



Optimizing Sustainability with GreenWise™ Solutions from Hubbell Wiring Systems

Our Changing World

All around the globe, there is a powerful shift towards “green” thinking, made evident by continuous environmental initiatives, programs and regulations. Now increased interest in energy efficiency and waste reduction has put sustainable building design at the very forefront of the industrial, commercial and residential construction industries. Today’s manufacturers, enterprises and even home owners are realizing the need to reduce their impact on the environment both today and over the lifecycle of a building.

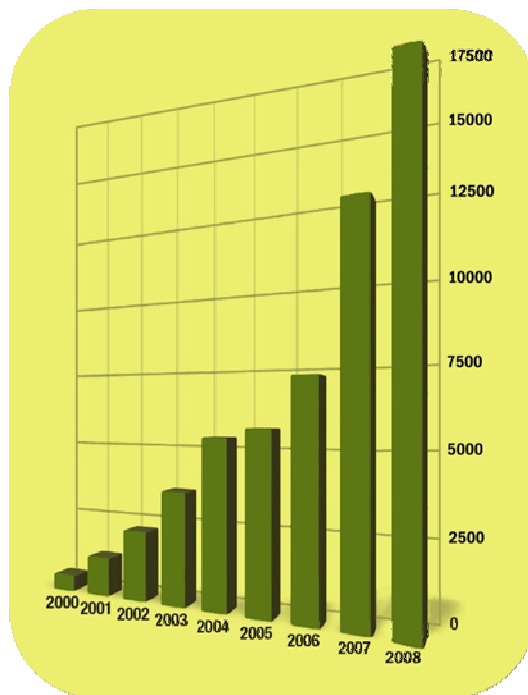
Many owners and architects are striving for certification through the U.S. Green Building Council’s (USGBC) LEED® (Leadership in Energy and Environmental Design) program, which is now considered the standard for what constitutes a green building and is the driving force behind sustainable building design. Since 2003, USGBC membership has more than quadrupled in size, and new project registrations for LEED certification have grown by 75% over the past few years.

Added to LEED® are several other local, state and national programs like the California Energy Commission’s (CEC) Title 24, the Environmental Protection Agency’s (EPA) ENERGY STAR® and the residential market’s Home Energy Rating System (HERS) index and National Green Building program.

In addition to incentive programs like LEED, standards bodies around the world are now requiring compliance with a variety of energy efficiency and environmental regulations and codes.

The AHSRAE/IESNA energy efficiency code, NFPA 900 Building Energy Code and IECC (International Energy Conservation Code) standards now all provide minimum requirements for the energy-efficient design of commercial buildings. The latest edition of the International Residential Code (IRC) includes new requirements for energy efficiency in one- and two-family dwellings.

In the electronic manufacturing industry, more than 30 U.S. states have already adopted or have pending legislation with directives like RoHS (Restriction of Hazardous Substances) that ban new electrical and electronic equipment from containing more than specified levels of hazardous substances. NEMA’s (National Electrical Manufacturers Association) “Call to Action” also calls for manufacturers to reduce the content of hazardous substances in all NEMA-covered products by 2014.



Growth of U.S. Green Building Council Membership, 2000 – 2008. Source: USGBC



These current programs and standards are just a few examples of efforts to improve the environment, and several other initiatives on the horizon will undoubtedly drive companies and individuals to further examine innovative products that optimize sustainable building design.

As a leader in the industry, Hubbell Wiring Systems recognizes its role and responsibility in protecting and safeguarding the environment. Through the GreenWise™ sustainability initiative, Hubbell Wiring Systems is doing its part through the design and development of innovative products that optimize sustainable building design by saving energy, supporting space efficiency, and reducing waste. At the same time, Hubbell Wiring Systems is striving for environmental stewardship by moving towards processes and practices that reduce our own impact on the environment and ensure a better world for generations to come.

Sustainable Building Design

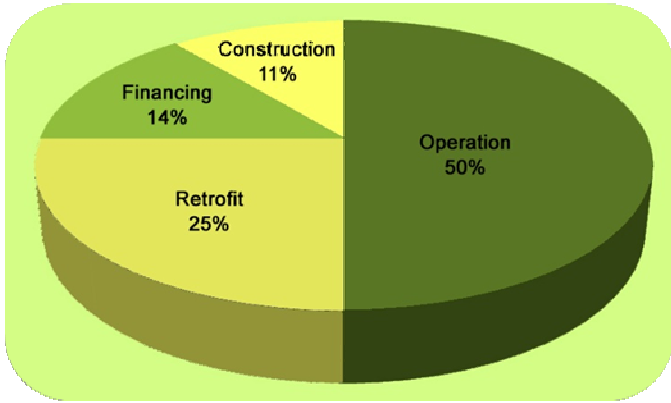
One of the buzz words that has emanated from the new global environmental initiative is “sustainability,” and while many are promoting it, few truly understand what it means. In the context of building design, sustainability seeks to minimize the negative environmental impact of buildings by enhancing efficiency and moderation in the use of energy, space and materials. Simply put, sustainable building design involves saving energy, using space efficiently and reducing waste over the lifecycle of a building.

- **Energy savings** can be accomplished in many ways, including deploying renewable energy sources like solar and wind power; shifting to energy efficient equipment like ENERGY STAR computers and electronics; implementing of design strategies that reduce dependence on air conditioning or other power-hungry systems; relying more on natural lighting; and simply turning off lights when not in use. Optimizing energy performance and savings is one of the most significant categories under the LEED certification program, and many solutions are available to help reach that objective.
- **Space efficiency** has become a key component in sustainable building design. For LEED certification, architects strive to maximize interior daylighting through the introduction of daylight and views into occupied areas of a building. This requires an open floor plan to avoid blocking areas off from exterior windows. In fact, the LEED rating system for new construction provides points for maintaining a direct line of sight to the outdoor environment in either 75% or 90% of occupied areas. The use of a raised-floor system can also improve space efficiency by supporting more efficient underfloor systems and reducing overall building height.
- **Reducing waste** during construction or over a building’s lifecycle directly minimizes the negative environmental impact of a building. Any product that is reusable and reconfigurable contributes to waste reduction because less material is required to upgrade or reconfigure to accommodate future changes. It is also important that building products match the lifecycle of a building to avoid frequent replacement. This helps reduce the demand for virgin materials associated with the replacement products and reduces the waste associated with disposal of the products being replaced. As a result, product quality and longevity is gaining importance among those designing sustainable buildings, and owners are now more willing to invest in products that provide these benefits.

Building for sustainability was once considered extremely expensive, but recent technological advancements and increased demand have resulted in a decrease of initial construction costs associated with “going green.” According to recent research, the cost to build a sustainable LEED-certified building is associated with approximately a 1% increase on initial costs at the lower end and 11.5% increase at the higher end. In other



words, an initial construction cost of \$1M would only cost an additional \$10K for the lowest level of LEED certification or an additional \$115K for the highest level of LEED certification.



A Building's Life Cycle Costs over 40 Years.
Source: ASHRAE

The slight increase in initial construction becomes inconsequential when considering the fact that a sustainable building typically reaches a positive return on investment in the first two years and ultimately offers significantly reduced operating cost over the lifecycle of the building.

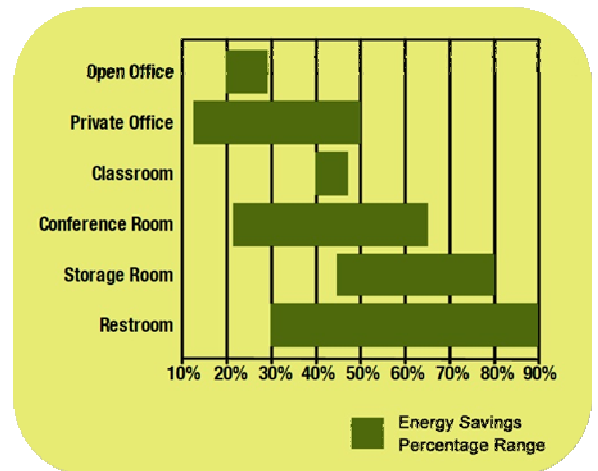
Any element that saves energy cuts down on operational costs. Any element that is reusable and reconfigurable, or that matches the lifecycle of a building, cuts down on retrofit costs. Together, operational and retrofit expenses make up 75% of a building's lifecycle cost over a 40-year period. At the same time, construction only accounts for 11%. It therefore makes more sense to slightly increase construction cost to save more over the long term.

In addition to reducing impact on the environment and decreasing costs over a building's lifecycle, sustainable building design also improves worker productivity and job satisfaction due to healthier working environments. A recent North American study revealed that brighter office conditions increased performance by more than 10%. Studies show that LEED-certified buildings have a significantly reduced number of missed work days among employees and lower employee turnover. A California-based company actually experienced a 40% drop in absenteeism after deploying skylights and lighting controls. It is also estimated that sustainable buildings generate higher rental rates, lower vacancy rates and higher market values compared to conventional buildings.

Energy Savings from Hubbell Wiring Systems

Lighting Controls—In the U.S., lighting consumes 22% of electricity and represents \$40 billion a year in energy costs. Using advanced technology, Hubbell's H-MOSS® Occupancy Sensors save energy and provide sustainability by automatically turning lights on when a room is occupied and off when a room is vacant. Hubbell daylight harvesting controls detect natural light and maintain required lighting levels accordingly.

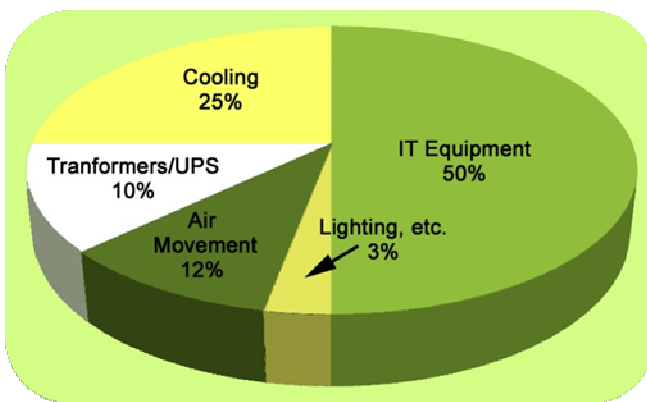
Manual and automatic dimmers also offer users the ability to reduce lighting requirements based on the task or amount of available daylight. Hubbell Wiring Systems offers many models of lighting controls that meet the latest codes and standards and provide LEED points under categories like Indoor Environmental Quality and Energy and Atmosphere.



Potential Energy Savings Using Occupancy Sensors. Source: eSource



- In the commercial environment, deploying H-MOSS occupancy sensors in areas of intermittent use where lights are often inadvertently left on can significantly reduce energy consumption, including restrooms, conference rooms, classrooms, laboratories and closets.
- In today's industrial environments, Hubbell's H-MOSS occupancy sensors with passive infrared technology turn lights off when they're not needed in large warehouse aisles and high-bay applications.
- Daylighting controls are ideal for open offices, classrooms, atriums or other spaces with available natural light. These devices are available with switching controls that turn lights off when there is adequate natural light or dimming controls that continuously adjust light output based on daylight conditions.
- In the home, Hubbell residential vacancy sensors are specifically designed for California Title 24 compliance. When a person enters an area, the manual switch is pressed to turn on the light and the sensor turns off the light when motion ceases. A wide range of occupancy sensors and dimmers are also available for saving energy in the home.



Sources of Data Center Energy Consumption.
Source: EYP Mission Critical Facilities, Inc.

Data Center Solutions—According to the EPA, energy used by U.S. data centers is estimated at over 61 billion kilowatt-hours (kWh), which is more than 1.5% of total U.S. consumption. It is estimated that under current efficiency trends, energy consumption of data centers will nearly double by 2011.

Much of the data center energy consumption is directly related to the amount of heat generated by networking equipment and the amount of cooling and air movement required to keep the equipment functioning properly. Data center solutions that eliminate airflow obstruction can help reduce dependence on cooling systems and potentially contribute to LEED certification.

- Hubbell Wiring Systems offers a variety of optical fiber and copper cable and connectivity solutions with a smaller footprint to save valuable plenum space and cabinet space for improved airflow around equipment.
- Hubbell iFrame vertical patch panels place ports at each rack unit, allowing use of short connecting cables and eliminating cables that would otherwise restrict airflow.
- Hubbell's iFrame network cabinets, open column systems and cable management remove barriers to forced and convective airflow by creating designated vertical cable pathways away from equipment and facilitating the use of a hot aisle/cold aisle data center configuration for optimum cooling.
- Hubbell power distribution systems like Twist-Lock power devices, IEC pin-and-sleeve high power connections, and iFrame three-phase power delivery help reduce cable bulk in plenum spaces and below raised floors for improved airflow in data centers.



Space Efficiency from Hubbell Wiring Systems

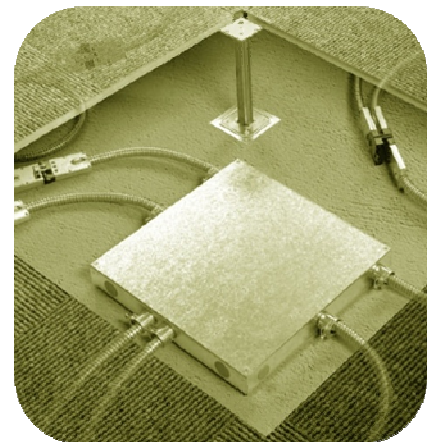
Delivery Systems—The use of open space to maximize interior daylighting in LEED-certified facilities depends on the ability to provide power and communications in these environments. Unlike conventional fixed power and communications systems that require walls and create barriers, Hubbell Wiring Systems offers a full line of through-floor and in-floor solutions for delivering power, voice, data and audio/video requirements to work stations in open spaces. These systems may provide LEED points in the category of Innovation Design.



- Hubbell SystemOne™ floor boxes and fire-rated poke-throughs offer an aesthetically pleasing, functional and unobtrusive alternative to wall-mounted receptacles and jacks. They can be customized to meet virtually every power and communications application. Hubbell's higher-capacity SystemOne design effectively deliver today's requirements for multiple low-voltage and active multimedia applications.
- Open-office modular furniture solutions, power poles, and metallic and nonmetallic surface raceway are also available for delivering power and communications in open spaces.
- In residential applications, Hubbell's floor boxes for wood floors provide ample power and communications connections in the floor, allocating more exterior wall space for windows and natural lighting.

Raised-Floor Solutions—The use of a raised floor is extremely common in sustainable building design and LEED-certified facilities. A raised floor facilitates the use of underfloor systems that can offer improved HVAC efficiency and control, facilitate easy access to power and communications, and reduce the need for large overhead air plenum space that may ultimately result in overall higher building height.

- Hubbell's raised-access offering includes a variety of deep and shallow access floor-boxes that are ideal for delivering multiple services in raised-floor applications.
- Hubbell's UL-listed CONNEXION zone distribution system is a modular wiring system that delivers power to workstations in raised-floor applications. Furniture feed boxes may be used to transition the CONNEXION zone distribution system with powered partitioned furniture or wall outlets.



Reducing Waste with Hubbell Wiring Systems

Reusable & Reconfigurable—Whenever systems and components are reusable, reconfigurable and relocatable, they reduce waste by eliminating the need to install completely new systems when needs change. Business and technology is constantly changing and evolving, and being able to relocate components to accommodate staff changes, reconfigure systems to support new power and communications needs, and reuse components in new spaces is a critical aspect of sustainable building design.



- All of Hubbell Wiring Systems' commercial and residential delivery systems are designed with a modular approach that allows various connections to fit into each system and be easily replaced to accommodate future technology needs. Hubbell's voice, data and audio/visual keystone connectors fit into SystemOne subplates for floor boxes and poke-throughs, raceway systems, and iStation faceplates. No longer does the entire system need to be replaced if a new application is required.
- Hubbell's CONNEXION zone distribution system and our full line of metallic and non-metallic raceway systems can be easily reconfigured or removed and reused in another location to accommodate occupancy changes in commercial and light industrial environments.
- For heavier industrial applications, Hubbell's LINKOSITY plug-and-play modular power system for delivering up to 600 VAC power is a sustainable alternative to conventional fixed pipe-and-wire power distribution. LINKOSITY cable, distribution and supply assemblies are completely reconfigurable and relocatable to accommodate changing needs for powering industrial equipment. LINKOSITY can also be used in conjunction with other Hubbell products to facilitate rapid change out of devices.

Matched to Building Lifecycle—With a history of setting industry standards for quality, Hubbell Wiring Systems manufactures products to more closely align with a building's lifecycle. By ensuring that our products stand the test of time, there's less chance of replacements being required and waste ending up in a landfill.

- Hubbell receptacles are designed for greater corrosion, heat and impact resistance and reduced contact separation due to frequent plug-ins, ensuring reliable flow of power and longer lifecycle. Our switches feature quality components like one-piece rivetless terminal plates that assure proper contact alignment for a longer life.
- Hubbell industrial connectivity and control devices are designed to maintain a long life in harsh environments. Features like water and dust seals, vibration integrity, and corrosion resistant housing ensure longevity in food processing, marine and manufacturing environments.
- Hubbell offers faceplates, delivery systems and residential products designed for durability with features like high-impact material and reliable scrub-water exclusion to withstand everyday use over a building's lifecycle.



Waste & Material Diversion—From less packaging and fewer hazardous chemicals to solutions that reduce a building's overall footprint, Hubbell Wiring Systems offers a variety of products that can help divert unnecessary waste from disposals in landfills and reduce material usage.

- Hubbell's pre-wired raceway is cut to length and fabricated to customer specifications, eliminating a significant amount of packaging and waste otherwise present on the job site. Surface mount raceway can also enable delivery of power and communications to new locations without having to open walls, which can impact the integrity of the insulation and generate more waste. Hubbell Wiring Systems also bulk packages many of our industrial, commercial and residential devices to eliminate unnecessary packaging.
- For commercial environments and data centers, Hubbell Wiring Systems offers a variety of space-saving solutions that can help reduce a building's overall footprint. The iFRAME column system saves 10% or more floor space in data center installations by supporting more equipment than typical rack systems. Hubbell also offers a variety of wall-mount cabinets for mounting computer equipment safely and remotely, reducing the need for floor space to accommodate telecommunications equipment.
- Hubbell POWERTRAC® system delivers power over Ethernet to the latest IP technologies and appliances like VoIP phones, wireless access points, IP surveillance cameras, IP clocks, and intelligent building access and control systems. This eliminates the need to run traditional AC power to several locations, further reducing material usage in sustainable and LEED-certified buildings.
- Wherever applicable, Hubbell manufactures devices to be RoHS compliant and meet regulations that restrict the use of hazardous materials like lead, mercury, cadmium, hexavalent chromium or PBB and PBDE flame retardants.

Hubbell Wiring Systems Environmental Stewardship

In addition to designing and developing GreenWise products that optimize sustainability, Hubbell Wiring Systems is committed to maintaining environmental stewardship in our own manufacturing and corporate facilities.

In keeping with our commitment, Hubbell manufacturing facilities meet ISO 14001 environmental management standards and actively participate in environmentally sound practices. Hubbell Wiring Systems' Puerto Rico manufacturing facility has implemented comprehensive recycling systems that currently recycle 90% of all paper products. The facility also addresses recycling, reuse and proper disposal of plastics, scrap metal, batteries, discarded equipment, wood pallets and more, resulting in a 75% reduction of landfill disposal. Purchasing of recycled packaging materials where possible is also a key initiative at the facility, as well as a waste minimization program per EPA guidelines.

The Puerto Rico facility recovers 980,000 gallons of water each year using condensed water from roof-top AC units. A reconfiguration of the compressed air system, along with other energy saving practices at the facility has saved nearly \$150K in kilowatt-hour costs. Hubbell Wiring Systems manufacturing facilities also continuously work to reduce waste and increase efficiency through our Lean manufacturing production practices. Current solar energy and lighting initiatives are underway that are estimated to save over 76,000 watts per year.



In our corporate facilities, Hubbell strives to contribute to the environment by consolidating multiple facilities, reusing interior elements and exploring LEED certification wherever possible. Hubbell Lighting's new 185,000 sq. ft. headquarters in Greenville, SC is registered to achieve a Silver rating under the LEED program. In addition to open spaces and natural lighting, the new facility deploys several design elements that manage to save 30 percent in energy costs. The new facility also features low-flow faucets and toilets and on-site storm water treatment.

In general, all Hubbell corporate facilities are moving towards more environmentally friendly practices like using recycled packing materials and aspiring for paperless and energy-efficient operations. For example, our Arden, NC warehouse recycles a significant amount of cardboard and reuses it as packaging material.

As an active member of the USGBC and other environmental associations, Hubbell Wiring Systems is committed to participating in national and global "green" initiatives while continuing to develop quality GreenWise products that save energy, support space efficiency and reduce waste.

