

# green education for the Professionals

I change myself, I change the world



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**Green Lifestyles Collection**  
learn . understand . advocate



## **FORWARD**

Lifestyles represent the values by which we conduct our lives - 24 hours a day, 365 days a year. Green lifestyles should also represent the values by which we conduct our lives - 24 hours a day, 365 days a year. It is a belief that neither stops when we back out of our driveway, nor begins again when we return home.

Children are blessed with the innocence of youth to appreciate in a caring way about nature - the animals and plants they are connected with. As children develop, they can then begin to *learn* how their lifestyles impact the animals and plants they care about.

As adults, we *understand* how our lifestyles affect not only the natural environment, but our health and comfort as well. Importantly, we understand that it is not only the material possessions we pass on to our children, and that simply not being wasteful can go a long way in ensuring the environmental future we pass forward.

Green professionals *advocate* responsible environmental stewardship. With their developed green knowledge and experience, sustainable professionals provide the interpretation, design and delivery of high performance green building projects.

## the professionals

*I change myself, I change the world* Gloria Anzuldua

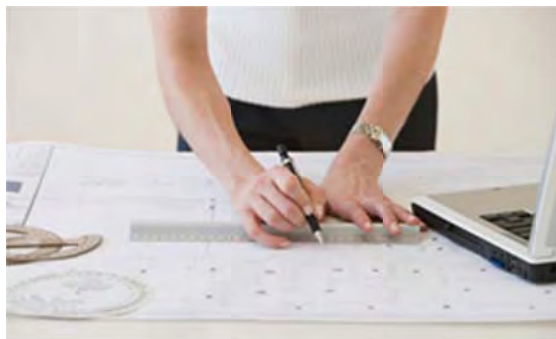
### Who are Sustainable Professionals?



To begin, we should not assume that all professionals who practice sustainability must be recognized or credentialed by any organization, as sustainability has been nurtured by architects, engineers and builders long before organizations created green building principles and rating systems. From the early cave dwellers to ancient Greek and Chinese civilizations, to the sustainable professionals today, we have been harnessing [solar energy](#). These were, and continue to be, responsible pioneers in environmental stewardship to whom much is owed.



Professional knowledge and accreditation in the world of sustainability ranges from merely being able to talk-the-talk to having the capability to walk-the-talk. Sustainable professionals who talk-the-talk support green building design, construction and operations, having a basic knowledge of green building principles and practices (e.g., real estate agents, manufacturer's reps, sales reps, managers, attorneys, lenders, public officials, developers, etc.). Generally, these professionals neither require nor desire a higher technical skill level to function effectively in their respective professions and can achieve basic entry level credentialing through organizations such as the [Green Building Certification Institute \(GBCI\)](#) and [Green Advantage](#).



Professionals who walk-the-talk regularly participate in the design and construction phases of high-performance commercial, institutional, high-rise residential buildings and single family residences (e.g., designers, architects, engineers, landscape architects, environmental engineers, maintenance personnel, contractors/builders, etc.). They exhibit a high level of technical and construction knowledge and are involved in the everyday creation and delivery of sustainable projects. To successfully walk-the-talk, sustainable professionals must deal with many complex decisions when working on sustainable or certified projects. For both non-residential projects and residential projects, they have to work within the constraints of green building codes or green rating systems, as well as their client's budget or degree of environmental interest.

GBCI offers LEED credentialing at several levels and disciplines. At the Tier I level (talk-the-talk) is the LEED Green Associate. The highly skilled Tier II levels (walk-the-talk) offer credentialing for several disciplines: LEED AP BD+C (Building Design & Construction); LEED AP O+M (LEED AP Operations & Maintenance); LEED AP ID+C (Interior Design & Construction); LEED AP Homes (LEED AP Homes); LEED AP ND (LEED AP Neighborhood Development). There is also the Tier III level, reserved for the LEED AP Fellow, sustainable professionals who must be nominated by their peers after meeting a collection of mandatory requirements. For the professionals credentialed prior to June 2009 before LEED v3 was implemented, they can remain a LEED AP, and be referred to as a legacy LEED AP, or they may opt into the new credentialing system via the GBCI [Credential Maintenance Program](#) (CMP).

### **Not All Green Buildings are Created Equal**



Yes, it's true not all green buildings are created equal. For example, consider a commercial development where the developer decides to construct two buildings on speculation, each for retail or office use, identical buildings with respect to size and architectural style. A potential client for building A comes along who may be interested in saving energy, understanding the environmental as well as cost saving benefits associated with reducing energy consumption. However, a potential client for building B may be more interested in seeking the advantages associated with improving the quality of the indoor air, fully aware that these strategies will reduce absenteeism, increase productivity and improve occupant comfort and satisfaction. Here you have two identical buildings, but not identical green buildings. Building A is focused on energy conservation while building B addresses occupant health and comfort.

Before we begin criticizing green building performance, we need to be informed about the targeted green goals of the project.

### **A Word About Green Building Performance**

Professionals provide certifiable buildings in accordance with green building codes or green rating systems, and the specific requirements of the client. Prior to occupancy, the project has been verified by a third party to have been designed and built in accordance with the above requirements. However, the client must be informed that performance not only depends on their awareness of the strategies incorporated to provide a certain level of performance, but also to the fact that performance will begin to degrade the day they take occupancy, if not the day the components were installed. Oversight, monitoring and maintenance are essential to the continued performance of any green project. It is important that the client, owner or tenant understand what is expected of their ownership or occupancy responsibilities in order to maintain building performance. Additionally, an important responsibility of the professional is that of educating their clients as to realistic expectations of performance achievement.

Two examples were posted in the family section to help explain the responsibilities that must be assumed by the owner/user:



Some consumers express disappointment with the performance of their green home. For those who have new homes that were or are being built to conform to some level of sustainability, they need to understand that only the vehicle is being provided to them. The owner of a new car must not only learn how to operate their new car, but also understand the importance of scheduled routine maintenance to the continued performance of their vehicle. As an example, take two families living next door to each other. One, the Jane family includes the mother, father and two teenage girls. Next door lives the John family with mother, father and two teenage boys. Each family buys an automobile. Identical automobiles - same make, model, power train and accessories. The Jane family drives responsibly, managing their daily trips and usage miles, obeying speed limits and having scheduled maintenance performed as recommended. On the other hand, there is John and his two teenage boys. Jumping in the car at every whim, total disregard for speed limits and changes the oil and spark plugs only when the car fails to start. Guess which family achieves the performance and reliability they expected when they purchased their brand new automobile? This same analogy applies to a sustainable building - that sustainable building is as well constructed and finely tuned as an automobile.



A sustainable home is greater than the sum of its pieces. While each of the individual pieces have meaning on their own, it's when taken together - working in unison – where the meaning changes. High performance buildings depend on these pieces being coordinated as a whole. For example, your sustainable home may use energy conservation measures designed to meet a certain performance level to save energy based on agreed to material and color selections. Change the colors from light to dark and flooring from carpet to ceramic and you've changed the original parameters. And, occasionally, these seemingly innocent changes are made too late, as the equipment had been installed. Now the dark colors reflect less light and absorb more of the sun's energy and the ceramic tile acts as a heat sink. More artificial lighting is required, possibly additional cooling needed and certainly more electricity. A sustainable design and construction team are aware of the design and parts that must be applied before they begin the project. However, given the fact that not only was the new home designed and built to specific parameters, the home will begin to degrade the day the keys are turned over. The homeowner needs to be aware of their responsibilities to ensure continued high performance. And this requires an education about their home and its design and construction parameters (e.g., energy and water conservation measures, indoor air quality equipment and operation). A green lifestyle may require a change in lifestyle. Learning the importance of how to use water and energy to maintaining the sustainable products and equipment are all fundamentally important.



## **the U.S. Green Building Council Overview**

**U.S. Green Building Council (USGBC):** The U.S. Green Building Council was founded in 1993 by Rick Fedrizzi, David Gottfried and Mike Italiano, three friends with backgrounds in marketing, development and environmental sciences. Today, USGBC is a community comprising 78 local affiliates, more than 18,000 member companies and organizations, and more than 140,000 LEED Professional Credential holders, leading a diverse constituency of builders and environmentalists, corporations and nonprofit organizations, elected officials and concerned citizens, and teachers and students. The U.S. Green Building Council (USGBC) is a 501 c3 non-profit organization.

**Green Building Certification Institute (GBCI):** The Green Building Certification Institute (GBCI) is an independent, third-party organization established in 2008 to administer project certifications and professional credentials and certificates within the framework of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) Green Building Rating Systems™. GBCI offers validation that LEED building certifications and LEED professional credentials have met specific criteria.

**Leadership in Energy and Environmental Design (LEED):** Developed in 1998, LEED is a green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO<sub>2</sub> emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

**LEED Online:** LEED Online is the primary resource for managing the LEED documentation process. Through LEED Online, project teams can manage project details, complete documentation requirements for LEED credits and prerequisites, upload supporting files, submit applications for review, receive reviewer feedback, and ultimately earn LEED certification. LEED Online provides a common space where members of a project team can work together to document compliance with the LEED rating system. With the exception of projects registered under LEED for Homes, all projects must be certified using LEED Online.

**GREENBUILD:** The annual Greenbuild International Conference and Expo was launched in 2002 as the world's largest conference and expo dedicated to green building.

### **How it all Works**

One can look at **USGBC** as the mothership, directing her individual warriors she created solely for administering and regulating her doctrine for sustainability. Currently there are two entities subordinate to USGBC that are responsible, in part, for carrying a large portion of the burden – **GBCI** (the Green Building Certification Institute) and **LEED** (Leadership in Energy and Environmental Design).

Sustainability in this country, and many other countries throughout the world, is benchmarked by Leadership in Energy and Environmental Design (LEED). LEED defines both the accredited professionals who work in the sustainable field and the degree of sustainability of certified constructed projects. As such, there are two distinct parts to the LEED environment.

One part is the accreditation of professionals who possess knowledge in the field of sustainability. There are three levels, or tiers, of accreditation based on the degree of green knowledge. Tier I is the LEED Green Associate who demonstrates a basic knowledge and skill in practicing green design, construction and development. Tier II is the LEED Accredited Professional with Specialty for those who have an extraordinary depth of knowledge in green building practices and specialization in a specific field. These professionals are designated as LEED AP+, where the + marker indicates the designation for the area of specialization, such as LEED AP BD+C, whereas BD+C indicates Building Design and Construction. The top level, Tier III, is reserved for the LEED AP Fellow, a LEED AP with specialty who has held the LEED AP credential for eight cumulative years and must document a total of at least 10 years of experience in the green building field. Nominees for the LEED Fellow will be nominated by their peers.

The second part of LEED is the certification of sustainable projects, as defined by the various LEED rating systems. Certification is awarded based on the degree of sustainability for the rating system selected by the project team. LEED rating systems cover a broad spectrum of building types, with pilot programs under development for additional rating systems. The LEED New Construction and Major Renovations rating system defines certain types of newly constructed projects, and includes major renovations. LEED for Homes is specific for residential projects, LEED Schools covers schools meeting certain criteria, and so on. For each rating system, there are various levels of certification awarded as determined by the amount of 'green' credit points achieved.

The major source controlling these processes is the Green Building Certification Institute (GBCI). GBCI performs two basic functions. The first is the development and administration of the accreditation examinations for LEED GA or AP candidates. The second responsibility of GBCI is managing the LEED project certification process.

### **A Snapshot Summary**

**USGBC:** Develops LEED Green Building Rating Systems; Provides and develops LEED based education and research projects

**GBCI:** Provides third party LEED professional credentials; Provides third party LEED project certification

**LEED:** The rating systems, specific to the project type, that establish the parameters for certified sustainable projects

**USGBC National Membership:** Only organizations, corporations or institutions are eligible for national membership

**USGBC Chapter Membership:** Only individuals are eligible for chapter membership

**Accreditation: People are accredited**

**Certification: Projects are certified**

**Products: Products are neither accredited nor certified.** USGBC, GBCI and LEED neither promotes nor endorses products

### **the National Association of Home Builders Overview**

**National Association of Home Builders (NAHB):** The National Association of Home Builders (NAHB) is a trade association that helps to promote the policies that make housing a national priority. Established in 1942, NAHB has been serving its members, the housing industry, and the public at large. NAHB's affiliates include the NAHB Research Center, which develops, tests and evaluates new materials, methods, standards and equipment to improve the technology and the affordability of America's housing; and the Home Builders Institute, NAHB's workforce development arm, which develops and administers a wide range of educational and job training programs.

**National Association of Homebuilders Research Center:** The NAHB Research Center is a full-service product commercialization company that strives to make housing more durable and affordable. The NAHB Research Center was created in 1964 as a subsidiary of the National Association of Home Builders (NAHB).

Benefits of working with the NAHB Research Center:

- Wholly-owned subsidiary of NAHB, which provides us unique access to the home building industry but allows us to maintain independence and objectivity
- Top industry resource for reliable, objective information and research on housing construction and development issues
- Highly skilled and experienced interdisciplinary team of technical experts in all branches of engineering and research

- Full-service, accredited product testing and certification laboratory

**Home Builders Institute (HBI):** Home Builders Institute (HBI), established in 1983 as the workforce development arm of the National Association of Home Builders, is dedicated to the advancement and enrichment of education and training programs serving the needs of the building industry. The creation of this non-profit corporation was a result of the merger of NAHB's Manpower Development and Training Division, Education Department and the Education Foundation. For more than 30 years, HBI has trained skilled workers in residential construction, promoted the industry as a career and helped the NAHB membership address its need for qualified employees.

**NAHBGREEN:** NAHBGREEN offers builders, remodelers, developers, and other home building professionals a variety of services to learn, incorporate, and market green building.

Specific program components include:

- **ICC-700-2008 National Green Building Standard**  
This ANSI approved standard defines green building for single and multifamily homes, residential remodeling projects, and site development projects. It allows flexibility for regionally-appropriate best green practices.
- **National Green Building Conference**  
This annual conference features exhibits, education sessions, networking opportunities, tours, and the National Green Building Awards. It is the only national conference targeted to green building for the mainstream residential building industry.
- **National Green Building Certification**  
The NAHB Research Center accredits third-party verifiers and is the sole certifying body for the National Green Building Program.
- **Certified Green Professional (CGP) Designation**  
Classwork leading to the designation provides a solid background in green building methods, as well as the tools to reach consumers, from the organization leading the charge to provide market-driven green building solutions to the home building industry.
- **Green Approved Products**  
Find products that the NAHB Research Center has approved as being eligible to contribute points toward certification under the National Green Building Standard™. Such products, when appropriately used, enable builders to earn points toward certification of the building.
- **Green Scoring Tool**  
Allows designers to score new homes, renovations, and land developments to the National Green Building Standard or the **NAHB Model Green Home Building Guidelines**. It is the tool to use for National Green Building Certification

**ICC 700-2008 National Green Building Standard:** The National Green Building Standard is the first residential green building rating system to undergo the full consensus process and receive American National Standards Institute approval. The four threshold levels - Bronze, Silver, Gold, and Emerald - allow builders to achieve entry-level green building, or the highest level of sustainable "green" building incorporating energy savings of 60% or more. Single-family & multi-unit homes, residential remodeling projects, and site developments are all covered in the Standard.



## Green Perspectives from Sustainable Professionals

### Green Trend Forecasting

*The following article was published by Shawn Hesse, with Emersion Design and the 2008 Chair of the USGBC Cincinnati Chapter.*

Over the course of the last 8 years, Green talk has infiltrated everything. The number of "Green Building" articles in newspapers has jumped from around 1,000 per year in 2000 to more than 9,000 in 2007. More cities and states are adopting green building incentives and policies (like Cincinnati and Ohio). Much of this has been attributed to the U.S. Green Building Council's LEED Rating system and its success. The USGBC has had a huge impact on the building industry as membership in the organization has grown by 50% every year for the last ten years. But there is something much larger at work in our world than the impact of LEED. Companies ranging from Wal-Mart to Starbucks are touting their sustainability initiatives, and it isn't just limited to the United States. There are now Green Building Councils in twelve countries on five continents. Somewhere along the way, 'green' has crossed the line between a fad and a movement.

Motivations for companies going green vary widely, and aside from the obvious motivation of saving the planet, many organizations have gone green to save money, or even to simply improve their public image. Still others have started talking green just to ride the wave of dollars following as customers seek greener products, vehicles, homes, and offices. So what's next? Amidst the green buzz, here are several trends in the green movement that visionary businesses should be preparing for.

The first green trend and the reason LEED has been successful, is third party verification. In a time when Chevron and BP make commercials about their sustainability missions, and green-washing claims like 'all natural' are everywhere, it is important to have verifiable definitions for what green really is. For buildings, that is LEED, but there are many other important third party verifications for the rest of our lives and businesses. The International Organization for Standardization is developing the 14000 series of ISO standards to define vocabulary and validate processes for product manufacturing and environmental impact management.

The second trend related to going green is rising energy costs. This should go without saying, but energy will only get more expensive before and if it ever gets cheaper. A comparison between investing the same amount of money in the S&P 500 or in energy efficiency for your building puts it all in perspective. Over the last ten years, the S&P 500 Index Fund has increased 36.8% while energy costs have risen 300%.

The phrase "Blue collar jobs to Green collar jobs" is one of the hottest topics for politicians, and represents the third trend. With the global push for sustainability, the need for solar panel manufacturing and installing, wind turbine manufacturing, green product manufacturing, and an endless list of sustainable business opportunities justifies the name "the Next Industrial Revolution".

Finally, savvy businesses recognize that by embracing sustainability at their core, employees will be proud to work there. When your job and your company is about more than just making widgets, a sense of loyalty and pride is inevitable, and as 'Generation Y' takes hold in the workforce, with their notorious 'job-hopping' tendencies, it is even more important for employers to recognize the recruitment potential of going green before their competitors do.

## **Integrated Design Process**

*The following article was published by Chad Edwards, RA, LEED AP, an Associate at Emersion Design and serves on the USGBC Cincinnati Regional Chapter Board of Directors.*

The built and natural environments are inextricably and vitally linked. To create a high performance / sustainable facility, a collaborative design approach is essential for a successful outcome. The Integrated Design Process fosters knowledge-sharing among significant stakeholders during the development of a holistic design and leads to increased project value.

These stakeholders should be comprised of the owner group, key users, facilities directors, programmers, real estate managers, architects, commissioning agents, civil engineers, planners, mechanical engineers, interior designers, structural engineers, construction managers, electrical engineers, plumbing designers, landscape architects, and / or key specialty consultants. The General Contractor and / or the Construction Manager should also be included in this process to encourage the sharing of cost, scheduling and construction knowledge. This will also familiarize the contractor with the construction intent resulting in a more accurate bid and more efficient construction period.

During the traditional approach, design and construction professionals work somewhat independently on their respective area of expertise. One of two things can happen when consultants are added to the design process midstream. The new team member shares expertise that changes the project late in the process, requiring more time, effort and money to back track; or more commonly, the team decides not to pursue the new approach. In either case, the project and the owner suffer a consequence. 'Value Engineering' during design and construction becomes the norm, which leads to value loss. The Integrated Design Process deviates from this traditional approach as it leverages the collective expertise as early as the pre-design phase, where the highest potentials and greatest values are realized. 'Value' engineering tends to generate project cuts, which successfully lessen the construction costs, but usually lessen the true value. The Integrated Design Process is vital to a successful work process, which can lessen the damages of 'value' engineering.

By bringing all the stakeholders to the design process early, intensive analysis and in-depth investigations can discover complementary and innovative project goals and design strategies when change costs less. This Integrated Design Team establishes project goals together while engaging in a productive exchange of ideas. The team understands, applies and tests these goals throughout the design process.

Stakeholders share their knowledge in multi-day charrette (brainstorming) formats; trade-offs and connections are recognized. Problems are reframed and better solutions are generated by creating an innovative and collaborative environment where each opinion matters. The entire team establishes and meets the project goals, objectives and major solutions. These charrettes frequently become rather lively and informal without jurisdiction. They are investigatory by nature, thoughtfully critiqued and leverage the expertise and resources of the team. Connections are made that typically are not immediately understood, such as how paint color impacts the mechanical load or how building orientation affects human productivity. Sometimes the most effective solutions have the lowest construction cost implications and might be undiscovered in a traditional design process.

By utilizing the Integrated Design Process, deep curiosity, thorough analysis and strategic, technical problem solving prevail, leading to a more comprehensive, cost effective and sustainable facility.

## LEED versus Green

*The following article was published by Greg Raffio, LEED AP, with Heapy Engineering.*

Three years ago, my team of graduate engineering students was presenting the energy, environmental, and economic analysis for the construction of a net-zero energy building. The client patiently listened, asked questions, and then dictated a verdict... we had the financial green light. Years of analysis, research, and calculations had paid off.

Next, we assembled a professional design team to take the project from concept to concrete. The house would have it all: net-zero energy use, a sustainable project site, low water use, and sustainable materials. The idea of LEED certification was brought up and immediately dismissed by the team. Why would our building need such a stamp of approval when we knew just how good the design was? No one knew just how wrong we were. Throughout the various stages of design, our student team lamented as the green features were removed. Once completed, the building would retain its net-zero energy status, but had lost all other important green features.

My current projects are larger and more expensive than that small house. But, the values of the lessons learned during my final years as a graduate student are greater than any that I have learned. I have come to realize the true value of the LEED rating system as a necessity to truly attain sustainable ("green") design.

During my career, I have seen project teams make 70% of the design decisions while spending just the first 1% of the design budget. Thus, it becomes a daunting task to retroactively set project goals ... specifically sustainability goals. The less prominent the goal, the more likely the feature necessary to attain that goal will fall by the wayside or be "value-engineered" from the project.

The LEED Rating System is a tool that a design team uses in order to insure that a project's green features are properly designed, constructed, and accounted for. Human error pervades the construction process. Examples of such errors include ordering the wrong product, calculation mistakes, or forgetting a step in a process. The LEED process, by no means ensures a perfect building. However, many portions of the LEED process act to significantly decrease such errors. One of the most prominent examples is the commissioning process, which is a service that all owners will benefit from, regardless of project scope, size, or cost.

Once the entire project has been completed, the owner asks, "What insures that I now own and operate a green building?" If the project has achieved LEED Certification, the team can be certain of their answer. The entire project team knows which goals have been successfully achieved, how much energy and water the building should save, and what type of indoor environment has been created for the building occupants.

A holistic perspective is necessary to grasp the true impact of a third-party rating system such as LEED. The LEED Rating system has two major components. First, LEED promotes general sustainability oriented features such as bike racks and daylighting. Second, LEED is a group of "best-practice" codes and standards compiled to influence the construction industry. When projects pursue LEED Certification, the market is driven to provide goods and services that attain the standards that have been chosen. Each LEED-Certified project strengthens the green building movement, pushes for products that are less impactful on people and the environment, and enables property owners to truly know just how "green" their building is.

## Why Bother with LEED Certification

*The following article was published by Michael Senger, LEED AP, is a Mechanical Engineer with Heapy Engineering. Involved in over 100 LEED projects and with +50 LEED Accredited Professional on staff, Heapy Engineering one of the leading sustainable design firms in the country. Michael is also a Board Member of the Cincinnati Regional Chapter of the USGBC.*

Building owners often question the additional time and expense involved with registering a building for Leadership in Energy and Environmental Design (LEED (Registered)) certification through the United States Green Building Council (USGBC), versus just simply including "green" features in a project. There are several reasons why owners choose to have their buildings certified through the various LEED Rating Systems. Some building owners feel that environmentally it is the right thing to do. Others make the decision to pursue LEED due to requirements of their own governing body. Still other building owners pursue a financial incentive offered through their local government or parent organization. Essentially, there are three general reasons why building owners should seek Certification: commitment, legitimacy, and marketability.

**Commitment.** By registering your project with the USGBC you are committing to design and construct your building to the standards and requirements outlined by the LEED Rating System. Your design team and your building's contractor are then committed to integrating those design features to ensure that your building is more durable, healthy and more energy efficient. Through the rigors of budget, programming, or other project challenges, these "green" features will remain because you and your team decided to produce a building that merits LEED Certification and national recognition for its sustainability.

**Legitimacy.** In the face of widespread "green washing" (ie: the attempt by businesses or individuals to mislead consumers as to the environmental practices of a company or the environmental benefits of a product or service), LEED Certification tells your peers, clients and customers, that your building's sustainable features have been verified by a third party to promote energy conservation, to ensure a healthier indoor environment and to reduce its impact on the environment. LEED is a consensus-based system, meaning one that was commented and voted upon by the USGBC's diverse membership. It ensures that your project team didn't just invent the "green" requirements on your own or design your project to some arbitrary definition of sustainability. Instead, thousands of professionals (there are over 45,000 LEED Accredited Professionals within the USGBC) collaborated, discussed and agreed upon these requirements.

**Marketability.** A LEED Certified headquarters, branch office, retail location, or elementary school is a strong marketing tool to show the community that your organization is committed to something greater than itself. It demonstrates that you were willing to make the extra effort to not only include those features, but also to have them confirmed - better yet Certified - by a nationally and internationally recognized leader in the field. The LEED Rating System is a tool that can help create a space that will enhance your employees', clients', or students' everyday environment while reducing operating and maintenance costs as well as decreasing its impact on the environment. LEED Certification demonstrates how it was accomplished.

## Websites and Blogs



Please visit ***the professionals*** category at [www.studio4llc.com](http://www.studio4llc.com) for direct links to these websites.

### Councils and Associations:

[U.S. Green Building Council \(USGBC\)](#)

[Green Building Certification Institute \(GBCI\)](#)

[Leadership in Energy and Environmental Design \(LEED\)](#)

[LEED Online](#)

[LEED Online](#) login

[USGBC Regional Chapters](#)

[Canada Green Building Council \(CaGBC\)](#)

[Green Advantage](#)

[World Green Building Council](#)

[Building Research and Environmental Assessment Method \(BREEAM\)](#)

[Green Building Initiative \(Green Globes\)](#)

[National Association of Homebuilders \(NAHB\)](#)

[NAHBGREEN](#)

[American Institute of Architects \(AIA\)](#)

### Government and National References:

[U.S. Department of Energy \(DOE\)](#)

[U.S. Department of Energy Building Energy Codes Program](#)

[U.S. Environmental Protection Agency \(EPA\)](#)



[Terms of Environment](#) EPA Environmental Glossary, Abbreviations and Acronyms

[California Environmental Protection Agency](#)

[Ohio Environmental Protection Agency](#)

[Sheet Metal and Air Conditioning Contractors National Association \(SMACNA\)](#)

[Stormwater Glossary of Terms](#)

[Brownfields and Land Revitalization](#)

[Code of Federal Regulations](#) Definitions of prime agricultural land and wetlands

[FEMA](#) Definition of 100 year flood

[U.S. Fish & Wildlife Service](#) Endangered Species Program

[NOAA](#) Office of Protected Resources Endangered Species Act

[CalGreen](#)

[Whole Building Design Guide \(WBDG\)](#) National Institute of Building Sciences

[California Building Standards Commission](#)

[WaterSense](#)

[ENERGY STAR](#)

[American Society of Heating, Refrigerating and Air-Conditioning Engineers \(ASHRAE\)](#)

[American National Standards Institute \(ANSI\)](#)

[Institute of Electrical and Electronics Engineers \(IEEE\)](#)

[Illuminating Engineering Society of North America \(IESNA\)](#)

[International Association of Plumbing and Mechanical Officials \(IAPMO\)](#) Uniform Plumbing Code

[International Code Council \(ICC\)](#) International Plumbing Code

**Publications:**

[Environmental Design + Construction](#)

[Green Builder](#)

[Architectural Record](#)

[EnviroInfo](#)

[Environmental Magazine List](#) list for US and Canada

[Stratford, Naturally](#) list for US and Canada

**Legal:**

[Green Building Law Update](#)

[Green Real Estate Law Journal](#)

[GreenLaw](#)

[Green Building Law](#)

[Green Energy and Development Law](#)

[Environmental Law Professor Blog](#)

**Websites & Blogs:**

[Best Green Blogs](#)

[Green Blog List](#)

[ARE forum](#)

[LEEDuser](#)

[Real Life LEED](#)

[Harvard Green Building Resource](#)

[McGraw-Hill](#)

[HOK](#)

[Life at HOK](#)

[Building My Green Life](#)

[GreenLearner](#)

[Inhabitat](#)

[Treehugger](#)

[Architype Review](#)

[PBS Green Builders](#)

[Sustainable Connections](#)

[Building Commissioning](#)

[Energy Modeler](#)

[Facilities Management Resource](#)

[Building Green](#)

[Alternative Energy News](#)

[Renewable Energy Solutions](#) (community-built)

[The Green Workplace](#)

[Greener Buildings](#)

[Business Green](#)

[Inside Cleantech](#)

[Green Business](#)

[Michelle Kaufmann Studio](#)