

Kitchen

green home renovation healthy homes for a healthy environment





Green

What is a Green Home Renovation?

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 renovation 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: Graham Winterbottom Photography

Why

Why Consider a Green Renovation?

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 renovation 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 moulds, 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

Renovations are 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 renovation, so you can create a game plan that works for you.

A kitchen renovation can be complicated and expensive. According to the Appraisal Institute of Canada, if you renovate your kitchen as a facelift prior to selling it, you should spend no more than 10-15 per cent of the cost of your house. If you are going to remain in your house for more than five years, you can spend 25 per cent or more – and in most cases you will recoup the cost of the renovation when you sell. Cosmetic renovations can cost you anywhere from \$2,000 to \$3,000, while renovating your kitchen completely with low-end cabinetry, counters, appliances, flooring, paint, and some minor structural changes will likely cost upwards of \$10,000.00. 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 performance.



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Rethink Renovation

Green renovating requires a new approach to the renovation process, with more up-front planning and coordination to capture opportunities that are often missed in the conventional approach. This includes expanding your list of objectives as well as the way you compare the price of products and services, by taking wideangle 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 renovation 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 renovation project 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 renovation. You'll use fewer resources with less waste. So first, define your priorities and then consider all your options carefully.

Decide What You Want

Health	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?
Usefulness	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?
Efficiency	Are the appliances and fixtures energy- and water-efficient? Are they sized to match the jobs at hand?
Comfort & Beauty	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, colours or lighting?
Durability	Do the materials stand up to the tasks performed in a kitchen over time? Are they time-honoured classics or will they look dated in a few years?
Space	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.
Accessibility	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.
Ecological Benefit	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 renovation. Each decision regarding countertops, sinks and faucets, cabinetry, appliances, lighting, and flooring will help you create a green kitchen.

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-even environmental, health, or social costs not reflected on the price tag.

Incentives and loans may be available for specific features of your green renovation project, helping with initial investment costs. Be sure to check the incentives list provided by Metro Vancouver's BuildSmart program at www. metrovancouver.org/buildsmart. You may qualify for additional financing options from Vancity or CMHC. Check out Vancity's Bright Ideas program, which provides loan to cover the costs of energy efficient upgrades, and Canada Mortgage and housing Corporation's (CMHC) energy savings renovations and flexible mortgage loan insurance options.

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. 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 on the Web. You can cross reference your research with information from green building product directories like those available from Metro Vancouver's BuildSmart program and Light House Sustainable Building Centre (www.metrovancouver.org/buildsmart and www.sustainablebuildingcentre.com).

Renovate Safely

Select products to minimize the introduction of harmful fumes caused by paints, adhesives, sealers, formaldehyde-containing materials and more. Make your objectives for dust and fume containment, as well as cleanup 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 on indoor air quality in the home, see CMHC's Your Home and Your Health series at www.cmhc-schel.gc.ca

Also, make sure all work follows building codes and bylaws. Work that violates these codes or bylaws 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 noncompliant elements. It's likely the reason it doesn't comply is due to safety, health, or energy efficiency issues-all goals of a green renovation.

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 renovation activity down the road.

The US National Kitchen and Bath Association maintains an excellent list of design and safety guidelines at www.nkba.org/guidelines/bathroom.aspx while the BC Building Code includes a set of Adaptable Housing Standards found at www.housing.gov.bc.ca/building/adaptable_housing/summary.html.



If it's time to recycle your old refrigerator, select a service that removes the Ozone depleting CFC refrigerant before recycling. It's estimated 4 million pounds (1.8 million kilograms) of CFCs are released from disposed refridgerators each year. If you have a fridge that measures between 10-24 cubic feet (288-680 litres) and is still in working condition, BC Hydro will pick it up, recycle it, and give you \$30 for it. To find out more call 604 881 4357 or 1 866 516 4357 outside the Lower Mainland.



Appliances & Lighting

It's estimated that the average kitchen accounts for 20-40 per cent 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 label (more information available from Natural Resources Canada at oee.nrcan. gc.ca), and look for the ENERGY STAR label at your retailer. An ENERGY STAR label means that a product meets stringent energy requirements. Ovens and ranges are not included in the ENERGY STAR program. Given the inefficiency of these appliances (it's estimated only six per cent of the energy used to power an oven is actually absorbed by the food!) it makes sense to choose wisely.

Another money-saving trick is to size your appliances to your needs. 80 per cent of the energy used by a dishwasher goes toward water heating, the rest runs the motor and the fan. Compact dishwashers use less water and energy per wash, but if you have to use it more than once a day, it is likely more efficient to use a standard size. Dishwashers and refrigerators operate most efficiently when they're full – the dishwasher will use the same amount of water if it is half or completely full, and more items in a fridge help to keep the internal temperature cool. Do not position your dishwasher next to the refrigerator. The heat produced by the dishwasher will cause your refrigerator to work harder.

Also, the style of refrigerator can actually affect energy use. In general, models with the freezer on the top use up to 25 per cent less energy than comparable side-by-side refrigerator/freezer models.



Cabinetry

New cabinetry can be the most expensive component in a kitchen renovation. First, determine whether your cabinets need to be totally replaced, resurfaced, or simply repainted.

If space design is a concern, 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 fibreboard (MDF). Not only can it fall apart if wet, it often contains urea formaldehyde, which can emit irritating and unhealthy fumes after it's installed. Environment and health friendly alternatives include:

- Formaldehyde-free MDF made with exterior-grade resins for added durability.
- Agricultural fibre 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. For details on the FSC program see www.fsccanada.org, and for help finding retailers that stock FSC products, see MetroVancouver's BuildSmart product directory at www.metrovanoucver.org/buildsmart.

Kitchen Waste & Recycling

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

Prevent

Compost

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: CancerSmart Consumer Guide from Toxics Free Canada, www. toxicfreecanada.ca

series, www.cmhc-schl.gc.ca/ en/co/maho/yohoyohe/ inaiqu/index.cfm

The Washington Toxics Coalition, www.watoxics.org. Garburators add cost to a renovation, 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 undersink storage. For more on composting, see City Farmer's Step-By-Step Photo Guide to Worm Composting at www. cityfarmer.org. Backyard composters are available to City of Vancouver residents for \$25 each (see www.vancouver. ca for more information).

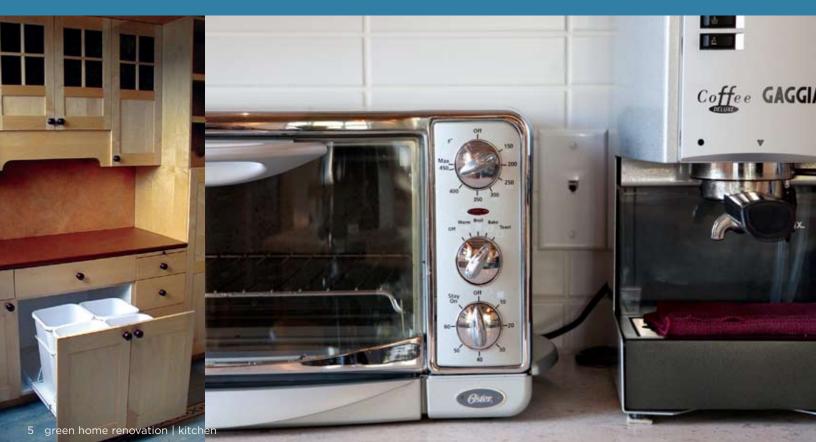
Recycle

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 blue box curbside recycling program by visiting the Metro Vancouver Recycles database at www. metrovancouver.com or call the Recycling Hotline at 604-732-9253. More information about recycling (Recycling Council of BC at rcbc.bc.ca).

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 vancouver.ca/ engsvcs/solidwaste/landfill/ alternative.htm to find where to take it. Of course, avoiding toxic products in the first place is by far the best option.

Photo left: Ecohaus. Photo right: Graham Winterbottom Photography





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 per cent 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

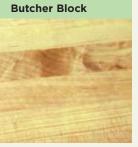
Concrete

Engineer

Laminate

Natural L

INSTALLED COST/DESCRIPTION/TIPS



Individual pieces of wood are bonded together to make a work

CONSIDERATIONS

• Made from natural, renewable material

re	and cutting surface. The environmental impact of wood products depends primarily on the way the material was grown, harvested and processed. Select wood certified by the Forest Stewardship Council (see www.fsccanada.org), reclaimed wood, or non-commercial regional species. Materials should meet US FDA requirements for food contact.	 Easy to sand out small nicks and scratches Not recommended near sinks or dishwashers as they are prone to water damage Hot cookware can scorch the surface Wood is porous; and will requires sealing and periodic treatment
	Made from Portland cement, sand, stone, and other fillers. It's also possible to incorporate recycled materials such as glass into the concrete mix - some local products contain up to 85 per cent recycled glass. Remember, cement production is energy intensive; approximately one tonne of greenhouse gases are released for every tonne of cement produced. Use non-toxic, natural pigments mixed into the concrete for integral colour rather than surface-applied stains.	 Can incorporate recycled materials Will tolerate hot cookware Porous and requires sealing and periodic treatments Heavy; and may require cabinet reinforcement. Many concrete sealers are toxic. Use products approved for eating surfaces such as food-grade mineral oil
ed Stone	Quartz crystals and ground quartz, pigments and polyester resin are combined and poured into a mould to create a dense slab resembling granite. The slab is then distributed to regional fabricators. Available in many colours. Look for regionally manufactured engineered stone, if available. Most is manufactured in Europe and shipping this heavy material long distances results in environmental impacts.	 Durable and very difficult to scratch, cut, or stain. Will tolerate hot cookware with no sealers or treatments needed Naturally hygienic Non renewable resource To avoid long distance shipping you should look for local fabricators
5	Layers of phenolic resin-soaked paper are cured under high pressure and finished with a decorative surface. Although laminates are non-toxic, the resin is made from phenol and formaldehyde, two toxic chemicals. 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 fibreboard (MDF) made with exterior-grade resins are good options.	 Hygienic Visible seams and nicks and scratches show Hot cookware can scorch the surface Substrate may be prone to water damage Request adhesives that contain no or low VOCs which are harmful to air quality
inoleum	Made from linseed oil, wood flour, pine resin, and pigments with a plant fibre 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. 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.	 Made from natural, renewable products Has anti-static qualities (repeling dust) Can provide an antibacterial surface As with other materials requiring a substrate, linoleum countertops can be prone to water damage Hot cookware can scorch the surface

MATERIAL	INSTALLED COST/DESCRIPTION/TIPS	CONSIDERATIONS
Natural Stone	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. 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.	 Durable Reusable Tolerates hot cookware well May prove difficult to repair and as it is porous Requires sealing and treatment Heavy; and may require cabinet reinforcement
Paper-resin Composite	Made from multiple layers of craft paper and resin bonded under low pressure into slabs. Some products use 50-100 per cent recycled paper and all can be fashioned with woodworking tools. 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.	 Small nicks and cuts with this type of composite can be sanded out Material is naturally hygienic There are several locally manufactured options for paper-resin composite Surface can stain or mottle, though some users like the effect Hot cookware can scorch the surface
Solid Surface	Solid surface materials are a mix of fillers and resins. The filler (at least 1/2 of the mix) is often a form of bauxite - the ore that produces aluminum – extraction and processing of which is associated with caustic soda contamination of water supplies, bauxite and alumina dust, and eco-system dislocation. Resins are either polyester or acrylic, both derived from oil and natural gas products. Acrylic resins are more resistant to damage from ultraviolet light (sunlight) than polyester. Materials should meet US FDA requirements for food contact.	 Can be easy to clean Small nicks and scratches can be sanded out Bauxite mining, extraction and manufacture are environmentally damaging processes Resins derived from natural gas contribute to pollution and depletion of scarce resources Surfaces are also prone to stains, cuts and scratches Hot cookware can scorch the surface
Stainless Steel	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 non-toxic (although there still is an issue with pollution caused by its production). Look for salvage at restaurant supply and metals surplus companies. Look for 18/10 stainless steel (18 per cent chromium and 10 per cent 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.	 Durable Hygienic Reusable and recyclable Tolerates hot cookware Extraction of the raw materials and smelting and manufacture are environmentally damaging processes Scratch prone Will show fingerprints
Tile	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. 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 0.3 cm (1/8 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.	 Do-it-yourself friendly Will tolerate hot cookware Individual tiles can be replaced Grout can stain Can harbour bacteria Surface can become uneven



Reduce the risk of scalding–and save energy–by using antiscald devices. Also, install or upgrade insulation on hot water pipes. This will reduce heat loss from water heater to point of use.

Faucets

Faucets should be efficient, durable and stylish. Kitchen faucets today must meet minimum standards for water efficiency, using no more than 8.3 litres/minute at 415 kPa (2.2 gallons per minute). The flow rate 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. 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.

Make choices carefully if considering a salvaged 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 lever handles (like those you see in doctors' offices) are both easier to clean and easier to use for people who have trouble gripping.

The City of Vancouver provides residents with Water Saver Kits that include an aerator to help your kitchen use 15 to 20 per cent less water. www.vancouver.ca

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. By letting the tap run cold before use, you can ensure your water will meet the Health Canada guidelines for metals. To avoid water wastage, use this water on your plants. To learn more about lead and other drinking water concerns, visit Health Canada at www.hc-sc.gc.ca. If you're installing a water filter at the sink, choose one with a biodegradable carbon filter.

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 harbour 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 mounted (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.



Sink Choices

MATERIAL	DESCRIPTION/TIPS
Enameled Cast Iron	Cast iron is a durable choice, handling heat and scrubbing well. Cast iron sinks are 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.
Enameled Steel	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.
Engineered Stone	Commonly made from quartz crystals and resins, these sinks are durable and available in a variety of colours. While engineered quartz countertops are usually more than 90 per cent quartz, quartz sinks are usually about 70 per cent, meaning they're a bit less durable than the countertops. Similar sinks made from granite and resins are also making headway, and are reputed to be even more durable than the quartz version.
Fire Clay	Similar in appearance to ceramic, these sinks are manufactured by pouring liquid clay into a mould, 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.
Solid Surface	Like solid surface countertops these sinks come in a variety of colours, 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.
Stainless Steel	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	DESCRIPTION	СОЅТ	CONSIDERATIONS
Concrete	Made from Portland cement, sand, stone and other fillers, concrete floors are applied by hand. For homes with a concrete slab foundation, a finish layer of concrete can be a hard wearing and beautiful solution. Cracks and stains are possibilities with concrete. Some people dislike such irregularities, while others enjoy the one- of-a-kind floor that results. Select natural, non-toxic pigments to colour concrete rather than surface stains. They're healthier, and will last the life of the floor, since the colour is integrated into to the material. Conventional sealers and paints for concrete floors can reduce 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 renovation is part of a larger project 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. Because of some of the difficulties associated with poured in place concrete, you may want to consider concrete tiles.	Poured in place concrete is expensive unless you are considering application to larger areas in your home. Prices for materials and installation start at \$25/ sq. ft. and you may need to consider structural issues or the installation of a membrane.	 Can incorporate recycled materials Durable Extremely energy intensive to produce (for every tonne of cement produced, approximately one tonne of greenhouse gases is released) Porous and it requires sealing and periodic treatments Can be cold and hard on feet.
Natural Linoleum	See the Countertops section for a description of natural linoleum. Available in both sheets and tiles, 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. Some manufacturers recommend against installing linoleum in high moisture areas; be sure to consult with manufacturers for warranty requirements. Linoleum tiles are naturally anti static and antibacterial and are considered do-it-yourself-friendly; professional installation is recommended with linoleum sheet.	Prices range from \$7.50/sq, ft. for 12" x 12" (30.5 x 30.5 cm) clickable tiles to \$3.90-\$6.70/sq. ft. for sheets of varying thickness.	 Made from natural, renewable products Can have antibacterial and antistatic (repels dust) properties Should be used with care
Cork	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.	Prices range from \$6-12/sq. ft. for 3/8" (10.8 mm) × 12" (30.5 cm) × 35 1/2" (90 cm) planks	 Primarily imported from Europe Look for factory- finished products, or seal with a low-toxic, low-VOC or plant- based wax sealer.
Bamboo	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.	Prices range from \$6-12/sq. ft.	 Look for low-VOC finishes Use caution when placing bamboo in areas of moisture Look for bamboo planks that are solid

MATERIAL

DESCRIPTION

Recycled Content Tile



Made primarily from clays and talc combined with water, pressed or poured into forms, then fired in a kiln, most tiles are glazed with a mixture of ground glass, metals or minerals. Ultra-durable, easy clean ceramic tiles are even greener when they contain recycled materials. Ceramic floor tiles are available with more than 50 per cent 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. 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.

соѕт

Prices range from \$7/ sq.ft. (for recycled porcelain) and go up to \$95/sq.ft. (for recycled glass mesh sheets). Installation of porcelain and ceramic tiles is straightforward and can work out to \$2-2.50/ sq. ft. for 12"x12" (30.5 x 30.5cm) tiles. Costs increase for complicated tiles or different shapes and sizes.

CONSIDERATIONS

•	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
- Can be cold and hard on feet

• Durable

• Reusable.

treatment

• Can be difficult to

repair and porous

depending on finish

• Requires sealing and

Salvaged Stone



This includes granite, marble and slate. Sources of stone exist around the world; environmental impact depends on quarrying and production practices as well as transport distance. Look to salvage yards for stone-at a fraction of the cost and environmental impact of new. 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 per cent over the cost of new stone, and reap environmental benefits. If buying new stone, look for local sources and local fabrication (some domestic stone is shipped overseas for processing). Seal stone with low-toxic, waterbased sealers. Stone floors, like concrete, are good candidates for in-floor heating. Select stone of uniform depth (gauged) to reduce trip hazard.

Prices range from under \$2/ sq. ft. for 12" x 12" (30.5 x 30.5 cm) slate tiles, through to \$3-12/ sq. ft. for granite.

 Is a heavy product which may require subfloor reinforcement
 Cold and hard on feet

Laminates



Also called floating floors, these systems usually consist of a thin pattern layer over a tongue-in-groove base of wood or wood fibre. These floors are either glued or snap-locked together, creating a single piece of flooring that floats above the subfloor, with the edges covered by moulding. Some brands contain adhesives and formaldehydes that can negatively affect indoor air quality. Unfortunately, most types of floating floor systems are of questionable durability and environmental benefit. Look for versions with recycled content, especially in the wood base, which makes up the majority of the product. Versions with bamboo and cork wear layers are also available. Avoid products containing tropical hardwoods, such as lauan, which is currently being harvested beyond sustainable levels. Snap-lock models can be removed and reused. You can expect to save half off the installed price above by installing this flooring yourself. Prices range around \$5/ sq. ft. for 12" x 12" (30.5 x 30.5 cm) tiles. • Do-it-yourselffriendly

- Inexpensive, especially if you install yourself
- Some brands are reusable or incorporate recycled material
- Cannot be refinished
 Composite wood
- base may be vulnerable to moisture damage
- Not readily recyclable, due to its composite nature





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.fsccanada.org for details on FSC.

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.

Construction Reuse & Recycling

In 2007, about 3.6 million tonnes of solid waste was generated in Metro Vancouver. Though 55 per cent of this is currently diverted from landfill, the Demolition, Construction and Landclearing sector still sends about 375,000 tonnes to landfill, much of which consists of wood waste that could be otherwise diverted. By salvaging building materials, and recycling as much as, we can reverse this trend.

Buy Used

Reduce costs and conserve natural resources by creatively incorporating second-hand materials into your renovation 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. See the salvaged building materials suppliers list maintained by Metro Vancouver's BuildSmart program at www.metrovancouver.org
- Classified ads. See the Building Materialssection of local newspapers or online boards such as Craigslist
- Be sure that what you salvage is safe, efficient and meets building codes. Old paints often contain lead, antique fixtures can waste water, and the pilot light and asbestos in that vintage gas stove could wreak havoc on your indoor air quality. Be sure to contact your local permitting agency for guidelines on using salvaged materials in the jurisdiction where you live.

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

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. See the hauling services directory maintained by Metro Vancouver's BuildSmart program at www.metrovancouver.org for businesses that may take your items. Consider giving away those materials not valuable enough for resale. The salvaged building materials suppliers list from Metro Vancouver can help you identify business that might take and resell your items. The Recycling Council of BC established a free province wide reuse and recycling service in 1985; the RCBC MEX program is a completely self-served web-based program comprised of Residential Reuses Programs and the BC Industrial Materials Exchange. Visit www.bc.reuses.com.

Again, exercise caution when salvaging materials or doing any demolition work. For cautions about lead-based paint, asbestos, and other renovation hazards, you may find the following resources useful:

- CMHC's Indoor Air Quality series, www.cmhc-schl.gc.ca/en/co/ maho/yohoyohe/inaiqu/index.cfm
- The Washington Toxics Coalition, www.watoxics.org

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Plan Ahead

Make sure your contractor has a construction waste management plan for your project. Have your contractor visit the Metro Vancouver BuildSmart website (www.metrovancouver. org/buildsmart) and download the Demolition, Land Clearing and Construction (DLC) Waste Management Toolkit at no cost.





Caulking

Proper caulk application 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 reduce indoor air quality. In short, research before you buy.

At the very least, ask your retailer for the Material 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. For more information on caulking options, see the accompanying guide for Green Bath & Laundry Renovations. For further assistance with selection of environmentally friendly building materials, see CMHC's 'Building Materials for the Environmentally Hypersensitive', available to purchase from www.cmhc.ca.

Choosing a Professional

The Greater Vancouver Home Builders' Association (GVHBA) runs the RenoMark program to distinguish renovators who have raised the bar by meeting the program criteria.

Light House Sustainable Building Centre maintains a database of green professionals - visit their website for more information. www.sustainablebuildingcentre.com

Make sure your contractor has a construction waste management plan for your project. Have your contractor visit the Metro Vancouver BuildSmart website (www. metrovancouver.org/buildsmart) and download the Demolition, Land Clearing and Construction (DLC) Waste Management Toolkit at no cost.



Neville Kitchen

Location: Vancouver

Contractor: TQ Construction

Project Objectives:

Compact Design

• a 'small footprint' ethic drove design decisions.

Energy & Water Efficiency

 aimed for high energy & water efficiency

Waste Management

 every item was considered for reuse or recycling



Case Study

This careful and innovative renovation enhanced the Neville family's treasured nook with a carefully crafted green kitchen. The goals for the project included preserving the family history associated with their home and retaining valued features while undertaking much needed updates. Care was given to understanding the kitchen's functionality and best utilization of the existing floor plan.

The resulting thoughtful layout accommodates multiple functions such as preparing meals and entertaining visitors, while accommodating privacy and traffic flow with the use of an angled peninsula and shoji screen divider. The design also affords the family the option of aging-in-place adaptability.

Material Selection

- In-built sink and countertops were chosen for durability and re-usability
- Cherry cabinet doors are adorned with beach rock handles made locally
- Cascading backsplash is handmade of landscape rocks
- No- and low-VOC materials were selected for the cabinetry, paints and finishes

Waste Reduction

- Everything was considered for reuse or recycling
- Built-in composting and recycling bins

Energy Efficiency

- ENERGY STAR appliances
- High efficient hydronic in-floor heating
- LED and Compact Fluorescent lighting
- Solar Photo Voltaic electrical supply
- Dishwasher features and low flow taps conserve water
- New pair of energy efficient windows

Resources

Design

- The US Green Building Council and the American Society of Interior Designers have a resource called the REGREEN Residential Remodeling Guidelines (www.regreenprogram. org). These guidelines, rather than a checklist rating program, were created to address the unique aspects of residential renovations, such as the varying range of projects, the existing conditions, the custom nature of the work and the occupant's needs.
- The US National Kitchen and Bath Association maintains an excellent list of design and safety guidelines at www. nkba.org/guidelines/bathroom.aspx while the BC Building Code includes a set of Adaptable Housing Standards found at www.housing.gov.bc.ca/building/adaptable_housing/ summary.html.
- CMHC has a series of renovation fact sheets that can help you plan your project. You can download these at www. cmhc-schl.gc.ca/en/co/renoho/refash/.
- For tips on harnessing the natural power of the sun for heating and cooling, see the City of Vancouver's Passive Design Toolkit for Homes downloadable at vancouver.ca/ sustainability/building_green.htm.

Toxics

- CancerSmart Consumer Guide from Toxics Free Canada, www.toxicfreecanada.ca
- CMHC's Indoor Air Quality series, www.cmhc-schl.gc.ca/en/ co/maho/yohoyohe/inaiqu/index.cfm
- CMHC's 'Building Materials for the Environmentally Hypersensitive', available to purchase from www.cmhc.ca
- The Washington Toxics Coalition, www.watoxics.org

Material Selection

- For details on the Forest Stewardship Council program and certification see www.fsccanada.org.
- Fordetails on the merits of various green building products and where you can purchase them locally, see MetroVancouver's BuildSmart product directory at www.metrovanoucver.org/ buildsmart, as well as Light House Sustainable Building Centre at www.sustainablebuildingcentre.com.

Incentives & Funding

- For a comprehensive list of incentives available, visit the Metro Vancouver BuildSmart website at www.metrovancouver.org/ buildsmart. Incentives and funding are available from:
- BC Hydro www.bchydro.com
- Solar BC www.solarbc.ca
- Terasen www.terasen.com
- CMHC www.cmhc.ca
- Vancity www.vancity.com
- Federal Eco Action program oee.nrcan.gc.ca

Waste

- Metro Vancouver provides a directory of recycling and salvage businesses at www.metrovancouver.org/ Metrovancouverrecycles. There is also more information about recycling available from the Recycling Council of BC at rcbc.bc.ca.
- Material Exchange RCBC's MEX program is a completely self-served web-based program comprised of Residential Reuses Programs and the BC Industrial Materials Exchange. Visit www.bc.reuses.com.
- If you have to dispose of asbestos containing materials, review the City of Vancouver's Asbestos Policy for guidelines on proper disposal at vancouver.ca/ENGSVCS/solidwaste/landfill/asbestos.htm.
- BC Paint Exchange. Groups and individuals who wish to obtain leftover paint should call the BC Recycling Hotline at 1-800-667-4321. This program is run by Product Care, a not-for-profit industry association which manages product stewardship programs for household hazardous and special waste on behalf of its members across Canada www. productcare.org.

Water Efficiency

- Select toilets that have been tested by the Canadian Standards Association or an equivalent lab – a list of high-performing toilets can be found in the CMHC study 'Maximum Performance Testing of Popular Water-Efficient Toilet Models', available at www.cwwa.ca.
- CMHC's 'Household Guide to Water Efficiency' available for download at www.cmhc.ca for more information on detecting and fixing leaks.
- The City of Vancouver provides residents with Water Saving Kits that can help your bathroom use 15 to 20 per cent less water. www.vancouver.ca.

Energy: Appliances and Fixtures

• For further details on the ENERGY STAR and EnerGuide labelling programs and energy efficiency of household appliances, visit Natural Resources Canada, oee.nrcan.gc.ca (click on Residential).





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vancouver.ca/sustainability



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