April 2007

Dear Friends and Colleagues:

The *Green Guide for Health Care* began in 2003 as the vision of a small group of committed individuals and funders. At that time, we could only dimly glimpse the future; we viewed our role as supporting the health care industry's entry into the world of 'green buildings.' We did not know exactly what that meant, or where that road would lead us, but we knew it was important.

Four years and thousands of dedicated volunteer hours later, we are proud to give you this Annual Report. Perhaps more importantly, *Green Guide for Health Care* Version 2.2, a tool evolved in content and breadth from its predecessor *Green Guide* documents, has been released and is being used as a foundation for the LEED® for Healthcare rating system anticipated for late 2007 release. As a *Green Guide* Steering Committee member put it, "Mission Accomplished."

But the reality is that the *Green Guide* itself is but the tip of the "green iceberg" that the work of this organization has helped to float. By all accounts, 2006 was a banner year for health care – the crest of the biggest health care construction boom in a half-century, with projections for continued increases in the final years of this decade. Even more important is the health care industry's growing uptake of green building practices. Since the *Green Guide's* launch in 2003, more than 11,000 people spanning 83 countries have registered on the *Green Guide* website, and 115 projects representing close to 30 million square feet of construction signed on as *Green Guide* Pilot Projects. Nurturing this burgeoning activity to shift the health care sector industry from its role as, to quote *Building Design & Construction* magazine, "the lost sheep of sustainability" into a leadership position in green building, has been a seminal role for the *Green Guide*.

As our understanding of the connections between buildings and human health, buildings and toxic chemicals, and buildings and the health of the planet evolve, it becomes more imperative that the health delivery industry assumes a more forceful leadership position in advancing green buildings. Buildings are fundamental bridges between humans and how they interact with the environment. If the health delivery industry does not lead us in healing ourselves, our communities, and our planet, who will?

2006 marked both the completion of the current version of the *Green Guide for Health Care* (Version 2.2 launched on January 31, 2007) and beginning to evolve the *Green Guide's* future role in the context of a world in which the first mission is completed. The *Green Guide* has unleashed unprecedented human energy; we want to now re-channel this energy into more good work. The *Green Guide* Steering Committee has begun this process, moving in a direction that straddles and complements the efforts of other organizations. We will continue in our fundamental mission to support the health delivery industry's leadership role in the green building movement. We will continue to provide state of the art best practices that bridge design, construction and operations. We will continue to be a catalyst and conduit for research needed to break through barriers to implement green building methods and materials in health delivery facilities. We will work to provide continuing insights into the fundamental relationship between buildings and health – including scale, development patterns, and infection control. We will continue to operate from a broad-based industry platform, with input from an ever-expanding universe of health care industry stakeholders. We will continue to take on issues that are complex, challenging and sometimes controversial – because if we don't, who will?

The health care industry represents about 16 percent of the U.S. gross domestic product (GDP), with a mission to "first, do no harm," and then to heal. More than any previous year, 2006 was a year in which health care expressed its mission and commitment to community benefit through its buildings. 2007 will see us entering into a new era, by evolving our collective learning and doing, to make this work better. We invite you to be part of our work.

Very truly yours,

Robin Guenther, FAIA, Gail Vittori, and Walt Vernon, PE, Co-Coordinators, *Green Guide for Health Care*

The *Green Guide for Health Care* (GGHC) is a project of the Center for Maximum Potential Building Systems (CMPBS)
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2006 *Green Guide for Health Care* Annual Report

Introduction

Health care construction is booming in the United States. According to McGraw Hill, health care construction represented 96 million square feet (or $18.7 billion) of construction in 2005. *Building Design + Construction* magazine estimates that health care construction spending increased over 10% in 2006 and will continue to increase by almost 14% in 2007. Why the escalating expenditures? Increasing health care costs, spiraling construction costs, obsolete facilities originally constructed in the 1950's, an ageing population requiring new accommodations such as long term care and care for chronic diseases are all contributing factors. Additionally, the State of California has set in motion requirements that all hospitals either upgrade to comply with new seismic regulations or construct replacement hospitals by 2030, with interim upgrades required by 2013.

In the midst of the largest construction boom in decades, the health care market in 2006 visibly embraced green design, construction and operations. According to a poll of 250 hospitals around the U.S. published in the November 2006 edition of *FacilityCare* magazine, 82% of the polled facilities are already in the process of planning or researching a construction project, indicating robust activity in the sector. Of particular note, 81% of the 250 facilities polled are actively addressing sustainable design in some way. 12% rate it as a top priority for their organization. Indicators such as these have emerged over the past year to mark broad-based adoption of high performance healing environments across the health care sector in the U.S. Jim Moler, Manager for Engineering Systems at Turner Healthcare, reports that internal research at Turner has discovered that many hospital projects around the country are poised to attain at least 22 LEED®-NC credits (and possibly more GGHC credits) at no additional cost if they are managed according to integrated design principles from the outset of the project. The key is to establish a baseline design and then identify strategies in tools such as the *Green Guide for Health Care*™ and LEED® that can be integrated into the project's design intent at the outset.

Barriers to green design that appeared impossible to overcome just a year ago have been substantially reduced or eliminated through enhanced awareness and education on green building practices sponsored by the *Green Guide for Health Care,* the U.S. Green Building Council, Hospitals for a Healthy Environment, American Society for Healthcare Engineering, and the Center for Health Design, among others. Articles published in 2006 in *Environmental Design + Construction, Clean Design, Building Design + Construction* and *FacilityCare,* among others, have reported on the health care industry's rapid transformation. These articles emphasize the pivotal role that the *Green Guide for Health Care* Pilot program has played since its launch in December 2004 to help define green building practices in health care as fundamentally enhancing the human health outcomes on building occupants, the surrounding community, and the global environment. These articles and the surge in LEED certification of health care projects across the country during the second half of 2006 serve as additional indicators that *Green Guide* Pilot projects and LEED certified health care projects have overcome many of the barriers to green design that challenged health care projects in the past and have tipped the balance in favor of greening health care facilities across the country and internationally.

Factors contributing to these successes include soaring energy costs, reduced cost and improved availability and performance of green building materials, a general recognition that patient and staff surroundings can be designed to benefit clinical outcomes, and the *Green Guide*'s effectiveness in raising awareness of the pragmatic and common sense efficacy of values-driven design, construction and operations.

The *Green Guide for Health Care* Pilot program has also raised the level of sustainability experience among health care project teams. Combining green construction and operations criteria into a single document has helped bridge the gap between green building practices and pollution prevention work in health care facility operations — including mercury elimination and substitution of PVC, latex, halogenated flame retardants, phthalate plasticizers, and other chemicals of concern. The *Green Guide* continues to work closely with Hospitals for a Healthy Environment (H2E) on further implementation of the 1998 Memorandum of Understanding signed by the U.S. EPA and the American Hospital Association that pledged to reduce solid waste, regulated medical waste and persistent bioaccumulative toxic chemicals (PBTs) in health care. These priorities and the lessons learned from the *Green Guide* Pilot experience were foundational to the development of *Green Guide* Version 2.2, released in January 2007, and serve as a guide for the *Green Guide*'s future evolution.

Green Guide for Health Care Website Registrants

As a testament to the internet's effectiveness as a fundamental communications medium, the *Green Guide* has built a global online community over 10,000 strong and growing (Figure 2). Over the final three months of 2006, the pace of website registration quickened from 220 per month to close to 400. The *Green Guide's* international reach has expanded to 83 countries, and includes every state in the U.S. (Figure 1) and every province in Canada.

A few example international locations where the *Green Guide* has been downloaded include:

ARGENTINA
AUSTRALIA
BAHRAIN
BANGLADESH
BELGIUM
BRAZIL
CANADA
CHILE
CHINA
COLOMBIA
DENMARK
DOMINICAN REPUBLIC
EGYPT
FRANCE
GERMANY
INDIA
INDONESIA
IRAQ
IRELAND
ITALY
JAPAN
KENYA
LITHUANIA
MEXICO
NIGERIA
PAKISTAN
SAUDI ARABIA
SINGAPORE
SOUTH AFRICA
SOUTH KOREA
TURKEY
UNITED KINGDOM

Figure 1: Green Guide Website Registrants in the U.S.

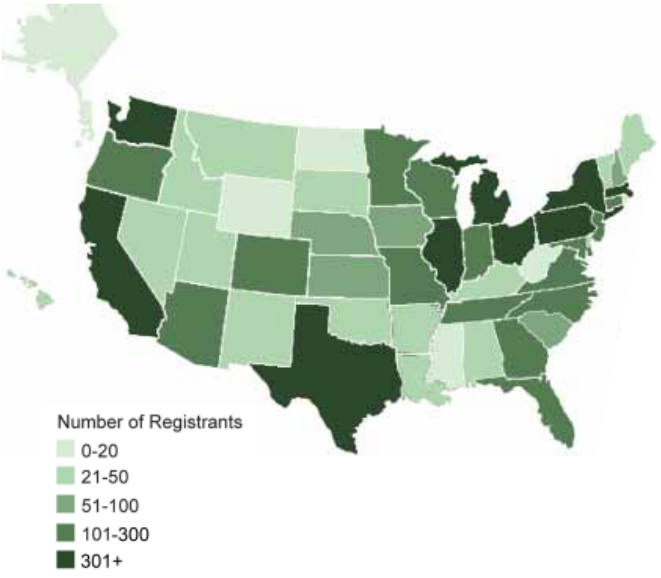
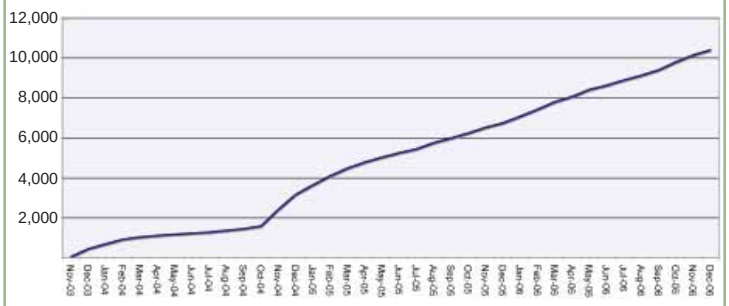


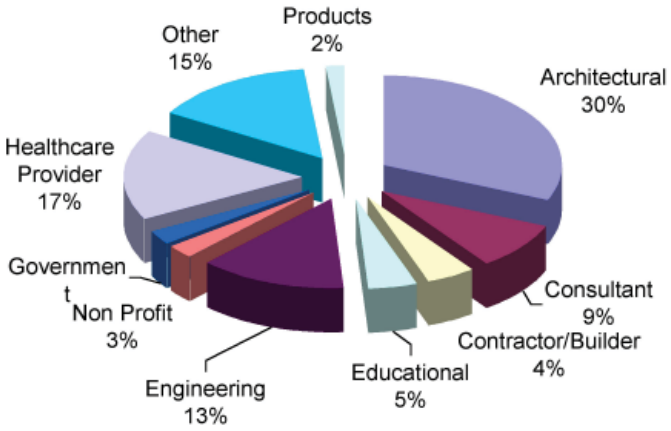
Figure 2: Green Guide Website Registrant Growth



Green Guide Website Registrant Affiliations

The strength of this community is its diversity (Figure 3). While design professions dominate, health care providers represent almost 20% of the total. The *Green Guide*'s recognition of emerging innovative technologies has prompted the educational and product manufacturing sectors to take notice and share their knowledge and experience through public comments and email correspondence.

Figure 3: Green Guide Website Registrant Affiliations



Benefits of Website Registration

Registrants on the *Green Guide* website have access to a free, downloadable copy of the *Green Guide*, an archive of the *Green Guide*'s monthly newsletter, an Events calendar that advertises *Green Guide* educational events around the country, and the ability to register projects. Occasionally, *Green Guide* website registrants participate in polls that measure current priorities in the green health care market. The continuous and rapid growth of the *Green Guide*'s online community demonstrates the health care sector's desire for education and green building tools tailored to the unique challenges of health care construction, emphasizing a healing environment for patients and staff and regional and global environmental health considerations.

Review of the Green Guide for Health Care Pilot: 2005 - 2006

The development of the *Green Guide for Health Care* best practices toolkit has relied heavily on public input and comment. In December 2003, Version 1.0 was released in draft form for public comment, generating about 1,200 comments. The *Green Guide* Steering Committee followed with the release of Version 2.0 Pilot in November 2004, with substantial modifications in response to the comments. The Pilot has 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.

A two year project, the Pilot program generated a wide-ranging set of comments and suggestions to improve and enhance the next version of the *Green Guide* toolkit, *Green Guide* Version 2.2, released in January 2007. The Pilot program grew in 2006 to 115 Pilot projects (Figure 4) 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 to be an effective tool for many building types and project phases. Pilot Projects may elect to remain private – for this reason, much of the data in this report is aggregated. A list of public projects is included in Figure 5.

The launch of *Green Guide* Version 2.2 in January 2007 marked the end of the Pilot and the *Green Guide*'s transition into a full-fledged registration and self-certification program. In its new role, 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.

Regional Distribution

The majority of *Green Guide* Pilot projects are located in the U.S. (Figure 6). Five projects are located in Canada, and four more outside of North America. U.S. regions hosting a critical mass of Pilot projects are creating a context for innovation and exemplary performance in the health care community (Figure 7). Boston is particularly notable for the eight institutions that have pledged to achieve at least 50 credits in the *Green Guide*'s *Construction* section.

Figure 5: Green Guide Public Pilots

Note: The *Green Guide* only releases the name of projects that have expressed interest in being publicly recognized as Pilots.

Beverly Hospital, Beverly, MA
Bon Aqua Health Nursing and Assisted Living Homes, Bon Aqua, TN
Brigham and Women's Hospital, Boston, MA
Children's Hospital, Boston, MA
Christus St. Catherine Hospital, Katy, TX
CSSS de la Montagne, Montréal, Quebec, Canada
The Christ Hospital, Cincinnati, OH
Dana-Faber Center for Cancer Care, Boston, Ma
Dell Children's Medical Center of Central Texas, Austin, TX
Denver Health Medical Center, Denver CO
Donald Dexter Dental Clinic, Eugene, OR
Hackensack University Medical Center Gabrellian Women's and Children's Pavilion, Hackensack, NJ
Indianapolis Community Hospital, Indianapolis, IN
Kaiser Permanente Modesto Medical Center, Modesto, CA
Longmont United Hospital, Longmont, CO
McGill University Health Centre - Glen Campus, Montréal, Quebec, Canada
Metropolitan Hospital, Grand Rapids, MI
New Edison Lakes Medical Campus, Mishawaka, IN
New York Presbyterian Hospital, New York, NY
Oregon Health & Science University Patient Care Facility, Portland, OR
Palomar Pomerado Health, San Diego County, CA
Salem Community Hospital, Salem, OH
Saint John Owasso Hospital, Owasso, OK
Santa Barbara Cottage Hospital, Santa Barbara, CA
Spaulding Rehabilitation Hospital, Charlestown, MA
U.S. Department of Health and Human Services Critical Access Hospital Prototype (200 nationwide)
Veterans Homes of California, West Los Angeles, CA
Veterans Homes of California, Ventura County, CA
Washington Hospital, Fremont, CA
Wellspring Medical Center, Woodburn, OR

Figure 4: Green Guide Pilot Growth

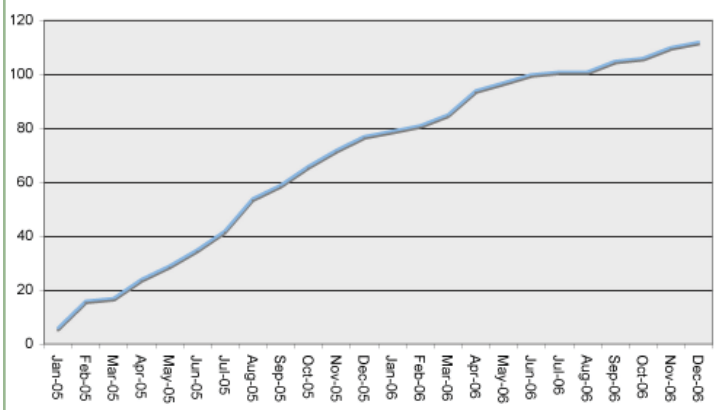


Figure 6: Green Guide Pilot Geographic Distribution

NASA ESIP funded project
(Image Source: Mission to Planet Earth Education Series)

Pilot Project Statistics

The *Green Guide*'s flexible structure has also accommodated all sizes of Pilot projects, from small renovations to major replacement facilities and operations (Figure 8). The scope of the smallest *Green Guide* Pilot project is 1,900 square feet; the largest, 3 million. But, the majority (41%) fall between 100,000 and 500,000 square feet.

The *Green Guide* Pilot program (Figures 9 & 10) is dominated by new construction (50% based on construction type) and Acute Care facilities (60% based on facility type). This bias reflects the *Green Guide*'s debt to LEED for New Construction as a foundational document and its accommodation of the unique regulatory and operational environment of licensed acute care facilities. The interest among facilities engaged in addition and renovation projects, as well as long term care, suggests the continued development of credit language that specifically addresses the unique challenges of these important market segments.

Architects manage the majority of *Green Guide* Pilot projects (Figure 11) (66%), with owners representing the second-largest group (22%). In fact, the only construction type that does not follow this model is Renovation – owners act as the *Green Guide*'s primary contact for 45% of renovation projects. The construction types that show the most diversity of Pilot project management are New Construction and Renovation projects in the Acute Care setting. Projects that combine new construction, additions, and/or renovation are almost entirely dominated by architect green leaders, but the rest of the project types share *Green Guide* project management responsibility, primarily between the project architect and the owner.

The profession represented by the majority of *Green Guide* project managers reflects the group that was most familiar with the *Green Guide's* organizational format (LEED for New Construction) – the design and construction community. Uptake by health care organizations (facility managers, nurses, etc.) has increased over the past year as the organizational format gained in familiarity and as more and more project teams began to pursue the *Construction* and *Operations* sections of the *Green Guide* in parallel.

Pilot Credit Achievement

In spite of the large number of new, Acute Care facilities registered with the *Green Guide* Pilot, this grouping of facility type and construction type does not ensure attaining the highest point totals (Figure 11). On average, Combination projects (a combination of new construction, renovation, and/or addition) have been the most successful construction type using the *Green Guide*'s *Construction* section, while Additions have fallen slightly behind the others (New, Renovation, and Combination). In spite

Figure 7: Green Guide Pilot Geographic Distribution

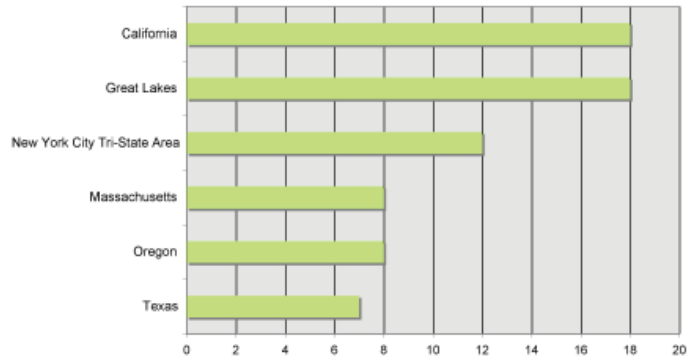


Figure 8: Green Guide Pilot Project Size

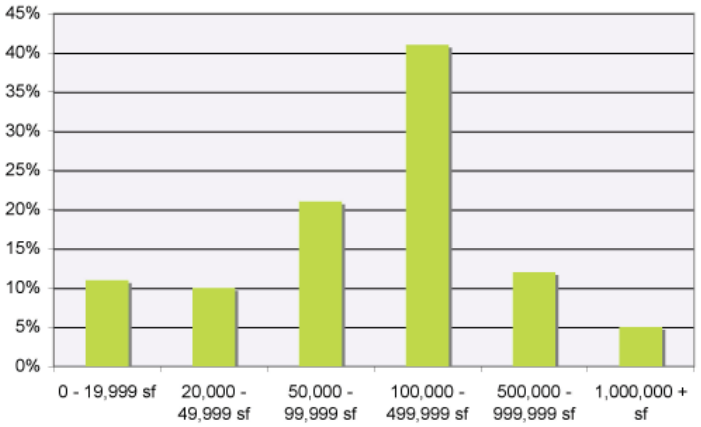


Figure 9: Green Guide Pilot Project Type

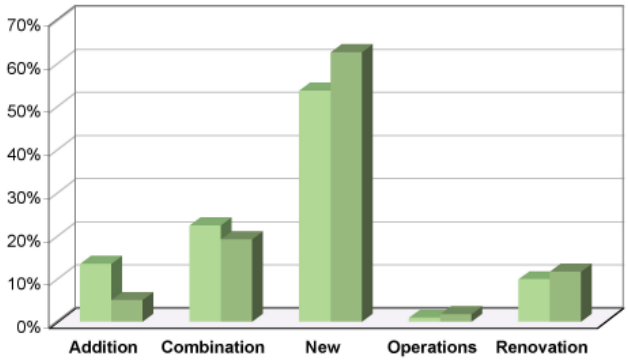


Figure 10: Green Guide Pilot Facility Type

Figure 11: Green Guide for Health Care Pilot: Green Project Managers

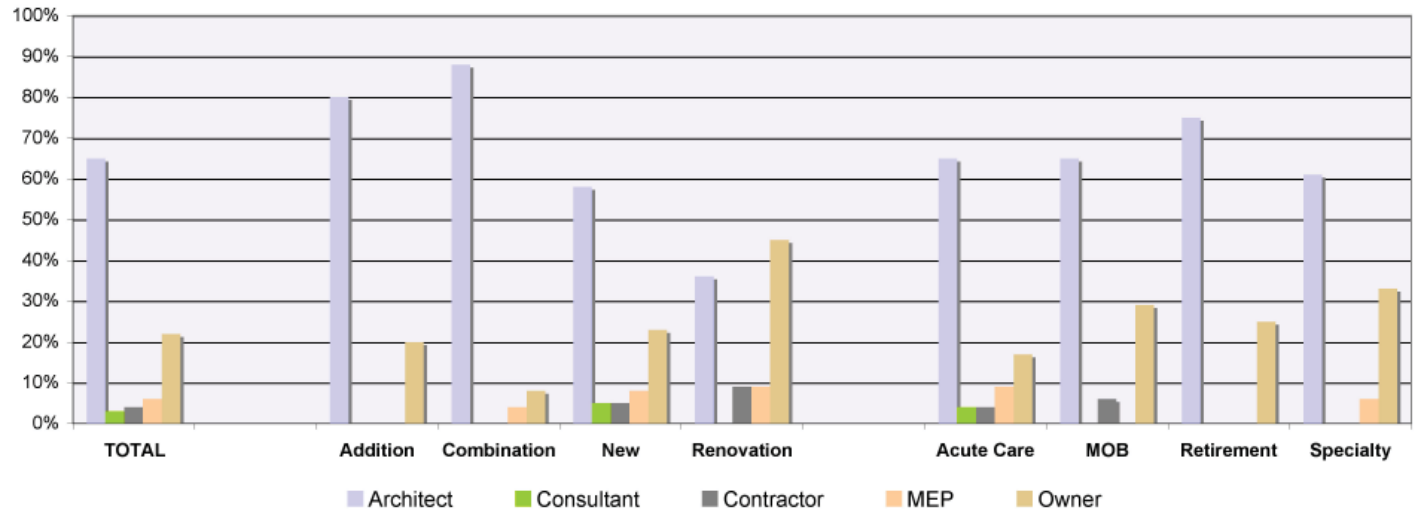


Figure 12: Green Guide Pilot Average Credit Breakdown: Project Type

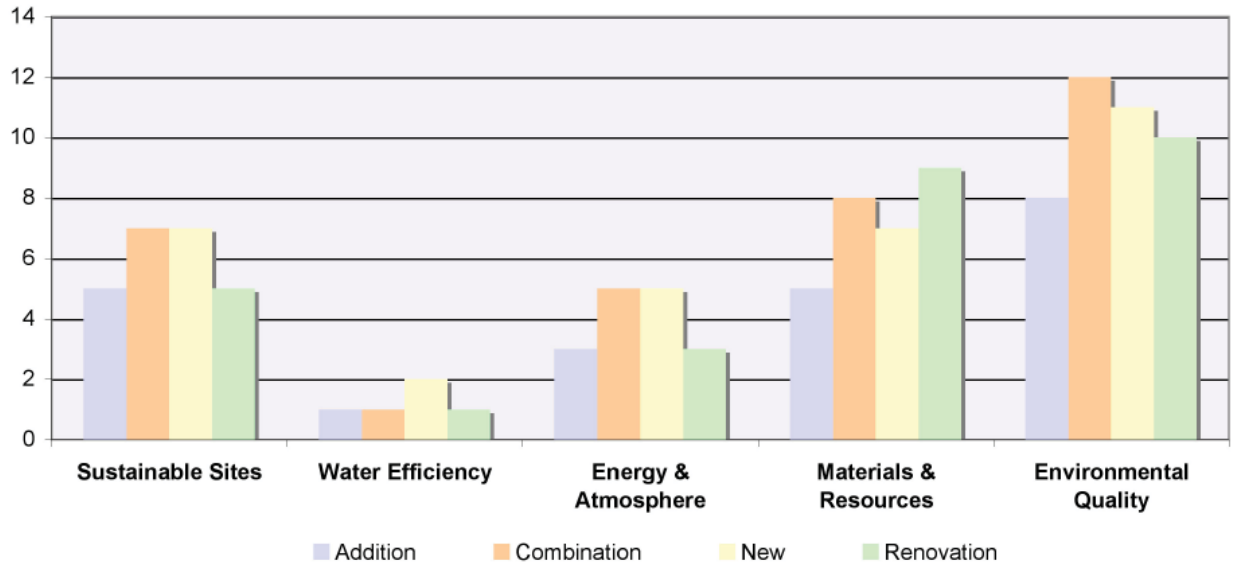
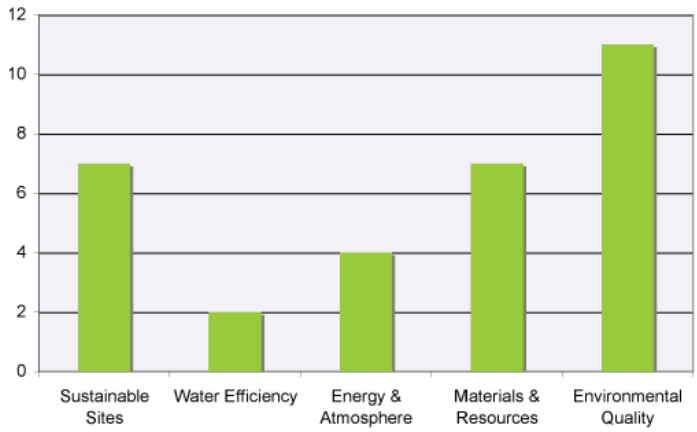


Figure 13: Green Guide Pilot Average Credit Breakdown: All Green Guide Pilots



of the fact that the *Green Guide* is tailored to Acute Care facilities, Medical Office Buildings, Retirement facilities, and Specialty hospitals have reached equivalent levels of achievement using the *Construction* section. For the *Operations* section, the best performing projects are Renovations and Specialty hospitals. In many cases, Renovation projects have been registered with the *Green Guide* at the instigation of the health care institution, rather than the design team, reflecting an established awareness of the facility operations' ecological footprint. Indeed, hospitals familiar with Hospital for a Healthy Environment's pollution prevention and waste reduction programs will find many familiar criteria in the *Green Guide*'s *Operations* section credits.

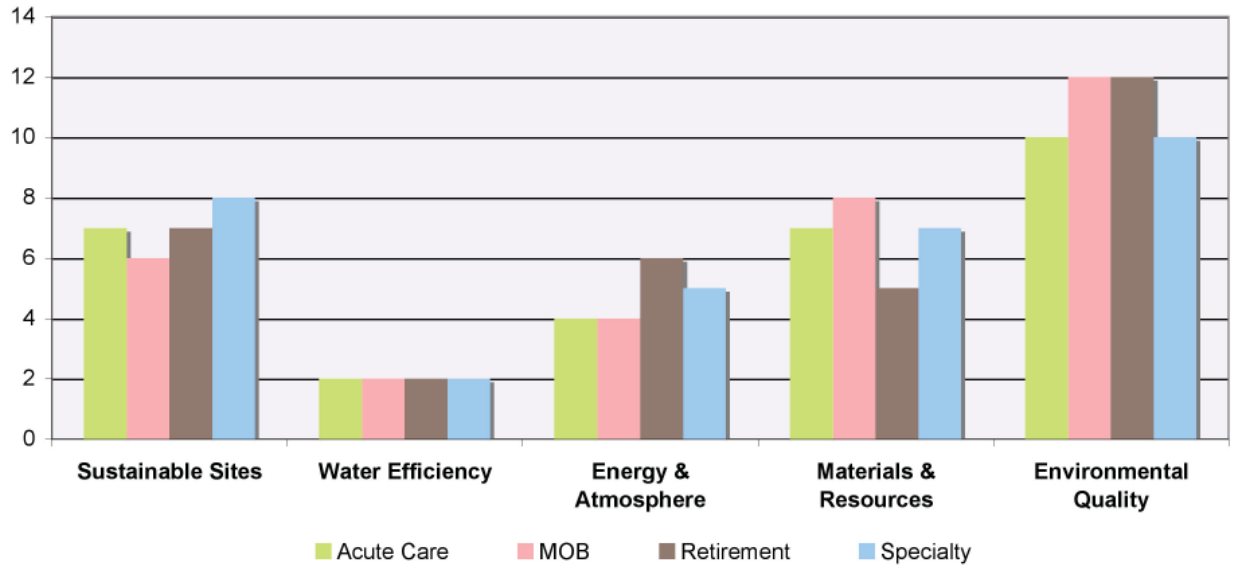
The profile of average credit achievement in each project type (Figure 12) – New Construction, Addition, Renovation, and a combination of project tyes – follows the average *Green Guide* Version 2.1 credit profile (Figure 13), with Sustainable Sites, Materials & Resources, and Environmental Quality boasting the highest achievement levels. The Integrated Design section is not included in these graphs, because all Pilots are required to comply with the two Prerequisites in that section governing an organized integrated design process and the inclusion of a health issues statement in the project's design intent document.

The Water Efficiency section has proved difficult for all of the Pilots; however, New Construction projects have found that the opportunity to design the entire facility's mechanical system and purchase new medical devices contributed to a moderately higher success rate than Renovations or Additions. Renovation projects, on the other hand, have demonstrated a higher level of achievement in the Materials & Resources section. In many cases, the limited scope of a Renovation project has provided the opportunity to concentrate on healthy materials selection, because other *Green Guide* credits, such as landscaping or upgrading mechanical systems, fall outside their scope of work.

In contrast to the graph outlining project types, the overall profile of average credit achievement by facility type (Figure 14) – Acute Care, Specialty Hospital, Medical Office Building, and Retirement – is relatively consistent; however, different facility types trend toward credit achievement in different areas of the *Construction* section. All facility types have concentrated the bulk of their green strategies in the Sustainable Sites, Materials & Resources, and Environmental Quality sections. Likewise, they have all struggled in the Water Efficiency section.

Retirement Facilities have excelled in the Energy & Atmosphere category, possibly reflecting their less intensive energy needs and less massive footprint. Medical Office Buildings, in contrast, have concentrated their effort in the Materials & Resources and Environmental Quality sections. Many Medical Office Buildings encounter less regulatory barriers to achieving LEED for New Construction certification than the Acute Care and Specialty Hospital projects. In fact, many are cross-registered with both the *Green Guide* and LEED. These projects often register with the *Green Guide* to take advantage of its health-based credits especially in the Materials & Resources and Environmental Quality sections, and pursue the other sections using LEED for New Construction.

Figure 14: Green Guide Pilot Average Credit Breakdown: Facility Type



Looking Forward

2007 promises to be a year of transitions and advancement in the health care industry. With the release of *Green Guide for Health Care* Version 2.2 in January 2007, the *Green Guide* has begun to lay a foundation for the next steps in the evolution of the health care industry, emphasizing a comprehensive ecological approach. Six groundbreaking white papers released in September 2006, commissioned by the Center for Health Design and Health Care Without Harm and sponsored by the Robert Wood Johnson Foundation, provide a glimpse into the future of the green health care movement. Entitled "Designing the 21st Century Hospital: Environmental Leadership for Healthier Patients and Facilities," the papers correlate the environmental impact of health care construction and public health concerns. New findings suggest that very low levels of exposure to chemicals routinely incorporated into building materials can result in chronic health disorders such as cancer and asthma. Several of the papers outline the proactive steps that leading health care institutions have taken to address the concerns raised by environmental health and evidence-based design findings in the realm of building materials, food service, and pollution prevention programs.

"Values-Driven Design and Construction: Enriching Community Benefits through Green Hospitals" presents interviews with CEOs of early adopter health care facilities that have embraced green building practices and operations. These executives identify sustainability as a mechanism for transforming the health care system's current image as a polluter and major contributor to the release of toxic chemicals into the environment into an industry that promotes health. Creating health care facilities that are high-performance, healthy, and healing environments can help spur the necessary market and organizational transformations that will be required to fuel a paradigm shift towards ecological health care.

The *Green Guide* will also continue to support research initiatives that spur market transformation in the green building sector. For example, a *Green Guide* research project sponsored in collaboration with the U.S. Green Buidling Council's LEED for Healthcare Core Committee and funded by New York State Energy Research and Development Authority, Pacific Gas + Electric, Southern California Edison, and the Massachusetts Technology Collaborative, has commissioned Viridian Energy + Environmental to develop a prescriptive path to comply with *Green Guide for Health Care* Energy & Atmosphere Credit 1: Optimize Energy Performance, also to be considered for the upcoming LEED for Healthcare tool.

The anticipated release of LEED® for Healthcare in late 2007, as recently announced by the U.S. Green Building Council (USGBC), will bolster the momentum towards market transformation initiated by the launch of the *Green Guide* Pilot in December 2004. Additionally, the *Green Guide* and the USGBC have committed to formalizing a partnership to support the organizations' continued provision of complementary services to the health care market, including a broad-based education program. Building on the body of work pioneered by the *Green Guide*, LEED® for Healthcare will represent the first third-party certification green building tool tailored to health care construction in the U.S.

In addition to its ongoing collaboration with the USGBC, the *Green Guide* will continue to work closely with Hospitals for a Healthy Environment (H2E) to encourage integration of green construction practices with programs within health care facilities that promote pollution prevention and green facility operations. Already, 60% of *Green Guide* Pilot projects are pursuing both the *Construction* and *Operations* sections of the *Green Guide* simultaneously. Embarking on its second year, the GGHC/H2E Green Building teleconference series has created a framework for sharing knowledge across design & construction teams and facilities management.

Accelerated market transformation evident over the past twelve months promises to continue into 2007. Together, we have reached the tipping point towards high performance healing environments!