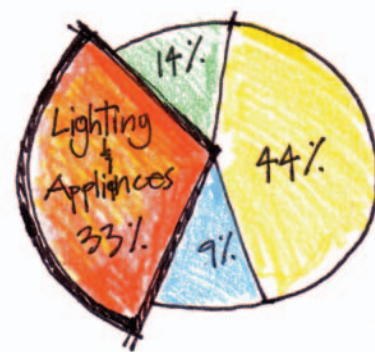
**Change a light.** The most common light bulb is an incandescent, which primarily gives off heat then light and uses at least 66% more energy than an Energy Star™ qualified compact fluorescent lamp (CFL) or fluorescent tube. These newer fluorescent fixtures no longer have the buzzing and poor color rendition of the previous generation. The bulbs also last much longer than incandescent. Another option for efficient lighting is a low voltage halogen fixture, which would use less energy per watt to achieve the same brightness as a standard incandescent.

### Fact:

A tune-up can increase your furnace's efficiency by 5% with an annual savings of 8,000 cubic feet of gas.



*Shade your air conditioner.*



### Fact:

Color affects energy use too, a white wall reflects 80% of the light that hits it while a black wall reflects just 10%. If you choose a lighter color more light will be bouncing off eliminating the need for added wattage.





**Install motion sensors.** These are a great way to ensure that lights are only used when needed. Use timers or photocells to control your existing outdoor entry lights. Solar L.E.D. lights are great for path and spot lights. No wiring is needed – light is generated with small solar panels on the top of the fixtures.

**Create your own power.** Install photovoltaic panels to generate electricity from the sun's energy. They can be mounted on your roof or as part of your roofing shingles. There are federal and state tax rebates too. For more information about cost and installers visit: [www.RecycleWorks.org/greenbuilding/solar](http://www.RecycleWorks.org/greenbuilding/solar).

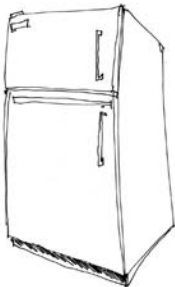
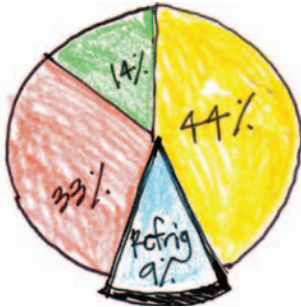
## REFRIGERATOR

Can you believe 9% of your home's energy use is for your refrigerator? Here are some things you can do to trim the amount of energy you use.

**Replace your old refrigerator.** New units use 50% less energy. Rebates are usually available for turning in refrigerators older than 10 years. It's also good to re-think the old refrigerator in the garage – is it really worth the extra cold sodas?

**Keep your refrigerator & freezer full.** Food retains cold better than air. Just don't overcrowd it to allow for some circulation.

**Set the temperature to the least cold setting.** Set the temperature for what you really need. Raising the temperature 10 degrees will save 25% in energy consumption.



### Fact:

PG&E provides rebates for your old appliances. visit [www.pge.com/res/rebates](http://www.pge.com/res/rebates)

## HOT WATER HEATER

You can enjoy the comforts of your hot water and save energy at the same time.

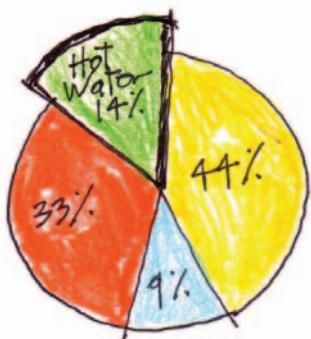
**Replace your old water heater.** If you are intending to replace your tank type heater, install a newer high efficiency unit.

**Install an on-demand tankless water heater.** Typical storage tank water heaters lose 15% of their energy through standing water. The tankless models only heat the water when it is needed. These types take up less room and can be installed in attics, allowing you to reclaim valuable space in your home.

**Insulate your hot water heater.** If you have an older hot water heater, get an insulation blanket to wrap around the tank. If pipes are accessible, add insulation to the hot water pipes that lead from the water heater.

**Lower the temperature.** Set the temperature for a comfortable shower or bath (110 – 120 degrees) and use just the hot water to fill the tub. Your dishwasher has its own heater to boost the temperature for extra cleaning.

**Create your own hot water.** Solar water heating systems have advanced significantly from the earliest models. These systems will pay for themselves in a few years.



## Water-Wise

Conserving water reduces demand. This, in turn, reduces the amount of water diverted to reservoirs, leading to healthier rivers and wetland habitats. Existing groundwater reservoirs, which are vulnerable to depletion, are also preserved.

Here are some water hogs to look out for.

Water hogs	Water wise	How much you save
Dripping faucet 6 gal/day	Snuggly fitting fixtures 0	180 gal/month <b>2,160 gal/year</b>
Leaky toilet 40 gal/day	Snuggly fitting fixtures 0	1200 gal/month <b>14,400 gal/year</b>
Old toilet 3.5 to 7 gal/flush	Ultra low flush toilet 1.6 gal/flush	1.9 – 5.4 gal/day 57 – 162 gal/month <b>684 – 1944 gal/year</b>
41 gallons/load 443 gallons/month per person (average 0.36 load per person/day)	23 gallons/load 248 gallons/month per person (average 0.36 load per person/day)	18 gallons/load 195 gallons/month per person <b>2,340 gal/year per person</b>
Brush teeth with tap running twice a day 3.5 gal/day 105 gal/month	Brush teeth and rinse with the faucet off while brushing twice a day 0.5 gal/day 15 gal/month	90 gal/month <b>1,080 gal/year</b>
Hand washing dishes with water running 20 gal/load	Dishwasher 10 gal/load Or hand wash with wash and rinse basins 5 gal/load	10 gal/load with dishwasher <b>3,650 gal/ year</b> 15 gal/load with basins <b>5,475 gal/ year</b> (1 load/day)



**Stop the leaks.** Many silent leaks allow water and your money to go down the drain. To help detect unseen leaks, read your meter. A simple way to check if your toilet leaks is to put a couple drops of food coloring in the tank. Wait 20 minutes and look to see if colored water is in your toilet bowl, if so you have a leak.

**Replace your old toilet.** Toilets are the largest water users in your home. If your home was built before 1992 and the toilet has never been replaced, then you probably do not have a water-efficient 1.6 gallon-per-flush toilet. Replace your old toilet with a low flow or dual flush model.

**Install low-flow shower heads and faucet aerators.** You can save up to 40% and barely notice the difference.



## Resource:

Order a compost bin from RecycleWorks. RecycleWorks offers a discounted compost bin to residents of San Mateo County. Order forms and more information about how to compost are available at [www.RecycleWorks.org](http://www.RecycleWorks.org) or by calling 1-888-442-2666.



***Operate the washer with full loads only.*** Even if your machine has an adjustable load setting, a full load is the most efficient way to wash clothes. Pre-treat stains to avoid rewashing. Use the shortest wash cycle for lightly soiled loads. Check your clothes washer hoses regularly for cracks that could result in leaks.

***Replace your old clothes washer.*** Washers are the second largest water user in your home. Get a front loading Energy Star™ rated washer that uses 35–50% less water and 50% less energy per load. These models also use less detergent!

***Install an on-demand hot water circulation pump.*** Instead of wasting water waiting for the shower to get hot, you can install a pump under your sink that will send the cooled standing water in the pipes back to the hot water heater. You'll have hot water in seconds. There are models that work with tankless water heaters, too.

***Go native.*** Plant native, drought tolerant plants. Whether you are putting in a new landscape or slowly changing the current landscaping at your home, select plants that are appropriate for our dry summer conditions. Lawns use significant amounts of water. If you do irrigate, switch from sprinkler heads to drip style, which lose less water to evaporation.

***Water only what your plants need.*** Most wasted water in your garden is caused by over watering or a poorly maintained irrigation system. Make sure your irrigation controller has a rain shutoff device and that it's appropriately scheduled. Most water is wasted in months prior to or just after the rainy season when intermittent rains occur. You can also install a weather adjusting irrigation controller that automatically turns off when plants don't need water.

***Compost food scraps with your yardwaste.*** Sending your food scraps down the garbage disposal uses water to grind and wash them away and more water to process them at the treatment plant. Instead send your food scraps to a compost pile. Composting in your backyard will keep your yardwaste and food scraps out of the landfill. It will also create a useful soil amendment that will improve moisture retention in your soil and reduce the need for pesticides and chemical fertilizers. And compost applied as a mulch can reduce the need to water as frequently.



# Green Materials

## CHOOSING THE RIGHT STUFF

What goes into your house can be made from materials that cause minimal impact to the environment and are healthier for you. Here are some things to look for.

**Recycled content or salvaged materials:** Selecting products made from recycled content keeps useable materials from filling up our landfills, reduces pollution and preserves raw materials. Using a salvaged product is even better.

**Durable products:** Longer lasting products save you money in the long run. You'll be happier too because they require less time to maintain.

**Products made from renewable resources:** There are a lot of products that can meet our growing need without pillaging the earth. Lumber is available from managed forests – ask for Forest Stewardship Council (FSC) certified harvested wood. Other agricultural products that grow rapidly, such as bamboo, cork and straw, are also being manufactured into building products.

**Healthy products:** A large part of our time is spent indoors with the inside air many times more polluted than outside. Why? Finishes, glues and plastics out-gas toxic fumes that are harmful to us and even worse for our children. There are many sources of indoor air pollution in any home, including formaldehyde in cabinets and furniture and volatile organic compounds (commonly known as VOCs) in paints and wood finishes.

## SPECIFIC MATERIALS

**Flooring:** Use natural flooring products, such as linoleum, which is made from sawdust and linseed oil. Vinyl is a petroleum base product that is often incorrectly called linoleum or “vinyl linoleum” – real linoleum is not a vinyl! Bamboo is a fast growing grass that is produced into a laminated durable material. Cork is harvested from the outer bark of a cork oak tree and provides a soft, warm and durable floor. Look for natural materials such as wool or sisal for carpeting. Plastic bottles are now recycled into synthetic carpeting which is resilient and durable.

**Tile:** Recycled content ceramic and glass tiles can contain up to 70% recycled glass and are available in a vast array of colors and sizes.

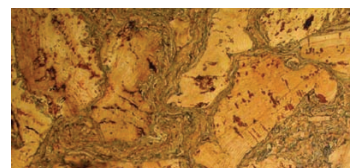
**Wood:** Look for Forest Stewardship Council (FSC) certified wood products that are harvested from sustainably managed forests or choose engineered wood products that use smaller trees to efficiently create strong framing elements. For decks, there are maintenance-free products made from recycled plastic and wood waste.

### Fact:

Interior air quality is 10 times more toxic than the outside air because of the materials used in building.



*Reclaimed wood flooring*



*Cork flooring*



*Recycled glass tile*



*Sisal Carpet*

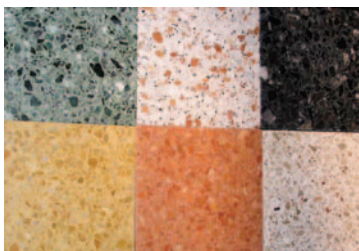
## Roofing:

Type	What to look for	What's good or bad
Asphalt shingle	Recycled content, long lasting – 40 year	Not as long lasting as other types, hard to recycle, least expensive
Clay tile	Make sure your roof framing is designed for the heavier weighted material	Made from abundantly available, inert material – clay  Extremely long lasting
Fiber-cement	Make sure your roof can support this weight	Newer product with 50 year warranty, made with cement which is polluting in the manufacturing process
Metal	Recycled content	Extremely long lasting, great for rainwater catchment systems
Slate	Lightest color available. Make sure your roof can support this weight	Extremely long lasting, tiles can be salvaged
Rubber tiles (looks like slate)	Recycled content, lightest color available	Light weight
Built-up asphalt roof or membrane roof (for flat or shallow pitched roof)	Light, reflective top surface	Will last longer because it does not expand and contract as much as darker colors

All green material photographs are courtesy of Eco Design Resources, a green materials showroom in San Carlos.



Bamboo cabinets



Countertops made with recycled glass and stone chips

**Trim:** For painted trim there are several options to solid lumber. Use finger-jointed wood made from shorter pieces of wood giving a straighter and more stable product than solid wood. Medium Density Fiberboard (MDF) trim is another alternative providing straight, true trim, but make sure it is formaldehyde-free. You can also find sturdy plastic trim made from recycled expanded polystyrene. It doesn't warp or absorb water and looks like wood when painted.

**Cabinetry:** For cabinet substrates and shelves use formaldehyde-free Medium Density Fiberboard (MDF) which is made from sawdust and binders. There are also boards made from agricultural waste products such as wheat board structural cores. For the exterior finish there are reclaimed hardwoods, bamboo, and composites made of agricultural waste, which have interesting textures.

**Counters:** If you're looking for a solid surface counter for your kitchen or bath, consider these options that contain recycled content: cement with recycled glass and stone chips in various colors or paper with resin compressed into sheets (incredibly durable).

**Gypsum board:** Look for gypsum board with recycled content (particulate by-product of scrubbers on power plants).

**Paneling:** There are various products available to create an interesting texture, such as straw panels, sisal wall covering, and cork and burlap wrapped Homasote (recycled newspaper) sound panels.

**Painting or plaster:** Choose no-VOC paint or milk-based paint to keep your indoor air clean. If you're looking for a richer finish try an integral color plaster, including clay plaster, which are natural products.

## *Taking the first step*

This may be a lot of information to grasp, so if you are feeling overwhelmed don't hesitate to ask professionals for help. However, the most important first step is simply to start thinking green. Keep asking your builder, gardener, architect, salesperson, and most importantly yourself:

*Is it energy and resource efficient?*

*Is it healthy for my family and the environment?*

*What is it made from?*

And if you need help or want to stay informed of green building events:



### **Ask An Expert**

The Ask An Expert hotline provides customized responses to a variety of green building questions for building professionals and the general public. Submit your question on the web by filling out the form found at [www.BuildItGreen.org/askanexpert.cfm](http://www.BuildItGreen.org/askanexpert.cfm), or call the hotline at 1-888-40-GREEN. The

[www.BuildItGreen.org](http://www.BuildItGreen.org) website has a database on where to buy green building products and provides a lot of specific technical information.

**ASK AN EXPERT**

**1-888-40-GREEN**

**[www.BuildItGreen.org](http://www.BuildItGreen.org)**

### **RecycleWorks**

To stay informed of what is happening in San Mateo County, sign up for the RecycleWorks Green Building e-list at [www.RecycleWorks.org/infoform.html](http://www.RecycleWorks.org/infoform.html) or check the RecycleWorks website often.

The County library system has two RecycleWorks DVDs available: Harnessing the Sun's Energy, A Solar Home Tour in San Mateo County and Green Commercial Buildings in San Mateo County, CA.

Every permitting or planning department in San Mateo County has copies of the San Mateo Countywide Guide to Sustainable Buildings, a comprehensive look at what you can do when building or doing a major remodel of a new home or commercial building. The guide is downloadable on the RecycleWorks website and available by emailing a request and your mail address to: [info@RecycleWorks.org](mailto:info@RecycleWorks.org). The solar and windows brochures mentioned earlier are also available through RecycleWorks.

The RecycleWorks website has comprehensive information on building green, recycling and waste reduction, composting and other environmental issues. There is an easy-to-use database for finding places to recycle just about anything, buy green products, or offer things for reuse.



**RecycleWorks**

**GREEN BUILDING**

A PROGRAM OF SAN MATEO COUNTY

**[www.RecycleWorks.org](http://www.RecycleWorks.org)**

**1-888-442-2666**

**[info@RecycleWorks.org](mailto:info@RecycleWorks.org)**

## A HANDY REFERENCE GUIDE FOR:



### Energy Efficiency



### Water Conservation



### Green Materials



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