

The Many Shades of Green: Clearing the Confusion

Confused about all the jargon used to describe "green building"? Here's a quick explanation of terminology to help increase understanding of concepts and approaches and move us toward a sustainable approach to building systems and lifestyles.

Sustainable Building and Lifestyle. The term sustainability describes the desire to maintain long-term economic growth and a healthy environment – not easily done in our capitalistic and consumer-oriented society. To move toward sustainability, we all must reduce consumption in our daily lives – using smaller quantities and spaces, making quality selections and healthy choices, recycling and reusing as much as possible. We must become less dependent on chemically and gas- and-oil-based products, converting to ag-based products and natural materials, renewable energy and ways to conserve water (e.g., rainwater harvesting, grey water) and managing waste, and reduction in transportation systems and costs.

Natural Building. Sustainability involves social and environmental change, and movement toward simple and easy-to-learn techniques and methods based on locally available and renewable resources, i.e., any method of harvesting or using a resource (earth, clay, straw or another fibrous material or crop residue), so that the resource is not depleted or permanently damaged, and using the approach of appropriate technologies.

Appropriate Technologies. To be appropriate, technology must be connected to the place, resources, economics, culture and impacts of its use. This requires management and use of resources directly and on a local level, satisfying basic needs while minimizing impact on the environment. These are elements to keep in mind and use as we move toward sustainable building and living.

Approaches such as natural building and the use of appropriate technologies have many benefits including use of materials readily at hand (salvage, indigenous materials, products manufactured from ag-based sources and crop residues creating new markets within the local economy, reducing dependence on chemically and gas- and oil-based products and energy sources, simpler and less complex systems, reducing transportation costs through regional distribution, conservation and reuse through water conservation and waste management systems, and a lifestyle evolving to less complexity and consumption.

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Sustainability (Building and Lifestyle)

Sources: Webster's dictionary

www.greenbuilder.com/sourcebook

www.EDCmag.com EnvironmentalDesign+Construction, September/October 2003

Natural Building

Source: Michael G. Smith, (Excerpted text from his chapter in the book *The Art of Natural Building: Design, Construction, Resources*. Editors: Joseph F. Kennedy, Michael G. Smith, Catherine Wanek. Used by permission in *The Last Straw* journal, issue #52/Winter 2006)
Resources

www.thelaststraw.org (strawbale and natural building)

www.econest.com (light straw/clay)

www.cobcottage.com (cob and natural building)

www.livingpaper.com (papercrete)

www.ecocomposite.com (composite of multiple compounds/materials)

Appropriate Technologies

Source: <http://lsa.colorado.edu/essence/texts/appropriate.htm>

Resources

Development Center for Appropriate Technologies, Tucson, Arizona. www.dcat.net

The Center for Maximum Potential Building Systems, Austin, Texas. www.cmpbs.org

Ecological Building Network, Sausalito, California. www.ecobuildnetwork.org

Building Science. The desire to improve building energy efficiency led to this way of calculating how heat is generated or lost in a house and how to "tighten" the building and eliminate leaks to gain energy efficiency. However, this approach can lead to a "too tight" building, causing problems such as mold and mildew, and poor indoor air quality.

Indoor Air Quality. Listed by the EPA as a top environmental threat, we continue to construct buildings with windows that don't open, mechanical heating/cooling and ventilation systems with minimal exchange of fresh air or exhausting of stale or polluted indoor air, causing health problems for the building's occupants leading to Sick Building Syndrome or Building Related Illness.

Sick Building Syndrome or Building Related Illness. Sick building syndrome (SBS) describes experiences of acute health and discomfort apparently linked to time spent in a room, zone or building, with no specific illness or cause identified. Building related illness (BRI) is used when symptoms of diagnosable illnesses are identified and attributed directly to airborne building contaminants.

LEED™ (Leadership in Energy and Environmental Design) is a four-level award rating system designed by the US Green Building Council. Ratings are based on total credits earned in each of five categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.

Green Building. Programs such as LEED and other green building programs locally designed such as the one for Austin, Texas, are intended to promote resource conservation (materials, energy, water) while reducing environmental impacts and minimizing waste to create a healthy and comfortable environment, and also reducing operation and maintenance costs. The entire life cycle of the building and its components is considered as well as the economic and environmental impact and performance.

Although a definite step in the right direction, and if we are to use the many shades of green to help us move toward a more sustainable lifestyle, changes still need to be made in attitude, perceptions and concepts of planning and siting, design and construction, selection of materials and finishes, building orientation and site considerations, interior air quality if programs and approaches to truly produce buildings that improve the indoor environment and health of its occupants, as well as reduce consumption of materials and products, energy sources, water and waste management systems.

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Building Science

Source: www.healthyindoorair.org - a partnership program of the U.S. Environmental Protection Agency; Indoor Environments Division, Montana State University Extension Service, Housing Program; and the U.S. Department of Agriculture, Cooperative State Research, Education, and Extension Service.

Indoor Air Quality

Source: www.healthylivingfoundation.org and www.epa.gov/iaq

Sick Building Syndrome (SBS) or Building Related Illness (BRI).

www.epa.gov/iaq/pubs/sbs.html

LEED

Source: www.usgbc.org

Green Building

Sources:

U.S. Department of Energy www.doe.gov

U.S. Department of Energy, Smart Communities Network, www.sustainable.doe.gov

U.S. Green Building Council, www.usgbc.org

U.S. Environmental Protection Agency, www.epa.gov/greenbuilding

Austin Green Building Program, www.ci.austin.tx.us/greenbuilder

Life Cycle Assessment. LCA compares the environmental performance of products and systems, finance, utilities and maintenance over the life of the building so that the least burdensome choices can be made. The process includes fair and holistic assessment of raw material production, manufacture, and distribution including all transportation steps, as well as use and disposal.

Embodied Energy. All the energy required to extract, manufacture and transport a building's materials as well as that required to assemble and finish it is called embodied energy. The energy required to create building becomes proportionately more significant in relation to that required to run them. Every building, no matter what its condition, has a large amount of energy locked into it. Favoring conservation and restoration of old buildings, and designing for a long building life through adaptable and flexible spaces can readily accommodate change. This will help minimize use of materials; help reduce costs of building, renovating and remodeling; keep related costs low. Because the energy used in transporting materials becomes part a building's embodied energy, use of local materials is encouraged and beneficial.

Most of us probably have never considered the impact of embodied energy when thinking about the design and construction, selection of materials and products, decisions regarding energy and water systems and all that goes into any building project. Life Cycle Assessment and Embodied Energy are vital components in the effort to move toward sustainable design and construction, lifestyles and communities.

Life Cycle Assessment

Sources: The Straw Bale House by Athena Swentzell Steen, Bill Steen, David Bainbridge with David Eisenberg, Chelsea Green Publishing, White River Junction, Vermont. 1994
www.life-cycle.org/
www.epa.gov/ORD/NRMRL/lcaccess/lcdef.htm

Embodied Energy

Source: www.archleague.org/tenshadesofgreen/shade4.html

Renewable Resources. Getting off the grid and converting to solar, wind, hydro power and other renewable energy sources; using rainwater catchment and grey water methods to conserve these resources; and turning to permaculture and xeriscape plantings in our surroundings must be part of a sustainable approach.

Passive Solar buildings are designed to collect, store and distribute the sun's energy in winter for heating, and block the sun's rays in summer for cooling without using mechanical equipment. Careful selection and planning of the site, construction materials, and building features enhance this design and keep the building comfortable. This design can be incorporated into any architectural style of construction and is applicable in all climates.

Off-the-grid energy systems do not require connection to utility grids. In remote locations, stand-alone systems can be more cost-effective than extending a power line to the electricity grid. People who live near the grid and want to be independent from the power supplier or demonstrate a commitment to non-polluting energy sources also use off-grid energy systems. Successful stand-alone systems generally take advantage of some combination of techniques and technologies to generate reliable power, reduce costs, and minimize inconvenience.

Net metering allows individuals to use electrical power they generate in excess of their demand to offset their consumption. Allowing their electric meters to turn backwards means the customer receives retail prices for the excess electricity they generate. Without net metering, a second meter is usually installed to measure the electricity that flows back to the provider, with the utility company purchasing the power at a rate lower than the retail rate.

Zero Energy Homes (ZEH) use zero net energy from the utility grid. The design concept matches the maximum energy efficiency of a building to the best renewable energy resources available to maximize the effectiveness of both.

Sustainability requires change in all aspects of our lives: lifestyle, buildings, products and materials, energy and water, recycling and waste management, and reduction of consumption in all ways possible. Reviewing our past and studying what worked, what didn't, or what is and isn't working now will help us assess the drawbacks and benefits of any approach. Because of all of the contradictory information and political views combined with economic and societal pressures, we may not see a fully sustainable society in our lifetime but should dedicate ourselves to moving in that direction if we are to advance while not letting our consumption create problems for future generations.

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Renewable Resources

Source: www.eere.energy.gov

Passive Solar

Source: www.greenbuilder.com/sourcebook/PassiveSol.html

Off the Grid

Source: www.off-grid.net/index.php

Net Metering

Source: www.eere.energy.gov/greenpower/markets/netmetering.shtml

Zero Energy Homes (ZEH)

Source: www.nrel.gov