



E³A: Understanding Energy

Understanding Energy

Energy Pyramid

Net Metering

Off-Grid Living

Green Building

Understanding Your Energy Consumption

Sources and Uses

Carbon and Energy

Importance Scale Survey

Green building programs for high performance and energy efficiency

When people look into buying or retrofitting a home or other building, they consider purchase price (the first price tag), number of rooms, floor plan and the overall look. Buyers increasingly consider the “second price tag,” which includes a building’s operation and maintenance costs. They ask questions about utility bills, maintenance, durability, indoor air quality, comfort and generally how the building will perform.

These programs can help you see the value of both price tags, whether you’re building or buying. Their guidelines take an integrated, whole-systems approach and address the energy and natural resources requirements for construction, operation and maintenance. They recognize the effects buildings can have on the environment and the pocketbook.

The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) program

The LEED program (<http://www.usgbc.org/LEED>) promotes green building design and construction, as well as strategies for operation and maintenance of homes, institutions, commercial and industrial buildings. It also promotes sustainable building interiors and neighborhoods. The program considers performance in the following categories: Site Selection; Water Efficiency; Materials and Resources; Energy and Atmosphere; Indoor Environmental Quality; Location and Linkages; Awareness and Education; and Innovation. A building can earn points in each category, which leads to four possible levels of certification.

Homes

- **Existing:** LEED currently does not address existing homes.
- **New:** Houses in this program maximize fresh air, minimize airborne toxins and pollutants, and have the potential to use as much as 60 percent less energy than a home built to the International Energy Code Council’s (IECC) 2006 code. Visit <http://greenhomeguide.com/program/leed-for-homes> to learn more.



Farm and ranch buildings

- **Existing:** LEED’s Existing Buildings: Operation and Maintenance program helps building owners and operators maximize energy efficiency and minimize environmental impacts. It addresses whole-building cleaning and maintenance issues (including chemical use), recycling and exterior maintenance programs, and systems upgrades.
- **New:** The New Construction and Major Renovations program is primarily for office buildings, but its strategies have been applied to many other building types.

The National Association of Home Builders (NAHB) National Green Building Standard

The NAHB’s National Green Building Standard is for single- and multifamily homes, home remodels and site development projects. The program considers performance in the following categories: lot design; preparation and development; resource, energy and water efficiency; indoor environmental quality; operation; maintenance; and owner education.

Buildings earn points in these categories for four possible certification levels.

Earth Advantage Institute

The Earth Advantage Institute's program (<http://www.earthadvantage.org>) for new and existing homes is currently developing a program for commercial buildings. Program categories include energy, water, health, land and materials.

Environments for Living

The Environments for Living Certified Green program (<http://www.environmentsforliving.com>) addresses has three possible certification levels and four areas of concern: energy efficiency, durability, indoor air quality and water efficiency.

U.S. Environmental Protection Agency's (EPA) Energy Star Program

The Energy Star Program (<http://www.energystar.gov>) provides energy-efficiency ratings for new and existing homes, and commercial and industrial buildings.



Homes

- **Existing:** This program provides information on how you can improve your home's energy efficiency and addresses how to conduct an assessment, sealing and insulating, and how to heat and cool efficiently.
- **New:** This program provides guidelines for building a home that will be 15 percent more energy-efficient than one built to the 2004 International Residential Code (IRC), and 20 to 30 percent more energy-efficient than a standard home. It also addresses efficient insulation, high-performance windows, tight construction and ductwork, efficient heating and cooling equipment, and Energy Star-qualified lighting and appliances.

Farm and ranch buildings

- **Existing:** The Building Upgrade Manual (http://www.energystar.gov/ial/business/EPA_BUM_Full.pdf) provides tips on lighting, supply load reduction, air distribution, and heating and cooling equipment upgrades.
- **New:** The program provides information on how to make informed decisions about energy efficiency in the design process.

The Passive House Institute, U.S. (PHIUS)

PHIUS (<http://www.passivehouse.us>) developed one of the

best building energy standards that can be applied to new construction and retrofits of residential and commercial buildings. This standard can reduce space-heating costs by up to 90 percent. A PHIUS-certified building is well-insulated, virtually airtight and primarily heated by passive solar gain and internal heat gain from people, appliances and equipment. Airtight construction and few, if any, thermal bridges minimize energy loss. Shading and window orientation eliminate summer heat gain, reducing the need for air conditioning. A heat or energy recovery ventilator provides a constant supply of fresh air.



Every program listed entails either a point-based rating system or computer verification tool. Neutral, third-party certification — such as on-site inspections and testing — ensures quality and performance.

State and local programs

Many of these programs may have state or local chapters with websites that provide contact information for certified individuals and companies that can help design, build, remodel and certify your high-performance building.

- Northwest Energy Star: <http://www.northwestenergystar.com/>
- USGBC Missouri Chapter: <http://www.usgbc-mogateway.org/>

Renewable energy design strategies

Most of these programs provide certification points for renewable energy design strategies and considerations.

- Passive solar design: <http://www.nrel.gov/docs/fy01osti/27954.pdf>
- Solar-ready design: <http://www.nrel.gov/docs/fy10osti/46078.pdf>
- Net-zero energy buildings: http://www.nrel.gov/sustainable_nrel/pdfs/44586.pdf and <http://zeb.buildinggreen.com/>

Incentives

- An Energy Efficient Mortgage (EEM) credits a home's energy efficiency in the mortgage itself. http://www.energystar.gov/index.cfm?c=mortgages.energy_efficient_mortgages
- The DSIRE website (<http://www.dsireusa.org>) provides up-to-date information on utility and government incentives available for energy efficiency projects.

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