
Version 2.2

January 2007

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## Release for Public Use

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**Version 2.2 is a major revision of the *Green Guide v2.1 Construction* Section and a maintenance release of the *Operations* section. Published in January 2007.**

*"The Green Guide for Health Care is a superb resource. It helps the leaders and managers of health care institutions "walk the talk," promoting the health of patients, visitors, employees, community members, and the global community, while operating economically and efficiently. I hope that every medical center, hospital, and clinic in the nation gets a copy of the Green Guide, takes its lessons to heart, and joins the growing movement toward healthier, more environmentally friendly environments in the health care sector."*

Howard Frumkin, M.D., Dr.P.H.
Director, National Center for Environmental Health/Agency for
Toxic Substances and Disease Registry
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
January 2007

# Objectives

Welcome to ***Green Guide for Health Care™***, the health care sector's first quantifiable sustainable design toolkit integrating enhanced environmental and health principles and practices into the planning, design, construction, operations and maintenance of their facilities. This *Guide* provides the health care sector with a voluntary, self-certifying metric toolkit of best practices that designers, owners, and operators can use to guide and evaluate their progress towards high performance healing environments.

Health care facilities present both a challenge and opportunity in the development and implementation of sustainable design, construction and operations practices. Issues such as 24/7 operations, energy and water use intensity, chemical use, infection control requirements and formidable regulatory requirements can pose significant obstacles to the implementation of currently accepted sustainability protocols. Furthermore, it is appropriate that guidelines customized for the health care sector reflect the collective fundamental mission to protect and enhance individual and community health, and that those guidelines acknowledge the intrinsic relationship between the built environment and ecological health. As health care institutions evolve a design language for high performance healing environments, they have the opportunity to highlight the associated health-based benefits. This in turn can inspire the broader adoption of health-based design principles in other building sectors.

This document is neither intended to establish regulatory requirements, nor to be viewed as a minimum standard for design, construction or operations. Rather it is designed to serve as a voluntary educational guide for early adopters of sustainable design, construction, and operations practices, to encourage continuous improvement in the health care sector, and to provide market signals to catalyze a richer palette of strategies for those who follow the early adopters. As the general level of green building practice rises, it is anticipated that the *Guide* will be updated to encourage continued leadership and higher levels of rigor associated with creating high performance healing environments.

## Updates and Information

This document is available for download at **www.gghc.org**.

This is an evolving document that has been updated in response to new information and guidance gleaned from the Pilot program and from other evolving green building best practices. If you did not download this document from the *Green Guide* website, ***it is important that you register*** at **www.gghc.org** to ensure that you will be notified of updates as this document progresses.

Please contact **info@gghc.org** for further information about document use and opportunities to support it.

# Using this Guide

## Applicable Building Types

While an array of building types are represented in the health care sector, the *Green Guide for Health Care* is specifically customized for buildings that are predominately institutional occupancies as defined by the local building code, such as acute care hospitals, where regulatory requirements have created particular needs. Medical office buildings, clinics and other buildings where health care concerns are dominant can also use the *Green Guide*. Recognizing the full-range of construction, operations and maintenance activities associated with the health care sector, the *Green Guide* applies to new freestanding facilities, additions to existing facilities coupled with renovation, extensive rehabilitation/adaptive reuse projects, and existing facilities for which the *Operations* section can be used as a stand-alone best practices guide.

## Points & Achievement Levels

The *Green Guide for Health Care* is a self-certifying, best practices toolkit; as such, it does not provide achievement level threshold rankings. The point system provides design and construction teams a way to baseline and benchmark their achievement and to support continuous improvement.

Existing facilities are encouraged to track their ongoing performance using the *Operations* section, while making a commitment to utilize the *Construction* section on future projects.

Construction projects are encouraged to identify the *Operations*-related credits that they intend to achieve and establish commitments to these O&M goals through policy setting. Note that construction projects are unable to attain all of the points in the *Operations* section, as some credits require a year's worth of data to achieve credit goals.

## Integrating Operations

Operations and maintenance protocols are critical to enhancing the health and environmental profile of health care facilities. As a result, using better, more health-promoting practices will benefit existing facilities and should also be considered during the design of new projects. Acknowledging this relationship, the *Green Guide for Health Care* has developed specific credits related to operations and maintenance. These represent a critical component of a sustainable design, continuous improvement program. Given the critical relationship between operations, building program and design, design teams are strongly encouraged to collaborate with facility staff early in the design process to establish commitments to sustainable operations policies included in the *Operations* section, and evaluate the impact of these protocols, during programming and design to ensure their integration.

## Relationship to LEED® Products

The *Green Guide for Health Care* is informed by a number of important guidance documents that have preceded it. See the Reference Documents section below for access to these key documents.

The *Green Guide's* organizational structure is borrowed by agreement from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) Green Building Rating System. The *Green Guide* is not a LEED® Rating System nor a product of the U.S. Green Building Council. The LEED structure was adopted because it is a familiar and effective method used by a rapidly growing sector of the building design, construction, operations and maintenance industries.

For many credits, the *Green Guide* directly incorporates the language of a parallel LEED credit, referencing credits in the LEED systems for New Construction, Existing Buildings and Commercial Interiors. In some cases, existing LEED credits have been modified to respond to the unique needs and concerns of health care facilities. In others, new credits have been added to those in current LEED products. The *Green Guide's* Credit Summary identifies its relationship to LEED® credits.

Although the *Green Guide* is a voluntary, self-certifying best practices guide to support teams in incorporating sustainable elements into their projects, the *Green Guide* can be used to facilitate teams pursuing LEED certification:

(1) Consider pursuing all the "prerequisites" and as many "credits" as are aligned with the project's guiding principles and goals.

(2) Consider following the "Suggested Documentation" associated with each prerequisite and credit. For projects using the *Green Guide*, documentation is not required, but is helpful to baseline and benchmark project performance, and to support continuous improvement. Because the "Suggested Documentation" approximates documentation requirements for LEED certification, it is recommended for projects contemplating eventual certification under LEED for Healthcare, anticipated for release in late 2007.

## Development History

The initiation of health care focused sustainable design tools began with the **Green Healthcare Construction Guidance Statement** published by the American Society for Healthcare Engineering (ASHE) in January 2002, representing the first sustainable design guidance document to emphasize a health-based approach.

The *Green Guide for Health Care* development initiative began in March 2003 with a professionally and geographically diverse group of green health care industry leaders convened as an independent Steering Committee to guide the document development (see the Steering Committee list). Working Groups for each section of the document drafted credit language that was reviewed and approved by the Steering Committee as a whole.

In December, 2003, Version 1.0 of the *Green Guidelines for Healthcare Construction* was released in draft form for public comment. More than 900 registrants downloaded the document during the public comment period from organizations representing a broad range of architectural, engineering, construction, health care, and manufacturing firms and industry associations. Between December 2003 and the close of the comment period on February 29, 2004, almost 1,200 public comments were received. A partial listing of those who submitted comments is included further in this Introduction. The Steering Committee reviewed all public comments prior to the drafting of Version 2.0.

In November 2004, Version 2.0 of the *Green Guide for Health Care* was released for general use in the Pilot phase. Version 2.1, released in September 2005, included a substantial update to the *Operations* section of the document and minor revisions to the *Construction* section, covering copy and editorial changes.

## *Green Guide for Health Care* Pilot Program

The *Green Guide* Pilot program, launched in November 2004 with the release of Version 2.0, provided the opportunity for the *Green Guide* to collaborate with a cross-section of leading health care institutions in an active development process. The Pilot's internal list-serve, online project management tools, and personal contact with the Pilot Coordinator generated sustained communications between the Pilot projects and the *Green Guide*, resulting in several revised credits in the *Construction* section of *Green Guide for Health Care* Version 2.1, released in September 2005.

Over the course of two years, the *Green Guide* Pilot program generated a wide-ranging set of comments and suggestions to improve and enhance Version 2.2. Overall, the program encompassed 114 pilot projects representing 30 million square feet of construction in the U.S. and abroad – an increase of 45% over 2005. Pilot projects range in size, building type, building phase, and region, demonstrating the *Green Guide's* versatility as an effective tool for many building types and project phases.

The release of the *Green Guide* Version 2.2 marks a transition from the Pilot program into a full-fledged registration and self-certification program. In this context, the *Green Guide* will continue to work closely with project teams to gather case studies and to promote research into innovative design strategies and technologies.

## Decision Making Process

The *Green Guide for Health Care* committee process is structured to include representation from a wide range of stakeholders and interests to ensure consistency and rigor in the document's development. Steering Committee membership, however, precludes organizations with direct financial interests in the products or certification services addressed by the document. Furthermore, this document is intended to be a best practices guide, not a basis for industry code or regulatory standard. For these reasons, the document is not intended to meet the legal definition of an industry "consensus based" standard.

# Levels of Support

The *Green Guide for Health Care* welcomes support of its continued efforts through several options: *Sponsors*, *Partners* and *Endorsers*. Sponsors, Partners and Endorsers affirm the intent and principles of the document (see the ASHE Green Healthcare Construction Guidance Statement - Statement of Principles) while not expressly endorsing every strategy or credit.

**Sponsors** provide a $10,000 minimum donation for a one-year sponsorship. Sponsors' logos are displayed on the *Green Guide* website home page, on the title page of the *Green Guide*, and in the Supporters section of the document and the *Green Guide* website. The Supporters' section listing includes a brief one sentence description of the Sponsor.

**Partners** provide a $5,000 minimum donation or equivalent in-kind contribution for a one-year partnership. In-kind contributions include organizational support for an active Steering Committee member or other significant contributor to the *Guide*. Partners are listed in the Supporters section of the document and the website and may, at their option, have their logo displayed on the Partners page of the *Green Guide* website.

Sponsor and Partner status is open to the following organization types, subject to Steering Committee approval:

- Non-Profit Organizations
- Professional Associations
- Private Foundations
- Government Agencies
- Health Care Organizations/ Hospital Systems
- Design and Construction Firms
- All other organizations except manufacturers and their trade associations and product certifiers

and is subject to approval by the co-coordinators of the *Green Guide*.

To avoid potential conflicts of interest, the *Green Guide* Steering Committee has determined that manufacturers, their trade associations and product certifiers are ineligible for Sponsor or Partner status. All organizations and companies are welcome to support the *Green Guide* as Endorsers.

**Endorsers** agree to support the principles of the *Green Guide* and indicate their intent to use and promote the *Guide*. No direct financial or in-kind commitment is required to sign on as an Endorser. Endorsers are listed in the Supporters section of the document and on the *Green Guide* website, which will be periodically updated.

Donations to support the work of the *Green Guide* are tax deductible to the fullest extent of the law.

Contact **info@gghc.org** for further information about opportunities to support the *Green Guide for Health Care*.

## Product Endorsement

The *Green Guide for Health Care* does not endorse products nor does it recommend for or against the purchase of specific products. In some instances, the *Green Guide* references product types that may be useful to address credit goals, considering price competitiveness, regulatory requirements, performance standards, and environmental/health impacts.

# *Green Guide for Health Care* Supporters

## Convener

The *Green Guide for Health Care* is convened by the **Center for Maximum Potential Building Systems**, a non-profit design firm established in 1975, engaged in life cycle design to foster ecological balance. The Center actively pursues interdisciplinary collaborations with a common vision of healthful environments, economic prosperity, and social equity.

## Founding Sponsors

**Hospitals for a Healthy Environment** (**H2E)** - the joint pollution prevention project of the **American Hospital Association**, the **U.S. Environmental Protection Agency**, **Health Care Without Harm**, and the **American Nurses Association**.

**Merck Family Fund -** A private foundation that seeks to restore and protect the natural environment and ensure a healthy planet for generations to come while strengthening the social fabric and the physical landscape of the urban community.

**New York State Energy Research & Development Authority (NYSERDA) –** A public benefit corporation formed to use innovation and technology to solve some of New York's most difficult energy and environmental problems in ways that improve the State's economy.

## Other Sponsors

**Pacific Gas and Electric Company (PG&E)** – delivers electric service to approximately 5 million customers and natural gas service to nearly 4.1 million customers in Northern and Central California.

**Southern California Edison --** an Edison International (NYSE:EIX) company, is one of the nation's largest electric utilities, with 4.7 million customer accounts in a 50,000-square-mile service area within central, coastal and Southern California.

## Founding Partners

The following organizations have provided critical direct or in-kind support to the development of the *Green Guide*:

**American Society for Healthcare Engineering (ASHE)**

**American Society for Healthcare Environmental Services (ASHES)**

**American Society of Landscape Architects (ASLA)**

**Andropogon Associates Ltd.**

**Center for Maximum Potential Building Systems**

**Chong Partners Architecture**

**CJL Engineering**

**Consorta**

**Guenther5 Architects**

**Guttmann & Blaevoet**

**HDR Architecture**

**Health Care Without Harm**

**Healthy Building Network**

**HOK Planning Group**

**Institute for a Sustainable Future**

**Kaiser Permanente**

**Karlsberger Companies**

**Kirksey**

**Massachusetts Technology Collaborative**

**Mazzetti & Associates**

**Stantec Architecture**

**TLC Engineering**

**Tufts - New England Medical Center**

**Perkins + Will**

**Progressive AE**

**Turner Construction Company**

**U.S. Environmental Protection Agency's ENERGY STAR® program**

**WHR Architects**

## Endorsers

The following organizations support the *Green Guide's* principles and indicate their intent to use and promote it:

**Affiliated Engineers, Inc.**

**Ambient Air Technologies, LLC**

**Amtico International**

**Anshen + Allen, Architects**

**Art Plumbing Company**

**BBH Design**

**Balzhiser & Hubbard Engineers**

**Boulder Associates**

**Carnegie**

**CDi Engineers**

**Center for Environmental Health**

**Coastwide Laboratories**

**Construction Specialties**

**EnviroGLAS Products Inc.**

**Environmental Dynamics**

**Eppstein Uhen Architects**

**GREENGUARD® Environmental Institute**

**The Green House® Replication Initiative**

**Houston Advanced Research Center**

**InPro Corporation**

**Integrated Architecture**

**Just Manufacturing Company**

**Legrand Companies: Ortronics/Legrand, Pass & Seymour/Legrand, Watt Stopper/Legrand, Wiremold/Legrand**

**Lees Carpets**

**LHB, Inc.**

**Lionakis Beaumont Design Group**

**MechoShade**

**Melink Corporation**

**Milliken Carpets**

**Nalco Company**

**National Pharmaceutical Returns, Inc.**

**New York Presbyterian Hospital**

**nora@/Freudenberg Building Systems, Inc.**

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**Prime Building Company**

**Puzer Canada**

**Rise Engineering**

**Robert D. Lynn Associates**

**Shaw**

**The Sheward Partnership, LLC**

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# Public Comment Period

During the Pubic Comment period from December 1, 2003 to February 29, 2004, over 900 people downloaded the *Green Guide.* More than 70 people submitted comments totaling almost 1200 entries. The comments received were broad reaching and constructive, ranging from probing critiques to enthusiastic endorsement. The Steering Committee worked diligently to address the comments yielding a markedly improved Version 2.0 document.

The following is a partial list of commenters who granted permission to publish their names. We list these individuals to acknowledge their contribution of ideas and efforts to the process. Listing here does not imply any endorsement by these individuals or their employers of the *Green Guide for Health Care.*

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# Reference Documents

The documents listed below have informed the overall development and content of the *Green Guide for Health Care*, though are not specifically referenced in the **Resources** sections associated with individual credits:

- **Green Healthcare Construction Guidance Statement**

  American Society for Healthcare Engineering
  http://www.ashe.org/ashe/products/pdfs/ashe_guidance_sustainconst_rev2_0410.pdf

- **LEED® (Leadership in Energy and Environmental Design) for New Construction**

  Green Building Rating System for New Construction
  Version 2.1 and 2.2 by the U.S. Green Building Council (USGBC)
  http://www.usgbc.org/leed

- **LEED® for Existing Buildings**

  Version 2 by the U.S. Green Building Council
  http://www.usgbc.org/leed

- **LEED® for Commercial Interiors**

  Version 2.0 by the U.S. Green Building Council
  http://www.usgbc.org/leed

- **Labs 21 Environmental Performance Criteria (EPC)**

  Laboratories for the 21st Century, U.S. Environmental Protection Agency
  http://www.labs21century.gov/

- **Green Star Green Building Rating System**

  Green Building Council of Australia
  http://www.gbcaus.org/greenstar

- **High Performance Building Guidelines**

  New York City Department of Design and Construction, Office of Sustainable Design
  http://www.ci.nyc.ny.us/html/ddc/html/ddcgreen/

- **2003 Savings By Design Healthcare Modeling Procedures**

  Pacific Gas and Electric Company
  http://www.gghc.org/Documents/PGEModProc.pdf

- **Greener Hospitals: Improving Environmental Performance**

  Edited by: Environment Science Center, with support of Bristol-Myers Squibb
  http://www.bms.com/static/ehs/sideba/data/greenh.pdf

# Green Healthcare Construction Guidance Statement (2001)

## Statement of Principles

The construction and use of buildings in the U.S. consumes 3 billion tons of raw materials annually (40% of raw stone, gravel, sand, and steel, 25% of virgin wood, 40% of energy resources, 75% of PVC, 17% of freshwater flows) and generates significant waste (25-40% of municipal solid waste from construction and demolition alone), 50% of CFCs, 30% of CO2 production, and substantial toxic emissions.

Given this, the opportunities are significant to improve environmental quality through green planning, design, construction and operations and maintenance practices. Improving the environment through green construction practices is consistent with the American Hospital Association's recent voluntary agreement with the United States Environmental Protection Agency to reduce waste volume and toxicity.

Building design and construction practice can be shaped to protect health at three scales:

## 1) Protecting the immediate health of building occupants

The health of patients, staff, and visitors can be profoundly affected by the quality of the indoor air which in turn is dependent upon physical and mechanical design (such as ventilation and location of wastes and toxics), the choice of building materials, the management of construction emissions, and building operations and maintenance. Additionally, access to daylighting has been found to favorably affect staff productivity and patient outcomes.

## 2) Protecting the health of the surrounding community

Local air and water quality is also significantly affected by building design choices. Off-gassing building materials and finishes, construction equipment and HVAC systems directly emit VOCs, particulates and other materials that can result in the formation of ground level ozone (smog), and cause allergic attacks, respiratory problems and other illnesses. Land use and transportation planning, landscape and water management on the grounds and water conservation efforts within the building will influence the amount of toxic emissions released to the water and air throughout the life of the building.

## 3) Protecting the health of the global community and natural resources

The health impact of a building stretches far beyond its immediate community. The production of building materials can result in the release of persistent bioaccumulative toxic compounds, carcinogens, endocrine disruptors and other toxic substances. These compounds threaten communities where the materials are manufactured, and, because of the long life of some of these compounds, can risk the health of communities and ecosystems far from their release.

Climate change resulting from burning fossil fuels is expected to increase the spread of disease vectors far from their current regions and destabilize ecosystems, threatening worldwide nutrition. Loss of rainforests from unsustainable forestry can result in the loss of medicines and important genetic information that could help fight disease. Moreover, release of CFCs and HCFCs damages the stratospheric ozone layer, allowing increased levels of ultraviolet rays on Earth resulting in heightened potential for skin cancer.

## The Importance of Prevention

Prevention is a fundamental principle of health care and public health. Indeed, to prevent disease is preferable to treating disease after it has occurred. In the face of uncertainty, precautionary action is appropriate to prevent harm. This public health approach makes sense both in the clinical setting and in responses to environmental and public health hazards. Similarly, a precautionary and preventive approach is an appropriate basis for decisions regarding material selection, design features, mechanical systems, infrastructure, and operations and maintenance practices.