

## Top 20 No or Low-Cost Green Building Strategies

### ENERGY

#### 1. Orient building to maximize natural daylighting

Description: Natural daylighting is usually available to the east, south, and west facades.

Benefits: Maximizing natural daylighting reduces the need for artificial light, thus reducing energy consumption and utility bills. Dwellings that have good natural daylighting are also more pleasant for the residents.

#### 2. Place windows to provide good natural ventilation

Description: Natural ventilation systems take advantage of prevailing winds and thermal convection to ventilate living spaces.

Benefits: Placing windows to take advantage of natural ventilation reduces the need for air conditioning, saves money on energy bills, and can make homes without air conditioning more comfortable.

#### 3. Select a light-colored "Cool Roof"

Description: Dark roofing materials absorb heat, making the house warmer in summer months, whereas light colored roofing reflects heat away from the building.

Benefits: Light colored roofing reduces heat buildup through the roof, thus increasing occupancy comfort and decreasing air conditioning bills. Light colored roofing can also last longer because it does not thermally expand and contract as much as darker colors.

#### 4. Provide overhangs on south-facing windows

Description: Overhangs or screens on south-facing windows are one component of a natural cooling system.

Benefits: Shading south-facing windows reduces heat gain by screening the summer sun during the hottest periods of the day.

#### 5. Install whole-house fans or ceiling fans

Description: Whole-house and ceiling fans improve interior comfort by circulating cold and warm air. They can be adjusted to either

draw warm air upward during summer months or push it downward during the winter.

Benefits: Fans can reduce the need for air conditioning and heating by circulating air effectively, and on average uses one-tenth the electricity of an air conditioning unit.

#### 6. Eliminate air conditioning

Description: After the refrigerator, air conditioning is the second biggest consumer of electricity in an average household.

Benefits: Eliminating air conditioning will significantly reduce a household's electricity bill.

#### 7. Provide combined-hydronic heating

Description: Combined hydronic heating uses hot water stored in the water heater to operate radiators typically installed in baseboards.

Benefits: Combined-hydronic heating saves energy by using hot water already produced and stored in the water heater, and eliminating the need for a separate furnace.

#### 8. Install fluorescent lights with electronic ballasts

Description: Interior fluorescent bulbs and fixtures produce light quantity and quality that is comparable to incandescents, while expending less energy. Electronic ballasts also improve efficiency and reduce flickering.

Benefits: Energy efficient lighting reduces energy consumption and lowers utility bills. One compact fluorescent bulb will pay itself back over ten times over the course of its life through reduced energy use.

#### 9. Install high R-value insulation

Description: Insulation provides a continuous thermal barrier to minimize heat flow through the walls, ceiling and floor. The higher the R-value, the greater the material's ability to insulate.

Benefits: Installing higher R-value insulation improves comfort, decreases demand for air conditioning and heating, saves money, and makes the home quieter.

#### 10. Select Energy Star appliances

Description: Refrigerators and freezers are among the largest users of electricity in most homes. They can account for up to 25% of household energy use. Energy Star appliances use 10–15% less energy and water than standard models.

Benefits: Energy Star refrigerators can save over 10% of the total annual electrical bill in a home. Check with the local utility company for rebate programs.

### **WATER**

#### 11. Design water-efficient landscapes

Description: Low-water landscape designs (such as xeriscape) reduce water use by emphasizing native and/or drought tolerant plants, eliminating turf areas, and minimizing maintenance. Efficient irrigation systems, such as drip and micro irrigation, place the correct amount of water directly at the base of each plant, thus reducing water use and waste from overwatering.

Benefits: Water efficient landscape and irrigation systems help plant growth and overall health by eliminating overwatering or excessive drying. They also lower water bills and reduce impacts on water supply infrastructure.

#### 12. Install water-efficient toilets and fixtures

Description: New toilets use 1.6 gallons per flush compared with old toilets that require 5–7 gallons per flush. Flow reducers fit into the aerator at the tip of the faucet and reduce the rate of water flow through the faucet. Low-flow showerheads replace standard showerheads.

Benefits: Low-flow toilets can save up to 22,000 gallons of water per year for a family of four. Flow reducers can cut water usage of faucets and showers by as much as 40% with little noticeable effect.

#### 13. Use permeable paving materials

Description: Permeable paving allows stormwater to percolate into the soil.

Benefits: Permeable paving allows on-site percolation, thus reducing the volume of polluted water that flows into rivers or bays, while replenishing soil moisture and local aquifers. Additional benefits include reduction in irrigation requirements and a lower risk of flooding.

## **MATERIALS**

### **14. Use 30% – 50% flyash in concrete**

Description: Flyash is a byproduct of coal burning power plants and can be an inexpensive substitute for 15% – 40% of the Portland cement used in concrete.

Benefits: Flyash increases the strength and durability of the concrete. Using flyash also reduces the amount of cement needed, thereby decreasing the overall environmental impacts of cement production (mining and energy consumption).

### **15. Use engineered wood for headers, joists, and sheathing**

Description: Solid sawn lumber in sizes of 2X10 or greater typically comes from old growth forests. Engineered lumber products, however, come from small-diameter and fast growing plantation trees. 2X10 and larger dimensional lumber is typically used for floor and ceiling joists and some seismic applications. Large size lumber can be replaced with engineered lumber (microlam, paralam, gluelam) in most applications unless required by seismic codes. Solid sawn 4X6s are often used for headers when smaller dimension lumber would suffice, such as double 2X6s, unless solid 4X6s are required by seismic codes. Wood I-Joists are an alternative to 2X6s or 2X8s used for floor and roof joists.

Benefits: Reducing demand for large dimensional lumber decreases pressure to cut down old growth forests. Engineered lumber uses wood fiber more efficiently than conventional lumber, resulting in stronger and higher quality homes.

### **16. Use recycled-content insulation, drywall, and carpet**

Description: Recycled-content insulation, drywall, and carpet are made from recycled paper, recycled plastic and glass bottles, recycled wool or recycled cotton. They don't differ in appearance or performance and the prices are comparable to conventional products.

Benefits: Recycled-content materials save resources and divert waste from landfills. Approximately 40 two-liter soda bottles are recycled per square yard of carpeting. Recycled-content insulation may contain up to 30% recycle glass.

## **INDOOR AIR QUALITY**

### **17. Use low- or no-VOC paint**

Description: No-VOC paint does not emit odors related to volatile organic compounds (VOCs). Organic chemicals are widely used as ingredients in household products like paint, adhesives, cleaning supplies, etc. No-VOC paint is used exactly like conventional paint. No-VOC paints are most suitable for indoor use.

Benefits: Use of low- or no-VOC paint can eliminate the eye, nose, and throat irritation, loss of coordination, and potentially damage to the liver and central nervous system caused by VOCs. Outside, VOCs can bond with other pollutants and create ground-level ozone.

### **18. Use formaldehyde-free or fully sealed materials for cabinets and counters**

Description: Particleboard typically contains formaldehyde, which can offgas for 10–15 years. EPA ranks formaldehyde as a probable human carcinogen. Exposure can cause eye, nose and throat irritation, skin rashes, headaches, nosebleeds and nausea.

Benefits: Elimination of formaldehyde-based materials reduces exposure to residents, particularly children, who are most susceptible. Sealing with a flat, latex-based primer or other suitable material can prevent the offgassing of formaldehyde.

### **19. Vent rangehood to the outside**

Description: Steam, gases, smoke and other combustion by-products (such as unburned hydrocarbons) can result from cooking. Stovetop range hoods expel these by-products to the outside.

Benefits: Range hoods improve indoor air quality, prevent overheating and reduce moisture build-up.

### **20. Install carbon monoxide detector**

Description: Carbon monoxide detectors monitor the level of this gas in individual dwelling units.

Benefits: Detectors can reduce harmful human health effects of carbon monoxide, a common indoor air pollutant created by the combustion of natural gas from stoves and heaters.

Post Construction: Prepare operation and maintenance plan

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