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## How LEED Certification Works

by [Tiffany Connors](#)

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Introduction to How LEED Certification Works

Let's say you're building a [house](#). You want to "[build green](#)" because you're trying to be more environmentally responsible -- and you also wouldn't mind saving some [money](#) on utilities and maximizing the home's resale value. Where do you start? Most likely, you'll turn to LEED.

In 1998, the [Washington, D.C.](#), trade association U.S. Green Building Council developed the **Leadership in Energy and Environmental Design** (LEED), which has become the authority for builders who want to work with the environment. LEED's green building requirements can be applied to new construction or older homes, but only new homes can be officially certified. The regulations are designed so that construction is healthy and durable for the occupants and the environment.

Some cities have taken the initiative to adopt green techniques as part of their city building codes. For instance, in March 2006, Pasadena, Calif., became the first local government to require LEED certification for private construction. As of October 2007, 22 states and 75 American towns and cities have adopted policies to require or encourage LEED's green building practices.

### Green Building

- [Can installing a green roof save you money?](#)
- [How can soy reduce energy use in my home?](#)
- [PlanetGreen.com: How to Go Green Home Renovation](#)

Some major new buildings in [New York City](#) have also turned to LEED. In September 2006, the Hearst Tower received the first gold certification in the city, in part for its innovative frame, which uses much less [steel](#) than a traditional [skyscraper](#). Seven World Trade Center, the first of the WTC complex to be rebuilt, also got a gold rating for its air-quality improvements, [water](#) and energy conservation measures and waste reduction. With the renovation of the [United Nations](#) headquarters, Secretary General Ban Ki Moon says he hopes the U.N. campus will "become a globally acclaimed model of efficient use of energy and resources" [source: [U.N. Division for Sustainable Development](#)]. The goal for the buildings is a silver LEED certification.

There are a few categories of LEED certification -- for schools, retail buildings and commercial interiors, for example -- but in this article, we'll be talking about **LEED for Homes**. We'll go step by step through the checklist, which includes a number of areas in

which to earn points for certification.

But what if you already own your home? Currently, the LEED for Homes certification is only for new home construction or gut renovations, but plenty of the recommendations can be applied to existing homes, especially if you want to work on green landscaping and materials, water and [energy](#) conservation, and indoor air quality.

[Green Living Image Gallery](#)



Emmanuel Dunand/[Getty Images](#)  
**The Hearst Tower was the first gold LEED-certified building in New York City. See more [green living pictures](#).**

### Discovery Tech: As Green as it Gets

This office building is about as green as it gets. In this "Discovery Tech" video, Tracy Staedter and James Williams see what they did to make it so Earth-friendly. (December, 2008)

[More Science Videos](#)  
[More Discovery Videos](#)

Location, Sustainable Sites and Water Efficiency

### Location

Some LEED location specifications are more difficult than others to meet. The LEED neighborhood development project (**LEED-ND**), which certifies environmentally friendly, sustainable communities, is in the pilot program stage, so there aren't many around yet. Some of the other rules are easier to comply with because they're linked to environmental laws that could already be in place.

1. Buy your home in a LEED-ND certified development.
2. Don't build on wetlands or on farmland.
3. Build within existing communities.
4. Build within a half-mile of existing [water](#) and [sewer](#) lines.
5. Set your home near resources like supermarkets and libraries or near public transportation.
6. Select a site within a half-mile of a community-based open space, like a park.

### Sustainable sites

Again, some of these items could be difficult or impossible for current homeowners (increasing the density of housing units on your property would mean getting into zoning issues). But adding mulch around your plants is a lot more doable -- and it won't upset the neighbors as much.

1. Change as little of the land as possible to avoid disrupting the ecosystem.
2. Minimize the need for water by mulching and using native plants. A [compost](#) heap does double duty, eliminating garbage and producing mulch.
3. Plant native trees and bushes to shade patios, sidewalks and driveways to reduce **heat islands** -- hot spots that raise the overall temperature in a metropolitan area, require more water to cool off and increase energy demand.
4. Install open pavers, retaining walls and rainwater cisterns to prevent erosion and runoff.
5. Use native plants and pest-resistant materials like cement and stainless-[steel](#) screens to cut down on the use of chemicals in your garden. Plant shrubs and trees at least 24 inches from the house so pests don't have a chance to hop from a tree to your basement.
6. Conserve land by increasing the density of housing units (don't use 30 acres for your own private compound).

### Water efficiency

There are many new innovations that will help you reduce water use, and most of them are inexpensive and easy to implement. Some communities offer treated [gray water](#) (waste water) to homeowners as an alternative to using municipal fresh water supplies.

1. Use rainwater or gray water for landscape irrigation. A **rain barrel** is an increasingly popular alternative for collecting water. Basically, it's a plastic or clay barrel that you place under a gutter downspout to catch rainwater. You can cover it with a screen filter to keep out leaves and debris, and putting a lid on it after it rains can prevent some evaporation. Rain barrels range in cost, depending on the size and features, but they generally start around \$100.
2. Install a high-efficiency irrigation system with moisture-sensor controls that minimize evaporation and overwatering.
3. Install high-efficiency fixtures, like low-flow showerheads, faucets and [toilets](#). Fixing leaky faucets and pipes can save gallons of water a day.

### 'Greening Up' Techniques

#### Energy and Atmosphere

This category includes some of the most well-known "greening up" techniques and some of the most effective ways to save energy and money. By now, most people are familiar with Energy Star-rated appliances and those [compact fluorescent bulbs](#), but there are many simple ways to make a big difference in this area.

1. Complete requirements for an Energy Star home, including third-party inspection. You can find Energy Star builders in your area by checking out the government's [Energy Star](#) Web site.
2. Install insulation to meet at least Grade II specifications (few gaps or holes in insulation).
3. Reduce heat and cooling loss by "**sealing the envelope**" (the outer shell of your home -- walls, [windows](#), doors).
4. Use Energy Star-labeled windows and solar-window screens, which can block out not only the summer heat, but also harmful UV rays.
5. Ensure that ducts fit snugly to prevent leakage, and insulate ducts.
6. Install heating ventilation and [air conditioning](#) (HVAC) systems that meet or exceed Energy Star requirements. For around \$100, a programmable [thermostat](#) will allow you to turn off the air conditioning (or turn down the heat) when you're not at home.
7. [Water](#) heating uses about 13 percent of the energy in U.S. homes, according to the [Department of Energy](#). Install an energy-efficient water distribution system -- keeping the [water heater](#) close to the plumbing fixtures and using low-flow faucets and alternative water-heating methods like [solar](#) and tankless water heaters. Solar water heaters typically cost \$1,500 to more than \$3,000, and tankless water heaters can cost from \$900 to \$4,000, not including installation costs. If you decide to stick with your old water heater, consider **water heater blanket**, which wrap around the heater to prevent heat from escaping. You can typically get one for less than \$25 at a hardware store, and most estimates say it will pay for itself in utility-bill savings within a couple of months.
8. Use energy-efficient fixtures and controls, like motion sensors on outdoor lighting, Energy Star-labeled fixtures and compact fluorescent bulbs.
9. Use energy- and water-efficient [washing machines](#), [dishwashers](#), [refrigerators](#), freezers and ceiling fans. Energy Star appliances use 10 to 50 percent less energy and water than standard models. They're more expensive, but you'll make up for it in energy-bill savings.
10. Install a **renewable electric-generation system**, like [wind](#) or solar power. You're going to need some space for wind power, obviously (it requires about an acre), but it has been effective in the Northeast and Midwest [United States](#). Expect to pay about \$40,000 to have a wind system installed. According to the [American Wind Energy Association](#), "Well-sited small wind turbines can usually pay for themselves within 15 years, about half their serviceable lifetimes, if the right [tax] incentives are applied." If you want to use solar power, costs have gone way down in the past few decades -- as much as 90 percent less by some estimates. Plus, many states now require utility companies to charge homeowners for only the energy they consume beyond their solar production. This means that solar users won't be



Richard Drew/AFP/Getty Images

California Gov. Arnold Schwarzenegger and New York Gov. George Pataki check out the solar panels on the Solaire building in [New York City](#), the largest green residential building in the [United States](#).

### How do I get started?

Your first step should be to find a LEED-accredited builder and/or architect. There is a directory of certified professionals -- which also includes interior designers, attorneys, engineers and landscape architects -- on the [U.S. Green Building Council](#) Web site.



Spencer Platt/Getty Images

Seven World Trade Center received gold LEED certification in 2007.

### LEED Points

When construction on your home is complete, your builder will fill out a LEED checklist. There are 129 available points in the LEED for Homes category, and the requirements are weighted. Using renewable energy like [wind](#) or [solar](#) power, for example, can get you 10 points, while installing exhaust fans in your

stuck in a cold, dark house on a rainy day. And some solar panels produce enough [electricity](#) to allow users to sell energy back to the utility company. Installation costs are still high -- in the thousands of dollars -- but they can be offset by [tax](#) incentives and rebates in some states.

- Use non-CFC refrigerants in HVAC equipment (CFCs, or chlorofluorocarbons, contribute to ozone depletion and are linked to [global warming](#)).

#### More LEED Categories

##### Materials and resources

Using [recycled](#) materials in a home requires some investigation, requiring you to ask about products you might not be familiar with. While many people feel comfortable researching [refrigerators](#), deciding whether to use plastic or real lumber can be a little more daunting. LEED notes that many of these products -- like linoleum flooring -- were once considered inferior, but they've made aesthetic strides in the past few years.

- Use less lumber and try modular framing and materials.
- Use salvaged, reused or wood-alternative flooring and walls, and products with low VOC (volatile organic compound) emissions. Avoid tropical [rainforest](#) wood products. Try synthetic materials like linoleum flooring and composite decking, renewable resources like bamboo and jute, and recycled carpet -- either PET (see sidebar) or carpet with reused backing.
- By using products manufactured within the region, you'll further cut down on pollution from transportation.
- Reduce job-site waste to no more than 2.5 pounds per square foot of floor area by recycling or reusing wood, drywall, metal and cardboard.

##### Recycled Carpets

What is recycled carpeting? According to [ecoproducts.com](#), recycled or PET (polyethylene terephthalate) carpet is "manufactured with yarn created from reclaimed polyester resins of two-liter soda bottles and ketchup containers."

bathroom is good for one point. A LEED-certified inspector will then award a level of certification.

- Certified** (45-59 points)
- Silver** (60-74 points)
- Gold** (75-89 points)
- Platinum** (90-128 points)

Points can be added or subtracted from this total based on the square footage of your home. Check out the chart in the [LEED for Homes Program Pilot Rating System](#) manual for more information.

##### Indoor Environmental Quality

There are a number of culprits that increase indoor air pollution, including poor ventilation and high temperature and humidity levels. The exposure to poor air quality can increase long-term health problems like respiratory and [heart disease](#).

- Using a moisture-control, heating, cooling and ventilation system -- like [Energy Star's Indoor Air Package](#) -- can prevent mold, pests and airborne pollutants.
- Ventilators for fireplaces and stoves remove toxic gases from the interior of the home. And you can install [carbon monoxide](#) detectors, which start around \$20.
- Install a humidity control system -- use a [humidifier](#) in dry climates and a [dehumidifier](#) in wet climates.
- Use an outdoor air system to ventilate indoor air. You can purchase specific devices to filter the air as it's entering your home, or you can open a few [windows](#).
- Install exhaust fans in kitchen and bathrooms to reduce pollutants and moisture.
- Design your air-duct system so air flow is evenly distributed among rooms.
- Install air filters. Mechanical, electrical and ionic [air purifiers](#) are available, with a wide range of prices.
- You can protect indoor air quality from outside contaminants with permanent **walk-off mats** (which are larger and more durable than traditional door mats) and [central vacuum systems](#). If you're in the design stage of building a home, LEED recommends including a space at the entrance for removing and storing shoes to prevent bringing outside contaminants into the home. Flush the house of construction contaminants by running the HVAC system fan for one week while the windows are open.
- Seal the foundation of the home and install a [radon](#) detector. Every state has a regional [EPA](#) office, which can help you find a qualified radon testing company.
- Seal an attached garage (and the carbon monoxide emissions from [cars](#)) from the home by painting the garage walls (carbon monoxide can penetrate unfinished [drywall](#)) and installing weather stripping around the doors.

##### Innovation and Design Process

This group has to do with educating the consumer and design innovation --it's really for new homeowners who want to make a long-term investment and get LEED certification.

- Use a team of architects, energy engineers and land planners and implement performance testing. An energy engineer, an architect and a land planner, for example, can work together on how to place [solar panels](#) on a house without making it unattractive.
- Use high-quality, durable materials according to your specific area's needs for the foundation, exterior walls, roof, air sealing and mechanical systems.
- Get creative and go above and beyond LEED standards for bonus points. (You'll need to contact LEED to see if your ideas qualify.)

Finally, your builder should provide you with a LEED for Homes rating certificate, the completed checklist and general guidance for equipment and appliances, as well as a walk-through before completion.

To learn more about LEED certification, check out the links on the next page.

Lots More Information

#### Related HowStuffWorks Articles

- [How to Make Your Home More Energy Efficient](#)
- [How to Save Money on Home Energy](#)
- [How Smart Windows Work](#)
- [How the EPA Works](#)
- [How Fluorescent Lamps Work](#)
- [How Air Purifiers Work](#)
- [How House Construction Works](#)
- [How Prefab Houses Work](#)
- [How Water Heaters Work](#)
- [What can you do to your home to save energy?](#)
- [What is gray water and can it solve the global water crisis?](#)

#### More Great Links

- [Green Building Initiative](#)
- [U.S. Green Building Council](#)
- [U.S. Environmental Protection Agency](#)
- [Home Energy Saver](#)
- [Checklist for LEED for Homes Program](#)

#### Sources

- American Wind Energy Association.  
<http://www.awea.org>

- Bongiorno, Lori. "How Do I Choose a Tankless Water Heater?" The Green Guide, March 11, 2004.
- Earthcraft House.  
<http://www.earthcrafthouse.com/documents/Insulation-Installation.pdf>
- Eco-Products.  
<http://www.ecoproducts.com/>
- Energy Star.  
<http://energystar.gov>
- Garskof, Josh. "How to Cut Your Energy Bills in Half." Money, October 2007.
- Green Building Initiative.  
<http://www.thegbi.org>
- GreenHomeBuilding.com.  
<http://www.greenhomebuilding.com/articles/buildingwithnature.htm>
- Gunther, Marc. "Who's The Greenest Bank Of All?" Fortune, Sept. 17, 2007.
- Home Energy Magazine.  
<http://www.homeenergy.org>
- Home Energy Saver.  
<http://hes.lbl.gov>
- Kamenetz, Anya. "The Green Standard? LEED buildings get lots of buzz, but the point is getting lost." FastCompany.com, October 2007.
- Karush, Sarah. "D.C. Council Passes Green Building Rules." Associated Press News Service, The, December 6, 2006.
- LEED for Homes Program.  
<http://www.usgbc.org/ShowFile.aspx?DocumentID=2267>
- Living Homes architectural firm.  
<http://www.livinghomes.us>
- Natural Resources Defense Council.  
<http://www.nrdc.org>
- Rain barrel guide.  
<http://rainbarrelguide.com/>
- Residential Energy Services Network.  
<http://resnet.us>
- Rocky Mountain Institute.  
[http://www.rmi.org/images/other/GDS-IGB\\_Eubank.pdf](http://www.rmi.org/images/other/GDS-IGB_Eubank.pdf)
- Solar Water Heating Guide.  
<http://www.nrel.gov/docs/legosti/ty96/17459.pdf>
- "The Greenest House on the Planet." Business Week, Sept. 11, 2006.
- Tibbitts, Tim. "Advocates say green buildings cut costs, improve work environment." Crain's Cleveland Business, October 16, 2006.
- United Nations.  
<http://www.un.org/esa/sustdev/index.html>
- United Nations Environment Programme.  
<http://www.grid.unep.ch>
- U.S. Department of Energy.  
<http://www.energy.gov>
- U.S. Environmental Protection Agency.  
<http://www.epa.gov>
- U.S. Green Building Council.  
<http://www.usgbc.org>
- Whole Building Design Guide.  
<http://www.wbdg.org/>