Chicago Green Homes

green home remodeling series

healthy homes for a healthy environment

baths & laundry

why

Why Consider a Green Remodel?

SAVE MONEY
Energy-efficient and water-wise designs and products reduce monthly bills. Home components chosen for their durability and timeless appeal will last longer and cost less to maintain in the long run. When you make living spaces welcoming to a variety of ages and abilities, your home will be marketable to a larger population (a key benefit for resale) and less likely to require costly modifications as your own abilities change.

MAKE A HEALTHIER HOME
A green remodel can be good for you, physically and emotionally. Environmentally-friendly designs maximize fresh air and natural light, while reducing the risk of injury and improving health. Potential problems like molds, allergens and toxic chemicals are identified and addressed early–a strategy that proves more effective and almost always much cheaper than fixing them after they develop.

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

green

What is a Green Remodel?

It's an approach to home improvement with the goal of not only making your house look better, but work better—for both you and the environment. With careful planning, you can create a living space that combines beauty, efficiency, comfort, and convenience with health and conservation.

THE CHICAGO GREEN HOME REMODELING SERIES
To help you plan your remodel, the City of Chicago has produced six guides that address common homeowner concerns. Download the complete series at www.cityofchicago.org/environment (See "Chicago Green Homes").

KITCHENS covers flooring, appliances, cabinetry, counter tops, tile and more

BATHS & LAUNDRY explore energy- and water- efficient alternatives for showers, baths, sinks, and toilets

BUILDING ENVELOPE learn weatherization techniques for your home and how to choose roofing materials, insulation, windows and more.

PAINTING topics range from removal to color choices to the benefits of low-VOC paints for family and house health

SALVAGE & REUSE learn about the reuse opportunities in your home, from flooring, molding and cabinets to products made from recycled goods

HIRING THE PROS identify how to find green contractors or architects and how to work with any contractor to ensure a green result.

baths & laundry

A bath remodel can be of the most expensive upgrades you can make to your home on a per-square-foot basis. A 2005 study by the National Association of Realtors estimates the cost of a midrange Chicago bathroom remodel, replacing fixtures, vanity and medicine cabinet in a 5' x 9' bath, including tile floor and tub surround, at a little over $12,000. An upscale remodel, involving enlarging an existing space, tile floor and surround, top-of-the-line fixtures and counter, plus relocating and partitioning the toilet, is estimated at over $32,000. Such a sizable investment encourages lots of planning and up-front research to ensure you'll be happy with the results for a long time.

The ideal laundry area combines durability, functionality, and efficiency with concern for human and environmental health. Careful decisions about appliances, flooring, cabinetry and fixtures can ensure your laundry is the right mix of these factors. A laundry space can range from its own room to a closet tucked into a bathroom. In both the bath and laundry, you can protect your investment by maintaining it with products that are safer for you and the environment.

The Green Home Remodeling Series was originally created by the Seattle Public Utilities Sustainable Building Program, with the assistance of Seattle Public Utilities Resource Conservation staff. The Chicago Department of Environment acknowledges the Seattle Public Utilities Sustainable Building Program for permission to revise these brochures for use in Chicago.

contents

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.

Decide What You Want

Planning a remodel can elicit equal parts excitement and terror. 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.

Health & Safety	Are materials and finishes non-toxic? Is ventilation sufficient? Are surfaces easy to clean without harsh chemicals? Does the layout promote safety from slips and electric shocks? Is the water temperature set to avoid scalds? Are lighting levels sufficient for tasks, without creating glare?
Usefulness	Create a list of your most common tasks. Does the design make tasks easier and more pleasant? Or does it hinder them?
Efficiency	Are the fixtures and appliances resource-efficient? Toilets and showers make the bathroom your home's biggest water user. In the laundry, efficient clothes washers can save thousands of gallons of water a year, while providing energy savings, as well.
Comfort & Beauty	Is the space inviting and attractive? What makes the space uncomfortable: the layout, surfaces, colors or lighting? In the laundry specifically, consider whether items such as ironing boards and drying racks should be built-in or portable.
Durability	Do the materials stand up to use over time? Bath and laundry areas are both subjected to standing water and other forms of continual moisture. Are they designed to be timeless, meshing with the era of the home, or will they look dated in a few years?
Space	Is it lacking or wasted? Take an inventory of all categories of space: personal space, elbow room, storage, floor and visual space. Then be creative. Explore simpler solutions first, such as creating a grooming station in the bedroom to free up human traffic jams during the morning rush, or consolidating cleaning supplies in one area (that's inaccessible to children, of course).
Accessibility	Does the design accommodate a variety of people, both in age and ability? Is there space for a wheelchair to maneuver? Does the design include support bars, or the option to add them if needed?
Ecological Benefit	Do materials and appliances reduce or avoid environmental harm during their production, 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 the starting point for your remodel. Each decision regarding your bath or laundry area, from appliances and lighting to flooring and fixtures will help you create a green remodel.

Photo: Corinne Knight

Expand Your Definition of *Cost*

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

Lenders and other organizations are beginning to recognize the value of ongoing savings to the homeowner. The savings from a more efficient home can cover and even exceed the incremental addition to your mortgage payment, meaning the improvements pay for themselves, and then some.

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 green products can be a challenge. It pays to start early looking for businesses that carry products you like. Keep a file of contact names and businesses, and magazine and newspaper clippings. Identify everything for your new bathroom or laundry area–down to the product brands, light fixtures and finishes. This will help you determine cost and availability, while reducing the need for expensive, last-minute decisions. Find out how long it takes to 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.

Remodel Safely

Select products to minimize the introduction of harmful fumes caused by paint, adhesives, sealers, formaldehyde-containing materials and more. Make your objectives for dust and fume containment, as well as clean-up procedures, clear with your contractor before the work begins. Beyond identifying health objectives for your new design, take time to identify the hazards that already exist in your home. Many old paints contain lead, and disturbing these surfaces can increase the risk of lead poisoning. Certain plumbing types can also contain lead, which can leach into drinking water. Asbestos is another potential hazard, most likely in older vinyl flooring in a bathroom. For more information, see "Addressing Indoor Environmental Concerns During Remodeling" at www.epa.gov/iaq/homes/hip-front.html.

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. Following codes 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 additional information, see the Chicago Department of Buildings at www.cityofchicago.org/dcap.

Universal Design Benefits Everyone

Beyond basic accessibility issues, *universal design* strives to create spaces that welcome all ages and abilities. 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. For more information about Universal Design, see the Center for Universal Design North Carolina State University at www.design.ncsu.edu/cud.

Photo top: Nathan Kipnis Architects.

Look for the new EPA Water Sense label that identifies water-saving fixtures, which are certified as meeting performance and efficiency standards in an independent testing laboratory. Visit the website at www.epa.gov/watersense/pp/index.htm to learn more.

bathrooms

Bathrooms, once considered purely utilitarian, are increasingly a place for everything from renewal and pampering to washing the family dog. Such a range of uses requires materials that are beautiful, durable, and impervious to moisture. The bathroom is also where most of the indoor water is used in a home, and energy is consumed by heating that water, as well as lighting, warming, and ventilating the space.

tub & shower heads

As a surface doused with water several times a day in the average house, shower walls must withstand long-term exposure to moisture. Fiberglass and acrylic enclosures make popular low-cost and easy-to-install options but raise concerns regarding manufacturing processes and durability. Long-lasting tile performs better environmentally, and often economically, when added durability is taken into account. If an existing tile surround is in good condition, consider re-grouting rather than re-tiling. This can be professionally contracted, or makes a good do-it-yourself project. A quality, properly installed and maintained tile wall can last as long as the house. Use a concrete backer board for tile in wet areas. Moisture-resistant gypsum wallboard (often called *greenboard* and identified by a green paper surface) is not suitable for wet applications such as shower and tub surrounds. Look for solvent-free mastics or *thinset mortars*.

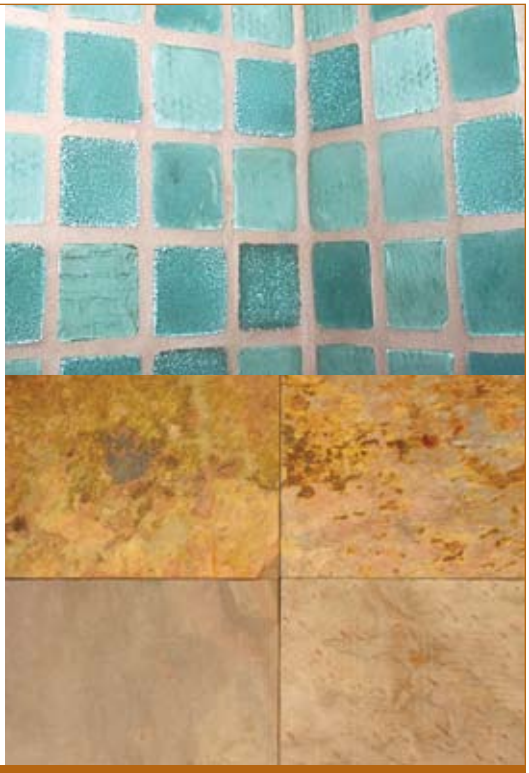
Tips for Easy Maintenance

A common problem with tile tub enclosures is moldy, stained grout. To avoid this:

- Consider light-colored grouts rather than white.
- Choose tiles that can be set close together (⅛ inch or less). This means less grout to clean, and that you can use *unsanded grout*, a denser grout mix that makes it harder for mold to take hold.
- Use a water-based grout sealer, and latex-modified grouts.
- Squeegee tiles after each shower.
- Keep shampoos and other bottles in a caddy or in freely draining wall shelves, rather than the tub ledge, so surfaces have a chance to dry.
- Install a timer of your bathroom fan. The Home Ventilating Institute (HVI) recommends that the fan be left on for 20 minutes after use of the bathroom. For additional information on bathroom ventilation, see www.hvi.org.

wall tile

In general, tile is considered an environmentally preferable choice, due to its durability and natural material origins. See "Flooring", page 10, for more information on tile. Look for locally produced designs. What's more, locally owned tile shops tend to carry a larger selection of regional manufacturers than you'll find in national chain home improvement stores. The cost of tile varies dramatically depending on material, quality, and complexity of the installed design. Research these costs along with other product attributes.



wall tile options

MATERIAL	DESCRIPTION	SELECTION TIPS
Ceramic 	■ made of various clays, mined from the earth and fired at high temperatures ■ usually glazed for additional protection and ease of cleaning ■ ceramic glazes often contain lead and other toxic heavy metals; today most toxins are excluded from tile glazes in the United States, but some other countries have yet to follow suit	■ consider regionally manufactured ceramic tiles, many available with up to 70% recycled content ■ tiles incorporating recycled glass not only support recycling, but last longer ■ research imported tiles as quality varies greatly; however, little information is usually available on production practices or whether glazes are lead-free ■ choose sealers free of formaldehyde and low in *volatile organic compounds* (VOCs)
Glass 	■ date back to Roman times; surviving mosaics from this period attest to their incredible durability ■ mosaic tiles (small, often 1/4"- 1" square) are usually cut from sheets of glass; larger glass tiles are often cast (either poured while glass is hot or made by placing ground glass in a mold and heating until fused)	■ look for regional manufacturers and 100% recycled content ■ recycled glass tiles manufactured using a *sintering* process (heated to the point of fusing rather than full melt) use less energy in production ■ larger glass tiles are usually irregular in shape, requiring wider grout lines and sanded grout ■ water-based grout sealers help keep grout surfaces easy to clean ■ avoid sealers with formaldehyde and other toxic substances usually added to inhibit mold growth
Terrazzo & Concrete 	■ traditional *terrazzo* embeds chips of marble in cement, with a smooth ground surface revealing the chip pattern ■ in some products, cement binder is replaced with a synthetic resin ■ commonly poured in place for floors; also available in tiles for wall applications	■ look for non-toxic sealers ■ the thickness of tiles can pose installation challenges ■ residential application is less common than commercial, so may be difficult to find an experienced residential contractor ■ look for options with recycled content, including recycled glass, *fly ash* (a by-product of coal burning), or reclaimed carpet fiber (which increases the strength of the tile)
Stone 	■ cut and honed marble, granite, and slate are common choices ■ durable but may require more maintenance than ceramic or glass tile ■ many stones like marble and granite require periodic sealing to withstand moisture and staining ■ quarried around the world; difficult to assess environmental impact	■ create a one-of-a-kind shower with salvaged stone or remnants from fabricators ■ cut stones allow for narrow grout lines and unsanded grout; tumbled stone often requires wider grout lines which increases maintenance ■ choose stone that does not require a sealant, or use a non-toxic version ■ look for vintage slate at building salvage companies ■ select regional sources, if purchasing new stone

For extensive information on paint selection and use, see the Chicago Green Home Remodeling guide, Painting, available for download at www.cityofchicago.org/environment (click on Chicago Green Homes).

paints

Durability is key when painting. Often, paint failures are a symptom of an underlying problem, commonly moisture issues (a special concern in bathrooms) or improper surface preparation. If walls or ceilings suffer from peeling paint, identify the underlying problem before repainting to reduce the likelihood of recurrent failure. Then, find a paint that combines durability with low toxicity. For extensive information on paint selection and use, see the Chicago Green Home Remodeling guide, *Painting*, available for download at www.cityofchicago.org/environment (click on *Chicago Green Homes*).

caulking

Essential in areas where different materials meet, caulking joins tile to the tub or drain pan, shower corners, and some sinks. Proper caulk application in these areas can prevent serious moisture damage. Caulk comes in a variety of formulations, giving it a range of qualities. Many conventional formulations include very toxic substances, often in large enough quantities to result in nerve damage and other serious side effects if used without sufficient ventilation. Never use caulk specifically formulated for outdoor uses (such as *butyl rubber caulk* and oil-based *contractor's caulk*) inside the home—these hazardous substances can severely impact indoor air quality. Many caulks formulated for the bathroom contain fungicides and mold-inhibiting compounds. Balance the benefits of these additives against their risk to humans or the environment. Better still, avoid them altogether and look for non-toxic blends. In short, research before you buy.

At the very least, ask your retailer for the *Materials Safety Data Sheets* (MSDS) for the brands you are considering. A MSDS is an overview of a product's toxic characteristics, as well as use and handling cautions. Although produced for worker safety, they provide valuable information to the consumer, too. Whichever type of caulk you choose, purchase only the amount you need. Leftover caulk tends to dry out, wasting money and resources. The following is an overview of the most common caulk choices:

- Latex caulking is similar in makeup to latex paint, with added fillers and colorants. Generally, latex caulking is the least toxic caulking alternative, and cleans up with soap and water. However, it tends to be less durable than its more toxic counterparts.
- Acrylic caulking can also be cleaned up with water. Formulations range from all-acrylic to acrylic-latex blends. Resins and solvents make these products more toxic than their all-latex counterparts. Given the variation in formulations of this type of caulk, it makes sense to read the label, and ask the retailer for the MSDS.
- Silicone caulks contain silicone resin and vinegar. In fact, the evaporating vinegar is what produces their distinctive smell. Once this caulk is dry, it is essentially inert, with excellent indoor air quality characteristics. However, the production process of silicone caulk creates hazardous waste and water pollution. Cleanup usually requires solvents, although misapplied caulk can often be left to dry and scraped off most surfaces with a razor blade. Silicone formulations for the bath usually contain toxic compounds intended to reduce mold and mildew growth.

bathtubs

If your current tub is in good condition, consider reusing it. If it dates from the period of your home's construction, the tub will help unify the bath remodel with the rest of the house. A little elbow grease and a *pumice stone* or an equal mix of table salt and vinegar with a nylon brush can remove stains and renew finishes. (Chlorine bleach products degrade porcelain finishes over time.) Removing an existing tub can be a major challenge or expense, often requiring stripping the walls above to the studs, or cutting a hole through an adjoining wall to remove it.

Bathtub Refinishing

It's possible to renew porcelain-finished cast iron tubs. This entails repairing any chips with a fiberglass filler, etching the surface with hydrofluoric acid or other bonding agent, then applying several coats of acrylic urethane enamel to the surface. The processes used by refinishing services are usually proprietary and it may be difficult to get information on the toxicity or health effects of the compounds used. Be sure to ask how the work area will be sealed off from the rest of your home and vented during the process, as well as how the refinisher treats the hazardous substances. Refinishing processes and products vary widely in quality—a true case of getting what you pay for. Look for long, comprehensive warranties (at least 10 years) and check references before selecting a refinishing firm.

Bathtub Replacement

If you're intent on a replacement tub, be sure to explore building salvage and architectural vintage retailers. Occasionally, you can find an old tub in mint condition for a fraction the cost of new. If you opt for new, consider cast iron or heavy gauge steel bathtubs with a porcelain finish. These can last 50 years or more. If you're a frequent tub user, one drawback of a steel or iron tub is heat loss. Carefully evaluate other tub choices: acrylic tubs, for example, are prone to scratching and short life spans, but retain heat better. A heavy object can chip a thin-gauge steel tub. Think carefully about jetted tubs. Make sure the tub will fit the space (including doorways leading to the bathroom), and that their use will justify the added expense. For those more likely to shower than soak, the money saved from eliminating a luxury tub can purchase other bath amenities. Also, small tubs take less water to fill, saving water.

Photo middle: Martha Rose Construction. Photo bottom: Prentiss Architects.

toilets

Older toilets can be huge water wasters, using as much as five gallons per flush (GPF), while new models are required to use 1.6 GPF or less. The GPF rating is often located on the toilet bowl, just behind the seat hinges. If your toilet was installed before 1994, you'll save water by replacing it with a new, efficient toilet. *High Efficiency Toilets (HET)* and *dual-flush* models save even more. HETs flush as little as 1.0 GPF, while dual flush models give the user the option between a full (1.6 gallon) or half (0.8 gallon) flush, depending on flushing needs.

Look for the new EPA Water Sense label that identifies water-saving fixtures, which are certified as meeting performance and efficiency standards in an independent testing laboratory. Visit the website at www.epa.gov/watersense/pp/index.htm to learn more.

A leaky toilet is common source of water waste. Common culprits include a water level set too high or a worn-out or improperly functioning toilet *flapper* (that rubber device inside the toilet tank that holds water until it's needed for flushing). Flappers are a low-cost replacement part available at hardware stores—pay the extra dollar or two for a quality flapper over the budget model. The lower quality plastics in the budget model mean you could be back in leaky toilet land sooner.

Toilets often have silent leaks (which can still easily waste $50 per year), making them very difficult to detect without the use of *dye tablets*. For more information about toilet repairs (and just about everything else you would ever want to know about toilets) see "Toiletology 101" at www.toiletology.com.

shower heads

Older shower heads can use 5 gallons of water per minute or more. New, low-cost designs save water and deliver plenty of shower power. Models are available that use 2 or even as little as 1½ gallons per minute (marked 2.0 or 1.5 GPM on the showerhead). Look for designs that deliver water in multiple individual streams rather than mist-like sprays–so water stays warmer, saving energy. Avoid *multi-head* shower heads; they waste water and energy. For extra water savings, consider installing a *shower head shutoff valve* (see image inset, photo bottom left). This handy little contraption fits between the shower arm and shower head, and features a button that reduces the shower stream to a trickle while the user soaps up. These are built into some low-flow shower heads. Also consider handheld shower heads, or shower heads installed on a vertical bar to allow for height adjustment. These provide greater versatility for users, plus make rinsing down the shower after cleaning a breeze. You may also consider a *chlorine filter* on your shower head. These devices remove chlorine from shower water, which otherwise can be inhaled and absorbed through the skin. The health effects of this exposure are debated, but many consider a chlorine filter a precautionary measure.

The Consumer Products Safety Commission estimates that 200,000 injuries occur per year in the United States from sudden changes in water temperature during baths and showers. Often, the elderly and children are most at risk. Anti-scald valves reduce the risk of this type of injury, and are now available in multiple styles to match any bath. Setting your water heater thermostat to no more than 120 degrees Fahrenheit reduces the risk of injury further, and reduces energy bills at the same time.

Photo bottom left: Environmental Home Center.

sinks

Like bathtubs, sinks make great reuse candidates, if they're in good condition and a style you like. If not, you can save money and resources by refinishing your existing sink (see Bathtubs on page 6 for details on refinishing) or looking for a vintage or salvaged model. When buying new, make classic design and durability a priority. Quality sinks should come with lifetime warranties. Common bath sink choices include:

- Enameled cast iron: Cast iron is a durable choice, handling scrubbing well. 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 bath. Cast iron is recyclable.

- Porcelain: This durable sink choice is made of high-fire clay with a glazed finish. Easy to clean and classic in appearance, porcelain is an enduring favorite. Porcelain sinks are also commonly available through used building materials retailers.

- Solid surface: 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 staining. Solid surface is resistant to scratching from scouring pads.

- Stainless steel: Designers often recommend thicker gauge steel, usually 18 or 16 gauge, but consumer tests found little difference in performance between gauges. A satin finish is better at hiding scratches, fingerprints and water spots than a polished finish. Quality stainless steel sinks are available at building salvage yards. Stainless steel can be recycled.

If you are planning on installing dual sinks, consider how much room you have. The National Kitchen and Bath Association recommends at least 30 inches of counter space between two bowls, measured from centerline to centerline; otherwise you'll be bumping elbows.

faucets

Look for faucets with the new EPA Water Sense label. These faucets use <1.5 gallons per minute (GPM) compared to >2 GPM for older models. Some use as little as 0.5 GPM. Remember that lever-handled or single-lever mixer handles are easier to operate than knobs or cross handles. Look for faucets that comply with Americans with Disabilities Act guidelines (marked *ADA Approved*). As a simple rule, the National Kitchen and Bath Association recommends selecting faucets that can be operated without having to grip and twist.

If you're reusing your existing faucet, see if it can be outfitted with a water-conserving *aerator*–a device that screws onto the end of the faucet to reduce flow, either by adding air to the stream or directing the flow into multiple small jets. Aerators that deliver water at rates as little as one gallon per minute are sufficient for most lavatory tasks.

Photo center: Nathan Kipnis Architects. Bottom right: Environmental Home Center.

flooring choices

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS	BENEFITS	DRAWBACKS
Tile 	$10-$100/sq.ft Made primarily from clays and talc combined with water, pressed or poured into forms, then fired in a kiln. Most are also glazed with a mixture of ground glass, metals or minerals. You can find 100% recycled glass tile, but it makes for a slippery surface. Wider grout lines can add traction but glass tile is generally better suited for accents, or walls, tubs or shower surrounds. Tips: Look for tiles with recycled content, such as waste glass, feldspar tailings, or reprocessed porcelain. Note that high-fire porcelain is more durable than low-fire clay tile. Consider locally manufactured tile. Make sure the tile you choose is meant for flooring applications. Proper preparation of the substrate (surface to which the tiles are applied) is critical. Most professionals suggest hand-applied mortar and galvanized reinforcing mesh for a base that will last as long as the tiles (and most likely, outlast your home). An alternative is cement board, applied to a sufficiently rigid subfloor.	exceptionally durable if of high quality and properly installed individual damaged tiles can be replaced	energy-intensive production requires careful surface preparation for lasting results cold and hard on feet
Concrete	$15-$20/sq.ft. Made from Portland cement, sand, stone and other fillers, concrete floors are applied by hand. Recycled materials such as glass can also be incorporated into the concrete mix. Tips: For lasting color, use non-toxic natural pigments mixed into the concrete or integral color rather than surface-applied stains. Many concrete sealers are toxic. Choose water-based products appropriate for the bath. Consider in-floor radiant heating when applying concrete in a bath situation. This energy-efficient heating method makes a concrete floor much more welcoming for bare feet. Consider replacing a portion of the cement used in the concrete mix with fly ash, a byproduct of coal-fired energy production. This reduces the environmental impact of this flooring choice, and makes for a more water-resistant concrete.	can incorporate recycled materials durable	extremely energy-intensive to produce (for every ton of cement produced, approximately one ton of greenhouse gases is released) porous; requires sealing and periodic treatments cold and hard on feet

flooring

The material underfoot is especially critical in bathrooms. Floors must tolerate constant moisture, standing water, frequent scrubbing and high traffic, plus clean easily. Because the demands are so great, effective flooring options are somewhat limited. The following table outlines some of the bath flooring options available.

Popular for its low purchase price, vinyl sheet flooring offers questionable durability and raises concerns over environmental and health safety, especially during manufacturing and disposal. Vinyl sheet flooring is essentially a thin layer of vinyl on top of a paper base. PVC (polyvinyl chloride, the plastic compound commonly called vinyl) is more than 50% chlorine by weight, and when burned, can produce both hydrochloric acid and dioxins.

Existing vinyl flooring can also pose hazards during remodeling. Vinyl sheet flooring manufactured before the mid-1980s may contain high levels of asbestos in its backing material, which is easily released into the air when the flooring is removed. Vinyl tiles from this era may also contain asbestos (especially the smaller 9" x 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 sheet vinyl backing, but they should not be sawn, drilled, or otherwise disturbed. If you suspect you may have asbestos-containing flooring, see "Asbestos in Your Home" at www.epa.gov/asbestos. Note that asbestos should not be thrown in the garbage. Instead, asbestos should be disposed of in a regulated landfill facility that accepts asbestos waste. See "Asbestos Management" at the Chicago Department of the Environment web site www.cityofchicago.org/environment. You may be able to avoid tearing out the first layer by using a synthetic floor leveling material, then installing the new material directly on top of the first. Consult manufacturer's instructions to ensure that this approach is compatible with your new flooring choice.

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS	BENEFITS	DRAWBACKS
Natural Linoleum 	$6-$10/sq. ft. Made from linseed oil, wood flour, pine resin, and pigments with a plant fiber backing, natural linoleum has been popular for kitchens and bathrooms for over a century. Currently manufactured in Europe, available in both sheets and tiles. Tips: Proper application requires a very smooth surface, as any imperfections in the substrate will likely show in the linoleum surface. On uneven surfaces, self-leveling floor fillers can help. Note that one manufacturer recommends against installing linoleum in the bathroom; be sure to consult with manufacturers for warranty requirements. Linoleum tiles and snap-together linoleum planks are considered do-it-yourself-friendly; however, professional installation is recommended with linoleum sheet.	made from natural, renewable products antibacterial and anti-static (repels dust) exceptionally durable appropriate for many architectural styles	one manufacturer recommends against installing linoleum in the bath
Stone 	$10-$150/sq. ft. Includes granite, marble and slate. Sources exist around the world. Environmental impact depends on quarrying and production practices as well as transport distance. Tips: Look to salvage yards for stone–at a fraction of the cost and environmental impact of new. Remnants are also often available from fabricators and stone yards. If buying new stone, look for local sources and local fabrication (some domestic stone is shipped overseas for processing). Use non-toxic water-based sealers and treatments.	durable and reusable	difficult to repair porous depending on finish; requires sealing and treatment heavy; may require subfloor reinforcement cold and hard on feet
Laminates 	$10-$20/sq. ft. Also called floating floor, systems usually consist of a thin pattern layer over a tongue-in-groove base of wood or wood fiber. These floors are either glued or snap-locked together, creating a single unit. Some brands contain adhesives and formaldehydes that can negatively affect indoor air quality. Tips: Look for versions with recycled content, especially in the wood base, which makes up the majority of the product. One brand is faced with natural linoleum, providing a much thicker wear layer than the other versions. Avoid products containing tropical hardwoods, such as lauan, which is currently being harvested beyond sustainable levels. Snap-lock models can be removed and reused. Not all laminates are up to the wet environment of the bath–make sure the brand you select is.	do-it-yourself-friendly inexpensive, especially if you install some brands are reusable or incorporate recycled material	cannot be refinished composite wood base vulnerable to moisture damage not readily recyclable, due to its composite nature

save energy

Put light where you want it with properly sized and positioned light fixtures. Reduce the need for supplemental light sources by using paler wall and ceiling colors to bounce light rather than absorb it. New fluorescent lighting has more natural color and instant-on technology, fortunately eliminating the flicker-flicker-on annoyance of years past. Want more natural light? Consider *light tubes*. Alternatives to skylights, they fit between roof joists to allow natural light into a bathroom without compromising privacy or reducing insulating power. Look for models that include light-dispersing lenses that spread daylight throughout the room. For excellent information on energy efficient lighting, see "Lighting" at "Keep Warm Illinois" (www.keepwarm.illinois.gov/documents/lighting.pdf) and Energy Star® (www.EnergyStar.gov).

Insulation and air sealing details are very important in the bathroom. Water and waste pipes require penetrations between heated and unheated areas such as crawl and attic spaces, resulting in heat loss and the introduction of moist or mold-laden air. Seal all plumbing and electrical openings leading into unheated space, and seal and insulate any exterior walls before a tub or tile is installed. Gaskets are available to cover the large hole created for bathtub drainpipes (hidden by the tub). These gaskets are applied from underneath the floor supporting the tub, and stapled to the subfloor. Any holes in the gasket created to allow drainpipes through should also be sealed. Insulation and air sealing is much cheaper and easier to accomplish during construction. Make sure your contractor is briefed and follows your sealing and insulation details. Take pictures of the walls before the drywall, shower or tub enclosures, or cement board is installed, to create a record of not only what's been insulated but the location of plumbing, electrical, and blocking for support bars.

Perhaps the simplest way to reduce energy use in a bathroom–and also minimize the risk of scalding–is to keep your water heater set at 120 degrees Fahrenheit. Also consider that a bath remodel offers a great opportunity to update an inefficient water heater. When planning the plumbing, try to minimize the distance hot water needs to travel from the heater to your bathroom by locating the shower as close to the heater as possible. Or, consider some of the new and innovative energy-saving technologies to heat water for the bathroom, including:

solar hot water

Solar thermal hot water systems provide hot water for all domestic needs. Usually configured as panels containing fluid filled tubes, they capture the sun's energy and use it to preheat your water heater's input. In the summer and on sunny days, they can provide enough hot water for all home needs, and then some. Solar thermal hot water systems generally have a much faster payback than solar electric systems. For additional information on solar energy systems, see Consumer's Guide to Energy Efficiency and Renewable Energy (www.eere.energy.gov/consumer).

- To find a solar thermal dealer in the Chicago area, check out the Illinois Solar Energy Association at www.illinoissolar.org, or the Midwest Renewable Energy Association at www.the-mrea.org
- For more information on finding certified installers of solar thermal systems in Illinois, visit the North American Board of Certified Energy Practitioners at www.nabcep.org.

heat recovery

Waste-water heat recovery captures the leftover heat that would otherwise escape down the shower drain and transfers it to the cold water entering the water heater. Heat is transferred while keeping the incoming and drain waters separate. By preheating the incoming water, the water heater doesn't need to work as hard, which saves energy. This system requires access below the shower or tub with enough space to install the unit (the shortest unit is 30 inches long). Be sure any equipment used meets Chicago code requirements, including a double-walled heat exchanger. See "Drain-Water Heat Recovery" at www.eere.energy.gov/consumer for more information.

hot water circulating

Hot water re-circulating systems use a pump to circulate cold water sitting in the hot water pipe back to the water heater, eliminating the need to run the tap until the water warms. They also reduce heat loss along the length of the pipe by quickly delivering it where it's needed. If you have one very remote location (perhaps the laundry area), an alternative would be to install a small point-of-use-water water heater. Look for versions specifically designed for existing plumbing systems, and systems that work *on demand*, when hot water is needed as constantly circulating systems waste energy.

laundry

Like the bath, laundry rooms must be durable and moisture-resistant. They can take many forms, ranging from an unfinished basement corner or multitasking bathroom closet to a specifically designated room. First, think of how you accomplish laundry-related tasks. A laundry area can often be a multitasking space, functioning as a mud room, sewing/craft/gift-wrapping center or storage area for tools and cleaning supplies. By designing flexibility into this space, you can keep a range of options open.

Cabinetry

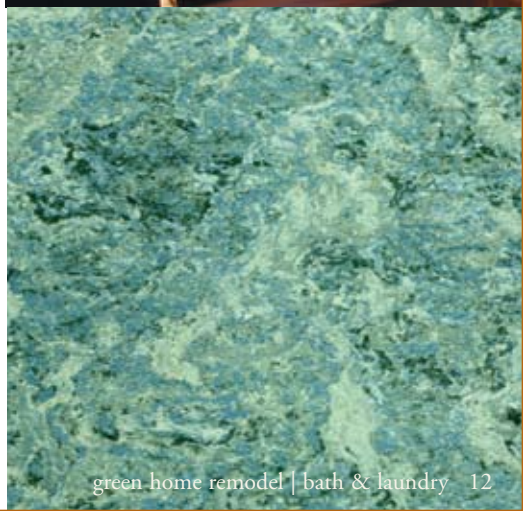
Get creative with storage in your laundry area. Consider what you need and whether open shelving or cabinets will work best. Salvaged items may be just the solution–old locker bays and gym baskets are often perfect for storing small items. Vintage fruit boxes can be reincarnated as eclectic laundry storage. If you choose to build new cabinets, look for Forest Stewardship Council (FSC) certified plywood, or strawboard products made from agricultural waste. FSC certification ensures wood has been harvested and processed in an environmentally and socially responsible manner. For details on the FSC program and help finding retailers that stock FSC products, see www.fscusorg. Strawboard products are available at specialty retailers of environmental building products, and occasionally at standard home improvement centers.

Laundry Sinks

The laundry sink makes a perfect candidate for salvage. Vintage cast iron utility sinks are relatively common, and will last as long as your home. A salvaged mop sink placed on the floor with a rod above is great for drip-drying clothes, rinsing off work boots or even the family dog. Of course, you can use it to rinse mops, too.

Flooring

Flooring choices that work for the bathroom function equally well in the laundry area. Due to its incredible durability, natural linoleum is an excellent choice. Refer to the Flooring Choices table on pages 9-10 of this guide for details.



washers and dryers

Washers

Conventional clothes washers use tremendous amounts of water and energy. An efficient washer can save you up to $110 per year compared to an inefficient model. Even new models vary widely in their efficiency, so choose carefully. Find the most efficient models on the list of WashWise approved machines at www.savingwater.org (click on *Conserve Inside*, then *In the Laundry Room*). The Modified Energy Factor (MEF) may also be used to compare models of clothes washers. MEF measures the energy used during the washing process, including machine energy, water heating energy, and dryer energy–the higher the MEF, the more efficient the clothes washer. Additional information may also be found at www.EnergyStar.gov.

Many of the most efficient clothes washers are *front-loading* models. Compared to a conventional washing machine, the drum is placed on its side, and clothes are tumbled through water that partly fills the drum. This configuration not only saves water and energy, it is easier on your clothes, uses less detergent, and since front-loaders have a faster spin cycle, clothes take less time to dry.

Look for the Energy Star® label when shopping for a new washing machine. Energy Star® qualified clothes washers clean clothes using 50% less energy than standard washers. In addition, most full-sized Energy Star® qualified washers use 18 to 25 gallons of water per load, compared to the 40 gallons used by a standard machine. To find manufacturers of Energy Star® clothes washers, see "Clothes Washers" at www.Energy Star.gov.

Dryers

Since dryers aren't required to display *EnergyGuide* labels, it's difficult to compare efficiency among models. However, natural gas dryers are generally less costly to operate than electric dryers. Look for a moisture sensor and automatic shutoff control, rather than just a timer. To make your dryer use most effective:

- select the fastest spin cycle on your clothes washer (more water extracted from clothes in the washer means less work and energy use for the dryer);
- dry full loads, but don't over-fill;
- clean the lint filter after every load;
- run loads back-to-back so energy will go toward drying clothes, rather than heating up a cold dryer; and
- keep the gasket around the dryer door clean and free of lint so heat, moisture and combustion gases stay in the dryer, rather than in your laundry room.

Is your washer or dryer all dried up? Consider taking a water- or energy-waster out of commission completely by recycling it. See "Appliances" under "Recycle Your Stuff A-Z" at the Chicago Recycling Coalition (www.chicagorecycling.org) for information on appliance recycling.

Venting

Dryers must be vented to the outside. Plastic ducts are prone to punctures and are not fireproof. Choose a metal duct, preferably one with a smooth interior, and use the shortest, most direct route possible to vent it to the outdoors. Be sure to check your duct twice a year, cleaning it of accumulated lint and making sure the venting hasn't come loose in the wall cavity, attic or crawl space.

Three Cheers for the Clothesline

Chicago has 84 sunny days in a typical year (Miami, FL has 74). If you have the space and inclination, a clothesline (sometimes called a "solar clothes dryer") can save money and energy on those sunny days. In Chicago's dry winters, clothes can dry overnight on an indoor drying rack. A rack with a 4' x 4' footprint can dry an entire load of laundry. Available in many configurations, one is certain to work for your living situation. According to the book *Seven Wonders: Everyday Things for a Healthier Planet* by John Ryan (1999, Sierra Club Books), the average American clothes dryer is responsible for the release of *one ton* of carbon dioxide, the greenhouse gas, per year.

salvage & recycling

Remodeling projects can generate tremendous amounts of waste–or resources, depending on how materials are managed. Contractors can reduce waste through salvage and reuse, and maximize recycling, to keep useful materials out of the landfill. In 2006, the City of Chicago implemented a construction and demolition debris recycling program. Residential projects with four or more units that involve new construction or substantial rehabilitation must recycle 75% of all waste. (Since its inception, more than 431,528 tons (or 90% of the material generated) has been diverted from our landfills). This is a good goal for remodeling projects of any size. You can help make a difference by salvaging building materials, and recycling what's left over from your remodeling projects.

buy used

Conserve natural resources by creatively incorporating second-hand materials into your remodeling project. In the bath, vintage sinks, tubs, cabinetry, towel rails, and drawer pulls are easy to reuse. 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.

A word of caution: be sure that what you salvage is safe, efficient and meets building codes. Old paints often contain lead and antique fixtures can waste water. For help understanding code issues with reusing building materials in Chicago, see the Chicago Department of Buildings at www.cityofchicago.org/dcap.

salvage

Just as there are many elements available to incorporate into your project, there are places to take reusable materials from your current bath or laundry renovation project. Sinks, tubs, vanities, medicine cabinets and mirrors, wainscoting, lighting and plumbing fixtures, hooks, shelves, and towel bars are all readily reusable. 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.

Again, exercise caution when salvaging materials or doing any demolition work. For cautions about lead-based paint, asbestos, and other remodeling hazards, see "Addressing Indoor Environmental Concerns During Remodeling" at www.epa.gov/iaq/homes/hip-front.html.

recycle

Some of your materials may be in poor shape and unable to be reused. Many of these materials are recyclable. The City of Chicago has implemented a construction and demolition recycling program. Residential projects with four or more units that involve new construction or substantial rehabilitation must recycle 75% of all waste.

For additional information, see "Construction Best Management Practices" at the Chicago Department of Buildings (www.cityofchicago.org/dcap)

Photo left: The ReStore.

case study

The remodeling project pictured here belongs to homeowner Gena Cielak, who transformed her 1970s bathroom into a 1920s-inspired design. While keeping with the period in which the house was built, Gena was able to incorporate modern, environmentally friendly, energy-saving materials and appliances simultaneously. The result? Simple elegance and great cost savings.

Ceramic Tiles Set the Tone for Beauty and Endurance

Gena chose white ceramic "subway" tile, commonly used during the early 20th century for the restoration. Ceramic is a natural material (as is porcelain, marble and granite) that provides beauty and durability while being easy to clean and maintain. Due to the material's hard surface, which deters bactierial growth and the capture of airborne allergens, ceramic tiles also contribute to a higher standard of air quality.

Water-saving Fixtures

Careful attention was paid to installing devices that would conserve water in the bathroom. Gena chose to install a low flush toilet that reduces her water consumption by half. A low-flow shower head and faucets, which significantly reduce the gallons of water used per minute, were also added.

Low-VOC Paint

Low-VOC (volatile organic compounds) were used throughout the bathroom. Low-VOC paints are particularly beneficial in small areas, such as bathrooms where limited natural ventilation and varying temperatures due to the use of hot water and heat make the reduction of chemicals in the air even more important for air quality.

Fluorescent Lighting

Fluorescent light bulbs as opposed to traditional incandescent bulbs were utilized in the light fixtures, providing both sufficient and attractive light while saving energy and money. Fluorescent light bulbs use a third of the electricity that incandescent bulbs do and last up to ten times longer. Although fluorescent bulbs used to be large and cumbersome, these bulbs are now being produced to fit in a variety of light fixtures.

With careful attention to both energy and beauty, this homeowner has created a bathroom whose looks and functionality will stand the test of time.

resources

Books

- *Green Remodeling: Changing the World One Room at a Time* by David Johnston and Kim Master (New Society Publishers, 2004). A good general introduction to green remodeling.
- *No-Regrets Remodeling* from Home Energy Magazine. Excellent reference for home remodels, focusing on energy savings. Available through www.homeenergy.org (click on *Home Energy Products*).
- *The New Natural House Book* by David Pearson (Fireside Publishers, 1998).

Websites

- For more information on Energy Star rated clothes washers, and other appliances, check out "Products" at www.EnergyStar.gov.
- For detailed information on toilet care and repair, or even toilet accessories, check out www.toiletology.com.
- Choose water-efficient products labeled through the EPA's Water Sense program. Visit http://www.epa.gov/watersense.
- To learn more about the construction and demolition debris recycling, visit www.cityofchicago.org/environment.
- Visit the Historic Chicago Bungalow website at *www.chicagobungalow.org* for rehab tips, product information, and loan and grant opportunities.

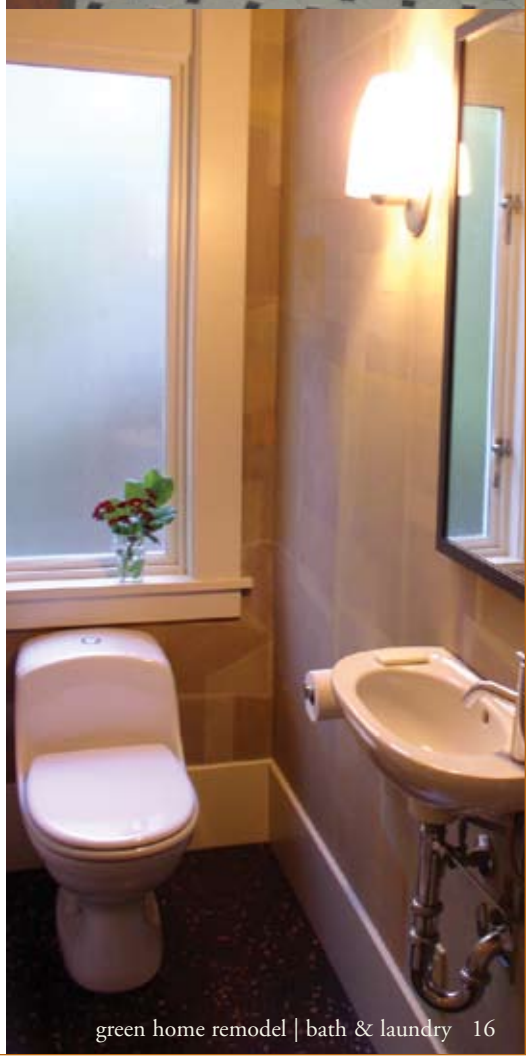
The Chicago Center for Green Technology

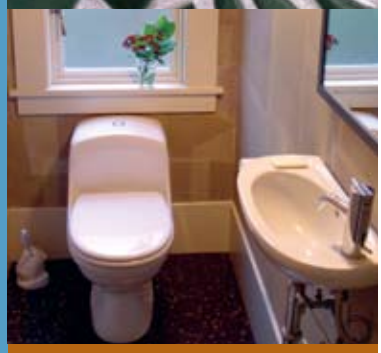
The Chicago Center for Green Technology (CCGT) is a great public resource for green remodelers, offering year-round educational programs and workshops on architecture, engineering, interior design, building construction and management, green business, and landscape design, many of them for free. CCGT also houses the Green Tech Resource Center, a library containing samples of environmentally-friendly building and design materials, in addition to books and periodicals including those referenced in the Chicago Green Remodeling Series. For more information and building hours, visit their web site at www.cityofchicago.org/environment/greentech or call (312) 746-9642. CCGT is located at 445 N. Sacramento Blvd. in Chicago.

Enroll in Chicago Green Homes

To take your home to an even higher level of environmental sustainability and energy efficiency, enroll in the City of Chicago's Green Homes Program. Chicago Green Homes is a flexible, voluntary, point-based certification system which encourages the use of environmentally-friendly building practices and materials. Choosing from a checklist of options and strategies, developers, builders and homeowners can earn points for their residential projects. Upon review and approval by the Chicago Department of Environment, a Chicago Green Homes Certificate will be issued with a 1, 2, or 3-star rating depending on the number of points attained. Participants will also be granted the use of the Chicago Green Homes logo, and their projects will be listed on the City's website.

To learn more about Chicago Green Homes or the Chicago Green Remodeling Series, visit the Chicago Department of Environment's website at www.cityofchicago.org/environment (See "Chicago Green Homes") or call (312) 744-7606.





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City of Chicago

Richard M. Daley, Mayor

Department of Environment
Department of Buildings
Department of Housing

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