

# CONCRETE SUSTAINABILITY

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Learn how you can use concrete to build environmentally responsible homes without compromising beauty, comfort or economy

Green building is the concept of constructing homes and buildings we need today without depleting resources for future generations. In the new world of sustainable building, information about the strength, durability, and indestructible nature of concrete as a resourceful building material is emerging. Amid the teardown-and-replace mentality still pervasive in the world today, concrete stands out defiantly. Try to replace concrete with an alternative building material, and you'll be hard pressed to find a substitute possessing the same thermal qualities, design flexibility, and permanence.



Fortunately, a paradigm shift is taking place in attitudes about resource conservation and sustainability. More builders and homeowners are now embracing green building, and concrete is emerging as a champion rather than a rebel. Read on to find out why, and learn how you can use concrete to build environmentally responsible homes without compromising beauty, comfort, or economy.

## WHAT MAKES CONCRETE A SUSTAINABLE BUILDING MATERIAL?

Concrete is a friend of the environment in all stages of its life span, from raw material production to demolition, making it a natural choice for sustainable home construction. Here are some of the reasons why, according to the Portland Cement Association and the Environmental Council of Concrete Organizations:

**Resource efficiency.** The predominant raw material for the cement in concrete is limestone, the most



Concrete Batch Plant. Davis Colors.

abundant mineral on earth. Concrete can also be made with fly ash, slag cement, and silica fume, all waste byproducts from power plants, steel mills, and other manufacturing facilities.

**Durability.** Concrete builds durable, long-lasting structures that will not rust, rot, or burn. Life spans for concrete building products can be double or triple those of other common building materials.

**Thermal mass.** Homes built with concrete walls, foundations, and floors are highly energy efficient because they take advantage of concrete's inherent thermal mass or ability to absorb and retain heat. This means homeowners can significantly cut their heating and cooling bills and install smaller-capacity HVAC equipment.

**Reflectivity.** Concrete minimizes the effects that produce urban heat islands. Light-colored concrete pavements and roofs absorb less heat and reflect more solar radiation than dark-colored materials, such as asphalt, reducing air conditioning demands in the summer.

**Ability to retain stormwater.** Paved surfaces tend to be impervious and can block natural water infiltration into the soil. This creates an imbalance in the natural ecosystem and leads to problems such as erosion, flash floods, water table depletion, and pollution. [Pervious concrete](#) is a special type of structural concrete with a sponge-like network of voids that water passes through readily. When used for driveways, sidewalks, parking lots, and other pavements, pervious concrete can help to retain stormwater runoff and replenish local water supplies.

**Minimal waste.** Concrete can be produced in the quantities needed for each project, reducing waste. After a concrete structure has served its original purpose, the concrete can be crushed and recycled into aggregate for use in new concrete pavements or as backfill or road base.



*This parking lot installed in 2001 at Bannister Park, Fair Oaks, Calif., is the first in the state to use pervious concrete. The Sacramento Cool Communities program was a partner in the project, which used pervious concrete for stormwater management and to reduce the urban heat-island effect. In about 10 years, the trees will shade more than half the lot.*



*Recycled Concrete Aggregate. Photo Courtesy of Portland Cement*

## WHAT IS GREEN BUILDING, AND WHY DOES IT MATTER?

For most homebuilders and homeowners, expressions such as sustainable development, green building, and eco-friendly design weren't part of the vernacular several years ago (although commercial builders have long been familiar with these terms). But with mounting concerns about rising energy costs and the continued depletion of finite resources, these environmental buzzwords are becoming mainstream.

In the past 10 years, green building has surged in popularity in the residential sector, according to Ray Tonjes, chair of the National Association of Home Builders Green Building Subcommittee. He says that more homebuyers are making environmental issues a top priority for new construction and remodeling.

Sustainability expands on the basic concept of reduce, reuse, and recycle. It seeks to balance sensitivity for the environment with economic and social values. For homeowners, the benefits of green living go beyond environmental stewardship. Sustainable homes also offer many practical, personal, and economic advantages including:

- **Lower utility costs.** Through such strategies as proper site orientation, the use of insulating building materials, and tighter construction to reduce drafts, sustainable homes require much less energy to heat and cool. Sometimes off-grid energy sources, such as solar power, can be used to meet all or part of the homes electricity needs.
- **Reduced impact on the surrounding environment and community.** Sustainable homes make more use of materials manufactured or harvested in an environmentally responsible manner. They also use materials available locally, not only to reduce transportation impacts (such as fuel consumption and pollution) but also to stimulate the local economy. Attention to landscaping is important as well, with consideration given to minimizing stormwater runoff, which can pollute local waterways.
- **A healthier, more comfortable living environment.** By using nontoxic materials, sustainable homes have better indoor air quality. They also use materials resistant to moisture and rot to eliminate concerns about the growth of hazardous mold and mildew. Exterior walls typically have greater thermal mass, which offers the dual benefits of reducing temperature fluctuations and muffling outdoor noise.
- **Greater durability with less maintenance.** Building with highly durable, low-maintenance materials, such as concrete, extends the useful life cycle of a sustainable home and reduces maintenance and replacement costs.



*Concrete is the key building material used in The New American Home 2004. Erin OBoyle Photographics. Photo Courtesy of Portland Cement.*