



Version 2.2 Operations Section, 2008 Revision

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Release for Public Use

The *Green Guide for Health Care™* (*Green Guide*), a project of the Center for Maximum Potential Building Systems and Practice Greenhealth, is released for public use in PDF format. All replication in whole or in part must reference the *Green Guide* and include the limitations on its use described herein. The *Green Guide* is an open source document that is provided at no charge. Material contained within the *Green Guide* may not be used by or as part of a for-profit enterprise (for sale or as a component of an educational program) in which attendees are charged fees without the express permission of the *Green Guide for Health Care* Co-Coordiators.

Portions of *Green Guide for Health Care-Operations* Version 2.2 are borrowed, with permission, from the U.S. Green Building Council's LEED for Existing Buildings: Operations and Maintenance, January 2008 and LEED for Healthcare public comment draft, November 2007.

This 2008 second public comment draft release of *Green Guide for Health Care-Operations* Version 2.2 represents a major revision of the *Green Guide* v2.2 *Operations* section. Published December 2008.

"The Green Guide for Health Care is a superb resource that continues to improve with each revision. 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 March 2008

Objectives

Welcome to **Green Guide for Health Care™**, the health care sector's first quantifiable sustainable design and facilities operations 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, feedback from registered projects, expert opinion from the *Green Guide* Steering Committee and *Operations* committee members, and from other evolving green building best practices. Please **register** at www.gghc.org to ensure that you will be notified of updates as this document progresses.

For further information about document use and opportunities to support the *Green Guide*, contact info@gghc.org.

Using this Guide

The *Green Guide for Health Care* is divided into two sections: *Construction* and *Operations*. The *Construction* section targets new construction projects and major renovations, while the *Operations* section is designed as a continuous improvement tool for existing operational facilities. More information on how to define the scope of a *Green Guide Construction* project within the context of an operational facility is included in the “Facility Alterations & Additions” section of the Introduction.

While projects are not required to simultaneously pursue both the *Construction* and *Operations* sections, 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.

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 concerns are dominant are also encouraged to use the *Green Guide*, as relevant.

Operations Credits

Intent

Operations and maintenance protocols are critical to enhancing the health and environmental performance of health care facilities. As a result, using effective, health-promoting practices will benefit existing facilities and their occupants; these practices should also be considered during the design of new projects. Acknowledging this relationship, the *Green Guide for Health Care (Green Guide)* has developed specific credits related to operations and maintenance. These credits represent a critical component of a facility’s continuous improvement program for sustainable operations. Like the *Construction* section, the *Green Guide’s Operations* section is a voluntary, best practices toolkit that acknowledges current U.S. regulatory standards. However, the *Green Guide for Health Care* is not a regulatory document.

The organizational intent and framework of the *Green Guide’s Operations* section is summarized as follows:

- Most health care construction projects are undertaken by existing institutions that already have ongoing operations and maintenance protocols in place, even if the project is a freestanding new building on a clean site.
- The distinction between existing buildings and new construction in health care is often complex and difficult to precisely define, given the frequency with which buildings undergo major renovation and expansion. Operational strategies aimed to reduce a facility’s environmental and health burdens can yield economic benefits.
- Given the critical relationship between operations, building program and design, design teams are encouraged to collaborate with a multi-disciplinary team of facility staff early in an integrative design process to establish commitments to sustainable operations policies included in the *Operations* section and to evaluate the impact of these protocols during programming and design to ensure their integration.

- To facilitate integration of the *Green Guide's Construction* and *Operations* sections, related credits between the two sections are cross-referenced in the Potential Technologies & Strategies section of each credit.
- The *Green Guide's Operations* section can also be used as an ongoing continuous quality improvement guidance document. It is not expected that a facility would address all the operational issues at one time. Operational improvement and improved efficiencies requires a long-term commitment and may take years to accomplish.

Organization

The *Green Guide Operations* section is organized in accordance with commonly understood areas of responsibility in health care organizations. Each credit or prerequisite corresponds to a distinct aspect of the operation of health care facilities. Within each credit, one or more points define a range of opportunities and strategies to yield specific beneficial outcomes. As noted above, teams using the *Green Guide* as a self-certifying tool should strive to achieve all of the prerequisites and as many credits as possible that correspond to the building's program and context.

Credit Structure

The *Green Guide for Health Care* borrows the framework and numbering scheme of the U.S. Green Building Council (USGBC) LEED® family of products, with permission, with some modifications. Each credit has the following elements:

- **Intent** – Summarizes the credit goal.
- **Health Issues** – (new to the *Green Guide*) Identifies specific health concerns addressed by the credit. Reviewed by Dr. Ted Schettler, M.D., MPH.
- **Credit Goals** – Itemizes the specific steps to achieve the credit including threshold goals.
- **Suggested Documentation** – Suggests documentation to monitor and baseline performance and to benchmark achievement of the Credit Goals. The *Green Guide* is a voluntary self-certifying document that does not offer third party certification. Users of the *Green Guide* are encouraged to establish internal record keeping and tracking systems to support ongoing monitoring and continuous improvement. Note that while the suggested documentation requirements in *Green Guide for Health Care: Construction* can be completed by the end of construction, some of the strategies in the *Operations* section require collection of up to a year's data to determine credit achievement. Furthermore, while these operational data requirements are especially geared for existing facilities, they are also intended to serve as useful references for new construction projects as they establish operations policies and ongoing operational protocols.
- **Reference Standards** – Identifies the standards and referenced documents that establish the basis of the Credit Goal criteria.
- **Potential Technologies & Strategies** – Suggests helpful information to support the credit Intent and Credit Goals. Regional considerations and project specific performance needs, goals and other constraints are important factors to consider. Products and materials referenced in the Potential Technologies & Strategies section do not represent an endorsement but are suggestions for consideration in some applications.
- **Resources** – Cites selected information sources associated with the Credit Intent, Credit Goals, and Potential Technologies and Strategies.

Using the Operations Section

Facility Alterations & Additions

The *Green Guide for Health Care Operations* section aligns with the definition of the term “alterations and additions” outlined in LEED for Existing Buildings: Operations and Maintenance, January 2008. The following definition is adapted from that text with permission from the U.S. Green Building Council.

In the *Green Guide for Health Care Operations* section, the term “alterations and additions” refers to changes that affect usable space in the building. (Mechanical, electrical, or plumbing system upgrades that involve no disruption to usable space are excluded.) Only alterations and additions within the following limits are suitable for inclusion in a *Green Guide for Health Care Operations* project. Alterations and additions falling outside the definition should pursue the *Green Guide for Health Care Construction* section and/or a LEED rating system, such as LEED for Healthcare, currently in development.

Maximum scope permitted – for alterations, those that affect no more than 50% of the total building floor area or cause relocation of no more than 50% of regular building occupants. For new additions, those that increase the total building floor area by no more than 50%. Alterations or additions exceeding these limits are more suitable for the *Green Guide for Health Care Construction* section and/or a relevant LEED rating system.

Minimum scope permitted – the *Green Guide for Health Care Operations* section calculates facility alterations and additions credits according to total annual aggregate quantities facility-wide. The calculation can either incorporate or exclude projects performed by outside contractors; however, the calculation methodology must remain consistent throughout all calculations.

Policy Model

Many credits in the *Green Guide for Health Care Operations* section require the development and implementation of a policy. These policies must, at a minimum, incorporate the following components.

Note: The Policy Model is adapted with permission from LEED for Existing Buildings: Operations and Maintenance, January 2008.

1. Scope
 - a. Describe the facility management and operations processes to which the policy applies.
 - b. Describe the building components, systems and materials to which the policy applies, if applicable.
2. Performance Metric
 - a. Describe how performance will be measured and/or evaluated.
3. Goals
 - a. Identify the goals that the building strives to meet by adhering to the policy.

Note: While facilities are required to set goals, documentation of actual achievements is not required in order to demonstrate compliant policies; stating the goal is enough. Facilities are encouraged to set high goals and work toward their achievement.
4. Procedure and Strategies
 - a. Outline the procedures and strategies in place to meet the goals and intent of the policy.
5. Responsible Party
 - a. Identify the teams and individuals involved in activities pertaining to the policy.
 - b. Identify and outline key task duties for the above teams and individuals.
6. Time Period
 - a. Identify the time period over which the policy is applicable.

First-Time Users

The comprehensive nature of the *Green Guide for Health Care Operations* section can be daunting for first-time users. The following guidelines will help Integrated Operations teams establish a robust program, with an initial focus on targeting priorities followed by instituting a continuous improvement process over time.

1. **Register as a *Green Guide for Health Care Project*** – *Green Guide* registered projects identify their institution as a leader in the industry committed to environmental excellence and the creation of a high performance, healing environment. *Green Guide* projects have access to online project management tools and join a learning community of their peers through a private, web-based discussion group organized around *Green Guide* credits and topical sections.
2. **Establish a Multi-Disciplinary, Inter-Departmental Integrated Operations Process** – An integrated operations process is an essential component of a successful green facilities operations program due to the size and complexity of health care facilities. The *Green Guide for Health Care* has prioritized an integrated operations process by introducing a section called Integrated Operations & Education dedicated to facility-wide support for green facilities operations programs.
3. **Align with the Facility’s Mission and Strategic Priorities** – As a voluntary, self-certifying, best practices toolkit, the *Green Guide for Health Care Operations* section does not require a minimum achievement level; however, achieving all prerequisites is encouraged. Prerequisites reflect common practice, one step above regulations, and are designed to be achievable for all facilities with the potential of becoming leaders in environmental excellence. Key to securing support within a facility new to green operations practices is to focus initial efforts on prerequisites and credits that will further the facility’s mission and priorities in a public and measurable way.
4. **Adopt one or two new goals per year** – The *Green Guide for Health Care Operations* section is designed as a continuous improvement tool. As such, policies, once in place, should be reviewed and improved upon annually. The continuous improvement focus also facilitates gradual implementation of the tool at a pace that will ensure the establishment of long-term programs, rather than a cursory adoption of a large number of programs that are ineffective due to lack of adequate focus, support and/or funding.
5. **Join Practice Greenhealth** – Hospitals for a Healthy Environment (H2E) has supported efforts in the health care industry to improve environmental excellence for ten years. Now having aligned with the *Green Guide for Health Care* and the new Healthcare Clean Energy Exchange program in “Practice Greenhealth”--a new, member-based non-profit organization--H2E’s services will continue to expand, including fact sheets, list-serves, online resources, and technical support for facilities interested in joining industry leaders in green facilities operations.

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 as are provided by third-party certification rating systems such as LEED®. The *Green Guide*’s point system provides a way to baseline and benchmark achievements 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 construction projects in accordance with the “Facilities Alterations & Additions” section above.

Integrating New Construction into the *Operations* Section

Construction projects that have self-certified using the *Green Guide for Health Care Construction* section are encouraged to identify the credits they have achieved and commit to pursue these topics after occupancy by establishing related policies. Note that projects using the *Green Guide Construction* section are particularly encouraged to shift to the use of the *Operations* section after occupancy. Existing facilities already registered with the *Green Guide*’s *Operations* section may separately register new

capital projects as *Green Guide Construction* projects if the project meets the criteria listed under the “Facilities Alterations and Additions” section of the Introduction.

Relationship to LEED® Rating Systems

The *Green Guide for Health Care* is informed by a number of important guidance documents. See the Reference Documents section below for a list of these key documents.

The *Green Guide's* organizational structure is borrowed with permission 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, Commercial Interiors and Healthcare, with permission. 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 rating systems. The *Green Guide's* Credit Summary identifies each credit's relationship to LEED® credits.

Following four years of close collaboration, the U.S. Green Building Council (USGBC) and the *Green Guide for Health Care* signed a memorandum of understanding in September 2007 agreeing to continue their work together on the development of tools, educational programs, and other activities to support green health care building. USGBC and the *Green Guide* will: a) jointly develop health care-related resource materials, education and training events; b) jointly identify a prioritized research agenda; and, c) continue to collaborate on developing future health care-related green building tools. The *Green Guide for Health Care* will continue to act as a change agent and tool developer dedicated to empowering the health delivery industry to take a leadership position in the world of green building and facilities operations. As such, the *Green Guide* will continue to develop the next generation of the *Green Guide* tools. Following the release of LEED for Healthcare, USGBC and the *Green Guide* will jointly encourage LEED for Healthcare registered and certified projects to participate in the *Green Guide's* project registration process for the *Operations* section. Furthermore, the *Green Guide* and USGBC will collaborate on informing the operations' related credits in the new LEED bookshelf system, as they specifically relate to the health care market sector.

Development History

The initiation of sustainable design tools focused on the health care sector 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 volunteer 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 website registrants downloaded the document during the public comment period representing a broad range of architectural, engineering, construction, health care, and manufacturing firms and industry associations. Between December 2003 and the close of the public comment period on February 29, 2004, almost 1,200 public comments were received. A listing of commenters who agreed to be identified is included further in the Introduction to the *Green Guide Construction* section. 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. Version 2.2, released in January 2007, included a substantial revision to the *Construction* section of the tool and minor revisions to the *Operations* section. The current version of the *Green Guide*, Version 2.2, 2008 Revision, represents a major revision of the *Green Guide v2.2 Operations* section and a maintenance update of the *Construction* section. This edition of the revised toolkit represents the most significant revision to the *Green Guide for Health Care Version 2.2 Operations* section to date.

With the launch of the *Green Guide for Health Care Version 2.2 Operations, 2008 Revision*, both the *Green Guide's Construction and Operations* sections will have been revised in response to its Version 2 Pilot. Building on those compelling precedents, the *Green Guide* is now positioned to develop the next generation tool, conscious of other emerging tools in the marketplace, including LEED for Healthcare (still in development) and other organizations developing other tools.

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 ranged 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 in January 2007 marked a transition from the Pilot program into a full-fledged registration and self-certification program. In this context, the *Green Guide* has continued 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 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.

Green Guide for Health Care Supporters

Convener

The *Green Guide for Health Care* was convened in 2001 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) (now part of Practice Greenhealth) - 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.

MERCK FAMILY FUND

Protecting the Natural Environment.
Strengthening 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.



Practice Greenhealth is the nation's leading membership and networking organization for institutions in the healthcare community that have made a commitment to sustainable, eco-friendly practices.

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.



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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.

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Health Care Without Harm

Healthy Building Network

HOK Planning Group

Institute for a Sustainable
Future

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Massachusetts Technology
Collaborative

Mazzetti & Associates

Perkins + Will

Progressive AE

Stantec Architecture

TLC Engineering

Tufts - New England Medical
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U.S. Environmental Protection
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MAZZETTI & ASSOCIATES
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RENEWABLE ENERGY TRUST

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Kirksey

theHOK Planning Group



andropogon



ENGINEERING
FOR ARCHITECTURE

PERKINS
+ WILL



Endorsers

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

Affiliated Engineers, Inc.	GREENGUARD® Environmental Institute	New York Presbyterian Hospital
AllerAir Industries	The Green House® Replication Initiative	nora systems, Inc.
Ambient Air Technologies, LLC	Frescatore Consulting, LLC	Novation
Antico International	Houston Advanced Research Center	Oregon Center for Environmental Health
Anshen + Allen, Architects	InPro Corporation	Panel Source International, Inc.
Arden Architectural Specialties	Integrated Architecture	Perry Crabb & Associates
Artline Wholesalers	Just Manufacturing Company	Premier
Art Plumbing Company	KI	Prime Building Company
Balzhiser & Hubbard Engineers	Legrand Companies: Ortronics/Legrand, Pass & Seymour/Legrand, Watt Stopper/Legrand, Wiremold/Legrand	Puzer Canada
BBH Design	Lees Carpets	Rise Engineering
Boulder Associates	Lencore Acoustics, Corp.	The RMH Group, Inc.
Carnegie	LHB, Inc.	Robert D. Lynn Associates
CDi Engineers	Lionakis Beaumont Design Group	Shaw
Center for Environmental Health	Mats, Inc.	The Sheward Partnership, LLC
Coastwide Laboratories	MM Systems	Siemens
Construction Specialties	MechoShade	SmithGroup
Coverings, Etc.	Melink Corporation	Titus
Dwyer	Milliken Carpets	TRC-EASI
E Cube, Inc.	Nalco Company	Tsoi Kobus & Associates
Engineering Economics, Inc.	National Pharmaceutical Returns, Inc.	Victor Insulation
EnviroGLAS Products, Inc.		Walbridge Woodworks, Inc.
Environmental Dynamics		Women's Health & Environmental Network
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