

green home remodel  
healthy homes for a healthy environment



# kitchen





# green

## What is a Green Remodel?

It's an approach to home improvement with the goal of not only making your home look better, but making it work better—for both you and the environment. Want a healthier home? Lower utility bills? Reduced maintenance? A cleaner planet? A green remodel helps you realize a range of far-reaching benefits from a single smart design. With careful planning, you can create a living space that combines beauty, efficiency, comfort and convenience with health and conservation.

*Cover photo: Robert Harrison Architects.  
Above photo: JAS Design Build (photo © John Granen).  
Photo contents page top left: VELOCIPEDA architects (photo © David Ericson).*

# why

## Why Consider a Green Remodel?

### SAVE MONEY

Energy- and water-wise designs and products reduce monthly bills. Efficient, durable, and enduring home elements can last longer and cost less to maintain in the long run. Also, by making spaces welcoming to various ages and abilities, your home will be marketable to a larger population (a key benefit for resale) and less likely to need costly modifications as your own abilities change.

### MAKE A HEALTHIER HOME

A green remodel can be good for you, physically and emotionally. Health-focused designs maximize fresh air and natural light, while reducing the risk of injury. Potential problems like molds, allergens and toxic chemicals are identified and addressed early—a strategy that is more effective and usually much cheaper than fixing them after they develop.

### REDUCE ECOLOGICAL IMPACT

Remodeling is an opportunity to create a home that enhances the environment, instead of depleting it. You can make your living space more energy and water-efficient, minimize waste, and recycle what's left over to reduce the amount of materials ending up in landfills.

# kitchens

The kitchen is the heart of the home, a place for everything from cooking and eating to socializing and entertaining. This guide discusses the considerations involved in orchestrating a green kitchen remodel, so you can create a game plan that works for you.

A kitchen remodel can be complicated and expensive. A 2002 study by the National Association of Realtors pins the cost of a *midrange* kitchen remodel in Seattle at over \$45,000, while an *upscale* one averages nearly \$73,000. So it makes sense to do things right the first time. Fortunately, there are ways to reduce both the cost and complexity of a kitchen renovation, while increasing the room's environmental efficiency and human performance.



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# rethink remodel

Green remodeling requires a new approach to the remodeling process, with more up-front planning and coordination to capture opportunities that are often missed in the conventional remodeling process. This includes expanding your list of objectives as well as the way you compare the price of products and services, by taking wide-angle and long-term views of decisions. It also means being willing to invest time and energy to find solutions that best fit your needs. And finally, it means approaching your remodeling project with health and safety at the forefront. This advance planning pays large dividends in terms of long-term satisfaction with your project and cost containment.

Planning a remodel can elicit equal parts excitement and terror. The choices are endless. Where do you begin? Generally, the more you can stick with existing walls, cabinetry, plumbing and electrical layouts, the less you will spend on your remodel. You'll use fewer resources with less waste. So first, define your priorities and then consider all your options carefully.

## Decide What You Want

<b>Health</b>	Are materials and finishes nontoxic? Is ventilation sufficient? Are surfaces easy to clean without using harsh chemicals? Does the layout promote safety from slips, cuts, burns, and electric shocks?
<b>Usefulness</b>	Does the design make kitchen tasks easier and more pleasant? Create a list of your common kitchen tasks. Does the design help or hinder these?
<b>Efficiency</b>	Are the appliances and fixtures energy- and water-efficient? Are they sized to match the jobs at hand?
<b>Comfort &amp; Beauty</b>	Is the space inviting and attractive? Does it encourage people to linger? Are countertop heights and floor surfaces comfortable? What makes the space uncomfortable: layout, surfaces, colors or lighting?
<b>Durability</b>	Do the materials stand up to the tasks performed in a kitchen over time? Are they time-honored classics or will they look dated in a few years?
<b>Space</b>	Is space lacking—or wasted? Take an inventory of all categories of space: work space, storage, floor and visual space. Then be creative. Explore the simpler solutions first, such as converting a nearby closet to storage or pantry or donating unused items.
<b>Accessibility</b>	Does the design accommodate a variety of people, both in age and ability? Today's kitchens often need to work for not just one user but several, each requiring different activity areas.
<b>Ecological Benefit</b>	Do materials and appliances avoid environmental harm during their manufacture, use, and disposal? Are they made from materials that are recycled, responsibly mined or harvested, renewable, and/or local? Are they reusable or recyclable?

*Let this guide serve as a starting point for your remodel. Each decision regarding countertops, sinks and faucets, cabinetry, appliances and lighting, and flooring will help you create a green kitchen.*



## Expand Your Definition of Cost

Initial price gives only a peephole view of the true cost of a product or design. A higher purchase price can mean a better deal in the long run: you can actually reduce the cost of living in your home by choosing resource-efficient materials and designs (lowering monthly bills) and durable materials (requiring less frequent replacement). Focus on long-term savings, ease of maintenance and conservation, not just initial price. A low purchase price may mean a good deal, or it may signify a lack of quality or durability, or that some environmental, health, or social costs are not included on the price tag.

Incentives and tax credits may be available for specific features of your green remodel, helping shorten the payback period. Be sure to check the incentives list at [www.seattle.gov/dpd/greenbuilding](http://www.seattle.gov/dpd/greenbuilding) (click on *Residential*, then *Homeowners*, then *Incentives & Assistance*)

## Do Your Homework

Research helps you ask the right questions of retailers, your designer and/or contractor—or avoid costly mistakes if you are doing the work yourself. Finding some “green” products can be a challenge. It pays to start early, looking for manufacturers that offer products you like. Keep a file of contact names and businesses, and magazine and newspaper clippings. Identify everything for your new kitchen—down to the appliance brands, light fixtures and finishes. This helps determine cost and availability and reduces the need for expensive, last minute decisions. Find out how long it takes to receive special-order items and factor this into your schedule. The Internet is a great place to start when searching for information and products—but be aware of biases in information sources. The line between sales pitch and factual information can be quite blurry on the Web.

## Remodel Safely

Beyond identifying health objectives for your new design, take time to identify the hazards that already exist in your home and those that may be created by the remodeling process. Many old paints contain lead, and disturbing these surfaces can increase the risk of lead poisoning. Certain plumbing types can also contain lead, and leach into drinking water. Asbestos is another potential hazard, discussed in the Flooring section. Make your objectives for dust and fume containment, as well as cleanup procedures, clear with your contractor. Learn more about remodeling hazards by visiting the Washington Toxics Coalition web site at [www.watoxics.org](http://www.watoxics.org) (click on *Toxics in the Home*).

Also, make sure all work follows building codes. Work that violates codes may also violate the terms of your insurance policy, leaving you vulnerable to loss. It can also save you the hassle, waste and expense of having to tear out non-compliant elements. It's likely the reason it doesn't comply is due to safety, health, or energy efficiency issues—all goals of a green remodel. For more on building code, visit the King County Department of Development and Environmental Services at [www.metrokc.gov/ddes](http://www.metrokc.gov/ddes) or call 206-296-6600. Seattle projects visit [www.seattle.gov/dpd](http://www.seattle.gov/dpd) to learn more about building code and permitting.

## Universal Design Benefits Everyone

*Universal Design* reexamines the basic assumptions we have made in designing high-function areas like kitchens and bathrooms. The result is a more flexible, adaptable design useful to a wide range of ages, sizes or physical abilities. These principles can help homeowners *age in place* and reduce the need for costly and wasteful tear-out and remodeling activity down the road. The National Kitchen and Bath Association ([www.nkba.org](http://www.nkba.org).) maintains an excellent list of Planning Guidelines in their Online Remodeling Guide.

*Photos from top: Robert Harrison Architects, VELOCIPEDA architects (photo © David Ericson), Prentiss Architects, and JAS Design Build (photo © John Granen).*



*If it's time to recycle your old refrigerator, select a service that removes the refrigerant before recycling. Not doing so releases ozone-depleting CFCs into the atmosphere - it's estimated 4 million pounds of CFCs are released this way each year. For a fee, old appliances can be dropped off for recycling (and refrigerant removal) See Resources on page 16 to find out about appliance recycling.*



## appliances & lighting

It's estimated the average kitchen accounts for 20-40% of a home's total energy bill. If your refrigerator and dishwasher are more than 10 years old, you can most likely reduce your utility bills by replacing these appliances with high-efficiency models. There's an initial investment with upgrading old appliances, but chances are you'll appreciate the resulting superior performance and lower utility bills.

To find the most energy-efficient electric appliances, start with the Energy Star® website at [www.energystar.gov](http://www.energystar.gov), and look for the Energy Star label at your retailer. An Energy Star label means that a product meets stringent energy requirements. Also, the more comprehensive a warranty, the more likely that the appliance will last. Ovens and ranges are not included in the Energy Star program. Given the inefficiency of these appliances (it's estimated only 6% of the energy used to power an oven is actually absorbed by the food!) it makes sense to choose wisely. See [www.aceee.org/consumerguide/cooking.htm](http://www.aceee.org/consumerguide/cooking.htm) for tips on energy efficient cooking appliance selection.

Puget Sound Energy Customers are eligible for rebates on efficient dishwashers, lighting fixtures and other appliances. Visit [www.pse.com/yourhome/rebates/index.htm/](http://www.pse.com/yourhome/rebates/index.htm/) for details.

Another money-saving trick is to size your appliances to your needs. Dishwashers and refrigerators operate most efficiently when they're full. If your old fridge or dishwasher is consistently only half full, consider smaller models. Also, the style of refrigerator can actually affect energy use. In general, models with the freezer on the top use up to 25% less energy than comparable side-by-side refrigerator/freezer models.

Good ventilation is a key consideration in a healthy home. Washington State Code (WAC 51-13) requires kitchen ventilation with a minimum fan flow rating of 100 cubic feet per minute (CFM). Removal of combustion gases and water vapor in kitchens is essential to maintaining good indoor air quality. However, high-powered kitchen ventilation hoods and downdraft fans can actually create a health hazard by pulling furnace, fireplace and water heater exhaust containing toxic fumes into your home. An overview of kitchen ventilation is available on the Oikos website at <http://oikos.com/library> (click on *Ventilation*).

Properly sized and positioned light fixtures put light where you need it, and natural light and lighter wall and ceiling colors reduce the need for supplemental electric light. For design tips and information about energy-efficient lighting, go to [www.elflist.com](http://www.elflist.com).

*Photo top of page 3 and 4: Robert Harrison Architects (photo © Michael Moore).  
Photo bottom right of page 4: VELOCIPEDA architects (photo © David Ericson).*



# cabinetry

New cabinetry can be the most expensive component in a kitchen remodel. First, determine whether your cabinets need to be totally replaced, resurfaced, or simply repainted. If your current cabinets are from the 1950s or earlier there's a good chance they're built better than most on the market today.

If space is the issue, there are ways to maximize what you already have. Increase storage by adding shelves within the cabinets, or changing doors to drawers under counters. Plan for a recycling collection area to minimize clutter. Pullout shelves can be added that allow you to retain the existing cabinet doors as well.

Existing cabinets can be completely transformed and updated with cabinet *refacing*—replacing the cabinet and drawer fronts while keeping the base cabinetry. By refacing them, you could end up with a premium-quality kitchen that looks brand new—at a fraction of the monetary and environmental cost. Find companies that specialize in this process under *Cabinet Refacing* in the phone directory or online.

Whether refacing your cabinets or installing new ones, be careful with cabinetry constructed of particleboard or conventional medium density fiberboard (MDF). Not only can it fall apart if wet, it often contains *urea formaldehyde*, which can emit irritating and unhealthy fumes for decades after it's installed. Environment and health friendly alternatives include:

- Formaldehyde-free MDF made with exterior-grade resins for added durability.
- Agricultural fiber panels (called *wheatboard* or *strawboard*) free from formaldehyde binders. In dry and protected areas, they are an excellent option, and make use of an underutilized resource: plant stems left over from grain production. Applying veneers or finishes increase the durability of wheatboard.
- Forest Stewardship Council (FSC) certified *exterior-grade plywood*. The Forest Stewardship Council sets standards to certify forest products from responsibly managed forests (see [www.certifiedwood.org](http://www.certifiedwood.org) for more on sustainable harvest wood products).



# kitchen waste & recycling

Kitchens generate a lot of waste in the form of food scraps and packaging, as well as toxic cleaners and pest control products. Fortunately, you can make a significant difference by choosing products carefully, composting, and recycling.

## prevent

Shop with reusable bags and try to choose products with less packaging. Reuse containers and purchase in bulk. Avoid using toxic chemicals; find alternatives to conventional toxic products at [www.watoxics.org](http://www.watoxics.org) (click on *Toxics in the Home*).



*Photo left: Environmental Home Center. Photo right: VELOCIPEDA architects (photo © David Ericson).*

## compost

Garbage disposals add cost to a remodel, use extra water, and put unnecessary stress on our wastewater treatment facilities. Instead, compost non-protein kitchen scraps. Provide space under the sink in your cabinet design for a compost bucket, or include a chute in the countertop for tossing scraps with under-sink storage. For more on composting, call the Natural Lawn and Garden Hotline at 206-633-0224.

## recycle

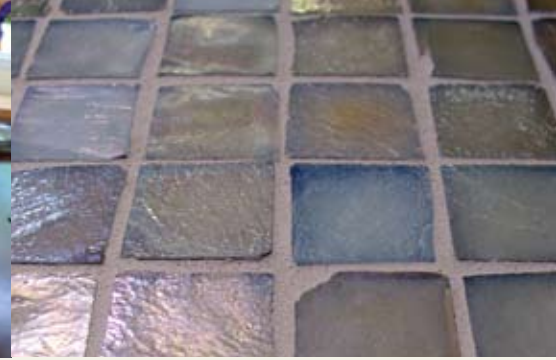
For ease and convenience, create a kitchen recycling station. You can purchase pre-manufactured recycling organizers or build your own. Find out what's accepted in your curbside recycling program by visiting [www.metrokc.gov/environ.htm](http://www.metrokc.gov/environ.htm) and clicking on *Curbside recycling*. Items not accepted at curbside may be accepted elsewhere. For quick answers to your recycling questions, call 206-296-4466.

## dispose

Meat, bones and fat or oil-rich food scraps belong in the garbage—composting these can attract pests. Tossing stuff in your recycling bin that doesn't belong there can turn the whole load into garbage. So learn what goes in your bin, and what doesn't. If you need to get rid of hazardous household materials (old paints, pesticides, cleaners, or other chemicals), visit [www.govlink.org/hazwaste/house/disposal](http://www.govlink.org/hazwaste/house/disposal) to find where to take it. Of course, avoiding toxic products in the first place is by far the best option.







# countertops

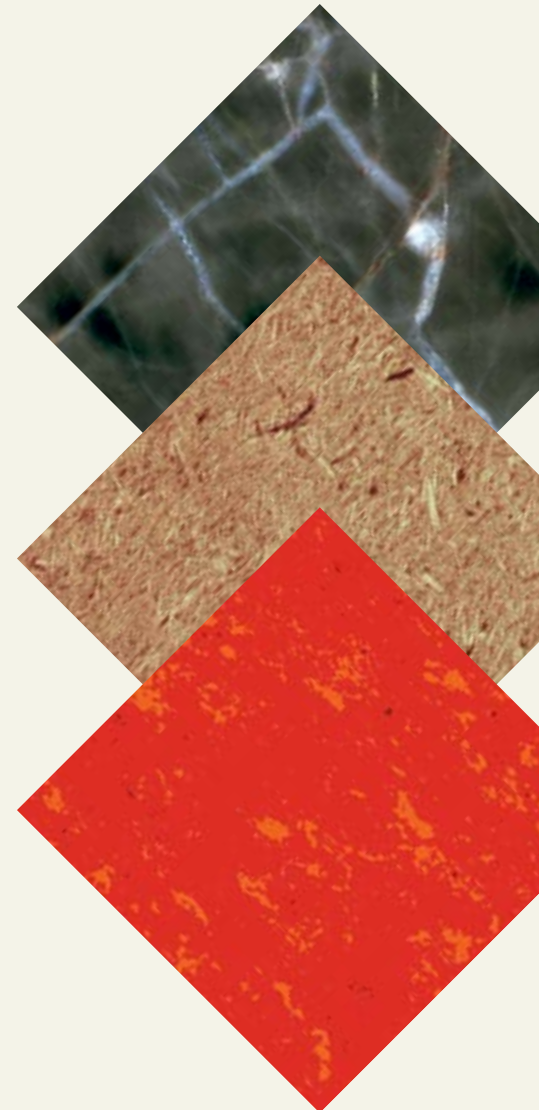
Perhaps the hardest-working surface in the home, kitchen countertops need to be durable and easy to clean. They're also a substantial investment. So first decide if it actually needs to be replaced, or just repaired or renewed. Tile countertops can be re-grouted. Wood countertops can be refinished. Even a laminate surface that's come loose can often be re-glued.

If it's time for a replacement, be sure to include fabrication and installation cost as you're comparing. Up to 80% of the cost of a countertop is related to these costs rather than the cost of material. For do-it-yourselfers, butcher block and tile are good options. Others, such as solid surface countertops and engineered stone, require professional installation to maintain the warranty. Finding an environmentally superior choice involves weighing several options based on your priorities. The chart on the following pages outlines some common countertop materials.

## Backsplashes


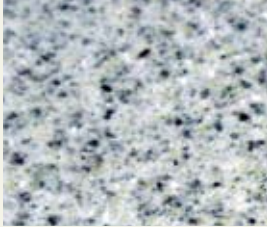

*Backsplashes* make the wall behind the counter easy to clean and protect it from moisture damage. Many countertop materials (laminates, tile, stone, stainless steel, and solid surface materials) can be used for backsplashes. Since a backsplash doesn't need to stand up to as many abuses as the kitchen counter (e.g., cutting, hot pots and pans, dropped items), you're allowed more freedom with your materials choices. Some options include vintage chalkboard slate, surplus or salvaged tempered glass, or a mosaic of salvaged tile or stone.

Choose a material that's up to the task of regular scrubbing, grease splatters and exposure to moisture. If using the same material as the counter, find out if the material can be fabricated from one piece, eliminating any seams between countertop and wall. This protects against water damage and makes cleaning a snap. If a seam or joint is unavoidable, refer to the manufacturer's suggestions on caulking selection. Look for water-based caulk formulas low in *volatile organic compounds* (VOCs), and invest in premium quality caulk. It usually costs less over time, since you don't have to replace it as often. If you choose a silicone caulk, look for additive-free, *aquarium grade* products.



# countertop options

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS	BENEFITS	DRAWBACKS
<b>Butcher Block</b> 	<p>\$40-80/sq. ft. Individual pieces of wood are bonded together to make a work and cutting surface. The environmental impact of wood products depends primarily on the way the material was grown, harvested and processed.</p> <p>Tips: Select wood certified by the Forest Stewardship Council (see <a href="http://www.certifiedwood.org">www.certifiedwood.org</a>), reclaimed wood, or non-commercial regional species, such as Pacific Madrone from urban salvage. Wood countertops are not recommended near sinks or dishwashers. Look for wood treatments labeled food safe in compliance with FDA rules.</p>	<p>made from natural, renewable materials</p> <p>small nicks and scratches can be sanded out</p>	<p>prone to water damage</p> <p>hot cookware can scorch surface</p> <p>porous; requires sealing and periodic treatments</p>
<b>Concrete</b> 	<p>\$80-150/sq. ft. Made from Portland cement, sand, stone, and other fillers. It's also possible to incorporate recycled materials such as glass into the concrete mix. Cement production is energy-intensive; approximately one ton of greenhouse gases are released for every ton of cement produced.</p> <p>Tips: Use nontoxic, natural pigments mixed into the concrete for integral color rather than surface-applied stains. Many concrete sealers are toxic. Use products approved for eating surfaces such as food-grade mineral oil.</p>	<p>can incorporate recycled materials</p> <p>tolerates hot cookware</p>	<p>porous; requires sealing and periodic treatments</p> <p>heavy; may require cabinet reinforcement</p>
<b>Engineered Stone</b> 	<p>\$80-120/sq. ft. Quartz crystals and ground quartz, pigments and polyester resin are combined and poured into a mold to create a dense slab resembling granite. The slab is then distributed to regional fabricators. Available in many colors.</p> <p>Tips: Look for regionally manufactured engineered stone, if available. Most is manufactured in Europe and shipping this heavy material long distances results in environmental impacts. Look for local fabricators.</p>	<p>durable: very difficult to scratch, cut, or stain</p> <p>tolerates hot cookware</p> <p>no sealers or treatments needed; hygienic</p>	<p>made from non-renewable resources</p>
<b>Laminates</b> 	<p>\$10-25/sq. ft. Layers of phenolic resin-soaked paper are cured under high pressure and finished with a decorative surface. Although laminates are nontoxic, the resin is made from phenol and formaldehyde, two toxic chemicals.</p> <p>Tips: Choose products made with water-based rather than solvent-based resins. A custom countertop allows you to choose a base other than particleboard: exterior-grade, FSC-certified plywood or formaldehyde-free, medium density fiberboard (MDF) made with exterior-grade resins are good options. Request adhesives low in volatile organic compounds (VOCs), which impact air quality.</p>	<p>hygienic</p>	<p>visible seams</p> <p>nicks and scratches show</p> <p>hot cookware can scorch surface</p> <p>substrate prone to water damage</p>
<b>Natural Linoleum</b> 	<p>\$10-25/sq. ft. Made from linseed oil, wood flour, pine resin, and pigments with a plant fiber backing, natural linoleum is called the 40-year floor, due to its durability. Not just for floors, linoleum can be applied to a substrate, similar to laminates.</p> <p>Tips: Natural linoleum is currently manufactured in Europe and available through various retailers in the US. The manufacture of linoleum is quite similar among companies. Selection of the substrate (see Laminates, above) is important. Look for a professional with experience installing linoleum in this application.</p>	<p>made from natural, renewable products</p> <p>anti-static (repels dust) and antibacterial</p>	<p>substrate prone to water damage</p> <p>hot cookware can scorch surface</p>

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS	BENEFITS	DRAWBACKS
<p><b>Natural Stone</b></p> 	<p>\$80-150/sq. ft. Quarried from around the world, impacts depend on quarrying and production practices as well as transport distance. It's also a readily available salvage and remnant item.</p> <p>Tips: Salvaged material is available at a fraction of the cost (and environmental impact) of new stone. Stone countertop remnants are also often available from fabricators. If you're buying new stone, look for local sources. Use food grade or non-toxic water based sealers and treatments.</p>	<p>durable and reusable</p> <p>tolerates hot cookware</p>	<p>difficult to repair</p> <p>porous; requires sealing and treatment</p> <p>heavy; may require cabinet reinforcement</p>
<p><b>Paper-resin Composite</b></p> 	<p>\$70-120/sq. ft. Made from multiple layers of kraft paper and resin bonded under low pressure into slabs. The two products that fit in this category are Richlite® and PaperStone®. It can be fashioned with woodworking tools.</p> <p>Tips: Thinner sheets will save money and resources. Requires periodic treatment to reduce staining; use food-grade products, e.g., mineral oil. These materials are relatively new to the residential market; find an experienced installer.</p>	<p>small nicks and cuts can be sanded out</p> <p>hygienic</p> <p>locally manufactured</p>	<p>can stain or mottle (some users like the effect)</p> <p>hot cookware can scorch surface</p>
<p><b>Solid Surface</b></p> 	<p>\$45-90/sq. ft. Solid surface materials (e.g., Corian®) are a mix of fillers and resins. The filler (at least ½ of the mix) is often a form of bauxite - the ore that produces aluminum. Resins are either polyester or acrylic, both derived from oil and natural gas products.</p> <p>Tips: Choose a product carrying at least 10 years' warranty against defects. Acrylic resins are more resistant to damage from ultraviolet light (sunlight) than polyester. Materials should meet FDA requirements for food contact, and a Class 1(A) fire rating—your retailer should know these terms.</p>	<p>easy to clean</p> <p>small nicks and scratches can be sanded out</p>	<p>bauxite mining environmentally damaging</p> <p>stain, cut- and scratch-prone</p> <p>hot cookware can scorch surface</p>
<p><b>Stainless Steel</b></p> 	<p>\$85-100/sq. ft. A combination of steel, chromium and nickel. Its production requires large amounts of energy. Chromium, a toxic heavy metal, is bound in stainless steel during manufacturing so the finished product is nontoxic (although there still is an issue with pollution caused by its production).</p> <p>Tips: Look for salvage at restaurant supply and metals surplus companies. Look for 18% stainless steel (18% chromium and 10% nickel) for durability. Thicker steel (18 or 16 gauge) is less prone to denting. Metal countertops are usually anchored to a plywood base for stability—request exterior-grade, FSC certified plywood.</p>	<p>durable</p> <p>hygienic</p> <p>reusable and recyclable</p> <p>tolerates hot cookware</p>	<p>scratch prone</p> <p>shows fingerprints</p>
<p><b>Tile</b></p> 	<p>\$5-80/sq. ft. Tile manufacturing requires large amounts of energy, but its durability gives it an environmental edge. The cost of this countertop option varies widely, based on the cost of tile and the complexity of the installation.</p> <p>Tips: Find tiles made from recycled glass, recycled porcelain, salvaged ceramic scrap, or feldspar tailings—waste from feldspar processing. Recycled glass tiles manufactured using a sintering process (heated to the point of fusing rather than full melt) use less energy in production. Grout sealers and grout lines less than ¼ inch wide create easy-to-clean surfaces. Choose sealers free of formaldehyde and low in volatile organic compounds (VOCs). Install tile with solvent-free mastic on a durable, rot-proof surface, such as cement backer board.</p>	<p>do-it-yourself friendly installation</p> <p>tolerates hot cookware</p> <p>individual tiles can be replaced</p>	<p>grout can stain and harbor bacteria</p> <p>uneven surface</p>



# faucets

Faucets should be efficient, durable and stylish. Kitchen faucets today must meet minimum standards for water efficiency, using no more than 2½ gallons per minute (GPM). The GPM should be marked on the aerator (nozzle). Efficient aerators save water and the energy used to heat it by reducing the flow from the faucet. Kitchen aerators should use no more than 2.0 GPM. Some handily designed aerators come with a small lever that allows you to temporarily reduce the water flow to a trickle while soaping up or between rinses, with the flick of a finger. This feature saves even more water, and you won't have to readjust water temperature every time you shut off the faucet.

If your current faucet is in good condition, consider reusing it. It may simply need an aerator or some do-it-yourself refurbishing. Faucet repair kits are available at most home improvement and hardware stores. Replacement handles, available at plumbing supply stores, can freshen the look of an existing faucet. Faucets with lever handles (like those you see in doctors' offices) are easier for folks with trouble gripping to use *and* easier to clean.

Make choices carefully if considering a salvage or vintage faucet—many of these fixtures are water wasters, and may not meet code requirements for efficiency. Additionally, some older faucet fittings contain lead. Look for newer faucets that can be fitted with an aerator meeting current code, available at hardware stores. Bring the aerator with you on your salvage trip to make sure it fits.

On new faucets, look first at the faucet's warranty: its length and comprehensiveness is a good indicator of faucet quality. Look for lifetime warranties, and warranties that include the faucet's finish, replacement parts, or full replacement. Faucets with ceramic disc valves are longer lasting and less prone to drips. Also, look for faucets with replaceable parts so you don't have to toss the whole thing if it breaks.

## Look out for Lead in Drinking Water!

Our regional drinking water doesn't contain lead, but lead can leach from certain types of plumbing in the home and accumulate to unhealthy levels within pipes. Homes most at risk are those with copper plumbing installed between 1948 and 1980, when solder containing lead was commonly used. Seattle banned the use of lead solder in 1980. To learn more about lead and other drinking water concerns, call the EPA Safe Drinking Water Hotline at 800-426-4791, or visit Seattle Public Utilities at [www.seattle.gov/util](http://www.seattle.gov/util) (click on *Water*). This web page includes information for all areas of King County.

If you're installing a water filter at the sink, choose one with a biodegradable carbon filter.

*Reduce the risk of scalding—  
and save energy—by keeping  
your water heater set to 120  
degrees Fahrenheit. Also,  
install or upgrade insulation  
on hot water pipes. This will  
reduce heat loss from water  
heater to point of use.*



# sinks

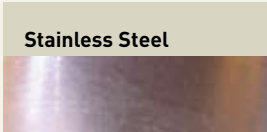
Sinks come in many of the same materials as countertops, including stainless steel, solid surface materials, and certain stones. The same pros and cons of these materials apply to sinks as countertops. One benefit of using the same material in both sink and counter is that it can sometimes be fabricated out of one piece of material. This eliminates seams that can harbor bacteria and cause leaks. Sinks with steep sides and tighter corners will provide more in-sink space than those with sloped sides and rounded corners.

Countertops made from a single material throughout (concrete, natural and engineered stone, solid surface) are flexible, allowing for either surface mount (*self-rimming* or *drop-in*) or undermounted sink styles. Undermounted sinks make cleanup easier by eliminating the lip present in most surface mount styles. Countertops with a surface layer of one material and base of another (laminate, linoleum etc.) require surface mounting sink styles.

Photo middle: Environmental Home Center. Photo bottom left: Robert Harrison Architects.







## sink choices

MATERIAL	DESCRIPTION/TIPS
 <b>Enameled Cast Iron</b>	Cast iron is a durable choice, handling heat and scrubbing well. They're also heavy, making them quieter with running water and pots and pans than stainless or enameled steel sinks. However, if the enamel chips, it can expose the iron and result in rust. Cast iron sinks are quite common at building materials salvage yards, where you can find one at a fraction of the price of new, and create "instant history" or match the period of your kitchen. Cast iron is recyclable.
 <b>Enameled Steel</b>	Low-end enameled steel sinks are one of the lowest priced sinks, but also one of the least durable, meaning they can cost more in the long run. Depending on the gauge of the steel, heavy items can chip an enameled steel sink, leading to rust. The cost of early replacement can quickly erase the initial dollars saved, so choose wisely. Better quality enameled steel sinks will feature thicker gauge steel, making them less prone to chips, and a resin coating to increase durability of the enamel.
 <b>Engineered Stone</b>	Commonly made from quartz crystals and resins, these sinks are durable and available in a variety of colors. While engineered quartz <i>countertops</i> are usually more than 90% quartz, quartz <i>sinks</i> are usually about 70%, meaning they're a bit less durable than the countertops. Similar sinks made from granite and resins are also making headway in US markets after introduction in Europe, and are reputed to be even more durable than the quartz version.
 <b>Fire Clay</b>	Similar in appearance to ceramic, these sinks are manufactured by pouring liquid clay into a mold, allowing it to air-dry, and then firing it with a glaze finish. A durable choice, fire clay is very difficult to chip or scratch. Many "farmhouse" style sinks are made from fire clay. Most of these sinks are manufactured in Europe.
 <b>Solid Surface</b>	Like solid surface countertops these sinks come in a variety of colors, and can be integrated into countertops. They also suffer the same shortcomings, including being prone to scorching (although small burns can be sanded out) and stains. Solid surface is resistant to scratching from scouring pads.
 <b>Stainless Steel</b>	Designers often recommend thicker gauge steel, usually 18 or 16 gauge, but consumer tests found little difference in performance between gauges. Sound-deadening pads and undercoats can reduce the noisy nature of these sinks. A satin finish is better at hiding scratches, fingerprints and water spots than a polished finish. Quality stainless steel sinks, including commercial grade units, are available at building salvage and industrial surplus yards. Stainless steel can be recycled.



# flooring choices

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS
<p data-bbox="66 930 155 951"><b>Concrete</b></p> 	<p data-bbox="354 930 1549 1003">\$15-20/sq. ft. For homes with a concrete slab foundation, a finish layer of concrete can be a hard wearing and beautiful solution. Concrete can be hard on the feet after extended periods. Cracks and stains are also possibilities with concrete. Some folks dislike such irregularities, while others enjoy the one-of-a-kind floor that results.</p> <p data-bbox="354 1024 1549 1171"><b>Tips:</b> Select natural, nontoxic pigments to color concrete rather than surface stains. They're healthier, and will last the life of the floor, since the color is integrated into to the material. Conventional sealers and paints for concrete floors can damage indoor air quality—look for water-based, low-toxic sealers. Fly ash, a by product of coal burning, can replace a portion of the cement in a concrete mix, reducing the environmental impact of this energy-intensive product. If your kitchen remodel is part of a larger home remodel involving the heating system, a concrete floor can be outfitted with radiant in-floor heating, an efficient heating method that can combat one of the main misgivings of this type of floor: cold feet.</p>
<p data-bbox="66 1245 237 1266"><b>Natural Linoleum</b></p> 	<p data-bbox="354 1245 1549 1339">\$6-10/sq. ft. See the Countertops section for a description of natural linoleum. Available in tiles and sheets, linoleum is naturally anti-static and antibacterial. This makes it easier to clean and tougher on germs. Linoleum also has a certain amount of give, making for a more comfortable standing surface. The one drawback to natural linoleum: it currently has to be transported from Europe, resulting in environmental impacts related to transport.</p> <p data-bbox="354 1360 1549 1434"><b>Tips:</b> Linoleum tiles are a good do-it-yourself project; professional installation is recommended with linoleum sheet. For small areas, look for linoleum remnants, often available through flooring retailers. If you're lucky, they may have the amount you need in a color to your liking, at a fraction of the cost.</p>
<p data-bbox="66 1507 115 1528"><b>Cork</b></p> 	<p data-bbox="354 1507 1549 1602">\$9-20/sq. ft. Cork is the bark of the cork oak tree, grown in the Mediterranean region. The bark is removed from the oak every nine years to create bottle corks; the scrap from this process is made into other products including floor tiles and planks. Tiles and planks can be ordered unfinished or pre-finished; natural finishes are readily available from manufacturers. Cork has a natural resilience and warmth that's good for areas that call for lots of standing (like kitchens!) or bare feet.</p> <p data-bbox="354 1623 1549 1696"><b>Tips:</b> Consult with a flooring professional regarding placing cork in areas of occasional moisture, such as near sinks and food preparation areas. Cork is primarily imported from Europe. Look for factory-finished products, or seal with a low-toxic, low-VOC or plant-based wax sealer.</p>
<p data-bbox="66 1770 147 1791"><b>Bamboo</b></p> 	<p data-bbox="354 1770 1549 1864">\$10-20/sq. ft. Bamboo is a fast-growing, rapidly renewable member of the grass family. When cut into strips and assembled into planks for flooring, bamboo is tougher than most hardwoods. Durable and easy to clean, the natural beauty of bamboo means it doesn't need to be stained or painted, although it must be sealed. Planks of bamboo flooring can be ordered unfinished or pre-finished. Most bamboo is currently imported from Asia.</p> <p data-bbox="354 1885 1549 1959"><b>Tips:</b> Look for low VOC (volatile organic compound) finishes that won't harm air quality. Ask a professional about placing bamboo in areas of moisture. Look for bamboo planks that are solid bamboo, rather than those with a wood core. Wood and bamboo expand at different rates when wet, and composite materials can come apart under the demands of a kitchen floor.</p>

# flooring

We expect kitchen floors to be tough. Of course, our floors have to be easy to clean, too—and we want them to stay looking clean for more than a few minutes. So it makes sense to carefully weigh a range of options for this key kitchen surface.

Vinyl (not to be confused with linoleum—see the Countertops section for a description of natural linoleum) has been a very popular kitchen flooring choice for the last several decades. However, recent research raises questions about vinyl’s impact on human health and environmental safety. What’s more, residential grade vinyl sheet flooring is composed of paper topped with a very thin layer of color or pattern. In an instant, a dropped knife or sharp appliance edge can cause irreparable damage.

Vinyl sheet flooring manufactured before the mid-1980s may contain high levels of asbestos in its backing material. Vinyl tiles from this era also may contain asbestos (especially the smaller, 9” by 9” tiles common in many 1940-60s houses). The asbestos in these tiles is usually much less likely to be released into the air than from the sheet vinyl backing.

If you suspect you have asbestos-containing flooring, visit the Puget Sound Clean Air Agency web site ([www.pscleanair.org](http://www.pscleanair.org); click on *Asbestos and Demolition*) to learn about safe handling and removal.

## MATERIAL

## INSTALLED COST/DESCRIPTION/TIPS

### Reclaimed or Certified Sustainable Wood



\$6-20/sq. ft. Wood flooring in a kitchen makes for a warm and durable surface that can be refinished over time. Reclaimed or salvaged wood flooring comes from either re-sawn salvaged lumber, logs reclaimed from river bottoms, or urban salvage - trees that are removed from properties because they’re storm damaged or a safety hazard. Alternatively, you can find new wood that’s been certified by the Forest Stewardship Council (FSC) as responsibly harvested and processed. See [www.certifiedwood.org](http://www.certifiedwood.org) for details on FSC.

Tips: Regional sources of both reclaimed and certified sustainable harvest wood are available. Finish wood with a water-based or plant-based (e.g., products with linseed oil, beeswax etc.) product, or order it factory finished.

### Recycled Content Tile



\$10-100/sq. ft. Ultra-durable, easy clean ceramic tiles are even greener when they contain recycled materials. Ceramic floor tiles are available with more than 50% recycled glass. The glass not only gives the tiles a depth and shine; it makes them extra durable. Tile with re-ground ceramic or feldspar tailings (a by product of mining) are also available.

Tips: Look for local sources. With 100% recycled glass, consider the possible slip hazard. Some professionals suggest limiting all-glass tiles to accent pieces in floor applications, or increasing the grout area by using smaller tiles. The downside of more grout area, however, is increased cleaning. Also, smaller tiles usually cost more per square foot than larger tiles.

### Salvaged Stone



\$2-20/sq. ft. Stone, like concrete, is extremely durable (and similarly hard on the feet when tasks require extended periods of standing). Building materials salvage yards often stock a variety of stone (e.g., slate, marble, and granite) appropriate for the kitchen. Salvaged stone can be custom cut by fabricators to your specifications. Using salvaged stone, especially when you find it on your own, can save you 50-80% over the cost of new stone, and reap environmental benefits.

Tips: Look for local sources of stone. Seal stone with low-toxic, water-based sealers. Stone floors, like concrete, are good candidates for in-floor heating. Select stone of uniform depth (gauged) to reduce trip hazard.

### Laminates



\$10-20/sq. ft. Also called floating floor, this product usually consists of a thin layer of color or pattern over a tongue-in-groove base of wood or wood fiber. These floors are usually glued to each other (along the tongue and groove) but not to the subfloor, creating a single piece of flooring that floats above the subfloor, with the edges covered by molding. Unfortunately, most types of floating floor systems are of questionable durability and environmental benefit.

Tips: Laminate flooring with recycled content is available, as are versions with bamboo and cork wear layers. Select versions that snap together rather than those that must be glued; this facilitates removal and reuse. A floating floor is a do-it-yourself friendly flooring choice. You can expect to save half off the installed price above by installing this flooring yourself.

# construction reuse & recycling

In 2005, Seattle and King County sent over 560,000 tons of building construction and demolition waste to the landfill. By salvaging building materials and recycling as much as we can of what's left over, we can reverse this trend.

## buy used

Reduce costs and conserve natural resources by creatively incorporating second-hand materials into your remodeling project. In the kitchen, vintage sinks, cabinetry, appliances, interior doors, and flooring are good examples. The key is to look for the potential in what others consider junk. This can be a challenge or an opportunity—and often, both. Materials are available from a variety of sources, including:

- Used building materials retailers. Find them in the phone book under *Building Materials - Used*
- Classified ads. See the *Building Materials* section of local newspapers.
- Online materials exchange: [www.metrokc.gov/dnrp/swd/exchange/](http://www.metrokc.gov/dnrp/swd/exchange/). Browse for items by category; most items are free or available for a nominal price, and it's free to list materials wanted.

Be sure that what you salvage is safe, efficient and meets building codes. The city of Seattle Client Assistance Memo on Sustainable Building and Reuse of Building Materials (CAM#336) at [www.seattle.gov/dpd/camlist/camlist.asp](http://www.seattle.gov/dpd/camlist/camlist.asp), provides a good introduction to the issues that should be addressed when using salvaged materials. Be sure to contact your local permitting agency for guidelines to using salvaged materials in the jurisdiction where you live.

## salvage it

Your existing sinks, cabinetry, flooring, wainscoting, lighting and plumbing fixtures, hooks, shelves, and towel bars are all potentially reusable. Careful removal of these items is the key to successful reuse. Look in the phone book under *Building Materials - Used* for businesses that may take your items. Consider giving away those materials not valuable enough for resale. You can list your items for free on the online materials exchange at [www.metrokc.gov/dnrp/swd/exchange/](http://www.metrokc.gov/dnrp/swd/exchange/).

Again, exercise caution when salvaging materials or doing any demolition work to avoid lead-based paint, asbestos, and other remodeling hazards. See [www.watoxics.org](http://www.watoxics.org) for more information (click on *Toxics in the Home*).

## recycle

Make sure your contractor has a construction waste management plan for your project. For Seattle projects, have your contractor visit the Resource Venture website for information, assistance, and referrals at [www.resourceventure.org](http://www.resourceventure.org). For King County projects outside Seattle, have your contractor call 206-296-4466 to find out how King County can help maximize recycling opportunities.

If you're dealing with construction waste yourself, visit King County's *What do I do with...?* web service at [www.metrokc.gov/dnrp/swd/wdidw](http://www.metrokc.gov/dnrp/swd/wdidw) and select *Construction/Demolition Debris*.

*Photo bottom left: Pacific Industrial Supply.  
Photo bottom middle and top right:  
The RE Store.  
Photo bottom right: Pacific Iron.*







# BUILT GREEN™

If you're hiring a professional to remodel your kitchen, consider using BUILT GREEN™ Remodeler on your project. BUILT GREEN™ is a green building rating system created specifically for Northwest homes by the Master Builder's Association of King and Snohomish counties in partnership with King County.

With over 250 health and environmentally friendly building strategies to choose from, the system is flexible enough for just about any remodeling project. BUILT GREEN™ makes the process of creating a green remodel easier by offering practical design strategies and materials and product suggestions. The system covers all the areas of a green remodel, including:

- complying with green codes,
- site and water quality protection,
- energy and water efficiency,
- healthy indoor air,
- materials efficiency, and
- strategies for helping keep a green home green.

*Learn more about*

*BUILT GREEN™ and find*

*builders that use the system by*

*visiting [www.builtgreen.net](http://www.builtgreen.net).*



*Images this page: a BUILT GREEN™ remodel in Seattle's Greenlake neighborhood, by the Soltner Group; built by BUILT GREEN™ member Jon Alexander of Sunshine Construction.*



*Location: Ballard*

*Architect: Robert Harrison  
Architects, Seattle*

### *Green elements:*

#### MATERIALS

- reclaimed fir in cabinetry and countertops
- FSC certified framing lumber and cabinetry (see page 4 for more on FSC)
- reused stove and faucet
- old kitchen cabinets reused in home
- extensive construction recycling
- kitchen recycling center

#### ENERGY & WATER EFFICIENCY

- Energy Star® appliances
- upgraded insulation and windows
- ultra high efficiency gas-fired hot water/space heater
- GFX wastewater heat recovery system
- compact fluorescent lighting
- smallest suitable appliances, without unnecessary features such as ice maker in refrigerator
- house footprint kept small to minimize impervious surface and limit heating and materials use

#### HEALTHY INDOOR ENVIRONMENT

- ample natural light
- proper ventilation over stove
- low toxic materials and finishes
- old fireplace/chimney removed, increasing space and eliminating air pollution and drafts
- eliminated asbestos and lead paint from indoor environment
- replaced old lead-soldered plumbing to safeguard water quality

## case study

This 1920s Seattle Bungalow (pictured on the cover of this guide) needed a new kitchen to make more efficient use of the existing space for a family of five. As the director of a Seattle environmental research center, it was inevitable the owner would include environmental performance as a prime consideration in his remodel. And like most remodels, cost was a major consideration. To translate these priorities into reality, the owners specifically sought out an architect with green design knowledge and a contractor experienced at implementing those designs.

### Small and Smart

At 108 square feet, the kitchen gains visual space by opening to the combination living and dining room. A counter defines the kitchen area without blocking the view from one room to the other. It also allows for food preparation on one side while kids do homework on the other. Storage abounds with a combination of base and wall cabinets, and additional cabinet space is gained by using appliances sized to the family's needs.

### Owner Participation Saves Money

The owners used their environmental knowledge and research skills, as well as old-fashioned elbow grease, to keep costs low. They examined their personal energy and water use to determine the most efficient equipment purchases. By doing the math, they found a refrigerator that was more efficient per cubic foot than the model widely considered the most efficient on the market. And by participating in the construction (and deconstruction) work, they saved on contractor's fees.

### Tradeoffs

In any project, ideals eventually meet the realities of time, budget, or availability. Existing floors were refinished with low-toxic polyurethane because they were too worn to accept the plant-based wax finish the owners preferred. A very small amount of conventional harvest wood found its way into some of the cabinetry and flooring because certified or reclaimed wood was not available. Owner involvement in construction saved on the budget, but lengthened the timeline of the project.

### Result: A Real Kitchen With Real Benefits

"The kitchen is the working center of our home," the owners say. "We love the feel of it, and it reflects our values, too. It's an investment that will pay dividends for years to come, with a combination of superior function, reduced bills, and delightful space."

# resources

## Print

- *Green Remodeling: Changing the World One Room at a Time* by David Johnston and Kim Master (New Society Publishers, 2004). This comprehensive resource gives detailed information on design, material selection, and more.
- *No-Regrets Remodeling* from Home Energy Magazine. Excellent general reference for home remodels, focusing on energy savings. See [www.homeenergy.org](http://www.homeenergy.org) (click on *Home Energy Products*)
- *The New Natural House Book* by David Pearson (Fireside Publishers, 1998)

## Online

The Internet is a great place to research green remodeling topics. Try search terms such as: residential green building, green building materials, healthy building, energy conservation, water conservation and sustainable building.

King County maintains a web site that includes recycling, waste prevention, composting and special events information at [www.metrokc.gov/dnrp/swd/](http://www.metrokc.gov/dnrp/swd/).

### Other useful web pages include:

The City of Seattle

- Seattle's City Green Building program  
[www.seattle.gov/dpd/greenbuilding](http://www.seattle.gov/dpd/greenbuilding)
- Seattle City Light Energy Conservation  
[www.seattle.gov/light/conserve/](http://www.seattle.gov/light/conserve/)
- Seattle Public Utilities Water Conservation and Protection  
[www.seattle.gov/html/environment/water.htm](http://www.seattle.gov/html/environment/water.htm)

King County

- "What do I do with...?" Recycling Information—including appliances  
[www.metrokc.gov/dnrp/swd/wdidw/](http://www.metrokc.gov/dnrp/swd/wdidw/)
- Green Building and Construction Recycling  
[www.metrokc.gov/dnrp/swd/greenbuilding](http://www.metrokc.gov/dnrp/swd/greenbuilding)

Regional

- The Built Green Program  
[www.builtgreen.net](http://www.builtgreen.net)
- Saving Water Partnership  
[www.savingwater.org](http://www.savingwater.org)
- Puget Sound Energy's Rebate Program  
[www.pse.com/yourhome/rebates/index.html](http://www.pse.com/yourhome/rebates/index.html)
- Energy Star  
[www.energystar.gov](http://www.energystar.gov)
- Solar Washington  
[www.solarwashington.org](http://www.solarwashington.org)



*This guide was developed by Seattle's City Green Building Program, with the assistance of Seattle Public Utilities Resource Conservation and Urban Sustainability staff and with content review and input from Seattle City Light and the Environmental Home Center. Jointly printed by Seattle and King County Green Building Programs*

*This information can be made available on request to accommodate people with disabilities.*

*Photo bottom right: Alchemy Design Lab (photo © Michael Moore).*



## King County

Department of  
Natural Resources and Parks  
**Solid Waste Division**  
King Street Center, Suite 701  
201 S. Jackson St.  
Seattle, WA 98104-3855



## City of Seattle

Department of Planning & Development  
**City Green Building**  
700 5th Ave., Suite 2000  
P.O. Box 34019  
Seattle, WA 98124-4019



*Want to learn more? Seattle residents visit [www.seattle.gov/dpd/greenbuilding](http://www.seattle.gov/dpd/greenbuilding) or call 206-615-0731.*

*King County residents visit [www.metrokc.gov/dnrp/swd/greenbuilding](http://www.metrokc.gov/dnrp/swd/greenbuilding) or call 206-296-4466 or 711 TTY Relay.*



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*Thank you!*

*December 2006*

