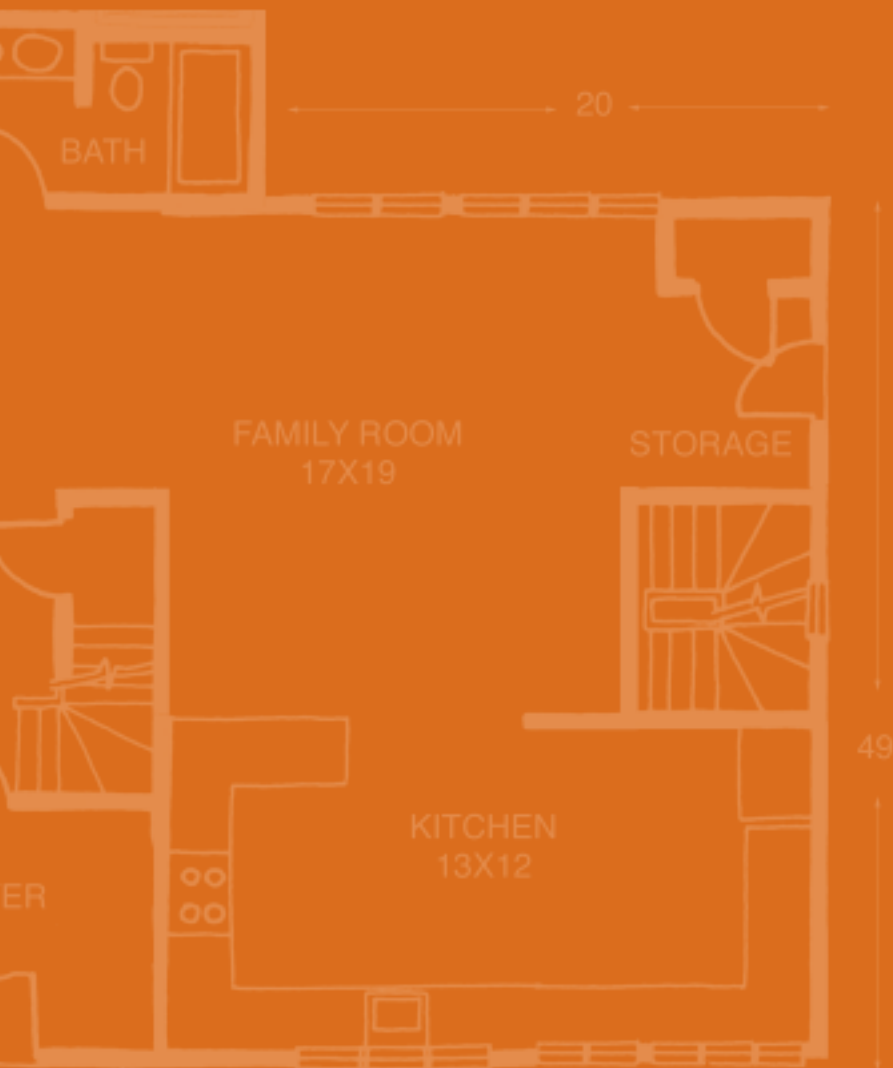




BUILDING GREEN WITHOUT GOING IN THE RED

A Household Guide to Healthy,
Affordable Building Materials



ACKNOWLEDGEMENTS

Written by:

Kathleen Curtis and Roberta Chase

Research and assistance by:

Jennifer Barnes, Michael Schade,
Amy Liberatore and Prateek Kumar

Reviewed by:

Paul F. Bogart
National Campaigns Coordinator
Healthy Building Network

Matthew Cacho
Northwest Coordinator
Healthy Building Network

James Curtis
Civil Engineer
NYS Department of Transportation

Graham Davis
Technical Advisor
Habitat for Humanity International

Kathy Fisher
Owner
Applied GIS

Robin Guenther, AIA
Principal
Guenther 5 Architects

Laura Haight
Senior Environmental Associate
NY Public Interest Research Group

Bruce M. Hampton, AIA, LEED
Principal
Elton + Hampton Architects

Tom Lent
Health and Materials Development Coordinator
Healthy Building Network

Steve Longo
Owner
Longo Construction and Remodeling Company

Dave Phillips
Design Engineer
Amphenol Aerospace

Judith Robinson
Special Projects Director
Environmental Health Fund

Dean E. Whalen, AIA
Senior Associate
Collins + Scoville Architects, P.C.

Graphic Design by Patt Kelly Design

Printed by Kendall Press on recycled stock

TABLE OF CONTENTS

WHY BUILD GREEN?	3
WHAT'S WRONG WITH CONVENTIONAL PRODUCTS?	5
TOP 15 NO- OR LOW-COST GREEN BUILDING STRATEGIES	8
BEFORE YOU START BUILDING...	10
FOUNDATIONS	12
THE FRAME OF THE HOUSE	13
WINDOWS	16
INSULATION AND ROOFING	18
SIDING, WIRING AND PLUMBING	20
FLOORING	22
WALLS CONSTRUCTION AND COVERING	24
HEATING AND COOLING	26
APPLIANCES AND FIXTURES	28
ALTERNATIVE HOUSES	30
RESOURCES	31

Citizens' Environmental Coalition is a statewide grassroots environmental organization working to eliminate pollution in New York State by empowering people.

For additional information about CEC, contact our offices:

Main Office
33 Central Avenue, Albany, NY 12210
518-462-5527 Fax: 518-465-8349

WNY Office
543 Franklin Street, Suite 2, Buffalo, NY 14202
716-885-6848 Fax: 716-885-6845

www.cectoxic.org

WHY BUILD GREEN?

GREEN BUILDING

The practice of 1) improving the efficiency with which buildings and their sites use energy, water and materials, and 2) reducing building impacts on human health and the environment through better siting, design, construction, operation, maintenance and removal – the complete building lifecycle.

— *The Office of the Federal Environmental Executive*

SUSTAINABLE DEVELOPMENT

That which “meets the needs of the present without compromising the ability of future generations to meet their own needs.”

— *The UN World Commission on Environment and Development*

BUILDING GREEN

Human beings are driven by a strong desire to make, to build, to construct. Many of us as children built forts out back, scavenging whatever building materials we could find, digging under the ground, building tree houses, constructing lean-to's, or cutting out windows in the box the refrigerator came in and drawing curtains and a picket fence on the cardboard. Some collapsed, some were washed away, but some endured for a surprisingly long time. They afforded us a respite from our parents, and provided us an entrée into pseudo adulthood. We decorated them lovingly, and some became a quite elaborate amalgam of the diverse contributions to their construction.

People spend 65% percent of their time in their homes. The built environment is often disregarded, because it is so familiar, yet it is where we live. That is why we created this guide, to improve your knowledge and decision-making ability to choose building materials that are safer for your family and more environmentally friendly while still being cost-effective. When we do this, we not only protect ourselves and our families, we also protect the larger environment as a whole, since many toxic building materials threaten the environment and our health at several points from manufacture to use to demolition – what is called their “lifecycle.”

We conducted an informal survey to determine the focus and value this guide would have. Many who responded were organizational members, attendees at grassroots events, or others who were somewhat versed in environmental issues.

Among survey respondents, an overwhelming majority realized building materials had serious environmental health impacts. However, the numbers dropped when it got down to specifics. For example, less than half of the respondents knew that PVC must be mixed with toxic chemicals such as lead and phthalates in order to have the necessary properties, such as rigidity or flexibility. Roughly 2/3 of respondents generally knew there were available, affordable, safer products, such as paints that release little or no harmful fumes and recycled deck material that isn't treated with arsenic or chromium. But less than half knew that linoleum was different than vinyl, drywall was available made from recycled gypsum, or that carpets are tested and rated for their impacts on indoor air quality.

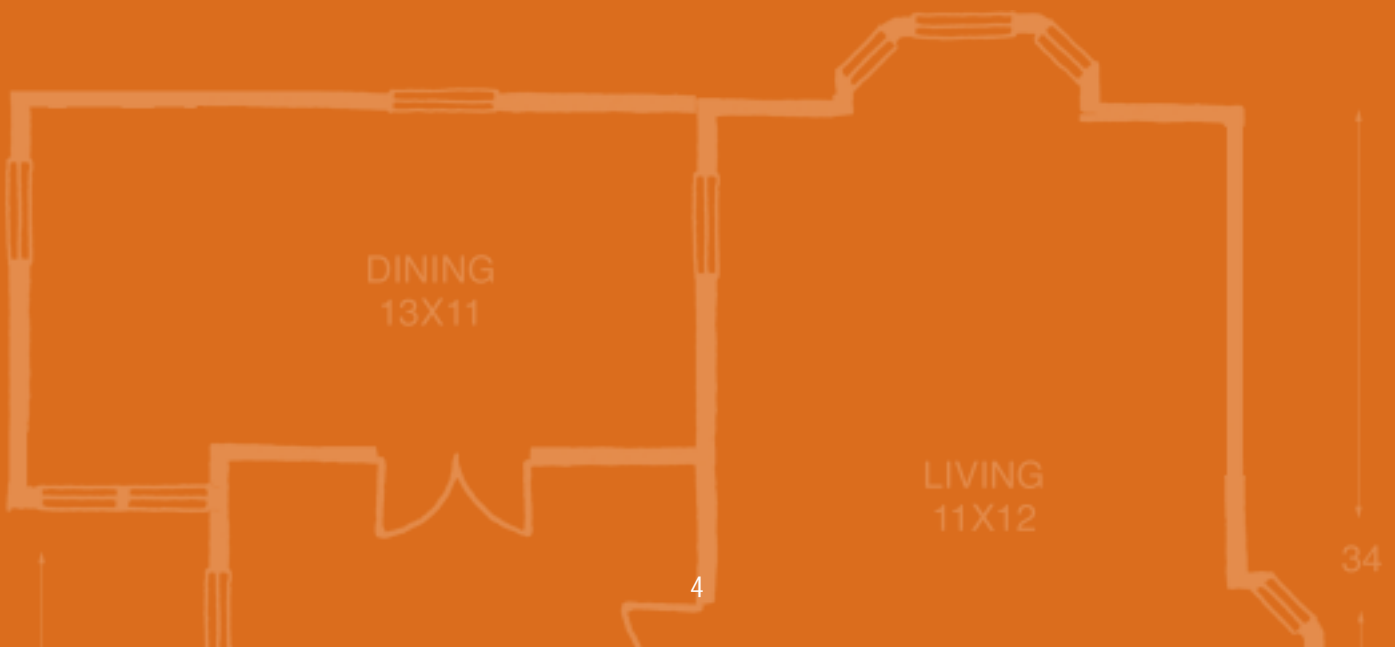


In response to the question of how important are cleaner, safer building materials on a scale of one to five, five being the most important, nearly 94% rated its importance as high to very high. Of all respondents, 98% replied that they would consider a guide to green building materials important in helping them select cleaner, safer products. The single topic respondents considered most valuable by far when selecting green building materials was non-toxicity. Other important topics, in order of priority, were energy efficiency, cost, recyclability, availability, and recycled content.

Of those who replied to the final, open ended question about what else they would find useful in an affordable green building materials guide, the most common response was some version of “Where do I get them?” Several subsets of that response showed up repeatedly, such as requests for specific contractors, brand names, other resources such as web sites, labeling (similar to the U.S. Department of Energy’s “Energy Star” program – www.energystar.gov), and specific retail outlets and their locations. Other responses expressed concern about where and how to dispose of waste, the challenge of recycling small amounts, and how to deal with toxic materials already in your house. One respondent urged us to use language the common person could understand. Another asked for deep alternatives, like straw bale houses and composting toilets (*see page 30*). Two respondents wanted to be more action-oriented, asking us to name politicians that support

green building initiatives, and those who don’t, and requesting incidences in which building material suppliers knew the harmful effects their materials caused, yet took no action to redress the problems.

This guide is meant to both empower and inspire you to compare building materials and make your own educated choices that affordably avoid PVC, formaldehyde, arsenic, chromium and other toxic chemicals. You can be part of creating a change in the cost, availability and selection of building materials on the market by choosing to buy healthy building materials for your next home improvement or construction project. In making better building material purchasing decisions, together we can cause a transformation in the overall selection, availability, and affordability of safer products. As more and more of us make these choices, we send a strong signal to manufacturers and distributors. As demand increases, manufacturers can take advantage of the “economy of scale,” or a reduction in cost per unit resulting from increased production, realized through operational efficiencies. Economies of scale can be accomplished because as production increases, the cost of producing each additional unit falls. Therefore, green building materials become less of a “gourmet” product, and more commonplace. Together we can hasten the day when it’s easy to get inexpensive, durable, sustainable building materials at every home improvement store and through every distributor.



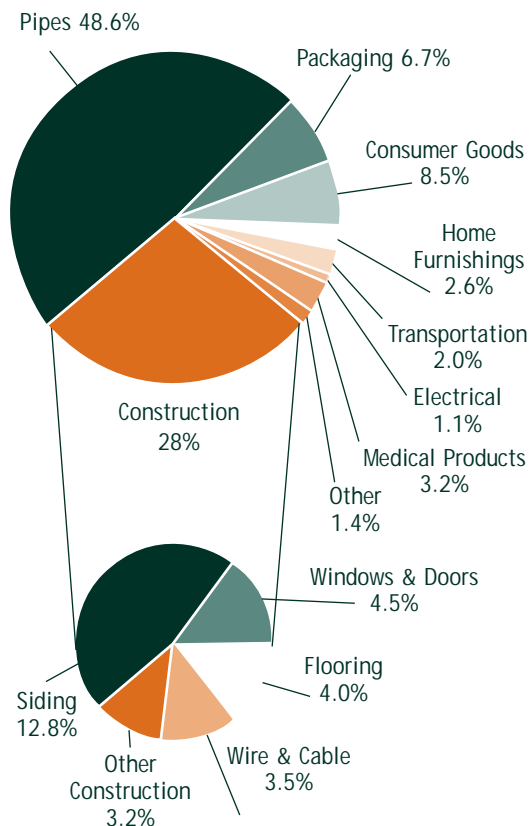
WHAT'S WRONG WITH CONVENTIONAL PRODUCTS?

Deforestation, toxic chemical pollution from production facilities, and incineration and landfilling of construction and demolition waste are just some of the problems our growing housing needs cause. Materials can also contribute to poor indoor air quality and cause health problems, because they contain toxic chemicals like phthalates, arsenic, and formaldehyde. The following are some examples of building materials that can leave a huge ecological footprint. Improvements over these worst-in-class materials are presented throughout the rest of this guide.

POLYVINYL CHLORIDE (PVC)

Polyvinyl chloride, also known as PVC or vinyl, pollutes throughout its entire lifecycle. The production, use, and disposal of this seemingly innocuous plastic exposes us to dioxin, vinyl chloride, phthalates, heavy metals and hydrochloric acid.

PVC USAGE IN THE U.S., 1996



Source: SRI International, 1997. "Chemical Economics Handbook Polyvinyl Chloride (PVC) Resins"

An estimated 75% of all PVC is used in building materials. Nearly half of all PVC is used in pipes, such as water mains, electrical conduits and waste-water pipes. The next largest use is for other construction materials such as siding, windows and doors, and roofing products.

PVC and Dioxin – The EPA considers dioxin to be one of the most dangerous chemicals ever created, due to the effects it can have at extremely low levels. It lasts a long time in the environment, builds up through the food chain to humans, and travels vast distances from where it is generated. Most human exposure to dioxin comes from consuming dioxin-contaminated foods like meat, eggs and milk. The largest material source of dioxin comes from the production and destruction of polyvinyl chloride.

PVC and Vinyl Chloride Monomer – Vinyl chloride (the basic building block of PVC) is one of the few chemicals that are classified as a known human carcinogen. There is no safe level of exposure to it. Many thousands of tons per year of vinyl chloride monomer are released into the environment, exposing workers and communities.

PVC and Phthalates – To make PVC products such as roofing, flooring, wall covering, and sheathing for wire and cable, plasticizers known as phthalates must be added in large quantities to make the PVC flexible. About 90% of all phthalates are used in PVC, to the tune of over 5 million tons per year. Phthalates are released when PVC is formulated, molded, used, disposed of, or accidentally burned.

The Department of Health and Human Services (DHHS) has determined that di(2-ethylhexyl) phthalate (DEHP), one such commonly used phthalate, may reasonably be anticipated to be a human carcinogen. The EPA has determined that DEHP is a probable human carcinogen. Phthalates are known carcinogens in laboratory animals. They are everywhere, and can cause infertility, testicular damage, reduced sperm count, abnormal testicular development and other reproductive damage. American phthalate exposure is now roughly equal to the EPA's maximum "acceptable" exposure. Phthalates in indoor air can trigger asthma attacks and other respiratory conditions.

PVC and Heavy Metals – In order to make PVC more rigid and sturdy, one must add metal stabilizers such as lead, cadmium and organotins. These metals do not break down in the environment, and are global pollutants. Lead damages developing brains, lowers IQ, and causes learning disabilities. Cadmium is a carcinogen. Organotins suppress our immune system and disrupt our endocrine system. All of these metals are released from PVC during formulation, use, and disposal.

PVC and Hydrochloric Acid – PVC poses a great risk in backyard burning, waste incineration and house fires. In addition to releasing dioxin, it releases lethal gases, such as hydrogen chloride, which becomes hydrochloric acid when inhaled, long before the PVC ignites. This hydrogen chloride gas poses the biggest threat to firefighters, occupants and neighbors in the event of an accidental house fire. It can also contribute to acid rain.



PHOTO: Joseph Urbaszewski

ARSENIC TREATED WOOD

Chromated Copper Arsenate (CCA) consists of chromium VI (a bactericide), copper (a fungicide) and arsenic (an insecticide) and is the most common arsenic formulation used to treat wood in the United States. It is often sold under the trade name “Wolmanized” wood. Ammoniacal Copper Zinc Arsenate (ACZA) is a very similar arsenic formulation sold primarily on the West Coast as Chemonite.

Arsenic - Inorganic arsenic is a known carcinogen, linked to skin, bladder, liver and lung cancers. Human and animal data suggest that inorganic arsenic is also a reproductive hazard. Released arsenic can find its way into our bodies, the food chain, and groundwater.

Although the EPA is phasing out arsenic treated wood, it may still be in stores. When pulling out old decks, playgrounds and garden borders you are likely to find CCA treated wood. If you saw or sand arsenic-treated wood, you will probably inhale some of the sawdust. Similarly, if you burn arsenic-treated wood, you will inhale arsenic in the smoke. Burning CCA wood creates a highly toxic ash. One tablespoon of ash from a CCA wood fire contains a lethal dose of arsenic. This has serious implications for firefighters and clean-up operations. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

According to the Agency for Toxic Substances and Disease Registry (ATSDR), breathing inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of “pins and needles” in hands and feet.

Ingesting or breathing inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small “corns” or “warts” on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling.

Chromium VI - The World Health Organization, Department of Health and Human Services and EPA have all determined that chromium VI is a human carcinogen. Birth defects have been observed in animals exposed to chromium.

Chromium VI should not be confused with the essential nutrient chromium III, which helps the body use sugar, protein, and fat.

Breathing chromium VI can cause irritation to the nose ranging from runny nose, to nosebleeds, to ulcers and holes in the nasal septum. Ingesting chromium VI can cause stomach upsets and ulcers, convulsions, kidney and liver damage, and even death. Skin contact with certain chromium VI compounds can cause skin ulcers. Some people are extremely sensitive to chromium VI. Allergic

reactions consist of severe redness and swelling of the skin.

FORMALDEHYDE

Formaldehyde is found in many products used to build a house, such as glues and adhesives, lacquers, paper, plastics, interior plywood, floor finishes, veneered or laminated cabinets, and paneling. Some people are exposed to higher levels of formaldehyde if they live in a new mobile home, as formaldehyde is given off as a gas from the manufactured wood products used in these homes.

There is usually more formaldehyde present indoors than outdoors. Formaldehyde is released to the air you breath while using latex paint, plywood and particle board, as well as furniture and cabinets made from them. Fiberglass products, new carpets, and decorative laminates also give off formaldehyde.

Particle board is the major contributor of formaldehyde to the home environment. The culprit is the adhesive, urea formaldehyde, which can break down, releasing the formaldehyde into the air. Phenol formaldehyde (used in exterior panels) does not present such problems. Some particleboard is now manufactured with reduced total formaldehyde.

The Department of Health and Human Services (DHHS) has determined that formaldehyde is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) has determined that formaldehyde is probably carcinogenic to humans.

Formaldehyde has been linked to “sick building syndrome” where people living or working in a particular building develop symptoms and ailments that aren’t connected with a specific disease. Some people who are exposed to formaldehyde develop chemical sensitivities, which means they can suffer painful symptoms from very low levels of exposures to particular toxins – even at levels that otherwise healthy individuals might not notice.

INDOOR AIR QUALITY

Building a new home provides the opportunity for preventing indoor air problems. However, it can result in exposure to higher levels of indoor air contaminants if careful attention is not given to potential pollution sources and the air exchange rate.

There are many sources of indoor air pollution in any home. These include combustion sources such as oil, gas, kerosene, coal, and wood, building materials and furnishings as diverse as deteriorated, asbestos-containing insulation, carpet, and cabinetry or furniture made of certain pressed wood products. Building materials release pollutants more or less continuously, and high pollutant concentrations can remain in the air for long periods after installation, or redecorating activities such as use of paint strippers.

Adhesives associated with wall coverings, and the mold that may result when moisture is trapped behind PVC wall covering also contribute to poor indoor air quality. Finally, the cleaning and maintenance products you use may also contain toxic chemicals.

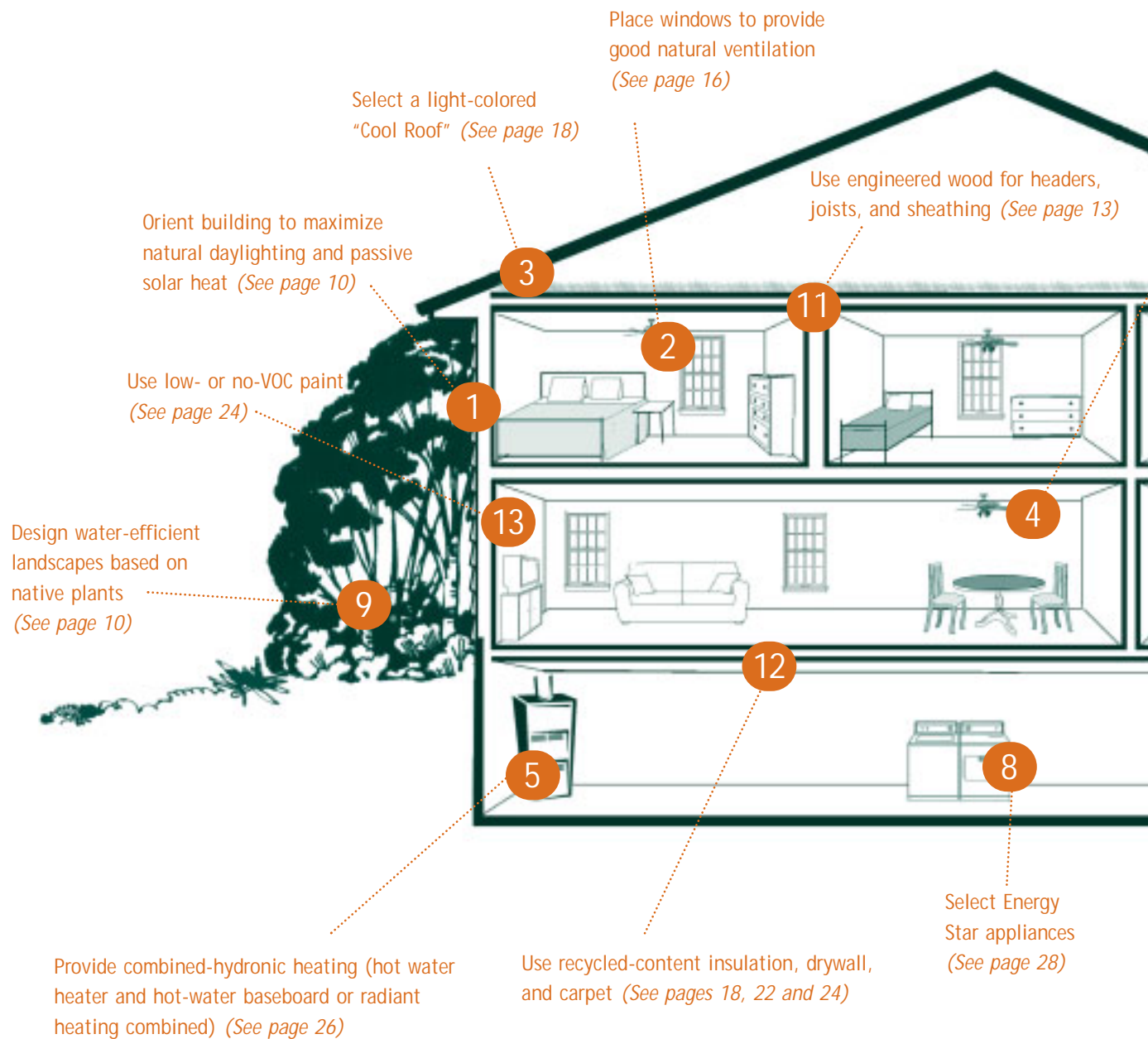
Express your concerns about indoor air quality to your architect or builder and enlist his or her cooperation in taking measures to provide good indoor air quality. Talk both about purchasing building materials, finishes and furnishings that are low-emitting and about providing an adequate amount of ventilation. Exercise care and caution in selection of wall finishes to minimize the risk of trapping moisture behind impermeable surfaces.

CONSTRUCTION & DEMOLITION DEBRIS

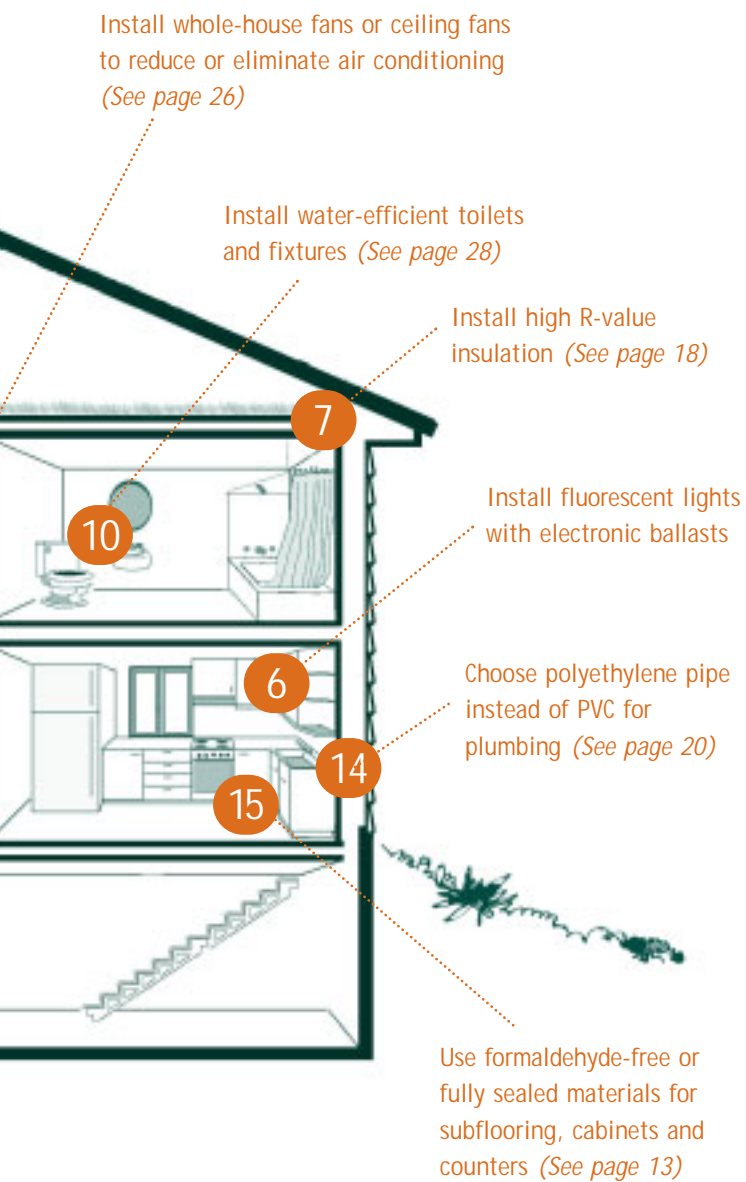
Construction and Demolition (C&D) debris consists of the waste generated during construction, renovation, and demolition projects. Covering a wide array of materials including wood, concrete, steel, brick, and gypsum, C&D debris is a large and complex waste stream. Reducing C&D debris conserves landfill space, reduces the environmental impact of producing new materials, and can reduce overall building project expenses through avoided purchase/disposal costs.

The most recent EPA study put the amount of C&D waste generated nationally at a staggering 136 million tons in 1996. In cities around the country, construction and demolition (C&D) debris—the waste produced in the course of constructing, renovating, and demolishing buildings—accounts for 10 percent to as much as 30 percent of the total municipal waste stream.

TOP 15 NO- OR LOW-COST GREEN BUILDING STRATEGIES



(Revised from *Global Green USA's TOP 20 No- or Low-Cost Green Building Strategies* at www.globalgreen.org/programs/20ways.html, with input from Bruce Hampton, AIA LEED, of Elt



Whether you are redecorating a room, renovating part of the house or building a new home, you can make choices that are not only inexpensive in the short-term, but lead to long-term benefits, like better indoor air quality, less water and energy consumption, and reduced utility costs.

The fifteen strategies listed here range from things you can do right now – such as purchasing a fluorescent light bulb to replace each incandescent bulb as they burn out – to long-term, large-scale projects, like designing a new house to take advantage of passive solar heat, daylighting and natural ventilation.

Throughout this guide, we present options that have a range of up-front costs, and offer a range of long-term benefits. Not all of these benefits are monetary. It's true that an energy-efficient refrigerator will reduce your electric bill, but choosing a slightly more expensive flooring option – like real linoleum over PVC – can help protect your family's health, something that's far more difficult to put a price tag on.

Whatever level of green building you choose to incorporate into your home, know that you're helping to support a market transformation that makes healthy, safer building materials more widely available and less expensive for everyone.

...TALK WITH YOUR DESIGNER

SITE DECISIONS

The choices you and your designer make in siting a new home or addition can save energy and money through passive solar heating, natural daylighting and adequate ventilation.

Take advantage of “passive solar” heating – using the sun’s energy coming through windows to heat the home, for example – properly orienting your home in respect to living area, window exposure and wall area, you can dramatically reduce heating and cooling loads. Check out the following for more information about passive solar designs:

- The Department of Energy's Fact Sheet: “Passive Solar Design for the Home” provides a basic overview. www.eere.energy.gov/erec/fact-sheets/passive_solar.html
- Affordable Passive Solar Homes by Richard Crowther, \$21. 49 low-cost designs for passive solar homes. 2400 Central Avenue, G-1, Boulder, CO 80301, 303-443-3130 ases@ases.org.
- The Northeast Sustainable Energy Association's passive solar principles and resource information. www.nesea.org/buildings/passive.html
- Southface Energy Institute. www.southface.org

“Daylighting” is really just the act of illuminating rooms naturally. Whenever you light a room with a window or skylight instead of flipping on a light switch, you are daylighting. It’s that simple. For interior rooms, or further from a roof (where a traditional skylight is impractical), you can use “sun pipes” that are skylights with reflective pipes that bounce light down to the interior room’s ceiling. This cuts down on use of electric lights during the day in dim parts of the house and can reduce heating costs, as electric lights can generate significant amounts of heat. Companies like Solatube (www.solatube.com/residential.php) make residential products. Home Tips.com (www.hometips.com/cs-protected/guides/daylight.html) has a good discussion about easy steps toward improving the amount of daylight in your home.

Good ventilation is critical to good indoor air quality. You need to strike a balance between an

energy-efficient house, which is often tightly sealed to prevent cold draughts, and good indoor air quality, which relies on frequent air exchanges, or replacement of indoor air with fresh air from outside. In older houses, this happens by accident – how many of us have been in homes with lots of draughts? Today, as there is greater emphasis on having the exterior tightly sealed, we need to be more thoughtful. When air is trapped inside the house, it can keep exposing you to pollutants and allergens. Fortunately, there are several options, the most effective being small energy efficient fans with a “heat exchanger” and air filter placed in the attic to both bring in fresh air and pull out stale air. The heat exchanger transfers heat from the warmer flow to the cooler flow, which can save heating costs in winter. The air filter removes allergens and particulates on the way in.

LANDSCAPING

Designing sustainable landscapes can decrease maintenance - watering, mowing, fertilizing and pesticide application, while conserving water, improving soil and increasing biodiversity. Consider gardens with perennial plants suitable to the climate and soil, and consider replacing turf grass and sod with native plants – a practice known as “xeriscaping”. Here are some websites to help you plan your lawn and garden:

- The Nature Conservancy's Eastern New York Chapter nature.org/wherework/northamerica/states/newyork/eastern/science/art4017.html
- The State University of New York's College of Environmental Science and Forestry. www.esf.edu/pubprog/brochure/landscap/landscap.htm

WATER RETENTION

Channeling rainwater through gutters and downspouts into an above ground cistern or below ground gravel dry well to use for landscape and garden irrigation keeps water runoff from overloading storm drains or increasing flooding, while providing a free source of water for lawns and gardens, making you less dependent on treated drinkable water when caring for your yard.

...TALK WITH YOUR CONTRACTOR

As construction begins, your contractor will make decisions about managing the site that can either help or harm the environment and affect costs. Be sure to talk with prospective contractors about using environmentally friendly approaches as many aren't familiar with them. By discussing this up front, you can ensure the job will be done the way you want it. Require your contractor to:

- 1) Incorporate reusable building materials into the construction or renovation project whenever possible. (See table below for Reuse Centers.)
- 2) Salvage reusable building materials from your renovation project, such as flooring, doors, windows, sinks, cabinets, and fixtures. Reuse Centers will accept donated materials, cutting disposal costs and conserving resources. Donations may be tax deductible. Check the Habitat for Humanity website to see if there is a "ReStore" in your area. www.habitat.org
- 3) Recycle the construction and demolition waste (including drywall, wood, metals, concrete, dirt and cardboard). This can conserve resources, and save limited land-fill space, as well as result in beautiful new products. For instance, Taylor Recycling in Montgomery, NY provides Construction & Demolition recycling in the Hudson Valley, and can be reached at 845-457-4021 or www.taylor-recycling.com. In Erie County, "C&D" debris can be recycled at drastically reduced costs through a County program. Call 716-858-6370 or go to www.erie.gov/environment/compliance/const_demo_drupal.asp to learn more.
- 4) If you have shrubs or trees that will be disturbed by the construction work, direct the contractor to temporarily set them aside, so they can be replanted safely when work is complete. This can save you from having to make additional plant purchases.

SOURCES FOR REUSABLE BUILDING MATERIALS IN NEW YORK STATE

Organization Name	City	Zip Code	Telephone
Association for Resource Conservation	Centerport	11721	613-580-7290
Building Preservation Works, LLC	Homer	13077	607-749-8889
ERC Community Warehouse, Inc.	Hoosick Falls	12090	518-686-7540
Habitat for Humanity of Westchester ReStore	New Rochelle	10801	914-829-7586
Historic Home Supply Corp	Troy	12180-380	518-266-0675
Hudson Valley Materials Exchange	New Windsor	12553	845-567-1445
Long Island City Business Development Corporation	Long Island	11101	718-786-5300
Mat-Ex Online Western/Central NY Materials Exchange www.mat-ex.org	21 Western/Central NY Counties		585-344-2580 x5464
NY WasteMatch	New York City	10007	212-442-5219
Significant Elements	Ithaca	14850	607-277-3450
Zaborski Emporium	Kingston	12401	914-338-6465

(from www.redo.org, www.mat-ex.org, and www.preservationworks.com)

Most homes today rely on the use of poured concrete. Houses built with natural building materials don't necessarily rely on poured concrete – *for more information about them, please see page 30.*

A contractor can take a number of steps to conserve resources when pouring your foundation:

- 1) Some forms are made from 2 x 10 sawn lumber cut from old growth forests. The contractor can eliminate the need for separate forms if you plan to insulate your foundation before backfilling to minimize heat loss (highly recommended). Use rigid foam as forms and leave them in place to serve as thermal insulation for the building.
- 2) If you don't plan to insulate, the contractor can buy metal forms that can be used over and over at multiple locations. These forms come in all shapes and sizes and produce a smooth finished surface on the concrete. Despite higher initial cost, they can be used many times, and pay for themselves after only a few builds.
- 3) Contractors can use reusable wood form boards. To minimize use of large sawn boards, carefully remove and separate the forms, allowing their reuse several times.

Some concrete is made with ash from incinerators or coal-fired power plants. Although these products are sometimes touted as good for the environment because it's a supposedly "beneficial use" of material that would otherwise require disposal in a hazardous waste landfill, this concrete contains heavy metals, which could leach out over time.

DAMP PROOFING

There are several key steps to keeping water from entering your house, which can lead to mold and rot. These involve both waterproofing -- keeping liquid water from being forced through small holes into your house -- and damp-proofing -- keeping water vapor from seeping through the foundation.

- 1) **Sealing the Foundation.** Typically this is done with tar (while not the best for the environment, it can help keep moisture out of your house).
- 2) **Drainage.** To keep liquid water away from the foundation, it is surrounded by a perforated pipe (commonly made from PVC) and gravel. The pipe is directed away from the house. Given PVC's toxic lifecycle (*see page 5*) and its tendency to get brittle over time, we recommend using polyethylene plastic pipe or clay pipe (*see page 20*). You can take an extra step to wrap the gravel and pipe in landscape fabric to keep silt and dirt from clogging the gravel.
- 3) **Landscaping.** By ensuring the ground slopes away from the house, by at least 5%, or 6 inches over the first 10 feet, you can help keep water from pooling by your foundation walls.
- 4) **Keep water away from the walls.** This can be done by having adequate overhangs on eaves and installing gutters and drainspouts that move rainwater away from the house.

SILL PLATE

The sill plate is the piece of wood that is placed on top of the foundation to anchor walls. Because it comes into contact with moisture, building codes require it to be pressure treated to resist rot and pests. Until recently, chromated copper arsenate was the common chemical compound (CCA) for treating lumber. However, due to the extremely harmful health effects of arsenic poisoning and exposure to chromium, CCA-treated lumber is no longer being produced, but may still be on the shelf at the local do-it-yourself store. (See page 6 for a description of these hazards.) Instead choose ACQ, (Alkaline Copper Quaternary) or CBA (Copper Boron Azole). Both ACQ and CBA require use of hot-dipped (not electro-plated) galvanized or stainless steel fasteners to prevent premature rusting. (See chart on page 15.)

FRAMING

The frame is built attached to the sill plate. In choosing wood for framing, look for sustainably logged products. Look for Forest Stewardship Council (FSC) certified lumber or consider engineered lumber. If you live in an area where “deconstruction firms” disassemble buildings, consider salvaged framing (see page 15). Many wood products are harvested unsustainably, tearing apart intact ecosystems and removing “old growth” trees – the large trees from forests that have never been logged. Companies often rely on old-growth wood for large beams, since most other forests now have smaller trees. We need to conserve old growth forests, for their biological diversity. Due to rapid growth in building construction, there is increasing pressure to log the few remaining stands of these ancient trees around the world.

CERTIFIED LUMBER

To make sure the wood used in your home was sustainably harvested, look for the Forest Stewardship Council's certification. They have a rigorous set of criteria for managing forest lands, which companies must demonstrate they meet in order to be certified. More information about the Forest Stewardship Council is available on-line at www.fscus.org. The Forest Stewardship Council is recognized by most conservation and forest sustainability groups, as well as the United States Green Building Council's

Leadership in Energy and Environmental Design (LEED) green building rating system. Using FSC lumber may add to lead time, as it can be more difficult to procure.

There are many different types of wood certification programs in use today. They have different standards for what they consider to be sustainable, and they are not all equally stringent about ensuring accurate “chain of custody” certification -- making sure the wood you buy is from the certified forest. In general, most environmental groups support FSC, as it is the most rigorous. The American Forest & Paper Association has developed its own program for its members, called the Sustainable Forestry Initiative (SFI). Much more lumber is SFI certified, but its program is not as stringent as FSC. Given the option, choose FSC lumber, as it offers the greatest certainty that you are buying lumber directly from a sustainably harvested forest.

RECLAIMED LUMBER

Rather than using newly-cut lumber, you may want to choose lumber from a building that has been “deconstructed” – taken apart carefully to allow reuse of the components, like brick, lumber, and siding. Many reclaimed pieces of lumber are high-quality, tightly grained pieces – often better quality than anything available on the market today. They can be more expensive than new lumber, and more difficult to find. If you have a renovation project that involves demolishing part of an older house, consider asking the contractor to carefully deconstruct that portion of the house and reuse the materials for the renovation project. This may cost more in labor, but it will save resources and landfill space and disposal costs.

ENGINEERED LUMBER

Most 2 x 10 and larger pieces of lumber come from old growth forests. As these resources have gotten scarcer (we have cut 95% of the old-growth forests in the United States), and thus the timber has gotten more expensive, people have sought engineered lumber. As a result, there are now many different products that get their strength from resins and glues, and rely on small bits of wood from smaller trees and wood from fast growing “plantation” trees to make them nail-able and screw-able.

These include:

- **glulams (wood that is glued and laminated together),**
- **laminated veneer lumber,**
- **wood I-joists (similar to steel I-beams, used to replace large timbers for floors and ceilings joists), and**
- **oriented strand board (OSB), using small bits of wood layered and glued together so the small piece grains layer in perpendicular directions, adding strength (for sheathing and sub-flooring),**
- **Finger-jointed studs (made from 2 x 4 scrap lumber).**

Engineered lumber uses smaller trees, reducing pressure on old-growth forests. Because humans created it, it is more reliable and consistent, and stronger than similarly sized all-wood timber. The benefits of this type of building material are that they use smaller trees, reducing pressure on old-growth forests, because they are created by humans, they are more reliable and consistent, and they are stronger than similarly sized all-wood timbers. Because it is manufactured, it requires more energy to produce, and the manufacturing process requires the use of some toxic materials (formaldehyde and methyl diphenyl diisocyanate) in the resins. *(See section on page 7 for details about the indoor air impacts and environmental impacts of these chemicals).* On balance, engineered lumber important stop-gap affordable substitutes for large-sized lumber, but for long-term ecological sustainability, we will need to find other solutions.

SHEATHING

Sheathing is the outside shell of the house, made in recent decades of plywood, but previously made of planks of lumber. Currently, there are two primary choices for sheathing: plywood and oriented strand board. Plywood is made of large thin panels of wood, each layer added with the grain oriented 90 degrees from the previous one, and glued together with formaldehyde-based glue. *(See page 7 for more details about the environmental and health problems formaldehyde poses.)* Oriented strand board (OSB) consists of smaller wood pieces

in layers at 90 degrees to one another (that's what they mean by "oriented") held together by glue made with formaldehyde or methyl diphenyl diisocyanate (MDI). OSB can be made from scraps of wood from other processes, while plywood is made from whole trees. Look for Forest Stewardship Council certified OSB or plywood. Home Depot (www.homedepot.com/HDUS/EN_US/corporate/corp_respon/wood_purchasing_policy.shtml) and Lowe's (www.lowes.com/woodpolicy) have both committed to purchasing FSC and otherwise certified lumber. However, not all sales associate aware of this, and labeling of these products is inconsistent. Look for the FSC logo stamped on plywood and other wood products. Another option for sheathing is homasote (www.homasote.com) made of recycled paper, and which, the manufacturer claims, was the sheathing of choice from the 1930s to the 1970s. As prices for wood products have gone up, homasote may be both the less expensive and more environmentally sound choice.



Look for the FSC logo stamped on plywood and other wood products.

SUBFLOORING

Subflooring is the first layer of material put down over the frame of the house to provide a base for the finished floor product, whether it is carpet, linoleum, ceramic tile, or wood. Modern subflooring is made from plywood, which can have a high content of formaldehyde, that can "off-gas" over time into the indoor air. To prevent exposures to formaldehyde from subflooring, purchase plywood with low or no formaldehyde. You can also use oriented strand board, if you prefer (it is usually less expensive), which may or may not have formaldehyde. If you choose plywood, use "exterior grade" plywood, normally glued with phenol formaldehyde which releases less formaldehyde than the urea type used for interior grade. Strawboard, made from post-harvest wheat straw, can be used under carpets. Homasote (www.homasote.com) manufactures a product that can be used for subflooring in some applications as well. Many finish floor materials have particular requirements for sub-floor stiffness and performance, which need to be considered. *(See the chart to the right for options.)*

HEALTHY OPTIONS FOR FRAMING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Sill Plate				
CBA (Copper Boron Azole) treated sill plate	Wolman, Wolman Natural Select www.naturalselect.com	PRO: Doesn't use arsenic. CON: Requires use of galvanized fasteners, since it is more corrosive than CCA.	Bellevue Builders www.bellevuebuilderssupply.com Curtis Lumber www.curtislumber.com 800-724-WOOD	\$7 - \$8 per board (2 x 6 x 12)
ACQ (Ammoniacal Copper Quaternary) treated sill plate	Chemical Specialties, ACQ Preserve, Preserve Plus www.treatedwood.com		Home Depot and Lowe's carry ACQ treated lumber. Or: www.treatedwood.com : click "where to buy," enter zip code. Choose Preserve and Preserve Plus	\$9 per board (2 x 6 x 12)
Lumber for Frame				
Glulams, laminated veneer lumber (LVL) and wood I-beams	Many manufacturers	PRO: Stronger and more consistent than solid wood because they're engineered. CON: Made with toxic glues that could off-gas into home, not as renewable as wood.	Special order from Home Depot or Lowe's.	Lumber prices vary widely based on the day, the type of lumber you want and where you're looking for it. Generally, all of these are cost-comparable.
Forestry Stewardship Council Certified Lumber	Adirondack Hardwood www.saranachollow.com/adkhdw.html , 518-293-8424	PRO: Comes from well managed forests. CON: More expensive, may have limited selection	Contact Adirondack Lumber see also www.fscus.org	
Reclaimed lumber	Recycle the Barn 610-286-5600	PRO: Lumber from dismantled barns and antique materials CON: Can be difficult to find, more costly.	Call Recycle the Barn	More expensive, but higher quality wood
Sheathing & Subflooring				
Strawboard made from wheat stalks	Dow Chemical Corporation www.dow-bioproducts.com 800-441-4369	PRO: Made from wheat stalks after harvesting, contains no formaldehyde. CON: Can be difficult to locate. May not be warranted for all types of uses.	Difficult to find. Contact Dow for local suppliers.	Cost-comparable to OSB and plywood
Homasote	Homasote www.homasote.com 800-257-9491	PRO: Made from post-consumer recycled newspaper in New Jersey. High water resistance. CON: Not appropriate for all types of flooring or siding applications.	Check your local lumber yard or go to www.homasote.com/where.html to find a dealer.	Cost-comparable to OSB and plywood
Certified OSB or Plywood	Various companies	PRO: Certified lumber means the wood is sustainably harvested according to certain organizational standards. CON: Lumber you purchase may or may not be certified. Labeling is inconsistent.	Lowe's sells certified plywood. 5.2 millimeter plywood for sheathing or subflooring is either FSC or CSP certified. Home Depot provides a list by geographic region of FSC certified products available.	

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

Windows provide light, heat and ventilation for houses. Many old wood-frame, single-pane windows did not seal well, leading to costly energy loss. Today, there are many choices for materials to use in windows. Unfortunately, one of the most popular materials, especially for “replacement” windows, is PVC, which relies on heavy metal additives to keep the PVC from breaking down rapidly. *(See page 5 for more details about the environmental and health problems PVC poses.)* PVC windows have been susceptible to excess expansion and shrinkage under temperature changes, causing leaks between frame and wall. Window pulls, locks and other hardware made from PVC often crack and break with normal residential usage. Many composite windows are part PVC and PVC jamb liners and other parts are included in many “non PVC” windows.

ENERGY EFFICIENCY

For energy efficiency, choose double paned windows, which insulate almost twice as well as single glazing. They can make the house quieter, less drafty, and more comfortable during all seasons, while saving energy and money. For an additional

10-15% in up-front cost, windows can be purchased that have low-emissivity (low-E) coatings on the glass and low conductivity gases, like argon or krypton in the air space between each pane. The coatings and gases help prevent heat transfer. They increase the insulating value from R-1 for single paned windows to R-3 or more. The U.S. Department of Energy and Department of Environmental Conservation have developed Energy Star (www.energystar.gov), a program to promote and register energy efficient products, such as energy-efficient windows, electronic devices and appliances. Windows that meet their standards are rated as Energy Star qualified. Look for this logo on energy efficient products while shopping. To help identify the best window ratings for your location, visit www.efficientwindows.org.



Look for the Energy Star label on energy efficient products.



HEALTHY OPTIONS FOR WINDOWS

Type of Material	Manufacturer/ Brand	Pro/Con	Availability	Cost
Wood	Jeld-wen www.jeld-wen.com	<p>PRO: Doesn't expand and contract as much as PVC, energy efficient, natural material.</p> <p>CON: Requires painting every 5-7 years to avoid rotting. Note that many wood windows have PVC jamb liners.</p>	Available at Home Depot, 84 Lumber, and other retailers. Log onto www.jeld-wen.com for retailer closest to you.	Double hung 30 1/8" x 41" - \$116
Wood clad in Aluminum on outside	Pella Windows and Doors www.pella.com 800-374-4758	<p>PRO: 63% of Pella's wood is certified – though not all by FSC. 95% of aluminum is recycled. Pella has a strong recycling and reuse policy. Much lower thermal expansion coefficient, maintenance free and generally more durable than PVC. Energy Star rated.</p> <p>CON: Aluminum processing emits significant air pollution. May contain some PVC parts.</p>	Lowe's, Pella stores and outlets (find one at www.pella.com)	Double hung 29" x 41" - \$140 Pella 29" x 35" - \$124
Wood Clad in Fiberglass on outside	Integrity Windows www.integritywindows.com 888-537-7828	<p>PRO: Fiberglass (known as Ultrex) exterior protects wood, energy efficient (Energy Star rated), minimal expansion and contraction, does not corrode.</p> <p>CON: Fiberglass processing emits significant air pollution.</p>	Dealers throughout NYS (find one at www.integritywindows.com)	Double hung 30.5" x 40 1/4" - \$215
Aluminum	Crystal Windows www.crystalwindows.com	<p>PRO: Three times as strong as vinyl and forty three times stronger than wood. Resists deterioration and does not shrink, swell, split, crack, or rust. Can be painted.</p> <p>CON: Aluminum processing emits significant air pollution. Windows let heat escape, may produce condensation. Must add insulation between inside and outside of frame and sash to make even moderately energy efficient.</p>	Distributors throughout NYS (call 800-472-9988)	Double hung 29" x 41" - \$120
Fiberglass	Inline Fiberglass www.inlinefiberglass.com 416-679-1171	<p>PRO: Fiberglass is made of a widely available material – sand, and a resin. Durable, high energy efficiency, and quite strong.</p> <p>CON: Fiberglass processing emits significant air pollution. Difficult to recycle, no recycled content.</p>	Log onto www.inlinefiberglass.com for local retailer.	Double hung 29" x 41" - \$300

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

INSULATION

A well-insulated house is a key ingredient in its energy-efficiency, so choosing an insulation that is both health-protective and effective is important. Insulation is placed in the walls, in attics/roofs, and underneath the house. There are several ways to improve the energy efficiency when designing your house or addition. This can include using 2 x 6 construction for outer walls and adding thicker insulation, or by staggering 2 x 4 studs so that blown cellulose (shredded newsprint treated with boric acid) insulation can form a continuous layer. Conventional insulation is usually fiberglass, which can irritate the skin, eyes, nose and throat. Fiberglass can cause itching due to mechanical irritation from the fibers. Breathing fibers can irritate the airways. If you choose fiberglass, be sure to cover all skin and wear a dust mask. It also contains formaldehyde (*see page 7 for more information about harm caused by formaldehyde production and use*). However, some fiberglass manufacturers now offer formaldehyde free formu-

lations, which are clearly marked as such. Houses may also have blown insulation, such as cellulose or concrete foam.

A wide range of options for insulation has emerged in recent decades, including cementous foam, which is cement mixed with air to form a "mousse" that can be injected into your existing walls, or applied to new construction. Like cellulose, it can fill in around all pipes and wires, and it's flexible enough to run new wires through it should need arise. It has the added advantage of being entirely fire-resistant, as it contains nothing that will burn. If you want something that comes in rolls like fiberglass, there's post-industrial recycled denim. For energy efficiency, the higher the overall "R value" (the amount the material resists heat transfer), the better. The overall R-value varies by type of product, application, thickness, and brand, so if you're looking for new insulation, get accurate measurements for your job and use that information to find the best insulation for you.

ROOFING

The roofing material shields the house from the elements and adds style. There are many different options for roofing. For steep roofs, there are asphalt shingles, metal of various shapes and sizes, wood shingles, concrete composite or slate. For shallow or flat roofs, there are options like tar, asphalt rolls, membranes such as EPDM and TPO (*see last two listings in chart on next page*). Asphalt and tar plants release noxious chemicals such as formaldehyde, hexane, phenol, polycyclic organic matter, and toluene. Exposure to these air toxics may cause cancer, central nervous system problems, liver damage, respiratory problems and skin irritation.

Regardless of the type of material you choose, the choice of color will influence heating requirements. A black or dark colored roof will absorb more heat, increasing cooling costs in summer. A lighter, more reflective roof will decrease these costs. The color of the roof does not play as significant a role in winter heating costs.

In upstate New York, the long-term best choice may well be a light-colored baked-enamel finished metal roof, as it will reflect summer heat, and allow snow to slide off of it without forming ice dams. The prices for metal roofs vary widely, but most are somewhat more expensive to install. However, a well-made and well-installed metal roof can far outlast an asphalt roof, saving money in the long run.

If you have a flat roof, consider creating a "green roof" -- covered with plants. These start with a membrane like TPO, and then have a layer of growing substrate (engineered soil) that selected plants can grow in. Green roofs can cut down on cooling costs, keep rainwater from simply running off into streams or sewers, help reduce air pollution and look nice. For more information, check out www.communityresources.org/greenroof.html or www.greenroofs.com.

HEALTHY OPTIONS FOR INSULATION

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Concrete Foam	Air Krete www.airkrete.com 315-834-6609	PRO: Non-toxic, needs no treatment to resist pests, fire resistant, can be installed in existing houses.	Gutters, Insulation and More (distributor/installer)	Around 50 cents per board foot installed
Cellulose	U.S. Green Fiber www.us-gf.com 800-228-0024	PRO: Made from recycled newspaper treated with boric acid – non-toxic, fire resistant in most cases. Can fill in around tightly cables and pipes. CON: Can settle over time, installation can be messy, must keep away from recessed lights and flues, boric acid (flame retardant) may corrode pipes.	Home Depot, Lowe's, or call 800-228-0024 for local retailer	1 to 2 times that of fiberglass batts
Cotton/Denim	Bonded Logic/Ultra Touch www.bondedlogic.com 480-812-9114	PRO: Made from 85% post-industrial denim scraps, non-toxic boric acid as fire and pest retardant.	Order from Eco of NY 800-238-5008 www.environmentproducts.com	\$0.50 - \$1.00/square foot, depending on thickness.
Fiberglass – formaldehyde free	Johns Manville www.jm.com/insulation 800-654-3103	PRO: Contains no formaldehyde. Made from recycled content. CON: Not recyclable.	Many Lowe's stores carry this product	\$0.50 - \$1.00/square foot, depending on thickness

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

HEALTHY OPTIONS FOR ROOFING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Metal	Many. See www.metalroofing.com	PRO: Made from recycled material, recyclable. Lasts twice as long as asphalt. Reflects heat reducing summer cooling, sheds snow easily. Lasts 2-3 times as long as asphalt shingles. 50 year warrantee.	Widely available. Contractors listed at www.metalroofing.com	2 - 3 (or more) times that of asphalt shingles
Asphalt	Many	PRO: Inexpensive. Light colored shingles will reflect more heat. CON: Uses toxic materials, which can run off in rain.	Any home improvement store	\$0.35 - \$1/square foot
Composite	Enviroshake www.enviroshake.com 866-423-3302	PRO: 95% recycled post-industrial plastics, crumb rubber, cellulosic fibers, etc. Looks like cedar but doesn't rot. 50 year warrantee. CON: Not recyclable.	23 locations in New York State, find them at: www.enviroshake.com/retailers.php?country=us&state=ny	Approximately \$3/square foot
Flat Roofs				
TPO (Thermoplastic Polyolefin)	Stevens Roofing System	PRO: Less toxic in production than asphalt or PVC. Can be recycled into lower-quality products.	Dave Brown Stevens Regional Sales Director 518-762-2071	Comparable to similar vinyl roofing
EPDM (Ethylene Propylene Diene Monomer)	Firestone Building Products www.firestonebpc.com 800-428-4442	PRO: Less toxic than asphalt or PVC.	Admiral - NY Regional Sales 978-988-1166	

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

SIDING

Choosing new siding can be a difficult task when weighing cost, benefits to the house, and environmental impact of the product. Siding must withstand all types of weather, look attractive, and be affordable to buy, install and maintain. PVC siding has been growing in popularity over the past few decades, as the PVC industry plays up the easy install (even over older siding), low up-front cost and supposed simple maintenance. In reality, however, PVC siding grows more brittle over time, and can be more easily blown off in high winds. While it does not need painting, the colors of PVC siding are limited and will fade over time, and it is very

difficult to paint or repair. PVC can be hazardous to occupants in the case of fire, as PVC does not burn but smolders, creating dioxin and hydrochloric acid (which can burn the lungs and kill a person long before normal smoke inhalation would), as well as numerous other environmental health impacts when manufactured, used and disposed of (*see page 5 for details*). There are many other options -- including solid wood, APA-rated plywood, oriented-strand board (OSB), wood-resin composites, stucco, fiber-cement, brick, polypropylene, masonite, and aluminum. Some of the more sustainable options are presented on the next page.

WIRING AND PLUMBING

ELECTRICAL WIRES & CABLE

Most people do not realize that nearly all of the electrical wiring they encounter is coated with PVC. (*See page 5 for more information about the health problems posed by PVC*). Currently, the National Electrical Code (NEC) in essence requires the use of PVC coated wire and cable for residential housing because of its high kindling point (when it starts to burn). While this fire-retardant property is widely touted by the PVC industry, smoldering PVC releases toxic hydrochloric acid and heavy metals.

This means that while PVC-free wiring and cable is readily available for projects that do not need to conform to the NEC, housing projects must use PVC coated cable. It is a good idea to ask your contractor or electrician if this is the case when you have work done on your house, and if it is possible to use PVC-free cable and wire, we encourage you to do so. Check out www.healthybuilding.net for information about PVC-free wire.

PIPES & PLUMBING

Pipes are used around the house for plumbing and drainage. Recently, PVC pipe has become popular for drainage and waste water pipes because it is lightweight and easily installed. However, it lacks durability. Sunlight, heat and impact damage lead to frequent early repair or replacement of PVC systems. PVC is especially susceptible to expansion and contraction, which places a constant strain upon the joints and the fixings. This problem has not been solved and aging exacerbates the wear caused by expansion and contraction, as does the hardening of the rubber seals used at joints.

There is a range of traditional and new materials that don't rely on PVC and offer the same or improved qualities with fewer lifecycle hazards. Choose pipe products to meet project needs (i.e., polyethylene pipe where weight is a primary consideration, clay or cast iron where durability is most important). When comparing costs, consider the life span of your options, including cost of repeated installation or repair. For example, while a PVC pipe drainage system may initially cost much less than a comparable vitrified clay pipe system, clay pipe systems last 4 - 5 times longer than the PVC system, which saves not only materials but also labor costs over time.

HEALTHY OPTIONS FOR SIDING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Composite (recycled wood fiber and cement)	James Hardie Siding Products Hardie Siding www.jameshardie.com 888-542-7343	PRO: Comes in many designs, colors. Paintable. Non-toxic. More durable and lower maintenance than wood or PVC. Won't burn or melt. Sturdy and weather resistant. Often warranted for 50 years. CON: Must use precautions when cutting boards (avoid silica dust).	Special order through some Home Depots, 84 Lumber, other suppliers. Contact manufacturer at 888-542-7343 for dealer near you	\$1.20 - \$1.80 per square foot (installed)
	U.S. Green Fiber www.us-gf.com 800-228-0024		Home Depot, Lowe's, or call 800-228-0024 for local retailer	
Forestry Stewardship Council (FSC) Certified Wood	Contact local mason contractor in phonebook.	PRO: Wood is natural, renewable, durable. FSC certification means third-party verification that the wood is sustainably grown and harvested. CON: High maintenance, will burn, can be infested with pests.	Contact Heyes Forest Products directly. Find other suppliers at www.foresthics.org	\$4.15 - \$5.40 per square foot (installed)
Brick	Contact local mason contractor in phonebook.	PRO: Durable, won't burn in fire, made of natural materials. CON: Heavy, so may use more energy if brick must be transported long distances. Requires skilled labor to install.	Contact local mason contractor in phonebook	\$6.18 per square foot (installed)
Aluminum	Alcoa www.alcoahomes.com	PRO: Recyclable, durable, non-combustible, can be made from recycled aluminum, and requires very little maintenance. Unlike wood, will never chip, flake, or peel. CON: Aluminum processing emits significant air pollution.	Log onto www.alcoahomes.com for a quote from local contractors	\$4.50 per square foot (installed)

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

HEALTHY OPTIONS FOR WIRING AND PLUMBING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Foundation Drainage (Around Outside of House)				
High Density Polyethylene (HDPE)	Hancor Pipe www.hancor.com 800-FOR PIPE	PRO: Durable, made from at least 50% recycled materials.	Call 800-FOR PIPE for nearest dealer, many throughout NY	\$0.45/ft. for 4" pipe (comes in 250 ft. rolls) or \$0.95/ft. for 6" pipe (comes in 100 ft. rolls)
Drainage, Waste, Venting (Inside the House)				
Cast Iron Pipe	Tyler Pipe www.tylerpipe.com 800-527-8478	PRO: Made from recycled iron. Durable. Recyclable. Quieter than any plastic. Can be attached without soldering. CON: Very heavy.	Go to www.tylerpipe.com/ny.htm for regional sales reps or call main number	\$4.58/ft. for 3" pipe \$5.95/ft. for 4" pipe (comes in 10 ft. sections)

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

There are many different ways to cover floors: with hard surfaces, like wood or tile, with resilient surfaces like linoleum, or with carpets. Each choice can have both environmental and health impacts.

HARD FLOORS

People who are concerned about asthma triggers in their homes should consider hard floors as a primary option instead of wall-to-wall carpet. If hardwood floors are treated with a non-toxic finish, they can be durable and attractive. Seek FSC certified hardwoods to protect the sustainability of our forests. Bamboo, which is ready for harvest in only four to six years, is an attractive, sustainable, moderately priced alternative to hardwoods and is more durable than many varieties. Tile floors can be made from recycled glass tiles, which are inexpensive, use resources wisely, look nice, and can be sterilized to reduce allergens. Tile absorbs heat and can act as a heat sink, helping to store solar energy during the day to keep the house comfortable at night.

Some manufacturers use reclaimed lumber from older structures (*see page 13, where this practice is discussed in relation to framing*) as flooring. Hard floors can also be made from materials like fast-growing bamboo, with looks similar to hardwood.

RESILIENT FLOORS

Many people have enjoyed the look and easy cleaning of linoleum for decades. Did you know that most tile and sheet “linoleum” is actually made from PVC, and can release toxic chemicals into your indoor air as it ages? Many staff at home improvement stores don’t understand the difference, but the original natural linoleum is made from linseed oil, a natural product. It does not have the same environmental or health impacts of PVC. These floors can be cleaned to prevent the buildup of contaminants and allergens. There are also cork floors available, made from a rapidly renewable source.

CARPETS

Many people view carpets as comfortable additions to their home, but don’t realize the amount of material that gets trapped in them. They are a sink for dirt, allergens, and pathogens, but also contain toxic materials that stick to the carpet fibers and are difficult to remove. Most experts recommend using area rugs that can be removed and washed periodically over wall-to-wall carpets.

Carpets were traditionally made from natural materials like wool. Today, some wall-to-wall and area carpets are made from synthetic materials with PVC backing to keep the fibers in order. However, some companies, like Shaw, have found healthier alternatives for their backings. Safer choices, listed below, range from fairly conventional carpet with a polyolefin backing, to all natural carpets of jute, hemp, and wool. Wool carpets have numerous advantages, including looking good until just before the end of their use, as fibers shear off in layers. Individual fibers are durable and hold their springiness for a long time. Up-front costs vary greatly, from that of conventional carpet upwards. You can also reduce the number of potentially toxic chemicals in your home by choosing not to get stain-resistant treatments applied to your carpet. They may prevent stains from setting in, but they will also outgas chemicals into your indoor air. Choosing natural-fiber area rugs on top of some other type of flooring (such as recycled glass tile) can enable cleaning options to keep contaminants to a minimum. When having wall-to-wall carpet installed, use mechanical attachment (staples or nails around the perimeter) if possible – the adhesive used to attach carpet to subflooring can release toxic chemicals known as Perfluorooctanoic Acids (PFOAs) into the air as well. The compounds are used in a huge range of consumer products, including Teflon and carpet stain protectors. They linger in the environment and accumulate in living tissues. Exposure may lead to increased risks of birth defects, developmental or other health problems, including cancer, according to the EPA, based on animal studies and other research.

HEALTHY OPTIONS FOR FLOORING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Hard Flooring				
Bamboo	Moso www.moso.com 800-617-2324	PRO: Rapidly renewable, harvested with no harm to its natural habitat, bamboo will regrow from harvested stumps. Durable. Easy to care for.	Contact them directly – no NYS dealers	\$4 - \$5/square foot
	Eco Friendly Flooring www.ecofriendlyflooring.com 866-250-3273			\$3.75 - \$7/square foot
Ceramic Tile	Eco-Wise www.ecowise.com 512- 326-447	At least 55% recycled glass, Hand-crafted ceramic tiles that are water, frost, chemical, and stain resistant.	www.ecowise.com	\$14 - \$17/square foot
Recycled Glass Tiles	Eco-Wise (see contact above)	PRO: The strength of recycled glass tiles exceeds that of ceramic tiles, making them ideal for any job where a tile surface is used. 100% recycled glass from post-consumer or post-industrial sources.	Contact them directly – no NYS dealers	\$40 - \$50/square foot
Resilient Floor Covering				
Linoleum	Eco Friendly Flooring www.ecofriendlyflooring.com 866-250-3273	PRO: Decomposes in dump, may be compostable, naturally antimicrobial. Available in floating floor planks — top layer of linoleum, middle layer of recycled fiberboard, and bottom layer of cork that can lock into place without glue or nails.	Contact Manufacturer	\$5 -\$6/square foot
	Marmoleum www.themarmoleumstore.com 570-459-0771	PRO: Made of natural materials. Naturally anti-static, anti-microbial.	Many throughout NY. See website, under “Dealer Search”	\$5 -\$6/square foot You must also purchase Forbo’s adhesive, cleaner, and finish, which will increase overall cost.
Cork	Expanko www.expanko.com	PRO: Naturally mold resistant, renewable product, zero VOC, During the manufacturing process, all raw materials are consumed, either for the finished flooring product or as an energy source. Additionally, all recommended finishes, sealers, and adhesives are water-based and environmentally friendly.	Ithaca Tile & Hardwood, Inc. 607-272-2763 will ship anywhere in NYS	\$10/square foot
Recycled Rubber	Expanko Reztex Chunks www.expanko.com	PRO: Made from a unique blend of recycled tires, post industrial waste rubber and virgin rubber. CON: Tires contain chemicals that could offgas into the home.	Ithaca Tile & Hardwood, Inc. 607-272-2763	\$8.50 - \$12/square foot
Carpet, Wool	Earth Weave Carpet Mills www.earthweave.com 706-278-8200	PRO: COMPLETELY biodegradable. 100% natural raw materials. Face fiber is 100% natural wool. No moth proofing or stain protections applied, no harsh dyes or chemical bonding agents, use a natural primary of hemp and cotton. Adhesive is 100% natural and bio-degradable, made of natural rubber. The back of carpet is jute.	Available only through manufacturer	\$5 - \$6/square foot

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

WALLS CONSTRUCTION AND COVERING

DRYWALL

Drywall is a relatively benign product. Unused dry-wall gypsum can be recycled back into new drywall if most of the paper is removed. The paper limits the amount of recycled gypsum allowed in new drywall, because the paper content affects its fire rating. One company produces drywall that is 15 – 20% recycled; it is working on technology to decrease the paper content so that it can further increase the recycled content. Scrap drywall can also be ground into powder and turned into soils. This helps to amend soils with high clay content and improve water retention.

WALL “PAPER”

Despite the fact that we commonly call it “wall paper,” many residential and commercial wall coverings are in fact made from films of PVC in part or in whole. Some wall papers are in fact paper, coated with PVC to make them more durable. Others are PVC with some kind of paper backing. The problems with PVC in wall coverings go beyond the previously discussed problems with production and disposal of the PVC. Because PVC is not breathable, moisture that gets trapped behind the “paper” can promote toxic mold. It also out-gasses the plasticizers that make it flexible, causing it to become brittle over time, and can affect indoor air quality (the phthalates are suspected of triggering asthma attacks). *(For a more complete description of the environmental and health impacts of PVC, please see page 5.)*

Fortunately, there are many alternatives to vinyl wall paper. The most simple is to paint your interior with a low-VOC or VOC-free paint. If you want the decorative effect of wall paper, consider the options presented below. There are many safer alternatives to vinyl wall coverings that are lightweight, durable, washable, easily installed, and made of more sustainable materials.

PAINT

Painting your walls not only adds color and style to a room or outside wall, but it also provides a protective covering against dirt and moisture. Most people are aware of two main types of paint – oil-based and latex.

The problem with oil-based paints is that they contain many toxic chemicals, including benzene, toluene, xylene and formaldehyde, and require even more toxic chemicals to clean up after a paint job is done, such as xylene or toluene. Latex-based paints also include toxic ingredients, though they are much easier to clean up, requiring only soap and water. Once applied to the wall, some of the toxic chemicals, called “volatile organic compounds” or “VOCs,” can outgas from the paint and into the air for up to eleven months, according to the U.S. Environmental Protection Agency (EPA).

The good news is that paint companies are becoming sensitive to these problems and creating paints that don't harm indoor air quality and have fewer toxic chemicals. When looking for an environmentally friendly paint, it's important to look for low-VOC paints, but also to make sure any VOCs present are nontoxic and nonreactive. GreenSeal certification is a good guarantee of a relatively non toxic paint.

No matter which paint you use, ventilate space by opening doors and windows for at least 48 hours or until paint thoroughly dries before re-inhabiting the room, especially for pregnant women and young children.

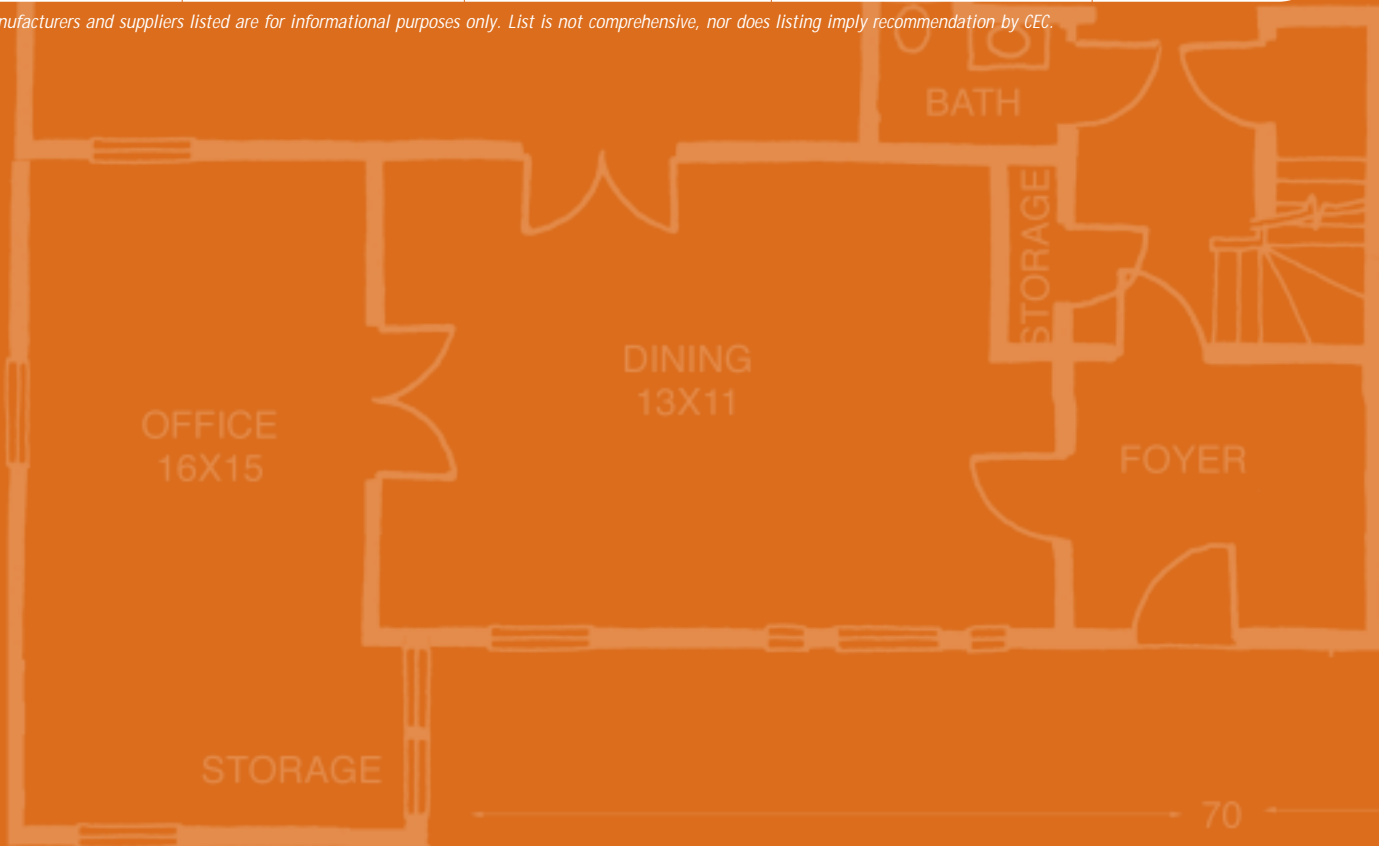
OTHER OPTIONS

There are other ways to cover walls that can be fun, creative and give you the design you're looking for. This can include using fabric, tinted plaster (for texture and color), or anything that you can imagine. Some of these techniques are fairly labor intensive and can therefore be more expensive. But if you are redoing a room interior yourself, then all you need is time and some instructions. Look for Do-It-Yourself books at the local library or bookstore for creative ideas and how to implement them in your home.

HEALTHY OPTIONS FOR WALLS COVERING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Paint				
Low-VOC Latex Paint	Olympic Premium	Pro: low VOCs.	In stock at Lowe's	\$14 - \$18/gallon
	Benjamin Moore Pristine EcoSpec www.benjaminmoore.com	PRO: Low VOCs. Benjamin Moore makes a low-VOC primer as well. CON: Still contains some toxic materials.	True Value Hardware Stores, paint stores – see www.benjaminmoore.com and enter your zipcode. Must special order primer	\$29 - \$34/gallon
Milk Paint	The Old Fashioned Milk Paint Company, Inc. www.milkpaint.com	PRO: Contains no hydrocarbons or any other petroleum derivatives. Non-toxic. CON: More limited palette and sheen options.	www.milkpaint.com 34 dealers in New York State	\$44/gallon
	BioShield Casein Milk Paint www.bioshieldpaint.com	PRO: Made from natural materials. Non-toxic. Comes in powder form, so lightweight shipping. CON: More limited palette and sheen options.	www.milkpaint.com 34 dealers in New York State	\$7 - \$44/gallon equivalent
Zero-VOC Paint	AFM Safecoat primer and paint 800-239-0321 www.afmsafecoat.com	PRO: Zero VOC emissions, free of other toxic chemicals, like formaldehyde, ammonia, and acetone.	Environmental Construction Outfitters of New York www.enviroproducts.org 800.238.5008	\$30/gallon
Wallpaper				
Natural fibers hand crafted Oriental grasscloths and textiles, PVC free backing	Eastgate III Collection from Washington Wall Coverings	PRO: Natural Fibers, less toxic. CON: More expensive.	Special order from Home Depot	\$18 - \$54 a single roll
	Mandarin Fantasy from Washington Wall Coverings		Special order from Lowe's	\$39 - \$45 a single roll

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.



HEATING AND COOLING

The biggest issue for heating and cooling has to do with energy efficiency. Heating, Ventilating and Air Conditioning (HVAC) systems can account for as much as 60% of home energy use. Water heaters can also use a lot of energy. The energy efficiency of a house is a combination of factors, such as how tightly sealed the house is (though a well-sealed house is more energy efficient, these houses can trap pollutants indoors longer due to a slower air exchange with the outdoor air – an air exchanger is needed to ensure an adequate supply of fresh air indoors), how well insulated it is, and the efficiency of windows.

The simplest thing you can do to cut cooling costs is to install ceiling fans, and/or to install a whole-house fan that draws air through the entire building. By using the much-less energy intensive fans instead of air conditioners whenever possible, you can save money and energy. To cut heating costs, make sure all doors and windows are well sealed. You can cut costs on hot water heating by wrapping the water heater in a specially-designed blanket. Buying a programmable thermostat (available at most hardware and home improvement stores) and setting the temperature to be cooler (in winter) or warmer (in summer) when the house is empty can reduce energy consumption.

If you are building a new house, it may make sense to use geothermal heating pumps, which involve running pipes deep into the earth.

There are also new two-phase heat pumps rated for cold climates that can be as energy-efficient as geothermal heat pumps. The manufacturer is Nyle Special Products. Their website is www.nyletherm.com. This can save up to 40% of your heating costs. There are also new two-phase heat pumps rated for cold climates that can be as energy-efficient as geothermal heat pumps. If you are renovating, however, it can be prohibitively expensive. When choosing a conventional heating and cooling system look for one that is Energy Star rated (by the U.S.

Environmental Protection Agency) which guarantees that it is at least 15% more efficient than the average system on the market. Also, if you are replacing your heating system, consider those which use the same furnace for heating hot water on demand and providing hot water for baseboard heaters. This can save costs on hot water heating (no tank to keep warm all the time) and reduce fuel costs for heating.



Look for the Energy Star label on energy efficient products.

Energy Star heating and cooling systems are currently available at most stores. Typically, Lowe's carries more Energy Star appliances, though both Home Depot and Lowe's carry them. Many department stores also carry Energy Star products. For more information about the Energy Star program, see www.energystar.gov. Talk with your contractor about the most efficient heating and cooling system for your house and budget. Keep in mind that while some more efficient systems cost more up front, they will pay for themselves in a few years.



HEALTHY OPTIONS FOR HEATING AND COOLING

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Energy Star Rated Furnaces	See list at www.energystar.gov/index.cfm?c=furnaces.pr_furnaces	PRO: Energy Star rated furnaces are more than 90% efficient – making them at least 15% more efficient than other models.	Home improvement stores and local dealers	Varies based on house size, location, etc.
Geothermal Heat Pump	www.energystar.gov/index.cfm?c=geo_heat.pr_geo_heat_pumps	PRO: Use 40-60% less energy than conventional heat pumps – rely on earth's steady temperature to keep homes comfortable. CON: High upfront cost, only good for new construction.	Locate a contractor in your area	Depends on house size, depth of drilling etc.
Room Air Conditioner	Kenmore www.kenmore.com Frigidaire www.frigidaire.com Friedrich www.frigidaire.com Carrier www.carrier.com and others	Energy Star qualified room air conditioners use at least 10% less energy than conventional models.	Department stores Home Improvement stores	\$200 - \$450 depending on size and manufacturer
Ceiling Fans	Hunter www.hunterfan.com Hampton Bay, others	PRO: Promote air circulation, reduce need for air conditioning. Available with or without lights.	Lowe's www.lowes.com Home Depot www.homedepot.com	\$40 - \$70

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.



APPLIANCES

Energy- and water-efficient appliances are now widely available on the market. The U.S. Environmental Protection Agency (EPA) has an energy efficiency rating system called “Energy Star” (www.energystar.gov). In addition, new appliances are required to provide information on energy and water usage and compare that usage and estimated cost to similar models. Although Energy Star models are more efficient, they are not necessarily the most efficient on the market. Many more efficient models may be available at somewhat more significant up front cost. However, if you have the budget to allow you to choose them, high-efficiency models can save you more in 5-10 years. Look for water and energy efficient washers, dryers, dishwashers, stoves and refrigerators as you shop – many of the Energy Star rated appliances are available at places like Lowe’s and Home Depot, as well as department and appliance stores.

FIXTURES

Fixtures, such as toilets, showers and sinks can consume lots of water. You can make a simple improvement in water conservation by replacing older showerheads with “low-flow” showerheads that maintain pressure while reducing the flow (gallons-per-minute). If you are updating a bathroom and have a toilet manufactured before the 1990s, you may want to consider replacing it. A 1.6 gallon-per-flush toilet can use 23% to 46% less water, an average of 10.5 gallons less per person daily. These simple changes can help reduce water and sewage expenses if you use municipal water, and conserve groundwater if you use a well. Better yet, a dual flush toilet uses even less water and they are becoming much more common on the market.



HEALTHY OPTIONS FOR APPLIANCES AND FIXTURES

Type of Material	Manufacturer/Brand	Pro/Con	Availability	Cost
Appliances				
Front Loading Washing Machine	Kenmore Kenmore (3.1 cubic ft) or Kenmore Elite (3.7 cubic ft) kenmore.com	Pro: 67%-77% less energy and 67% less water than conventional washers. Extraction feature removes more water, cutting drying time. Energy star rated.	Sears www.sears.com	\$720 (3.1 cu. ft.) \$1,430 (3.7 cu. ft)
	Bosch Axxis, or Axxis+ www.boschappliances.com/laundry	Reduces water use by roughly 70% and energy consumption by 78%. Energy star rated.	Sears Lowe's	\$930 - \$1,100
	Asko www.askousa.com/laundry	Reduces water use by 65% to 87% depending on setting. Energy star rated.	www.modernkitchens.com to locate a dealer	\$1,050
Dishwasher	Bosch www.boschappliances.com/2003_dev/	Up to 39% less energy; 39% less water. Energy Star rated.	Sears Lowe's	\$570 & \$840
	Kenmore, Kenmore Elite kenmore.com	32% less energy and 32% less water (7 - 10 gallons versus 8 - 14 per wash) than conventional dishwashers. Energy Star rated.	Sears	\$640, \$990
	KitchenAid www.kitchenaid.com	33% less energy. Energy Star rated.	Sears Lowe's	\$759
Refrigerators	Maytag www.maytag.com General Electric www.ge.com , others	Energy Star models use at least 15% less energy than required by current federal standards, and 40% less energy than the conventional models sold in 2001.	Lowe's, Sears, home improvement or appliance stores	\$600 - \$2,500
Fixtures				
Toilets: Pressure, Gravity	Various	All new toilets for residential use are 1.6 gallons per flush. See www.toiletology.com for descriptions of options on the market.	Lowe's Sears	\$145 - \$400
Composting Toilets	Envirolet® W/RS Non-Electric www.envirolet.com	PRO: Waterless – reducing water and sewer costs, or reducing pressure on septic tank. Waste product, once composted, can be used as fertilizer. CON: much more costly.	www.envirolet.com	\$1,595
Faucet Aerators	Various	Models 2.75 gallons per minute or below can reduce water consumption by 50%.	Widely available	Less than \$5
Low-flow Shower Head	Various	Look for models rated at 2.5 gallons per minute which reduce water consumption by 50%.	Home Depot Hardware Stores	\$8 and up

Products, manufacturers and suppliers listed are for informational purposes only. List is not comprehensive, nor does listing imply recommendation by CEC.

ALTERNATIVE HOUSES

Until now, we have focused on building or renovating a traditional wood-frame house. However, there are housing designs that don't rely on the traditional techniques or building materials. These houses consume fewer resources in their construction, and often rely on inexpensive, locally available materials. *If you are interested in learning more about these green building techniques, check out the resources section of the guide on the next page.*

ADOBE

Adobe construction is arguably one of the most popular green building techniques. Adobe homes are made up of mud bricks, composed of clay and sand mixed with water and heated in the sun. Building with adobe has numerous advantages. First and foremost, adobe is probably the easiest material to build with. Since it is made of mud it is easy to cut and shape. Adobe bricks consume low amounts of energy, emit low levels of pollutants during manufacturing, and in combination with good passive solar design, make for an effective energy-saving solution in cold winter areas.

BAMBOO

Bamboo has been used in the construction of homes for hundreds of years. Bamboo is a renewable product. Hardwood trees require over 40 years to grow to maturity, but bamboo can be harvested in just four to six years. Bamboo has an extensive root system constantly growing underground, replenishing itself naturally. By using bamboo you help to preserve the habitat of endangered wildlife, unlike the harvesting of other hardwoods.

COB

Cob construction uses hands and feet to form lumps of earth mixed with sand and straw, a sensory and aesthetic experience similar to sculpting with clay. Mixed well, this special mud is applied to the foundation in continuing layers. When dry, the walls are very hard and load bearing. Cob building techniques are easy to learn and inexpensive to build. Because there are no forms, ramming, cement or rectilinear bricks, cob lends itself to organic shapes: curved walls, arches and niches. Cob homes are cool in the summer and warm in winter. Cob has been used for millennia even in the harsh climates of coastal Britain, and at the high latitudes of the Aleutians.

CORDWOOD MASONRY

Cordwood Masonry is a low-cost, energy efficient, easily constructed and aesthetically pleasing building technique

in which short logs are laid widthwise within a special mortar matrix. The wall derives excellent insulation and thermal mass characteristics from insulation sandwiched between the inner and outer mortar joints. Cordwood masonry is also beautiful, combining the texture of stone masonry with the warmth of wood.

PAPERCRETE

Papercrete, also called fibrous cement, is a remarkable building material composed of recycled papers mixed with sand and cement to form walls, blocks, panels, domes, etc. This is potentially an ideal building material because it is cheap, utilizing unwanted newspapers, magazines, cardboard and other recycled paper materials. Papercrete homes do not mold, swell, or attract insects, and are surprisingly fire resistant. This is a new method, still untested in some environments, but the potential is enormous for do-it-yourself builders.

RAMMED EARTH

This type of house is built just like the name states: pounding damp soil into movable, reusable frames with manual or machine-powered pneumatic tampers to create a firm and steady house. Mass walls absorb solar energy during winter days and then re-radiate that energy to offset nighttime heat losses within the building. In the summer months, the mass of the walls absorbs excess heat generated during the day, keeping the inside spaces surprisingly cool, and then releases that stored heat to the night sky. In a properly designed and oriented building, this can mean significant savings in heating and cooling bills. Rammed earth buildings are fire resistant, pest resistant, long lasting, resistant to weathering, and do not outgas hazardous fumes.

STRAW-BALE HOUSES

People have built homes using straw, grass, or reed throughout history. Building with tightly packed straw-bales has become increasingly popular in recent years. Straw-bale buildings boast quiet, well-insulated walls, simple construction, low costs, and the conversion of an agricultural byproduct into a healthy building material. Properly constructed and maintained, straw-bale houses remain waterproof, fire resistant, and pest free. In humid climates, as with conventional materials, efforts need to be taken to prevent moisture accumulation. Once the house is constructed, the interiors and exteriors are plastered over, so the appearance is very similar to a conventional house.

RESOURCES

INTRODUCTION

- Edwin Piñero
Acting Federal Environmental Executive
The Office of the Federal Environmental Executive
Mail Code 1600, 401 M Street, SW
Washington, DC 20460
202-260-1297, mcpoland.fran@ofee.gov
- The UN World Commission on Environment and Development
www.sovereignty.net/p/sd/sdtut.htm
- PRé Consultants
Plotterweg 12, 3821 BB, Amersfoort, The Netherlands
+31 33 4555022, Fax: +31 33 4555024
support@pre.nl, www.pre.nl
- Definition of "Economies of Scale"
www.investorwords.com/1653/economy_of_scale.html

WHAT'S WRONG WITH CONVENTIONAL PRODUCTS?

- Healthy Building Network (HBN)
927 15th Street NW, Washington, DC 20005
202-898-1610 x219
info@healthybuilding.net, www.healthybuilding.net
- Greenpeace USA
702 H Street, NW, Washington, DC 20001
202-462-1177, greenpeaceusa.org/
- *Environmental Impacts of Polyvinyl Chloride Building Materials*
By Joe Thornton, Ph.D. 2002. 110 pages.
- *The Economics of Phasing out PVC*
December, 2003. 53 pages By Frank Ackerman,
Director of Research and Policy Program
Global Development and Environment Institute
- Tufts University
Global Development and Environment Institute
44 Teele Avenue, Somerville, MA 02144
www.ase.tufts.edu/gdae
- Agency for Toxic Substances and Disease Registry
The NCEH/ATSDR Information Center
888-422-8737, Fax: 404-498-0093
www.atsdr.cdc.gov/contacts.html

- The U.S. Department of Health and Human Services
200 Independence Ave., S.W.
Washington, D.C. 20201
202-619-0257, 877-696-6775, www.hhs.gov
- World Health Organization
www.who.int/en/
- US Environmental Protection Agency
Ariel Rios Building, 1200 Pennsylvania Ave., N.W.
Washington, DC 20460
202-272-0167, www.epa.gov
- INFORM Fact Sheet on Construction & Demolition Dumps
www.informinc.org/fact_CWPconstruction.php

ALTERNATIVES

- Environmental Home Center
www.environmentalhomecenter.com
- The Green Guide (may helpful articles on "green" products.) Subscriptions are \$12/year.
www.thegreenguide.com
- Rainforest Action Network
www.ran.org/ran_campaigns/old_growth/
- *A Blueprint for Greening Affordable Housing: Developer Guidelines for Resource Efficiency and Sustainable Communities*. Summer 1999. 142 pgs.
www.globalgreen.org/publications/index.html
- Santa Monica Affordable Housing Green Checklist
www.globalgreen.org/pdf/SMGreenBuildingChecklist.pdf
- Green Building Advisor
(for architects and building professionals)
greenbuildingadvisor.com/
- Healthy Home Designs
(architectural designs for houses)
www.healthyhomedesigns.com
- Habitat for Humanity ReStore Directory - New York
www.habitat.org/env/restore_detail.aspx?place=70



Citizens' Environmental Coalition
33 Central Avenue
Albany, NY 12210

518.462.5527
Fax: 518.465.8349

www.cectoxic.org
www.ecothreatny.org
www.kodakstoxiccolors.org

