WaterFurnace and the LEED Green Building Rating System™

Few recent trends in the building industry have achieved the momentum that has marked the growing interest in green building technology. Advances in techniques and materials have made it possible to do what was unthinkable only a few years ago: Design buildings that enhance the environment instead of exploiting it.

This report summarizes some of these advances and explains the role that a high-efficiency, environmentally friendly geothermal or water source heating and cooling system from WaterFurnace International can play in designing a green building. It will also briefly explain the LEED Green Building Rating System program from the U.S. Green Building Council and how WaterFurnace can help you achieve LEED certification.

LEED stands for Leadership in Energy and Environmental Design. Designation as a LEED building is one of the highest honors a building designer and owner can achieve. The process is rigorous, but the rewards are great. And they go far beyond the official designation. Much like a world-class athlete can take satisfaction both in winning an athletic contest and in the strength and health achieved along the way, a green building owner will reap benefits years after the LEED certificate is awarded.

At WaterFurnace International, we manufacture the most energy-efficient and technologically advanced geothermal and water source heating and cooling systems available. Our systems do not directly burn fossil fuels and therefore emit no harmful pollutants, such as carbon dioxide, which is associated with the greenhouse effect and global warming. All of our units use the chlorine-free refrigerant R-410A, which will not harm the environment.

The Business Case for Green Buildings*

- In the event that up-front costs are higher, they can be recovered through lower operating costs.
- Integrating design features lowers ongoing operating costs.
- Better buildings equate to better employee productivity.
- New technologies enhance health and well-being.
- Healthier buildings can reduce liability.
- Tenant costs can be reduced significantly.
- Property value will increase.
- Financial incentive programs are available for green buildings.
- Communities will notice your efforts.
- Using best practices yields more predictable results.

*Source: “Making the Business Case for High-Performance Green Buildings,” a pamphlet produced by the Urban Land Institute and The Real Estate Roundtable.

Note: For more details on green building techniques and a comprehensive examination of the material in this report, we recommend the publication, Building Momentum: National Trends and Prospects for High-Performance Green Buildings, prepared for the U.S. Green Building Council for the U.S. Senate Committee on the Environment and Public Works, published by the U.S. Green Building Council, February, 2003. This report is available online at www.usgbc.org. This website also is an excellent source for learning about the LEED program.

As a part of the green building industry, we support efforts by the USGBC and other private and governmental organizations to promote all green building technologies. There is no doubt that using green building technologies benefits not only a building’s owner and employees but the public and the environment as well. To support this end, many states already offer energy efficiency rebates and incentives. There is a wealth of research and hands-on experience to support this idea, and we recommend those interested seek further information from sources such as the USGBC, the U.S. Environmental Protection Agency, the U.S. Department of Energy and the GEO (GeoExchange) in Washington, D.C.

Here is a brief look at the U.S. Green Building Council and its LEED Green Building Rating System program, which is changing the building industry.

Simply put, LEED gives facility design and management teams a benchmark from which
to base their sustainable building plans, giving them a touch-point to compare product specifications and other environmentally friendly decisions. Becoming involved in the LEED rating system is probably the easiest and most technically complete way for building professionals to learn sustainable design and environmental stewardship.

Council membership represents nearly 3,000 leading organizations, including building owners; architectural, interior design and engineering firms; product manufacturers; contractors and builders; environmental groups; professional societies; developers; financial and insurance firms; utilities; universities and technical research institutes; building control service contractors and manufacturers; and federal, state and local government agencies.

The USGBC’s mission is to promote buildings that are environmentally responsible, profitable and healthy places to work. Council members collaborate to develop LEED resources, policy guidance, and educational and marketing tools that support sustainable building design.

LEED is a cutting-edge system for designing, constructing and certifying green buildings. The full program offers training workshops, professional accreditation, resource support, and third-party certification of a building’s performance.

The LEED system is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. Members of the USGBC, representing all segments of the building industry, developed LEED and continue to contribute to its evolution. LEED standards are available for new construction and major renovation projects, new schools, existing building operations, commercial interiors projects and high-rise residential buildings.

**LEED was created to:**

- define “green building” by establishing a common standard of measurement
- promote integrated, whole-building design practices
- recognize environmental leadership in the building industry
- stimulate green competition
- raise consumer awareness of green building benefits
- transform the building market

LEED certification is based on a rating system that awards credit points to a project that meets or exceeds each credit’s technical requirements. Points add up to a final score that relates to one of four possible levels of certification. A newly updated version of this rating system, LEED Version 3.0, takes the project’s designers and owners through a step-by-step process of identifying the categories eligible for certification points and how to apply for them.

But that’s only part of the USGBC’s green building program. Membership in the USGBC offers resources that can be extremely helpful to building professionals in their pursuit of green building technology and its many applications and benefits. For more information, you may visit the USGBC Web site, www.usgbc.org or call 202-828-7422. The USGBC is located at 1015 18th St. NW, Suite 805, Washington, DC, 20036.
The Leed rating system and WaterFurnace

The U.S. Green Building Council’s LEED Green Building Rating System is based on the LEED Letter Template, a dynamic tracking and documentation tool that must be used by Version 3.0 project teams in preparing a complete LEED certification submittal. For each credit, the Letter Template prompts LEED practitioners for data, indicates when documentation requirements have been fulfilled adequately for submittal, and serves as a formatting template for the project’s initial submittal. Additional support documents will be requested during the certification auditor’s auditing phase.

This rating system document states the basic intent, requirements and documentation submittals that are necessary to achieve each prerequisite and voluntary “credit.” Projects earn one or more points toward certification. Points add up to a score that relates to one of four levels of certification.

<table>
<thead>
<tr>
<th>Points</th>
<th>Certification</th>
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<tr>
<td>40-49</td>
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<tr>
<td>50-59</td>
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Following is a portion of the certification checklist as it applies to potential points available with the use of WaterFurnace equipment. Please consider this as a guide to how your building or renovation project could benefit from using WaterFurnace equipment. We urge you to talk with the USGBC about these and other categories for which your building may qualify.

We estimate a total of 30 points potentially may be available, more than halfway toward the goal of 50 points for Silver certification.

What is a “Green” building?

Green buildings are designed, constructed and operated to boost environmental, economic, health and productivity performance over that of conventional buildings. As reflected in the USGBC’s voluntary LEED rating system, widely accepted as the national standard for green buildings, an integrated design approach addresses the potential of the site itself, water conservation, energy-efficiency and renewable energy, selection of materials and indoor environmental quality.

Projects that meet higher levels of LEED certification can include a wide array of features such as storm water retention through landscaping, innovative wastewater technologies, reflective roofs, energy generating sources and personal comfort controls. And, of course, energy-saving technologies such as WaterFurnace geothermal and water source heating and cooling.

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The monumental impact of the current use of geothermal is equivalent to planting more than 385 million trees or taking over a million cars off the road.
EXPLANATION OF WATERFURNACE CONTRIBUTIONS

Energy & Atmosphere

Prerequisite 1: WaterFurnace products are computer run-tested to ensure operation within standards. Factory check and start services available.

Prerequisite 2: WaterFurnace products meet or exceed ASHRAE 90.1 efficiency guidelines.

Prerequisite 3: WaterFurnace equipment is CFC free.

Optimize Energy Performance: WaterFurnace equipment typically saves 20% to 50% of energy over the minimum standard. Heat recovery strategies available using water source heat pumps in air/hydronic applications.

New Building: 4 to 19 points available.
Existing Building: 4 to 19 points available.
Ozone Depletion: With WaterFurnace equipment, 2 points.

Materials & Resources

Local/Regional Materials: Within a 500-mile radius of Fort Wayne, Indiana, 2 points.

Indoor Environmental Quality

Thermal Comfort: Design and install WaterFurnace Water-to-Water and Water-to-Air heat pumps with FX-10 controls in tandem with building automation systems to provide occupants with precise and verifiable local temperature control and maximum comfort. MERV 13 filters available on all WaterFurnace products.

Innovation & Design Process

Innovation in Design: Water-to-water units used to provide hot water at the same time they cool the building and other energy recovery strategies possible, 2 points.

VERSION 3.0 REGISTERED PROJECT CHECKLISTS

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<td>Credit 4: Local/Regional Materials, If 20% of all material comes from within 500 miles - 2 points</td>
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<tr>
<td>Credit 5: Indoor Chemical and Pollutant Source Control—MERV 13 filters</td>
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<tr>
<td>Credit 6: Comfortability of Systems: Thermal Comfort</td>
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<tr>
<td>Credit 7: Thermal Comfort, Comply with ASHRAE 55-1992</td>
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<tr>
<td>Credit 7.2: Thermal Comfort, Verification</td>
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</thead>
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<tr>
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Pre-Certification Estimate of Total Points available through WaterFurnace Equipment: 30 total points
WHAT ARE SOME OF THE BENEFITS OF A “GREEN” BUILDING?

Many of the benefits of green building technologies and practices for occupants, owners and the environment and society at large are quantifiable and well documented. These include energy savings, measurable reduction of waste, decreased water use, and improved indoor air quality. Other benefits are less tangible and harder to demonstrate statistically—while highly desirable. These include improvements in occupants’ health, employee morale, productivity, recruitment, employee retention and improved public image for organizations and businesses that build green.

Many building and health experts agree that the social benefits of green building technologies and practices can produce financial returns for employers and building owners that overshadow the savings associated with more measurable building performance gains.

Here are some financial, economic and environmental benefits of green building technologies and practices.

**No increase in first cost.** Many green buildings cost no more to build—or may even cost less—than conventional building alternatives because resource-efficient strategies and integrated design often allow downsizing of more costly mechanical, electrical and structural systems.

**High-performance green buildings are cost-effective.** Even for projects loaded with high-value features, higher first costs often are recovered within three to five years through lower operating expenses and utility rebates for energy-saving equipment. Savings in energy of 20-50 percent are common through energy-saving technologies, integrated planning and downsized equipment.

**Increased resale value of energy-efficient facilities.** Facility owners can reduce their financial risk by making investments in energy-efficiency that earn a higher rate of return than the stock market or bonds.

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*Source: GEO (GeoExchange), www.geoexchange.org*
Increased value for developers and owners. There is growing confidence in the industry that a high-performance green building can either capture lease premiums or present a more competitive property in an otherwise tough market.

Improved health and productivity. Design features that enhance energy-efficiency and indoor air quality are cost-effective strategies for improving worker productivity and product quality. An increase of one percent in productivity can provide savings to a facility that exceeds its entire energy bill.

Enhanced occupant health and well-being. High-performance green buildings typically offer healthier and more satisfying work environments for tenants. A recent Lawrence Berkley National Laboratory Study reported that commonly recommended improvements to indoor environments could reduce health care costs and work losses from communicable respiratory diseases by 9-20 percent, among other benefits.

Children's health and learning. Studies are confirming what teachers, students and parents have known intuitively for years: school facilities with high-performance features produce an environment in which students perform better.

Stretch local infrastructure capacity. Decreased energy and material requirements coupled with appropriate siting help stretch the capacity of overburdened public systems for grid-supplied power, water, wastewater and transportation.

Enhanced security. As domestic fossil fuel supplies are depleted, our nation becomes more dependent on sources from foreign countries. Energy-efficiency and renewable energy sources can lessen this dependence and help improve national security.

Geothermal heat pumps generate no on site emissions and have the lowest emissions among all heating and cooling technologies.

Environmental Protection Agency

WaterFurnace offers a variety of commercial geothermal and water-source systems. Here are a few of their available features.

- Burn no fossil fuels, eliminating air pollution and offering safer, cleaner, cost-effective operation
- Can be used for conditioning outside air, pool heating, radiant heating, snow melt and water heating
- Safe, efficient operation in a wide range of liquid temperatures
- Microprocessor controls sequence components for efficient operation
- Efficient scroll, rotary and reciprocating compressors available
- Oversized heat exchangers designed for maximum heat transfer
THE BENEFITS OF GEOTHERMAL

ENERGY EFFICIENT: WaterFurnace geothermal systems are simply the most efficient units available. They can deliver up to five dollars of energy for every dollar of electrical energy used. That translates into an astounding efficiency rating of 500 percent, compared to the most efficient gas furnace, which rates only 97 percent.

COST EFFECTIVE: Because of the extraordinary efficiency of a WaterFurnace system, any added costs over ordinary equipment are usually more than offset by your annual energy savings. In fact, most building owners experience an immediate positive return on their investment. In replacement and retrofit installations, costs are usually recouped within just a few years.

RELIABLE: The WaterFurnace reputation for reliability has been earned by using only the highest-quality components, design and workmanship. Computer run-testing after assembly ensures that your equipment performs flawlessly at start-up.

CLEAN: High-efficiency air cleaners found in WaterFurnace systems improve your indoor air quality by removing dust and pollen so you can breathe easier. For added protection, ask about our AlpinePure line of premium indoor air quality solutions.

FLEXIBLE: Regardless of climate, WaterFurnace systems deliver. A variety of configurations and sizes are available to fit any application—heating, cooling, supplemental domestic hot water, hot gas bypass and hot gas reheat.

EARTH LOOPS

1 Vertical Loop
The ideal choice when limited land surface is available. Welldrilling equipment is used to bore the 75 ft. to 300 ft. deep, small-diameter holes that will accommodate the loop.

2 Boiler/Tower
Where large ground-source systems are not viable, existing boiler/tower installations are often retrofitted. Hybrid systems use a ground-source loop coupled with down-sized conventional heat rejection or boiler/tower equipment.

3 Pond Loop
Very economical to install when an adequate body of water is available, because excavation costs are virtually eliminated. Coils of pipe are simply placed on the bottom of the nearby pond or lake.

4 Open Loop
These loop systems utilize ground water as a direct energy source. In ideal conditions an open loop application can be the most economical type of ground-source system.

WATERFURNACE—THE SMART DECISION

WaterFurnace is dedicated to providing you with safe, reliable and energy efficient heating and cooling systems that save you money while helping protect our environment. Our engineers and technicians work to create and build quality geothermal products that are extensively tested to ensure the highest quality. An industry leader and an innovator in geothermal technology—WaterFurnace. Smarter from the Ground Up.