

Why Build Green?

Green building is a set of integrated design and construction practices that promote the health and well being of the building occupants, the community, and the environment for years to come.

SAVE MONEY Green building products and construction practices can lower water and energy bills, reduce maintenance costs, and reduce replacement requirements.

BE HEALTHY Green building encourages the use of materials, paints, finishes, mechanical systems, and construction methods that reduce or eliminate many sources of indoor air pollution.

LIVE COMFORTABLY With smart energy design, proper insulation, and efficient heating and cooling systems, green building helps to ensure that your building is more comfortable.

REDUCE MAINTENANCE Green building guidelines go beyond local building codes to recommend methods and materials that result in durable homes requiring less upkeep.

PROTECT THE ENVIRONMENT Conventional buildings needlessly consume large quantities of wood, water, fuel and other materials through their construction and operation. Green building conserves these natural resources.

This display highlights only a small sample of green building materials. Material options should be considered within the context of your project since no single material is ideal for all applications. Product listings should not be construed as an endorsement by the City of Palm Desert. For additional information and resources, please contact the City of Palm Desert Department of Community Development/ Planning at (760) 346-0611.



Introductory text courtesy of Build It Green

KEY TO ENVIRONMENTAL BENEFITS



Minimizes waste through reuse, recycling, and/or material reduction



Promotes healthy indoor air quality



Conserves natural resources and ecosystems

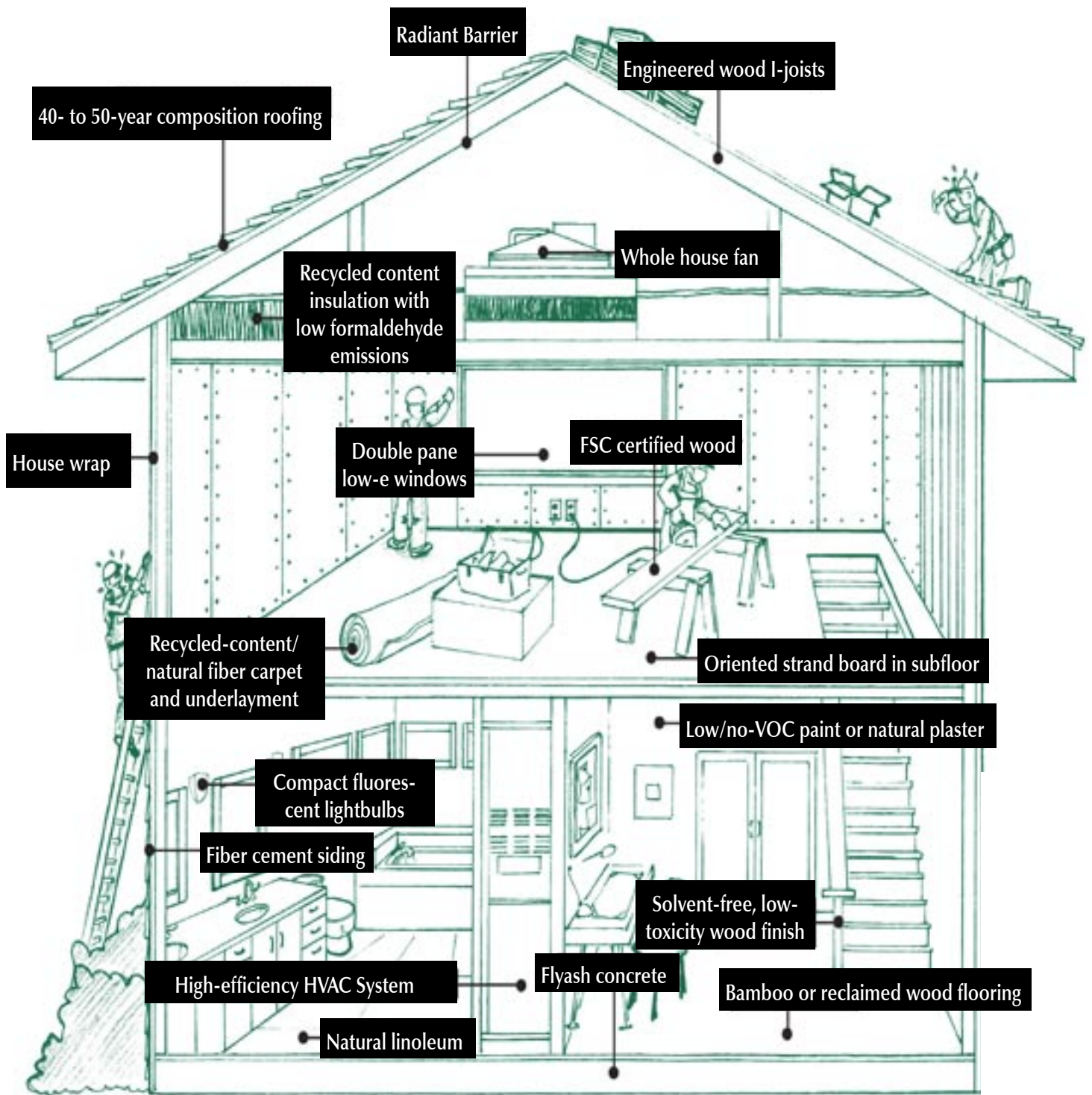


Reduces air or water pollution



Increases efficiency or conserves energy

Look inside a green built home...



Text and graphic on pp. 1-2 courtesy of



Green Building Tips

SmartGrowth/EcoCities

Living downtown allows for walking, biking and mass transit instead of driving. Living downtown uses land efficiently – the antithesis of suburban sprawl. See smartgrowth.org and ecocitybuilders.org.

Small is Beautiful

Whether building, remodeling, or buying, a smaller home provides quality over quantity. If remodeling, make better use of existing space rather than adding more space. Also, donate unwanted belongings to reduce unnecessary storage space. Smaller homes require less land, fewer materials to build, less energy to heat/cool, and are easier to clean.

Passive Solar Design

Your building can use less energy and be more comfortable through natural heating, cooling, and lighting by considering building orientation, sun and wind patterns.

Choosing Materials

Green material offerings are numerous and increasing. When possible choose:

Products that Conserve Natural Resources

- *Products That Use Fewer Materials* – e.g., finish concrete floors, engineered lumber, drywall clips.
- *Durable, Low-Maintenance Materials* – e.g., fiber cement siding, composite wood, 40+ year roofs.
- *Wood Certified from Sustainably Managed Forests* – e.g., Forest Stewardship Council (FSC) certified wood.
- *Rapidly Renewable Materials* – e.g., bamboo, linoleum flooring, wool carpet.

Salvaged, Recycled, or Agricultural Waste Content Products

- *Salvaged Materials* – e.g., bricks, millwork, lumber, plumbing fixtures, and hardware sourced from building material salvage yards.
- *Recycled-Content Materials* (post-consumer recycled content is preferred to post-industrial) – e.g., cellulose insulation made of recycled paper, and tile made of recycled glass.
- *Products Made From Agricultural Waste Material* – e.g., “agboard” wood substitutes made of wheat, sorghum, sunflower seeds, and other grains.

Products That Reduce Toxins

- *Natural Materials* – e.g., seagrass carpet, stone, and wood.
- *Alternatives to PVC* – poly vinyl chloride (PVC) production creates hazardous byproducts, toxic fumes if burned, and is neither biodegradable nor recyclable. Choose PVC-free alternatives.
- *Materials that Reduce or Eliminate Pesticides* – e.g., physical termite barriers, borate-treated materials, diverse native species landscaping.
- *Materials that Reduce Pollution or Waste* – e.g., porous paving, compost bins, and recycling bins.

Energy- and/or Water-Saving Products

- *Building Components that Reduce Heating and Cooling loads* – e.g., structural insulated panels (SIPs), insulated concrete forms (ICFs), passive solar design, and Energy Star® rated windows.
- *Energy-Conserving Equipment* – e.g., Energy Star® rated appliances, compact fluorescent lamps, dimmers and occupancy/daylighting sensors.
- *Renewable Energy* – e.g., solar hot water heaters, photovoltaic systems, and wind power.
- *Fixtures and Equipment that Save Water* – e.g., dual-flush toilets, waterless urinals, low-flow showerheads and faucet aerators, drip irrigation systems, and greywater systems.

Products That Contribute to a Healthy Indoor Environment

- *Materials that Provide High Indoor Air Quality* – e.g., paints, caulks, and adhesives made with low- or zero- volatile organic compounds (VOCs), formaldehyde-free manufactured wood products, direct vent appliances, and radiant in-floor heating systems.
- *Materials that Maximize Light Quality* – e.g., light colors and reflective materials for walls, ceiling and floor, fiber optic sunlight transport systems, tubular skylights, and light shelves.

Passive Solar Design



Passive solar design results in quiet, comfortable, energy efficient living year-round. It heats and cools through use of sunlight, proper building orientation, thermal mass (materials which absorb and store heat), insulation, and the careful placement of windows and shading. Retrofits of existing buildings are often possible.

- Substantially reduces or eliminates heating and cooling costs.
- Improves indoor air quality through reduction in forced air systems.
- Low- or no-cost to design for new construction.

Deconstruction & Recycling



Deconstruction is the careful dismantling of a building to preserve the useful value of materials (e.g., timber, tile, fixtures) through reuse.

- Reduces or eliminates waste, extending the life of landfills, reduces the need for new materials, and reduces material costs.
- Material recovery may yield hardwoods and dimensional lumber that are superior in size or quality to virgin materials.
- Tax deductions from donating materials to a non-profit organization typically offset the additional labor costs.



Xeriscape

Xeriscape is landscaping designed to reduce the resources needed for maintenance (most notably water) and the waste the landscape produces. Successful xeriscapes match local resources, soil, and climate with the aesthetic goals of the owner, and incorporate native plant species as well as exotic plants suited to our climate. Download the "Lush and Efficient" landscaping guide and learn about water efficiency rebates at www.cvwd.org. Also refer to the City's Landscape Maintenance Guide, available from the Department of Public Works.

- Reduces maintenance and green waste.
- Eliminates or reduces the expense of irrigation.
- Requires less fertilizer, reducing air and water pollution.

Pervious Pavement



Pervious pavement contains voids that allow water to percolate through to the base materials and underlying soil below. Available products include permeable concrete, asphalt, and unit pavers. Its compressive strength is suitable for parking lots and driveways.

- Reduces peak storm water runoff and water pollution.
- Promotes groundwater recharge.
- Encourages nearby tree roots to grow deeper.
- Reduces "heat island" effect of traditional pavements.

Unit pavers are often used in pervious pavement systems.

Photo courtesy of City of Palo Alto.

Fly Ash-Content Concrete



Fly ash is a waste product recovered from coal power plants. It is readily available and performs as well as or better than the portland cement typically used in standard concrete.

- Can replace more than 50% of the portland cement in concrete, which helps to reduce habitat destruction, energy use, and pollution.

Earthen Building Materials



Common earthen building materials are beautiful, sculptural and durable. They include **adobe brick** (clay, sand and straw), **rammed earth** (compressed with fly ash and/or fibers for stabilization), and **cob** (clay, sand and straw that is stacked and shaped while wet).

- Plentiful, produce little or no waste, require minimal energy use, and can be turned back into soil at the end of their life.
- Provide excellent thermal mass for passive solar buildings, maintaining stable temperatures year round.

Straw Bale Construction



In straw bale construction, compressed bales of straw are stacked and covered by plaster. Straw is a plentiful waste product and is rapidly renewable.

- Diverts agricultural waste from burning or landfills.
- Uses much less wood and/or concrete than conventional construction.
- Excellent thermal and acoustical insulation.
- Resistant to fire, mold, and vermin.

Insulated Structural Systems



Insulated structural systems combine a building's structure and insulation into a single component.



Structural Insulated Panels (SIPs) are factory-built walls/roof panels of rigid foam insulation sandwiched between two layers of structural facing. **Rastra and Insulated Concrete Forms (ICFs)** consist of a hollow shell that acts both as insulation and a permanent form for concrete.

- Reduces waste because panels are pre-cut at the factory.
- Reduces or eliminates use of structural wood.
- Superior structural, thermal and acoustic performance.
- Excellent fire resistance.
- Rapid construction.

Deterring Wood-Destroying Organisms



Wood is the most common home building material in the U.S. However, wood can be susceptible to Wood Destroying Organisms (WDOs), including termites, wood beetles, and fungi ("rot").



- Consider wood alternatives such as fiber-cement siding, composite decking, insulated concrete forms, structural composites, and steel studs.
- Consider borate-treated wood. Avoid chromated copper arsenate (CCA).
- Build with subterranean termite barriers (aggregate, concrete, metal, or plastic).
- Learn to recognize WDOs, inspecting for them annually.
- Treat WDO infestations promptly.
- Avoid soil-wood contact.
- Keep wood dry (fix water leaks promptly and add ventilation if necessary).
- Paint/seal/caulk wood, or treat unpainted/unsealed wood with a borate product to deter WDOs.

Advanced Framing Techniques



Simple alternatives to conventional framing techniques can reduce the wood required by up to 20%. For example: framing with 2x6 studs on 24" centers in lieu of 2x4s on 16" centers; stacking roof rafters directly over studs; framed-in and insulated headers in lieu of solid dimensional lumber; and the use of prefabricated trusses or wall units.



- Deeper wall cavities allow for additional insulation.
- Fewer studs reduces thermal bridging and improves insulation values.
- Reduces labor, waste and materials costs while saving natural resources.
- Widely accepted by building departments and code officials.

Engineered Lumber



Engineered lumber is manufactured from oriented strips of wood pressed together with a binding agent.



- Strong and durable, it is available in long spans, so it can be used instead of mature timber.
- Saves money and reduces total wood use in a construction project by as much as 35%.
- It is stronger, longer, straighter, more durable and lighter than comparable solid lumber.
- It is widely available and cost-effective.



Engineered lumber can be utilized for sheathing, shear panels, or structural elements like beams and joists.

Photo courtesy of APA.

Agboard



Agboard is a term for a variety of products made of agricultural products or by-products such as wheat, sorghum, straw, or sunflower seed shells. More sustainable than wood, it may be used for non-structural uses such as floor underlayment, cabinets, desktops, doors, and wall or ceiling finish materials.



- Distinctive appearance.
- Some are made of agricultural waste products.
- Rapidly renewable.
- As durable and workable as wood.

Recycled Plastic Lumber



Most useful for long-term use, dimensional plastic "lumber" products can be made from many recycled materials (including polyethylene grocery bags, plastic soda and milk bottles, and pallet wrap), or may use wood fibers for a composite.



- Durable, immune to insects and rot, and UV resistant.
- High recycled content reduces waste and energy use.
- Reduces logging of mature trees, particularly redwoods.
- Requires virtually no maintenance, including the use of sealants commonly applied to wood.

Certified Wood



Forest Stewardship Council (FSC) certification is a widely recognized and respected standard for responsible forest management. Look for certified wood when purchasing hardwood flooring, cabinetry, mouldings, veneers, furniture, and dimensional lumber.

- The negative impacts of logging, milling, transport, and disposal of wood can be reduced through minimizing wood use (with alternate materials, reuse, or better design) and by building with certified wood.

Recycled Content Roofing



Durable shingles that are made from recycled rubber and/or plastics can provide the appearance of slate or wood shakes. They are lightweight and maintain their appearance over time.



- Diverts material from landfills.
- Available with up to a 50-year warranty.

Metal Roofing



Lightweight and durable, metal roofing can be refurbished on-site, delaying replacement. It is recyclable at the end of use.



- Typically available with greater than 80% recycled content.
- Offers good fire protection.

Cool Roofs



Reflective cool roofs, cool roof-rated concrete tile roofing products, and Energy Star® qualified reflective roof products reduce cooling energy demand and reduce the urban "heat island effect." May last up to 75 years, reducing lifetime material costs and preventing waste from going to the landfill.



- Rebates are available (www.sce.com).

Green or living roofs feature living plants atop a membrane roof system. They are very durable, provide habitat, reduce stormwater runoff, and absorb carbon dioxide (greenhouse gases).



Composition Roofing



Durable 40- to 50-year composition shingles are made primarily from asphalt and gravel.



- Saves resources because of their durability.
- Light colors will reflect heat.

Insulation Choices



Recycled Cotton: Made primarily from post-industrial denim, recycled cotton has good thermal performance, has sound insulation better than fiberglass, and is resistant to fire, mold, insects and rodents.



- Non-irritating.
- Diverts material from landfills.
- Fire and pest resistant.

Cellulose: Cellulose insulates as well as alternatives like fiberglass (roughly R-3.7 per inch). Cellulose insulation can be loose-filled into attic spaces or sprayed in to open wall cavities. The spray method has the added benefit of controlling air leakage.

- Made primarily from post-consumer recycled newspaper or cardboard, with nontoxic fire and pest retardants.

Spray Foam: With R-Values of up to 7 per inch, spray foam insulation creates a continuous air barrier, and minimizes condensation and thermal bridging. The greenest foam insulations are bio-based products, derived primarily from agricultural products such as soybeans, instead of petroleum, and/or use water as their blowing agent.

- Reduces energy use.

Fiber Cement Siding



Fiber cement siding and shingles consist of wood fibers blended with cement.



With a variety of wood grain or textures, it is available pre-primed or pre-finished as lap siding, shingles, and panel products.

- Very durable, with little maintenance (50+ year warranty).
- Extremely resistant to pests and rot.
- Non-combustible.
- Can ultimately be processed back into cement.

Selecting Windows and Skylights



When choosing windows, research which models offer the most quality and durability. Energy Star® labeled windows are a good place to start when considering energy performance. For the greatest energy efficiency and durability specify windows appropriate to their orientation (i.e. south-facing), and with:

- Argon gas-filled glazing & low-emissivity (low-e) coating.
- Fiberglass frames. If using metal-framed windows, request "thermal breaks" to minimize heat transfer.
- U-factor less than 0.40.
- A lifetime warranty.
- Also keep in mind that horizontal sliders tend to last longer than other types.

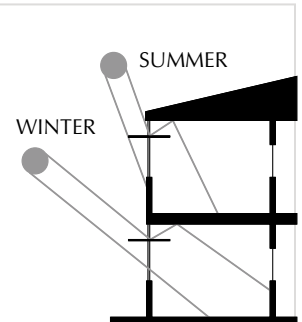
Natural Daylighting



Daylighting is the use of natural light in a building through perimeter windows, roof windows, clerestories, or skylights. Daylighting is best when integrated with electric lighting, shading and controls, mechanical systems, and overall building design.

- Energy savings through reduced electric lighting and, in many cases, from reduced cooling loads.
- Day lit spaces feel better – there is nothing quite like natural light.
- Research demonstrates that natural light improves student performance in classrooms, productivity in the workplace, and offers retail establishments a competitive advantage.

Daylighting saves energy and creates a pleasant indoor environment, providing glare-free, indirect lighting.



Homasote®



Primarily used in multi-family and multi-story dwellings as sound board, Homasote® can also be used for vertical sheathing, insulating nail base for roofing, roof decking, or subflooring. Prefinished panels with decorative cork or fabric coverings are used as interior wall paneling.

- Made from 100% recycled newspaper, with a paraffin binder for water resistance.

Recycled-Content Tile



Beautiful glass and ceramic tiles are made from post-industrial waste from gravel production, recycled windshields, or recycled bottles.



- Requires less energy to manufacture than tile made from new materials.



- Extremely durable, suitable for high-traffic and wet areas.

- Diverts material from landfills.

Recycled Rubber Flooring



Resilient non-skid flooring for commercial and outdoor uses can be made of rubber with high recycled content.



- Extremely durable.
- Low-maintenance.

- Can be recycled back into flooring later on.

Bamboo



Bamboo is perennial grass that grows rapidly and has been used as a building material for millennia.

Bamboo plywood, used for cabinets, furnishings and flooring products, consist of layers of bamboo compressed with binder.

- Conserves forest resources.
- Rapidly renewable, grows to maturity in as little as one year.
- Durable and dimensionally stable.

Reclaimed Hardwood



Reclaimed hardwood may be salvaged from building deconstruction or underwater from trees logged and abandoned long ago. It can be used for flooring, trim, siding, furniture, and, under some circumstances, for structural members.



- Reduces solid waste.
- Saves forest resources.
- May be available in size and old-growth quality no longer available.

Recycled-Content Countertops



Solid-surface composite countertops are available with recycled content.



• Vetrazzo® is a durable surface made from recycled glass and cement. It can be used inside or out, will not fade, and is scratch- and heat-resistant. It is made from up to 95% recycled materials, including crushed bottles, windshields, and stemware.

- Stain- and heat-resistant solid surface countertops like Paperstone® are made from recycled paper compressed in a water based resin.

Linoleum Flooring



Linoleum is a natural flooring material made from linseed oil, pine resin, and wood flour on a natural jute-fiber backing. It comes in a wide variety of colors and styles to suit applications from homes to heavy-traffic commercial uses.



- Very durable, can last for decades.
- Quiet, comfortable, and easy to maintain.
- Made from non-toxic components and biodegradable at the end of its useful life.

Cork Flooring



Cork flooring is made from the bark of cork oak trees, which is harvested approximately every 9 years - without harm to the tree it is harvested from. Cork flooring may be used in any room of a house. Beautiful cork wall coverings are also available.



- Very durable, can last for decades.
- Rapidly renewable, biodegradable at the end of useful life.
- Thermal and acoustic insulator.

Recycled-Content Carpet



The costs and available colors of recycled-content carpets are comparable to standard carpets. Some can even be recycled repeatedly into new carpet. You can also choose low-emitting carpets and padding certified by GreenGuard™ and/or the Carpet and Rug Institute (CRI Green Label™).



- Diverts plastics from the landfill.
- Reduces demand for petroleum resources.
- Low-emitting carpets and padding installed with tack-strip or low-emitting adhesives can improve indoor air quality.

Natural Fiber Flooring



Natural fiber flooring, including jute, sisal, coir, seagrass, wool and others are renewable and biodegradable, and can lend a unique look to your home or office.



- **Seagrass** is a durable, economical plant fiber derived from tropical grasses.
- **Wool** is a rapidly renewable resource that is naturally resilient, stain and soil resistant, and flame retardant.
- **Sisal** is a natural fiber derived from the 'agave sisalana' cactus plant.

Low- or Zero-VOC Paint



The Volatile Organic Compounds (VOCs) in conventional paints (and many other building materials) may be emitted at room temperature for days or even months after painting, contributing to "Sick Building Syndrome".

Look for paint certified by Green Seal™, an independent emissions standards organization.

- Minimal odors.
- Performs as well or better than conventional paints.

Natural Wallcoverings



Natural wall coverings, composed primarily of plant-derived fibers, are a beautiful alternative to vinyl wallpaper, which can be a significant source of volatile organic compounds (VOCs).

- Durable and easy to clean with non-toxic cleansers.
- Breathable and low or no emissions, reducing the likelihood of mold, and helping indoor air quality when applied with appropriate adhesives.
- Made from non-toxic components, and typically biodegradable at the end of their useful life.

Natural Plaster



Beautiful, durable, breathable and biodegradable lime and clay plasters are available for interior and exterior applications.

- Requires less energy to manufacture than conventional cement-based plaster.
- Integral natural pigments, available in a variety of colors, eliminate the need for paint, reducing indoor air pollution and odors.

Saving Energy



There are many easy, cost-effective ways to save energy:



- Replace incandescent bulbs with compact fluorescents (use 1/4 the energy and last 10X longer).
- Install <2.0 gpm showerheads to save on water heating.
- Install a programmable thermostat to automatically change settings at certain times of day.
- Caulk and weather-strip doors and windows.
- Check ducts for air leakage and seal with mastic. Seal gaps around pipes, ducts, fans and vents.
- Insulate your attic/ceiling to R-38. Insulate walls, floors, cooling and heating ducts.
- Replace single-pane windows with dual-pane windows.
- Select energy-efficient appliances. Inquire about rebates at www.settosave.com.

Water-Efficient Fixtures



Inside, use high-efficiency toilets (HETs) that use 1.28 gallons per flush (gpf) or less. HETs use gravity, pressure-assisted or dual-flush technology (0.8 gpf to remove liquid waste and 1.6 gpf for solid waste). Also consider waterless urinals, touch-free faucets, 0.5 gallons per minute (gpm) aerators, 1.0-2.0 gpm showerheads, and front-loading clothes washers.

Outside, install drought-tolerant landscaping, drip irrigation, and consider plumbing for graywater separation (e.g., for use in irrigation, car washing, etc.).

- Rebates and incentives may be available for eligible purchases and landscaping. Learn more at www.cvw.org.

Solar Photovoltaics



Solar Photovoltaics (PV) convert sunlight into electricity. Durable PV panels on the roof of a home or commercial building can generate clean, renewable energy, help owners avoid rising electricity costs, and prevent greenhouse gas emissions. Tax credits, and utility incentive programs can offset the initial cost.



Building-Integrated PV



Building-integrated photovoltaics, or BIPVs, can be integrated into many types of exterior materials, including roofing products, façade materials, awnings, covered walkways, and windows. Electricity is generated when the sun strikes a semiconductor layer laminated to the roofing material or curtain wall's surface.



- Like traditional photovoltaic systems, BIPVs generate clean, renewable energy, help owners avoid rising electricity costs, and prevent greenhouse gas emissions.
- BIPVs are considered more aesthetically pleasing than traditional PV systems.

Energy-Efficient Appliances



Energy and water costs over the life of an appliance may greatly exceed its purchase price. When purchasing new appliances, look for the EPA Energy Star™ seal, or refer to American Council for Energy Efficient Economy's free independent buyers guide (www.aceee.org) for energy-efficient options. Eligible purchases may also qualify for rebates from local utilities (www.sce.com).



When purchasing new appliances, look for the EPA Energy Star™ seal, or refer to American Council for Energy Efficient Economy's free independent buyers guide (www.aceee.org) for energy-efficient options. Eligible purchases may also qualify for rebates from local utilities (www.sce.com).

- Saves money.
- Reduces pollution and greenhouse gas emissions.

Variable Speed Pool Pump



Programmable variable - speed pool pumps utilize the minimum speed and energy required for pool, spa and water feature applications.



- Run cooler and quieter, prolonging the life of the pump.
- Filters work more efficiently, keeping water cleaner.
- May reduce pool's electrical usage & costs by up to 90%.
- Rebates are available (www.settosave.com).

Solar Water Heating



Solar water heating systems use energy from the sun to heat water, reducing the amount of natural gas or electricity needed for residential or commercial water heating. The heated water is then stored for use in a hot water storage tank. Incorporating water conservation measures will ensure that your solar-heated water isn't wasted.



- Easy to retrofit into existing homes.
- Highly efficient; up to 87 percent of the sun's energy that reaches a given section of roof can be absorbed.
- Systems can last several decades.

Radiant Hydronic Heating



In radiant hydronic heating systems, hot water is piped through the floor, warming the room from below.



- Maintains steady interior temperatures when installed in floors with high thermal mass, like tile, concrete, or terrazzo.
- Highly efficient, may reduce heating costs by more than 30%.
- Improves indoor air quality by eliminating the ducts and fans that accumulate and distribute dust and other allergens.