



# A GREEN BUILDING REPORT

From WaterFurnace International

## WaterFurnace & 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 explain 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. Many of our units use the chlorine-free refrigerant R-410A, which will not harm the environment. We are committed to converting our entire product line to R-410A by 2006.

### *Policies & Programs that Support Green Building*

According to the U.S. Green Building Council, there are at least 15 major federal laws and departmental policies directly involved in green building issues. Agencies include Department of Energy, EPA, General Services Administration and Department of Education.

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 Geothermal Heat Pump Consortium 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 form 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 products and 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

### *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 by 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 on-line at [www.usgbc.org](http://www.usgbc.org). This website also is an excellent source for learning about the LEED program.*



## Some Interesting Facts About Geothermal Technology\*

- ✓ According to the U. S. Environmental Protection Agency, geothermal heating and cooling is the most energy-efficient, environmentally clean, and cost-effective space conditioning system.
- ✓ Energy costs with geothermal heating and cooling typically are 25 to 50 percent less than other HVAC systems.
- ✓ The use of geothermal heating and cooling lowers electricity demand by nearly 1 kW per ton of capacity.
- ✓ Because they burn no fossil fuels on site, geothermal heating and cooling systems generate virtually no carbon dioxide.
- ✓ For businesses, geothermal heating and cooling systems provide the architect with optimal design flexibility because the roof and landscape are free of chillers, air handlers and other outdoor equipment. In addition, boiler rooms can be eliminated and the size of mechanical rooms can be reduced.
- ✓ The elimination of outdoor or rooftop equipment means the geothermal heating and cooling system is not exposed to temperature extremes, dirt, pollution or vandalism.
- ✓ Geothermal heating and cooling systems have a lower life-cycle cost than conventional systems, even in hot, humid regions where the demand for air conditioning is high. Geothermal systems also have long equipment life (20 + years).
- ✓ The electricity required to power one million homes for one year would be saved, if every school that could use geothermal technology did.

\*Source: Geothermal Heat Pump Consortium, [www.geoexchange.org](http://www.geoexchange.org)

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, 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 2.1, 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](http://www.usgbc.org) or call 202-828-7422. The USGBC is located at 1015 18th St. NW, Suite 805, Washington, DC, 20036.

### 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.

### The LEED Rating System and WaterFurnace

The USGBC'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 2.1 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 audit 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.

26-32 points	Certification
33-38 points	Silver
39-51 points	Gold
52-60 points	Platinum

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 17 points potentially may be available, more than half-way toward the goal of 33 points for Silver certification.

## ☑ Version 2.1 Registered Project Checklists

### ☑ Energy & Atmosphere\*

**Prerequisite 1** - Fundamental Building Systems Commission Required

*Intent: Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.*

**Prerequisite 2** - Minimum Energy Performance Required

*Intent: Establish the minimum level of energy efficiency for the base building and systems.*

**Prerequisite 3** - CFC Reduction in HVAC&R Equipment Required

*Intent: Reduce ozone depletion.*

**Credit 1** - Optimize Energy Performance

*Intent: Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.*

**Credit 2.1** - Renewable Energy, 5%

*Intent: Encourage and recognize increasing levels of an on-site renewable energy self-supply in order to reduce environmental impacts associated with fossil fuel energy use.*

**Credit 2.2** - Renewable Energy, 10%

**Credit 2.3** - Renewable Energy, 20%

**Credit 4** - Ozone Depletion

*Intent: Reduce ozone depletion and support early compliance with the Montreal Protocol.*

### ☑ Materials & Resources\*

**Credit 5.1** - Local/Regional Materials, 20% manufactured locally

*Intent: Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.*

### ☑ Indoor Environmental Quality\*

**Credit 7.1** - Thermal Comfort, Comply with ASHRAE 55-1992

*Intent: Provide a thermally comfortable environment that supports the productivity and well-being of building occupants*

### ☑ Innovation & Design Process\*

**Credit 1.1** - Innovation in Design: Provide Specific Title

*Intent: Provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.*

☑ **Pre-Certification Estimate of Total Points available through WaterFurnace Equipment: 17**

### WaterFurnace Points

### 17 possible points

YES

YES

YES

2 to 10 points

1 to 10

1 point

1

1 point

1

1 point

1

1 point

1

**13 total points**

1 point

1

**15 total points**

1 point

1

**5 total points**

1 point

1

## \* Explanation of WaterFurnace Contributions

### Energy & Atmosphere

**Prerequisite 1** – WaterFurnace products are factory run-tested to ensure operation within standards. Factory check, test and start services available.

**Prerequisite 2** – All WaterFurnace products meet or exceed ASHRAE 90.1 efficiency guidelines.

**Prerequisite 3** – All 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:** 2 to 8 points available.

**Existing Building:** 4 to 10 points available.

**Renewable Energy (5-20%)** – 1 point available in each of 3 categories, for a total of 3.

**Ozone Depletion** – With WaterFurnace E Series equipment, 1 point.

### Materials & Resources

**Local/Regional Materials** – Within a 500-mile radius of Fort Wayne, Indiana, 1 point.

### Indoor Environmental Quality

**Thermal Comfort** – Water-to-water units used in reheat/ Outdoor air systems, 1 point.

### 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, 1 point.



## 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 no less 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.

**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

*WaterFurnace offers a variety of commercial geothermal and water-source systems. Here are just 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 sequences components for efficient operation
- ✓ Efficient scroll, rotary and reciprocating compressors available
- ✓ Oversized heat exchangers designed for maximum heat transfer

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.



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