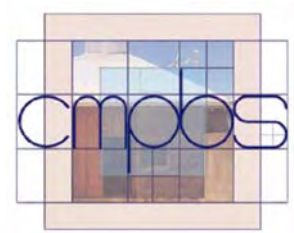




Version 2.2 Operations Section, 2008 Revision

December 2008

Convener:



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Table of Contents

Overview

- 1 – Introduction
- 2 – Checklist – Operations
- 3 – Credit Summary – Operations

Operations Credits

- 4 – Integrated Operations & Education
- 5 – Sustainable Sites Management
- 6 – Transportation Operations
- 7 – Facilities Management
- 8 – Chemical Management
- 9 – Waste Management
- 10 – Environmental Services
- 11 – Food Service
- 12 – Environmentally Preferable Purchasing
- 13 – Innovation in Operations

Release for Public Use

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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.

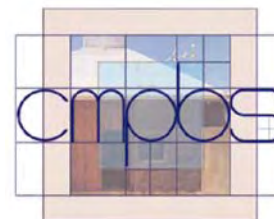
Decision Making Process

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.



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)

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Center for Maximum Potential
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Health Care Without Harm

Healthy Building Network

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HEALTHY BUILDING NETWORK



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Without Harm



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WHR
ARCHITECTS

Endorsers

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

Affiliated Engineers, Inc.

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Anshen + Allen, Architects

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Environmental Dynamics

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**GREENGUARD®
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Operations - Version 2.2, 2008 Revision

Y - (yes) you are moderately confident that you can attain the credit.

? - (maybe) it will be challenging for this project and you are uncertain of your ability to attain it but you will try.

N - (no) while technically possible, you currently don't expect to try to achieve this credit in this project due to cost or other tradeoffs with project goals.

NA - (not applicable) it is inherently physically unattainable for this particular project regardless of effort due to physical conditions or project scope.

Note: an Excel spreadsheet of this checklist is available for download at www.gghc.org

Integrated Operations & Education 1 Point

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1	Integrated Operations & Maintenance Process	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1	Education: Staff, Patient and Community Environmental Sustainability Education	1

Sustainable Sites Management 9 Points

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.1	Site Management: Building Exterior & Hardscape Management Plan	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.2	Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.1	Reduced Site Disturbance: Protect or Restore Open Space or Habitat	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.2	Reduced Site Disturbance: Structured Parking	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3	Stormwater Management	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.1	Heat Island Reduction: Non-Roof	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.2	Heat Island Reduction: Roof	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.1	Connection to the Natural World: Outdoor Places of Respite	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.2	Connection to the Natural World: Exterior Access for Patients	1

Transportation Operations 5 Points

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.1	Alternative Transportation: Commuting: 10%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.2	Alternative Transportation: Commuting: 25%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.3	Alternative Transportation: Commuting: 50%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.4	Alternative Transportation: Commuting: 75%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.5	Alternative Transportation: Allowances	1

Facilities Management 40 Points

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1	Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 2	Minimum Building Energy Efficiency Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 3	Refrigerant Management - Ozone Protection	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 4	Minimum Indoor Plumbing Fixture and Fitting Efficiency	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 5	Outdoor Air Introduction & Exhaust Systems	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 6	Environmental Tobacco Smoke (ETS) Control	Required

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.1	Optimize Energy Efficiency Performance: Energy Star score of 67 or EUI of 17% (Required per FM Prereq 2)	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.2	Optimize Energy Efficiency Performance: Energy Star score of 69 or EUI of 19% (Required per FM Prereq 2)	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.3	Optimize Energy Efficiency Performance: Energy Star score of 71 or EUI of 21% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.4	Optimize Energy Efficiency Performance: Energy Star score of 73 or EUI of 23% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.5	Optimize Energy Efficiency Performance: Energy Star score of 75 or EUI of 25% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.6	Optimize Energy Efficiency Performance: Energy Star score of 77 or EUI of 27% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.7	Optimize Energy Efficiency Performance: Energy Star score of 79 or EUI of 29% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.8	Optimize Energy Efficiency Performance: Energy Star score of 81 or EUI of 31% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.9	Optimize Energy Efficiency Performance: Energy Star score of 83 or EUI of 33% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.10	Optimize Energy Efficiency Performance: Energy Star score of 85 or EUI of 35% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.11	Optimize Energy Efficiency Performance: Energy Star score of 87 or EUI of 37% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.12	Optimize Energy Efficiency Performance: Energy Star score of 89 or EUI of 39% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.13	Optimize Energy Efficiency Performance: Energy Star score of 91 or EUI of 41% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.14	Optimize Energy Efficiency Performance: Energy Star score of 93 or EUI of 43% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.15	Optimize Energy Efficiency Performance: Energy Star score of 95+ or EUI of 45% better than average	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.1	Potable Water Use Reduction: Total Building Reduction: Reduce 10%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.2	Potable Water Use Reduction: Total Building Reduction: Reduce 20%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.3	Potable Water Use Reduction: Total Building Reduction: Reduce 30%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.4	Potable Water Use Reduction: Total Building Reduction: Reduce 40%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.5	Potable Water Use Reduction: Total Building Reduction: Reduce 50%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2.6	Potable Water Use Reduction: Water Efficient Landscaping	1

Project Checklist

Y	?	N	NA	Credit 2.7	Potable Water Use Reduction: Cooling Tower: Chemical Management	1
Y	?	N	NA	Credit 2.8	Potable Water Use Reduction: Cooling Tower: Non-Potable Water Source Use	1
Y	?	N	NA	Credit 3.1	Existing Building Commissioning: Investigation & Analysis	1
Y	?	N	NA	Credit 3.2	Existing Building Commissioning: Implementation	1
Y	?	N	NA	Credit 3.3	Existing Building Commissioning: Ongoing Commissioning	1
Y	?	N	NA	Credit 4.1	Building Operations & Maintenance: Staff Education	1
Y	?	N	NA	Credit 4.2	Building Operations & Maintenance: Building Systems Maintenance	1
Y	?	N	NA	Credit 4.3	Building Operations & Maintenance: Building Systems Monitoring	1
Y	?	N	NA	Credit 5.1	Performance Measurement: System-Level Energy Metering: 40%	1
Y	?	N	NA	Credit 5.2	Performance Measurement: System-Level Energy Metering: 80%	1
Y	?	N	NA	Credit 5.3	Performance Measurement: Enhanced Water Metering	1
Y	?	N	NA	Credit 5.4	Performance Measurement: Emissions Reduction Reporting	1
Y	?	N	NA	Credit 6	IAQ Management: Maintaining Indoor Air Quality	1
Y	?	N	NA	Credit 7.1	On-Site & Off-Site Renewable Energy: 1% on or 25% off	1
Y	?	N	NA	Credit 7.2	On-Site & Off-Site Renewable Energy: 3% on or 50% off	1
Y	?	N	NA	Credit 7.3	On-Site & Off-Site Renewable Energy: 5% on or 75% off	1
Y	?	N	NA	Credit 7.4	On-Site & Off-Site Renewable Energy: 10% on or 100% off	1
Y	?	N	NA	Credit 8	Refrigerant Management	1
Y	?	N	NA	Credit 9	Light Pollution Reduction	1

Chemical Management**8 Points**

Y		NA	Prereq 1	Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management	Required
Y		NA	Prereq 2	Chemical Management Policy and Audit	Required
Y		NA	Prereq 3	Community Contaminant Reduction: Leaks & Spills	Required

Y	?	N	NA	Credit 1.1	Indoor Chemical Contaminant Reduction: Sanitary Sewer	1
Y	?	N	NA	Credit 1.2	Indoor Chemical Contaminant Reduction: Hand Hygiene Products	1
Y	?	N	NA	Credit 1.3	Indoor Chemical Contaminant Reduction: Sterilization	1
Y	?	N	NA	Credit 1.4	Indoor Chemical Contaminant Reduction: High Level Disinfection	1
Y	?	N	NA	Credit 1.5	Indoor Chemical Contaminant Reduction: Laboratory	1
Y	?	N	NA	Credit 1.6	Indoor Chemical Contaminant Reduction: Radiology	1
Y	?	N	NA	Credit 2.1	Pharmaceutical Minimization, Management & Disposal: Characterization, Policy & Program	1
Y	?	N	NA	Credit 2.2	Pharmaceutical Minimization, Management & Disposal: Minimization, Best Management Practices	1

Waste Management**6 Points**

Y		NA	Prereq 1	Waste Management Plan	Required	
Y		NA	Prereq 2	Waste Generation Profile & Measurement	Required	
Y		NA	Prereq 3	Solid Waste Land Disposal	Required	
Y	?	N	NA	Credit 1.1	Solid Waste & Material Management: Waste Prevention and Reduction: 15% diversion or 25 lb/adjusted patient bed	1
Y	?	N	NA	Credit 1.2	Solid Waste & Material Management: Waste Prevention and Reduction: 35% diversion or 20 lb/adjusted patient bed	1
Y	?	N	NA	Credit 1.3	Solid Waste & Material Management: Waste Prevention and Reduction: 50% diversion or 15 lb/adjusted patient bed	1
Y	?	N	NA	Credit 1.4	Solid Waste & Material Management: Recycling & Reuse of Facility Alterations & Additions	1
Y	?	N	NA	Credit 2.1	Regulated Medical Waste Reduction: <10% Total Waste Stream	1
Y	?	N	NA	Credit 2.2	Regulated Medical Waste Reduction: Minimize incineration	1

Environmental Services**8 Points**

Y	?	N	NA	Credit 1.1	Environmentally Preferable Cleaning: Policy Development	1
Y	?	N	NA	Credit 1.2	Environmentally Preferable Cleaning: Policy Development: Commitment to Phase In Implementation	1
Y	?	N	NA	Credit 1.3	Environmentally Preferable Cleaning: Products & Materials: Cleaners, 5 categories	1
Y	?	N	NA	Credit 1.4	Environmentally Preferable Cleaning: Products & Materials: Cleaners, 10 categories	1
Y	?	N	NA	Credit 1.5	Environmentally Preferable Cleaning: Products & Materials: Disposable Products	1
Y	?	N	NA	Credit 1.6	Environmentally Preferable Cleaning: Equipment	1
Y	?	N	NA	Credit 2	Entryway Systems	1
Y	?	N	NA	Credit 3	Indoor Integrated Pest Management	1

Food Service

17 Points

Y	?	N	NA	Credit 1.1	Sustainable Food Policy & Plan	1
Y	?	N	NA	Credit 1.2	Food Nutrition	1
Y	?	N	NA	Credit 2	Sustainable Food Education & Promotion	1
Y	?	N	NA	Credit 3.1	Local, Sustainably Produced Food Purchasing: 15%	1
Y	?	N	NA	Credit 3.2	Local, Sustainably Produced Food Purchasing: 25%	1
Y	?	N	NA	Credit 3.3	Local, Sustainably Produced Food Purchasing: 50%	1
Y	?	N	NA	Credit 4.1	Reusable & Non-Reusable Products: Reusable Food Service Ware	1
Y	?	N	NA	Credit 4.2	Reusable & Non-Reusable Products: Non-Reusable Food Service Ware & Take Out Containers	1
Y	?	N	NA	Credit 4.3	Reusable & Non-Reusable Products: Non-Food Service Ware Items	1
Y	?	N	NA	Credit 4.4	Reusable & Non-Reusable Products: Bottled Water Elimination & Public Drinking Water Access	1
Y	?	N	NA	Credit 5	Hospital Supported Agriculture: Food & Farm Linkages	1
Y	?	N	NA	Credit 6.1	Food Waste Reduction, Donation & Composting	1
Y	?	N	NA	Credit 6.2	Food Services Recycling	1
Y	?	N	NA	Credit 7.1	Food Vendors: Achieve 1 category	1
Y	?	N	NA	Credit 7.2	Food Vendors: Achieve 2 categories	1
Y	?	N	NA	Credit 8.1	Chemical Management for Food Services: Cleaning Products	1
Y	?	N	NA	Credit 8.2	Chemical Management for Food Services: Cutlery and Food Preparation Equipment	1

Environmentally Preferable Purchasing

20 Points

Y		NA	Prereq 1	Mercury Reduction	Required	
Y		NA	Prereq 2	Electronic Assets Environmental Management Plan	Required	
Y	?	N	NA	Credit 1	Solid Waste Reduction in Purchasing	1
Y	?	N	NA	Credit 2.1	Toxic Chemical Reduction in Purchasing: Policy/Structure Development	1
Y	?	N	NA	Credit 2.2	Toxic Chemical Reduction in Purchasing: Implementation	1
Y	?	N	NA	Credit 3.1	Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions: 10%	1
Y	?	N	NA	Credit 3.2	Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions: 20%	1
Y	?	N	NA	Credit 3.3	Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions: 30%	1
Y	?	N	NA	Credit 3.4	Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions: 40%	1
Y	?	N	NA	Credit 3.5	Toxic Chemical Reduction: FacilityMaintenance, Alterations & Additions: 50%	1
Y	?	N	NA	Credit 3.6	Toxic Chemical Reduction: Furniture & Medical Furnishings	1
Y	?	N	NA	Credit 4.1	Sustainably Sourced Materials & Products: Facility Alterations & Additions: 10%	1
Y	?	N	NA	Credit 4.2	Sustainably Sourced Materials & Products: Facility Alterations & Additions: 20%	1
Y	?	N	NA	Credit 4.3	Sustainably Sourced Materials & Products: Facility Alterations & Additions: 30%	1
Y	?	N	NA	Credit 4.4	Sustainably Sourced Materials & Products: Facility Alterations & Additions: 40%	1
Y	?	N	NA	Credit 4.5	Sustainably Sourced Materials & Products: Facility Alterations & Additions: 50%	1
Y	?	N	NA	Credit 5.1	Electronics Purchasing & End of Life Management: End of Life Management	1
Y	?	N	NA	Credit 5.2	Electronics Purchasing & End of Life Management: Office & Commercial Electronic Equipment Purchasing	1
Y	?	N	NA	Credit 5.3	Electronics Purchasing & End of Life Management: Medical Equipment Purchasing	1
Y	?	N	NA	Credit 6.1	Office Supplies: Paper and Non-Paper Product	1
Y	?	N	NA	Credit 6.2	Office Supplies: 100% Post-Consumer Recycled Content and Processed Chlorine Free Paper Products	1
Y	?	N	NA	Credit 7	Low Emitting & Fuel Efficient Fleet Vehicles	1

Innovation in Operation

7 Points

Y	?	N	Credit 1.1	Innovation in Operations	1
Y	?	N	Credit 1.2	Innovation in Operations	1
Y	?	N	Credit 1.3	Innovation in Operations	1
Y	?	N	Credit 1.4	Innovation in Operations	1
Y	?	N	Credit 2.1	Documenting Sustainable Operations Cost Impacts: Overall Operating Costs	1
Y	?	N	Credit 2.2	Documenting Sustainable Operations Cost Impacts: Absenteeism & Health Care Cost Impacts	1
Y	?	N	Credit 3	Research Initiatives	1

Operations Project Total

121 Points

Operations

Integrated Operations & Education

Title	Intent	Credit Goals	Source
IO Prereq 1 Integrated Operations & Maintenance Process	Demonstrate a cross discipline approach in Operations and Maintenance decision-making and implementation to ensure safe, healthful, environmentally sensitive methods and materials.	<ul style="list-style-type: none"> Develop and implement a functional cross discipline process for decision-making regarding safe, healthful and environmentally sensitive operations and maintenance and encourage continuous improvement. Define key organizational stakeholders and involve them in ongoing cross discipline decision-making process(es) for operations and maintenance. Create a Health Mission Statement that establishes the values and goals for operations and maintenance procedures and protocols, encouraging continuous improvement. 	New to GGHC
IO 1 Education: Staff, Patient and Community Environmental Sustainability Education	Create awareness among staff, patients, visitors, service providers, vendors and the community of environmental sustainability and reinforce its benefits to human health.	<p>Upon hire and at a minimum annually, educate all staff (including, but not limited to, physicians, nurses, interns, nursing and allied health students, board members, etc.) on their roles and responsibilities regarding the facility's environmental sustainability initiatives (as defined by IO Pre-requisite 1) and the connection to human health and environmental stewardship. Train staff to report relevant activities using the responsibility matrix outlined in Suggested Documentation under IO Prerequisite 1: Integrated Operations & Maintenance Process. <i>Note: In many cases, education on environmental sustainability initiatives and the connection to human health and the environment can be integrated into existing training programs.</i></p> <ul style="list-style-type: none"> Annually present a formal written report on progress in environmental programs and connection to human health and the environment to the facility's Board of Directors and other senior level leadership. <p>AND</p> <p>Establish a staff education program or programs incorporating at least one of the following criteria:</p> <ul style="list-style-type: none"> Educate staff on environmental programs and impact on human health and the environment through regular reports in the staff newsletter (minimum 4 per year) or a minimum of two dedicated staff newsletters annually. Develop and periodically update (minimum twice a year) an environmental poster campaign on facility environmental programs and their connection to human health and the environment targeted to staff within the facility. Annually recognize staff participation and leadership in environmental programs. <p>AND</p> <p>Establish a communications program or programs to educate patients, visitors, and the surrounding community incorporating at least one of the following criteria:</p> <ul style="list-style-type: none"> Develop and implement an active education program targeted to patients, visitors, and the public on facility environmental initiatives, outcomes, and the initiatives' connection to human health and the environment. Include reporting on the facility's progress in environmental programs, including associated health benefits to the surrounding community, in the annual report. 	New to GGHC

Sustainable Sites Management

Title	Intent	Credit Goals	Source
SSM 1.1 Site Management: Building Exterior & Hardscape Management Plan	Encourage environmentally-sensitive building exterior hardscape management practices that provide a clean, well-maintained and safe buildings exterior, while supporting high performance building operations.	<ul style="list-style-type: none"> Develop and implement an environmentally-sensitive, low-impact building exterior and hardscape management plan that helps preserve surrounding ecological integrity. The plan must employ best management practices that significantly reduce the use of harmful chemicals, energy waste, water waste, air pollution, solid waste and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared to standard practices, whether direct-purchase or contracted services. The plan must address all of the following operational elements that occur on the building and grounds, as applicable: <ul style="list-style-type: none"> Outdoor maintenance equipment Green cleaning and maintenance products, practices, and materials Least toxic snow removal strategies 	Modified from LEED EB 2008 SS c2: Building Exterior & Hardscape Management Plan.
SSM 1.2 Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan	Preserve ecological integrity, enhance natural diversity, and protect wildlife while supporting high performance building operations and integration into surrounding landscapes.	<ul style="list-style-type: none"> Develop and implement an environmentally-sensitive erosion control and landscape management plan for the site's natural components. The plan must employ best management practices that significantly reduce the use of harmful chemicals, energy waste, water waste, air pollution, solid waste, and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared to standard practices, whether direct-purchase or contracted services. The plan must address the following operational elements at a minimum: <ul style="list-style-type: none"> Outdoor Integrated Pest Management Green landscape management actions Native and/or drought-tolerant plants Erosion and sedimentation control Maintenance of landscape technologies Diver landscape waste 	Modified from LEED EB 2008 SS c3: Integrated Pest Management Erosion Control and Landscape Management Plan.
SSM 2.1 Reduced Site Disturbance: Protect or Restore Open Space or Habitat	Conserve existing natural site areas and restore damaged site areas to provide habitat and promote biodiversity.	<ul style="list-style-type: none"> Protect or restore natural habitat area as follows: $\text{Natural Habitat Area Required} = (\text{Site Area}) \cdot (.15 - \text{Site Size Factor}) \div (\text{Floor Space Ratio})$ Improving and/or maintaining off-site areas with native or non-invasive adapted plants can contribute toward earning GGHC SSM Credit 2.1. Every 2 square feet off-site will be counted as 1 square foot on-site. Off-site areas must be documented in a contract with the owner of the off-site area that specifies the required improvement and maintenance of the off-site area. 	Modified from GGHC v2.2 SS c5.1 and LEED EB 2008 SS c5: Reduced Site Disturbance: Protect or Restore Open Space.
SSM 2.2 Reduced Site Disturbance: Structured Parking	Conserve existing natural site areas and restore damaged site areas to provide habitat and promote biodiversity.	<ul style="list-style-type: none"> Achieve SSM Credit 2.1. <p>AND</p> <ul style="list-style-type: none"> Ensure that minimum 50% of total installed parking spaces meet one or more of the following criteria: <ul style="list-style-type: none"> Onsite structured parking Off-site structured parking Shared existing off-site surface parking 	Modified from GGHC v2.2 SS Credit 5.3: Site Development: Structured Parking

SSM 3 Stormwater Management	Limit the disruption of natural hydrology by the building and grounds.	<ul style="list-style-type: none"> Develop and implement a stormwater management plan that infiltrates, collects and reuses, or evapotranspires runoff from 15% of the rainfall falling on the whole project site: <ul style="list-style-type: none"> During an average weather year, and During the two-year, 24-hour design storm Implement an annual inspection program of all stormwater management facilities to confirm continued performance. Perform all routine required maintenance, necessary repairs, or stabilization within 60 days of inspection. 	Aligned with LEED EB 2008 SS c6: Stormwater Management
SSM 4.1 Heat Island Reduction: Non-Roof	Reduce heat islands (temperature differences between developed and undeveloped areas) to minimize impact on microclimate and human wildlife habitat.	<p>OPTION A</p> <p>Use any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots):</p> <ul style="list-style-type: none"> Shade from existing canopy or within 5 years of landscape installation, where landscaping (trees) must already be in place at the time of credit achievement. Shade from structures fully covered by solar photovoltaic panels. Shade from architectural devices or structures that have a Solar Reflectance Index (SRI) of at least 29. Implement a maintenance program that ensures these surfaces are cleaned at least every 2 years to maintain good reflectance. Light colored paving materials with an SRI of at least 29. Implement a maintenance program that ensures these surfaces are cleaned at least every 2 years to maintain good reflectance. Open grid pavement system (at least 50% pervious). <p>OR</p> <p>OPTION B</p> <p>Place a minimum of 50% of parking spaces under cover (defined as underground, under deck, under roof, or under a building). Any roof used to shade or cover parking must have an SRI of at least 29. Implement a maintenance program that ensures all SRI surfaces are cleaned at least every 2 years to maintain good reflectance. The top parking level of a multi-level parking structure is included in the total parking spaces calculation, but is not considered a roof and is not required to be an SRI surface.</p>	Aligned with LEED EB 2008 SS c7.1: Heat Island Reduction: Non-Roof
SSM 4.2 Heat Island Reduction: Roof	Reduce heat islands (temperature differences between developed and undeveloped areas) to minimize impact on microclimate and human wildlife habitat.	<p>OPTION A</p> <ul style="list-style-type: none"> Install and maintain roofing materials having a Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface. If more than 75% of the roof surface is covered with the SRI material, the SRI value may be lower than the required value if the resulting area-weighted equivalent SRI performance is at least as high as having the required value on 75% of the surface. Implement a maintenance program that ensures all SRI surfaces are cleaned at least every 2 years to maintain good reflectance. <p>OR</p> <p>OPTION B</p> <ul style="list-style-type: none"> Withstanding a structural verification, install and maintain a vegetated roof for at least 50% of the roof area. Implement a vegetated roof maintenance program in accordance with design and installation instructions. <p>OR</p>	Modified from LEED EB 2008 SS c7.2: Heat Island Reduction: Roof.

		<p>OPTION C</p> <ul style="list-style-type: none"> Install and maintain high albedo and vegetated roof surfaces that, in combination, meet the following criteria: $(\text{Area of SRI Roof}/0.75) + (\text{Area of vegetated roof}/0.5) \geq \text{Total Roof Area}$ 	
<p>SSM 5.1 Connection to the Natural World: Outdoor Places of Respite</p>	<p>Provide outdoor places of respite on the health care campus to connect health care patients, staff, and visitors to the health benefits of the natural environment.</p>	<p>Provide patient, staff, and visitor accessible outdoor places of respite equal to 5% of the net usable program area. Qualifying areas are defined below. <i>Note: For the purposes of this credit, net usable program area refers to usable areas within the scope of the project with a programmed function. It does not include closets or mechanical rooms.</i></p> <ul style="list-style-type: none"> Provide additional dedicated outdoor place(s) of respite for staff equal to 2% of the net usable program area. Exterior places of respite shall be subject to occupancy, located within 200 feet of a building entrance or access point, and must be spaces where no medical intervention or direct medical care is delivered. Qualifying areas shall be open to fresh air, the sky and the natural elements, including seasonal weather. 	<p>Aligned with GGHC v2.2/LEED HC SS c9.1: Connection to the Natural World: Places of Respite</p>
<p>SSM 5.2 Connection to the Natural World: Exterior Access for Patients</p>	<p>Provide outdoor places of respite on the health care campus to connect health care patients, staff, and visitors to the health benefits of the natural environment</p>	<ul style="list-style-type: none"> Provide direct access to an exterior courtyard, terrace or balcony with a minimum area of five square feet/patient served for 75% of all inpatients AND 75% of qualifying outpatients with clinical length of stay (LOS) greater than four hours. Vegetation (including planters) shall use either non-potable water for irrigation or a high-efficiency irrigation system. 	<p>Modified from GGHC v2.2/LEED HC SS c9.2: Connection to the Natural World: Exterior Access for Patients.</p>

Transportation Operations

<i>Title</i>	<i>Intent</i>	<i>Credit Goals</i>	<i>Source</i>
TO 1.1-1.4 Alternative Transportation: Commuting	Reduce pollution and land development impacts from conventional single-occupant vehicles used for commuting.	<ul style="list-style-type: none"> Document the percentage of commuting round trips made by Full Time Equivalent (FTE) and contract peak period staff using transportation means other than single-occupant, conventionally-powered, conventionally-fueled vehicles. <ul style="list-style-type: none"> TO c1.1 (1 pt): 10% TO c1.2 (2 pts): 25% TO c1.3 (3 pts): 50% TO c1.4 (4 pts): 75% Provide and maintain a building occupant conveyance program (shuttle-link) for buildings more than 1/2 mile from commuter rail or subway and more than 1/4 mile from established bus routes. Connect transit stops within 1/2 mile of the health care facility to main entrances using sidewalks, high-visibility crosswalks, and signage. Provide preferred parking for vehicles used for carpools/vanpools and for low-emitting, fuel-efficient vehicles. 	Modified from LEED EB 2008 SS c4.1-4.4: Alternative Commuting Transportation
TO 1.5 Alternative Transportation: Allowances	Reduce pollution and land development impacts from conventional single-occupant vehicles used for commuting.	<ul style="list-style-type: none"> Offer a financial incentive (also known as parking cash-out), other discount program, or non-monetary benefit equivalent to subsidizing on-site parking for all Full Time Equivalent (FTE) and contract peak period staff for alternative modes of travel. For the purposes of this credit, alternative modes of travel may include, but are not limited to: walking; public transit; bicycles or other human-powered means; carpools; vanpools; low-emission; fuel-efficient or alternative fuel vehicles; compressed work weeks; and, telecommuting. 	New to GGHC

Facilities Management

<i>Title</i>	<i>Intent</i>	<i>Credit Goals</i>	<i>Source</i>
FM Prereq 1 Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment	Promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training and system analysis.	<ul style="list-style-type: none"> Develop and annually revise a Building Operating Plan that provides details on how the building is to be operated and maintained. Develop and annually revise a Systems Narrative that provides a brief description of the mechanical and electrical systems, equipment, and envelope systems in the building with a corresponding preventive maintenance plan for all equipment covered by the Narrative. Document and annually review the current Sequence of Operations for the building. Create and annually review a narrative of the preventative maintenance plan for equipment described in the Systems Narrative and document the preventative maintenance schedule over a minimum twelve-month period. Annually conduct an energy audit that meets the requirements of ASHRAE Level I – Walk-Through Assessment. 	Modified from LEED EB 2008 EA Prereq 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment
FM Prereq 2 Minimum Building Energy Efficiency Performance	Establish the minimum level of energy efficiency for the building and systems.	<p>OPTION 1</p> <ul style="list-style-type: none"> For building types rated by Energy Star®, annually demonstrate that the facility has achieved a score of at least 69 utilizing the EPA Energy Star® Portfolio Manager Benchmarking Tool. <p>OR</p> <ul style="list-style-type: none"> For building types not rated by Energy Star, annually demonstrate that the facility has achieved an EUI of 19% above industry average in KBtu/ft²/year. <i>Note: Option 1 automatically awards projects 2 points in GGHC Facilities Management Credit 1: Optimize Energy Performance.</i> <p>OR</p> <p>OPTION 2</p> <ul style="list-style-type: none"> Facilities with Energy Star scores below 69 (or, if a non-rated facility, with an EUI that does NOT achieve 19% above industry average) shall improve energy performance by at least 7% per year on average over the improvement period until they reach the threshold listed under Option 1. <p>AND</p> <ul style="list-style-type: none"> Verify energy performance ratings through certification by a licensed professional engineer, either on staff or third party. 	Modified from LEED EB 2008 EA Prereq 2: Minimum Energy Efficiency Performance
FM Prereq 3 Refrigerant Management - Ozone Protection	Reduce stratospheric ozone depletion.	<ul style="list-style-type: none"> Zero use of Chlorofluorocarbon (CFC)-based refrigerants in new and replacement (HVAC&R) base building equipment. If CFC-based refrigerant containing HVAC&R equipment is maintained in the building, implement a phase-out plan that reduces annual leakage to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting, and reduces the total leakage over the remaining life of the unit to less than 30% of its refrigerant charge. Small HVAC&R units (defined as containing less than 	Modified from LEED EB 2008 EA Prereq 3: Refrigerant Management - Ozone Protection

		0.5 lbs of refrigerant), and other equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the "base building" system and are not subject to the requirements of this prerequisite.	
FM Prereq 4 Minimum Indoor Plumbing Fixture and Fitting Efficiency	Reduce indoor fixture and fitting water use within buildings to reduce the burdens on potable water supply and wastewater systems.	<ul style="list-style-type: none"> Reduce potable water usage of indoor plumbing fixtures and fittings to a level equal to or below the facility baseline, calculated assuming 100% of the building's indoor plumbing fixture and fitting count were outfitted with fixtures and fittings meeting the Uniform Plumbing Code 2006 (UPC) or the International Plumbing Code (IPC) 2006 fixture and fitting performance requirements. Fixtures and fittings included in the calculations for this credit are water closets, urinals, showerheads, faucets, faucet replacement aerators and metering faucets. The baseline water usage is set depending on the year of substantial completion of the building's indoor plumbing system. Set the baseline as follows: <ul style="list-style-type: none"> Plumbing system substantially completed in 1993 or later throughout the building – 120% of the water usage that would result if all fixtures meet the codes cited above; OR Plumbing system substantially completed before 1993 throughout the building – 160% of the water usage that would result if all fixtures meet the codes cited above. Develop and implement a policy requiring economic assessment of conversion to high-performance plumbing fixtures and fittings as part of any future indoor plumbing renovation. The assessment must account for potential water supply and disposal cost savings and maintenance cost savings. 	Aligned with LEED EB 2008 WE Prereq 1: Minimum Indoor Plumbing Fixture and Fitting Efficiency
FM Prereq 5 Outdoor Air Introduction & Exhaust Systems	Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.	<ul style="list-style-type: none"> Modify or maintain each outdoor-air (OA) intake, supply air fan, and/or ventilation distribution system to supply at a minimum, the outdoor air ventilation rate required by ANSI/ASHRAE 62.1-2007 under the Ventilation Rate Procedure under all normal operating conditions or the minimum requirements of the relevant local licensing requirement for ventilation, whichever is more stringent, AND the air quality criteria required by ANSI/ASHRAE 62.1-2007 under all normal operating conditions. Show compliance through measurements taken at the system level (i.e. at the air handler unit). Implement and maintain an HVAC System Maintenance Program that incorporates a reliability centered maintenance approach to ensure the proper operations and maintenance of HVAC components as they relate to outdoor air introduction and exhaust. Meet the EPA Indoor Air Quality (IAQ) guidelines OR Sheet Metal & Air Conditioning Contractor's National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings Under Construction to ensure the proper operations and maintenance of HVAC components as they relate to IAQ. Test and maintain the operation of all building general and local exhaust systems, including but not limited to, bathroom, shower, utility areas, paint shops, print shops, laboratories, kitchen, parking, copy rooms, and large volume shredding exhaust systems. 	Modified from LEED EB 2008 IEQ Prereq 1: Outdoor Air Introduction & Exhaust Systems
FM Prereq 6 Environmental	Prevent exposure of building occupants, indoor surfaces,	<ul style="list-style-type: none"> Prohibit smoking from the campus, including all 	Modified from LEED

Tobacco Smoke (ETS) Control	and systems to Environmental Tobacco Smoke (ETS).	buildings and public outdoor spaces.	EB 2008 IEQ Prereq 2: Environmental Tobacco Smoke Control
FM 1 Optimize Energy Efficiency Performance	Achieve an increased level of energy efficiency performance relative to typical buildings of similar type to reduce environmental and health burdens associated with excessive energy use.	<ul style="list-style-type: none"> Demonstrate either the EPA Energy Star® score or the Energy Use Intensity (EUI) that the facility has achieved according to the table below over a minimum twelve-months. Utilize the EPA benchmarking system within the Portfolio Manager Benchmarking Tool for building types addressed by Energy Star. Verify energy performance ratings through certification by a licensed professional engineer or facility manager, either on staff or third party. <p>Note: GGHC FM Prerequisite 2 automatically awards projects 2 points under this credit.</p> <ul style="list-style-type: none"> Credit 1.1: Energy Star 67 or EUI of 17% Credit 1.2: Energy Star 69 or EUI of 19% Credit 1.3: Energy Star 71 or EUI of 21% Credit 1.4: Energy Star 73 or EUI of 23% Credit 1.5: Energy Star 75 or EUI of 25% Credit 1.6: Energy Star 77 or EUI of 27% Credit 1.7: Energy Star 79 or EUI of 29% Credit 1.8: Energy Star 81 or EUI of 31% Credit 1.9: Energy Star 83 or EUI of 33% Credit 1.10: Energy Star 85 or EUI of 35% Credit 1.11: Energy Star 87 or EUI of 37% Credit 1.12: Energy Star 89 or EUI of 39% Credit 1.13: Energy Star 91 or EUI of 41% Credit 1.14: Energy Star 93 or EUI of 43% Credit 1.15: Energy Star 95+ or EUI of 45% 	Modified from LEED EB 2008 EA Credit 1: Optimize Energy Efficiency Performance
FM 2.1-2.5 Potable Water Use Reduction: Total Building Reduction	Maximize indoor potable water use efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.	<ul style="list-style-type: none"> Ensure no once-through potable water use for interior water features. If potable water is used in interior or exterior water features, it shall be separately metered and the water features' consumption shall be excluded from the numerator of the water reduction calculations outlined in the table below. Develop and implement strategies and systems that in aggregate produce a percentage reduction of total building potable water use from a facility baseline measured over a minimum one-year period. At least one meter for the overall building water use is required. Develop potable water use reduction strategies in collaboration with the facility infection control committee to minimize potential infection control risks. <ul style="list-style-type: none"> Credit 2.1: 10% potable water reduction Credit 2.2: 20% potable water reduction Credit 2.3: 30% potable water reduction Credit 2.4: 40% potable water reduction Credit 2.5: 50% potable water reduction 	New to GGHC
FM 2.6 Potable Water Use Reduction: Water Efficient Landscaping	Eliminate the use of potable water or other natural surface/subsurface resources available on or near the facility site for landscape irrigation.	<ul style="list-style-type: none"> Use only captured rainwater, recycled wastewater, recycled greywater, or water treated and conveyed by a public agency specifically for non-potable uses for irrigation. OR Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within 	Modified from LEED EB 2008 WE c3: Water Efficient Landscaping

		<p>one year of installation and plants are weaned in accordance with design and installation instructions.</p> <p>AND</p> <ul style="list-style-type: none"> In urban settings, where there is no lawn or landscaping, this credit can be earned by eliminating the use of potable water for watering any roof and/or courtyard garden space or outdoor planters, provided that the planters and/or garden space cover at least 5% of the building site area. <p><i>Note: For the purposes of this credit, potable water shall be defined in accordance with health regulations having jurisdiction.</i></p> <p><i>Note: If authorities having jurisdiction (e.g., Infection Control) do not permit irrigation using non-potable water sources, vegetated areas in accordance with SSM Credit 4.2: Heat Island Effect: Roof; SSM Credit 5.1: Connection to the Natural World: Outdoor Places of Respite; and/or SSM Credit 5.2: Connection to the Natural World: Exterior Access for Patients comply with this credit if they install a high-efficiency irrigation system. For the purposes of this credit, "high-efficiency irrigation systems" are defined as irrigation systems that use minimum 30% less water than conventional sprinkler irrigation. High-efficiency irrigation systems include micro or drip irrigation systems, moisture sensors, clock timers and water-data based controllers.</i></p>	
FM 2.7 Potable Water Use Reduction: Cooling Tower: Chemical Management	Reduce potable water consumption for cooling tower equipment through effective water management and/or use of non-potable make-up water.	<ul style="list-style-type: none"> Develop and implement a water management plan for the cooling tower that addresses chemical treatment, bleed-off, biological control and staff training as it relates to cooling tower maintenance. Improve water efficiency by installing and/or maintaining a conductivity meter and automatic controls to adjust the bleed rate and maintain proper concentration at all times. Employ non-toxic treatment chemicals or chemical-free cooling tower systems that meet NACE International Standard 7K189, "Control Factors in Performance Testing of Nonchemical Water Treatment Devices," 1997, and that demonstrate effectiveness in controlling at minimum, <i>Legionella spp.</i> per the 2003 CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities. 	Modified from LEED EB 2008 WE c4.1: Cooling Tower: Chemical Management
FM 2.8 Potable Water Use Reduction: Cooling Tower: Non-Potable Water Source Use	Reduce potable water consumption for cooling tower equipment through effective water management and/or use of non-potable make-up water.	<ul style="list-style-type: none"> Use make-up water that consists of at least 50% non-potable water over a minimum one-year period, such as: Develop and implement a measurement program that verifies make-up water quantities used from non-potable sources. 	Modified from LEED EB 2008 WE c4.1: Cooling Tower: Non-Potable Water Source Use
FM 3.1 Existing Building Commissioning: Investigation & Analysis	Through a systematic process, develop an understanding of the operation of the facility's major energy using systems, options for optimizing the building's energy performance and a plan to achieve energy savings.	<ul style="list-style-type: none"> Document the breakdown of energy use in the building. Annually list identified capital improvements that will provide cost-effective energy savings and document the cost benefit analysis associated with each. <p>AND</p> <ul style="list-style-type: none"> Conduct one of the following: <ul style="list-style-type: none"> Commissioning Process OR 	Modified from LEED EB 2008 EA Credit 2.1: Existing Building Commissioning: Investigation &

Credit Summary: Operations
Facilities Management

		• ASHRAE Level II Energy Audit	Analysis
FM 3.2 Existing Building Commissioning: Implementation	Implement minor improvements and identify planned capital projects to ensure that the facility's major energy using systems are repaired, operated, and maintained effectively to optimize the buildings' energy performance.	<ul style="list-style-type: none"> Annually develop and evaluate a five-year capital plan for major retrofits or upgrades including implementation of no- or low-cost operational improvements. Provide training in accordance with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff for facility management staff at the point of hire and annually that builds awareness and skills in a broad range of sustainable building operations subject matter, including energy efficiency and building, savings and benchmarking, and equipment and systems operation and maintenance. Annually demonstrate the observed and/or anticipated financial costs and benefits of measures that were implemented. Update the building's Building Operating Plan as necessary to reflect any changes in the occupancy schedule, equipment run time schedule, design set points, and lighting levels. 	Modified from LEED EB 2008 EA Credit 2.2: Existing Building Commissioning: Implementation
FM 3.3 Existing Building Commissioning: Ongoing Commissioning	Use commissioning to address constant changes in facility occupancy, usage, maintenance and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and provided service.	<ul style="list-style-type: none"> Implement an ongoing commissioning program that includes elements of planning, system testing, performance verification, corrective action response, ongoing measurement and documentation to proactively address operating problems. Create and annually revise a written plan that summarizes the overall commissioning cycle for the building by equipment or building system group. The ongoing commissioning cycle shall not exceed 24 months. This plan must include a building equipment list, performance measurement frequency for each equipment item and steps to respond to deviation from expected performance parameters. Track progress of the ongoing commissioning program against a baseline of two years previous to the current year. Update the Building Operating Plan and/or Systems Narrative as necessary to reflect any changes in the occupancy schedule, equipment run time schedule, design set points, lighting levels, or system specifications. 	Aligned with LEED EB 2008 EA Credit 2.1: Existing Building Commissioning: Ongoing Commissioning
FM 4.1 Building Operations & Maintenance: Staff Education	Support appropriate training, monitoring, operations and maintenance for facilities staff and building systems to ensure the facility delivers target building performance goals over the life of the building.	<ul style="list-style-type: none"> Develop and implement a continuing education program for facilities management operations and maintenance staff that provides each staff person with primary building maintenance responsibilities with minimum 8 hours per year of continuing education courses above and beyond licensure requirements on topics covered in the GGHC Facilities Management section such as building systems operations, continuous commissioning, maintenance, energy and water efficient building operations and maintenance practices, and/or achieving sustainable building performance. Qualifying courses shall meet the quality standards for continuing education required by the staff member's licensing board. 	New to GGHC
FM 4.2 Building Operations & Maintenance: Building Systems Maintenance	Support appropriate training, monitoring, operations and maintenance for buildings and building systems to ensure they deliver target building performance goals	<ul style="list-style-type: none"> Establish and maintain a comprehensive best practices equipment preventive maintenance program that provides in-house resources and/or contractual services to deliver maintenance. If operating a new building, require that the operating 	New to GGHC

	over the life of the building.	<p>and maintenance documentation provided to the building owner contain meaningful, appropriate, and system/equipment-specific training materials from the design/construction team explaining the sustainable building goals and anticipated performance.</p> <ul style="list-style-type: none"> Use a formal Computerized Maintenance Management System (CMMS) to track equipment and trigger preventive maintenance, document history, and manage the maintenance program. 	
FM 4.3 Building Operations & Maintenance: Building Systems Monitoring	Provide capacity for ventilation system monitoring to help sustain long-term occupant comfort and well-being.	Install permanent, continuous monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain minimum outdoor airflow rates under all operating conditions.	Aligned with LEED EB 2008 IEQ c1.2: IAQ Best Management Practices
FM 5.1-5.2 Performance Measurement: System-Level Energy Metering	Provide accurate energy use information to support energy management and identify opportunities for additional energy-saving improvements.	<ul style="list-style-type: none"> Develop a breakdown of energy use in the building, either through GGHC FM Credit 3.1 & 3.2 or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end use applications. This analysis of major energy use categories must have been conducted within the past two years. <p>AND</p> <ul style="list-style-type: none"> Based on the energy use breakdown, employ system-level metering covering the total expected annual energy consumption of the building. Permanent metering and recording is required. All types of submetering are permitted. FM Credit 5.1: Demonstrate that system-level metering is in place covering at least 40% of the total expected annual energy consumption of the <u>building</u>. At least one of the largest two energy use categories from the breakdown report must be covered to at least an 80% extent. FM Credit 5.2: Demonstrate that system-level metering is in place covering at least 80% of the total expected annual energy consumption of the <u>building</u>. At least two of the three largest energy use categories from the breakdown report must be covered to at least an 80% extent. 	Aligned with LEED EB 2008 EA c3.2-3.3: Performance Measurement: System Level Metering
FM 5.3 Performance Measurement: Enhanced Water Metering	Measure building and subsystem water performance over time to understand consumption patterns and identify opportunities for additional water savings.	Have in place permanently installed metering devices to measure potable water use, as applicable to the facility. One point is earned for sub-metering that captures 85% of water consumption.	New to GGHC
FM 5.4 Performance Measurement: Emissions Reduction Reporting	Document emission reduction benefits of building efficiency measures.	<ul style="list-style-type: none"> Identify building performance parameters that reduce conventional energy use and emissions, quantify those reductions, and report them to a formal tracking program. Meet all standards of California South Coast Air Quality Management District or local regulations or permit, whichever is more stringent, for all products of combustion. Track and record the significant emission reductions including those delivered by energy efficiency, 	Modified from LEED EB 2008 EA c6: Emission Reduction Reporting

		<p>renewable energy and other building emission reduction actions. Emissions to be tracked may include, but are not limited to: carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrogen oxides (NO_x), mercury (Hg), small particulates (PM_{2.5}), large particulates (PM₁₀), and volatile organic compounds (VOCs).</p> <ul style="list-style-type: none"> Report the reductions in emissions resulting from these energy efficiency and renewable operations using a third party voluntary reporting/certification program including, but not limited to: EPA Climate Leaders, Energy Star® or WRI/WBCSD protocols. Retire at least 10% of the emission reductions annually, delivered by the energy efficiency actions through a third party voluntary certification program. <p>AND</p> <ul style="list-style-type: none"> Develop and implement a review process to upgrade existing equipment to the best technological system of continuous emissions reduction available every five years or when retrofitting or upgrading, whichever comes first. Utilize biodiesel fuels or other low-emitting fuel (e.g., biodiesel, compressed natural gas or liquid propane) for generators and other diesel equipment, unless replacing fuels will void the equipment warranty. <p>AND</p> <ul style="list-style-type: none"> Ask the suppliers of goods and services for the building to do the same by implementing the actions listed above annually or at the point of contract renewal. 	
FM 6 IAQ Management: Maintaining Indoor Air Quality	Enhance Indoor Air Quality (IAQ) performance by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting indoor air quality problems when they occur and maintaining the well-being of the occupants.	<ul style="list-style-type: none"> Develop and implement on an ongoing basis an IAQ management program in accordance with infection control and prevention protocols in the 2003 CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities AND in accordance with either "A Guide to Managing Indoor Air Quality in Health Care Organizations", Joint Commission, 1997 OR the U.S. EPA document "Indoor Air Quality Building Education and Assessment Model (I-BEAM)," EPA Reference Number 402-C-01-001, December 2002. Verify that the facility's Indoor Air Quality (IAQ) management plan requires routine review of locations of sterilization equipment, copiers, paint shops, and other indoor pollutant sources requiring air monitoring to ensure that healthy IAQ will be maintained. Verify that the facility annually undertakes air testing and complies with regulatory limits for any substance listed in OSHA Table Z-1-Limits for Air Contaminants. Annually evaluate the plan's success responding to IAQ incidents. Analyze and determine the root causes of IAQ incidents and compile documentation on the short term and long-term actions taken. <p>AND</p> <ul style="list-style-type: none"> Maintain a minimum annual indoor air quality satisfaction rate of 80% reported by an annual survey of facility occupants, in accordance with ASHRAE 62.1-2007. In acute care settings, survey staff in both administrative and clinical settings; in residential health care occupancies, survey both residents and staff. 	Modified from LEED EB 2008 IEQ c1.1: IAQ Best Management Practices: IAQ Management Program

FM 7.1-7.4 On-Site & Off-Site Renewable Energy	<p>Encourage and recognize increasing levels of on-site and off-site renewable energy in order to reduce environmental and health burdens associated with fossil fuel energy use.</p>	<ul style="list-style-type: none"> Fulfill some or all of the building's total energy use through the use of on-site or off-site renewable energy systems. Projects shall compile proof of a contract to purchase RECs for a minimum of two years and shall also make a commitment to purchase RECs on an ongoing basis beyond that contract. Only projects meeting an Energy Star® score of 75 or Energy Use Intensity (EUI) of 25% better than average in accordance with GGHC FM Credit 1: Optimize Energy Performance may pursue more than one point under the off-site renewable energy certificates compliance pathway. Credit 7.1: 1% on-site or 25% off-site Credit 7.2: 3% on-site or 50% off-site Credit 7.3: 5% on-site or 75% off-site Credit 7.4: 10% on-site or 100% off-site 	<p>Modified from LEED EB 2008 EA Credit 4: On-Site and Off-Site Renewable Energy</p>
FM 8 Refrigerant Management	<p>Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.</p>	<p>OPTION A</p> <ul style="list-style-type: none"> Do not use refrigerants in base building HVAC&R systems. <p>OR</p> <p>OPTION B</p> <ul style="list-style-type: none"> Select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming. The base building HVAC&R equipment shall comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential: $LCGWP + (LCODP \times 10^5) \leq 100$ <p><i>Note: Small HVAC&R units (defined as containing less than 0.5 lbs of refrigerant), and other equipment such as standard refrigerators, small water coolers, medical equipment, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the "base building" system and are not subject to the requirements of this credit.</i></p>	<p>Modified from LEED EB 2008 EA c5: Refrigerant Management</p>
FM 9 Light Pollution Reduction	<p>Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.</p>	<p>FOR INTERIOR LIGHTING</p> <ul style="list-style-type: none"> The angle of maximum candela from each interior luminaire as located in the building shall intersect opaque building interior surfaces and not exit out through the windows. In spaces with fenestration that do not function 24/7, all non-emergency interior lighting shall be automatically controlled to turn off during non-business hours. Provide up to 2-hour manual override capability for after hours use. <p>AND</p> <p>FOR EXTERIOR LIGHTING</p> <ul style="list-style-type: none"> Zone and control lights so as to restrict full night lighting to the following areas: Emergency Department, a small employee parking area, a small visitor parking area, pedestrian walkways, and circulation routes. Reduce sight lighting by 50% in all other non-essential areas after 11pm. Only light areas as required for safety and comfort. Do not exceed 80% of the lighting power densities for exterior areas and 50% for building facades and landscape features as defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without 	<p>Aligned with LEED HC SS c8: Light Pollution Reduction</p>

		<p>amendments.</p> <ul style="list-style-type: none"> • All projects shall be classified under one of the following zones, as defined in IESNA RP-33, and shall follow all of the requirements for that specific zone. <ul style="list-style-type: none"> • For Lighting Zones 2, 3, and 4 - For site boundaries that abut public right-of-way, light trespass requirements may be met relative to the curb line shared by the public right-of-way and the site instead of the site boundary. • For ALL Zones - Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site, is allowed to use the centerline of the public roadway as the site boundary for 2 times the driveway width. 	
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Chemical Management

Title	Intent	Credit Goals	Source
CM Prereq 1 Polychlorinated BiPhenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management	Reduce the potential exposure of building occupants to polychlorinated biphenyls and equivalents (PCBs), PCB combustion by-products, and asbestos-containing materials (ACM). Prevent associated harmful effects of these hazardous materials in new and existing buildings.	OPTION 1: New Construction (operational less than one year) <ul style="list-style-type: none"> Verify that materials containing polychlorinated biphenyls and equivalents (PCB's), PCB combustion by-products and asbestos-containing materials (ACM) are not present in the building or on the site. OR OPTION 2: Existing Facilities (operational more than one year) <ul style="list-style-type: none"> Develop and implement a program for the discovery, testing and mitigation of PCB-containing materials and ACM to ensure proper removal and appropriate disposal as the facility is upgraded and equipment is replaced. Identify the applicable regulatory requirements for identification and proper disposal of PCBs and ACM. Maintain a current survey of the facility to identify where PCBs and ACM may be remaining in the building and on the site. 	Modified from previous LEED-EB version
CM Prereq 2 Chemical Management Policy and Audit	Institute a comprehensive chemical management policy and audit process to establish a framework of policies and procedures to reduce and eliminate the use, emission and improper disposal of chemical hazards and toxic materials within the healthcare facility and to the surrounding community.	<ul style="list-style-type: none"> Develop a comprehensive chemical management policy (per Joint Commission Environment of Care Standard 3.10.1). Undertake an internal hazardous chemical/material audit (per Joint Commission Environment of Care Standard 3.10.2, Element of Performance 2: Hazardous Materials and Hazardous Waste Inventory) to determine use by each department, and properly characterize chemical/materials. Develop and implement an occupational health strategy addressing potential occupational exposure issues and goals for improvement. 	New to GGHC
CM Prereq 3 Community Contaminant Reduction: Leaks & Spills	Mitigate leaks and spills and waterborne effluents to prevent releasing waterborne environmental, health and safety burdens to the site neighbors and surrounding community.	<ul style="list-style-type: none"> Develop and implement a policy that complies with US EPA Spill Prevention Control Countermeasures Regulations (SPCC) containment and engineering controls and all applicable state and local administrative codes pertaining to storage tanks to manage above- and below-ground storage of fuels and chemicals in order to minimize risk from leakage and spills. Develop and implement an emergency response plan to contain leaks and spills from above- and below-ground storage tanks in accordance with applicable state and local administrative codes pertaining to petroleum storage tanks. Ensure that outdoor hazardous waste storage areas include secondary containment provisions, a locked enclosure, an emergency phone and proper labeling with the date and documentation of all chemicals stored onsite per the U.S. EPA Resource Conservation and Recovery Act (RCRA) or state or local regulations, whichever is most stringent. Assure that RCRA rules are followed for time limitations on hazardous waste storage areas. Develop and implement a plan to prevent materials/substances from dumpsters, compactors and outdoor hazardous or medical waste storage areas from entering stormwater runoff, and inspect and monitor storm drains at least quarterly to ensure proper clearance. 	New to GGHC

CM 1.1 Indoor Chemical Contaminant Reduction: Sanitary Sewer	Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.	<ul style="list-style-type: none"> Develop and implement a policy banning discharge of chemicals into the sanitary sewer without express permission and acknowledgment of the Hazardous Materials Officer or other staff member responsible for regulatory compliance. Report to local Publicly Owned Treatment Works (POTW) on all planned chemical releases to wastewater to ensure regulatory compliance. Test wastewater discharge at minimum quarterly to ensure that nitrates, mercury and other heavy metals, cyanide and other toxic substances are not entering the sanitary sewer at concentrations greater than federal, state or locally regulated levels. Mercury shall be eliminated from wastewater down to 30 parts per trillion per EPA Method 1631E (40 CFR Part 136). Ensure that chemical and biological oxygen demand levels meet local publicly-owned treatment works (POTW) standards. 	New to GGHC
CM 1.2-1.4 Indoor Chemical Contaminant Reduction: Hand Hygiene Products, Sterilization & High Level Disinfection	Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.	<p>CM Credit 1.2: Hand Hygiene</p> <ul style="list-style-type: none"> In collaboration with the infection control committee, use the infection control risk analysis (ICRA) process to determine which areas of the facility may require the use of antimicrobial hand soaps. Avoid the use of hand soaps containing antimicrobials for any area not recommended by the ICRA process, as a mechanism to reduce the volume of antimicrobials entering the sanitary sewer and thus the environment. For hand soaps not containing antimicrobials, utilize selection criteria for hand soaps per GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products & Materials. In addition to meeting environmental and efficacy criteria, ensure that hand hygiene products have a low irritancy potential, particularly when these products must be used multiple times per shift. To maximize acceptance of hand-hygiene products by health care providers, solicit input from these staff regarding the feel, fragrance, and skin tolerance of products under consideration. <p><i>Note: Alcohol-based hand sanitizers are excluded from this credit.</i></p> <p>CM Credit 1.3: Sterilization</p> <ul style="list-style-type: none"> Replace the sterilant ethylene oxide (EtO) with safer alternatives for a minimum of 90% of equipment requiring sterilization. Where EtO must be used due to incompatibility or regulatory recommendations, ensure that reprocessing units are enclosed under negative pressurization and utilize local exhaust ventilation in accordance with OSHA Standard 29 CFR 1910.1047 and NIOSH "Current Intelligence Bulletin-52: Ethylene Oxide Sterilizers in Healthcare Facilities (1997, October 22)" and the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Monitor exposure to ensure that the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) and the OSHA Permissible Exposure Limit (PEL) of 1 ppm for an 8 hour time weighted average with a 5 ppm excursion level is never exceeded. In addition, meet state permitting requirements for use of EtO sterilizer reprocessing units. <p>CM Credit 1.4: High Level Disinfection</p> <ul style="list-style-type: none"> Replace the high level disinfectant (HDL) glutaraldehyde 	

		<p>with safer alternatives for a minimum of 90% of equipment requiring high level disinfection.</p> <ul style="list-style-type: none"> Where glutaraldehyde must be used due to incompatibility or regulatory recommendations: <ul style="list-style-type: none"> Ensure that enclosed reprocessing units limit the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) threshold of 0.05 ppm or less, and use local exhaust ventilation (capture velocity of at least 100 feet per minute and at least 10 air exchanges per hour) per NIOSH's Glutaraldehyde: Occupational Hazards in Hospitals. Units must also operate in accordance with the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Additionally, glutaraldehyde shall never be used or stored in a direct patient care area. Replace manual disinfection with automatic machine washers/disinfectors to minimize staff exposure to liquid disinfectants. 	
CM 1.5 Indoor Chemical Contaminant Reduction: Laboratories	Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.	<ul style="list-style-type: none"> Develop and implement a laboratory solvent reprocessing program for alcohols, xylene and formalin in the laboratory. Phase out use of mercury-containing fixatives, stains and laboratory equipment where safe and effective alternatives exist, as outlined in the Sustainable Hospital Project's "List of Mercury-free Alternatives in the Lab." Use automated laboratory equipment that maximizes sample throughput while minimizing sample size, reagent quantity, and waste streams. Utilize microscale chemistry to minimize use of lab chemicals and solvents where possible. Work with Environmental Health & Safety (EHS) personnel and wastewater authorities in developing an action plan. Use either local exhaust controls or other HVAC design element(s) that facilitate safe removal of chemical vapors, to minimize occupational exposure in laboratory per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality. 	
CM 1.6 Indoor Chemical Contaminant Reduction: Radiology	Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.	<ul style="list-style-type: none"> Recycle silver and used lead aprons from Radiology. Ensure that fixer solution from x-ray technology (where not digital) is properly captured and disposed of. Do not dispose to sanitary sewer unless tested for heavy metal content. Use either local exhaust controls or other HVAC design element(s) that facilitates safe removal of chemical vapors, to minimize occupational exposure in radiology per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality. 	
CM 2.1-2.2 Pharmaceutical Minimization, Management & Disposal	Safeguard human and ecological health through minimization and proper management and disposal of pharmaceuticals and associated wastes.	<p>CM Credit 2.1 (1 point)</p> <ul style="list-style-type: none"> Utilize a formulary review process to characterize hazardous pharmaceuticals. Based on the results of the formulary review, develop and implement a policy and program for the receipt, handling, storage, labeling, transport and end disposal of all pharmaceuticals, as well as staff education and training. <p>CM Credit 2.2 (1 point in addition to CM Credit 2.1)</p> <ul style="list-style-type: none"> Minimize the generation of waste pharmaceuticals. 	New to GGHC

		<ul style="list-style-type: none"> • Institute best management practices for the handling and disposal of non-regulated pharmaceuticals that act as teratogens, mutagens, carcinogens, endocrine disruptors, reproductive and developmental toxicants or pose a threat to ecosystem health. • Utilize stock rotation strategies to rotate pharmaceuticals close to the expiration date back into high-use areas such as crash carts or the pharmacy as a means of pharmaceutical waste minimization. • Ensure all pharmaceutical samples are logged into the facility, and only allow those samples with an expiration of one year or longer. 	
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Waste Management

<i>Title</i>	<i>Intent</i>	<i>Credit Goals</i>	<i>Source</i>
WM Prereq 1 Waste Management Plan	Institute a waste management plan to establish a framework of policies and procedures with a goal of zero waste.	<ul style="list-style-type: none"> Develop and implement a Waste Management Plan in compliance with the Waste Management Sections of the Joint Commission Environment of Care Standard 3.10 coordinating the facility's various waste policies into a single framework. The Waste Management Plan must include the following: <ul style="list-style-type: none"> A tracking and reporting mechanism for waste and material weight or volume and associated cost information, as detailed in GGHC WM Prerequisite 2 Waste Generation Profile and Measurement. Logistics for receiving, handling, returning, storing, spill response, and safe disposal of hazardous materials, recyclables and waste. Set clear expectations for facility-wide responsibility regarding required participation in environmental programs that cross several department lines. Provide departmental access to the plan and educate new and existing employees through annual staff education programs. Establish and maintain a process for continuous review and updates of the plan on an annual basis with documentation in a committee structure, or equivalent decision-making body. 	Modified from LEED EB 2008 MR Prereq 2: Solid Waste Management Policy
WM Prereq 2 Waste Generation Profile & Measurement	Establish baseline generation rates of all waste categories to enhance environmental goal setting and performance tracking.	<ul style="list-style-type: none"> Collect waste stream data and establish a tracking mechanism through invoice review and waste and recycling vendor reporting to establish a current baseline identifying the types and amounts of waste stream categories in weight or volume per month and cost per month for a minimum one year period. Characterize major waste streams including, at a minimum: regulated medical waste, solid waste, hazardous waste and recyclables. Calculate the percentage represented by each waste stream to help determine the focus of the waste reduction program. . Annually set waste segregation and reduction goals in alignment with GGHC WM Credits 1-3. Standardize vendors (where beneficial) and operations, and set up a data collection procedure, based on new data on materials and wastes. Identify waste data baseline and convert to adjusted patient day. At a minimum of quarterly, report waste profile to Joint Commission's Environment of Care (EOC) committee or equivalent decision-making body. 	Modified from LEED EB 2008 MR c6: Solid Waste Management: Waste Stream Audit
WM Prereq 3 Solid Waste Land Disposal	Prevent contamination of the land associated with improper disposal of toxic, hazardous, infectious or radiological substances.	<ul style="list-style-type: none"> Verify that contractors selected for solid, medical or hazardous waste treatment are licensed and permitted by the state. Ensure contract language with waste contractors requires full compliance with applicable state disposal rules for applicable waste types. Select contractors and technologies for medical, hazardous and mixed waste treatment that meet Maximum Achievable Control Technology (MACT) standards. Ensure contract language with waste contractors requires verification that chemotherapeutic agents, regulated 	New to GGHC

		medical waste, pathological waste, sharps, hazardous materials and low level radioactive waste are properly transported..	
WM 1.1-1.3 Solid Waste & Material Management: Waste Prevention & Reduction	Reduce solid waste disposal in land, air and water through prevention, reuse, recycling, donation and composting.	<ul style="list-style-type: none"> • Measure, track and report annual reduction in total solid waste. <ul style="list-style-type: none"> • WM Credit 1.1: 15% waste diversion or 25 pounds per adjusted patient day • WM Credit 1.2: 35% waste diversion or 20 pounds per adjusted patient day • WM Credit 1.3: 50% waste diversion or 15 pounds per adjusted patient day • Conduct site inspections at minimum on contract renewal for all final waste treatment, storage and disposal facilities. • Avoid municipal waste incineration for all waste streams, except where required. 	Modified from LEED EB 2008 MR c7: Solid Waste Management: Ongoing Consumables & MR c8: Solid Waste Management: Durable Goods
WM 1.4 Solid Waste & Material Management: Recycling and Reuse of Facility Alterations & Additions	Reduce amount of waste associated with renovations and alterations through deconstruction, material reuse, donation and recycling.	<ul style="list-style-type: none"> • Develop and implement a process (both written and in practice) to conduct a walk-through of areas prior to renovation to identify wastes, materials, deconstruction opportunities, supplies and equipment for reuse, donation or proper cleanup and disposal in preparation for the renovation. Set up a system to coordinate responsible parties to reduce waste and conserve financial and natural resources prior to area demolition. • Include in the Waste Management Plan (as defined in GGHC WM Prerequisite 1) a waste diversion program covering materials for facility renovations, demolitions, refits and new construction additions. 	Modified from LEED EB 2008 MR c9: Solid Waste Management: Facility Alterations & Additions
WM 2 Regulated Medical Waste Reduction	Reduce disposal of regulated medical waste to landfills, incinerators and alternative treatment plants through improved segregation, change of work practices and use of emerging technology.	<p>WM Credit 2.1 (1 point)</p> <ul style="list-style-type: none"> • Develop a facility policy for regulated medical waste disposal in collaboration with infection control and environmental services that is based on and references the definition of regulated medical waste (RMW) established by Authorities Having Jurisdiction (AHJs). AHJs for RMW may include the U.S. Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen Standard or state-level environmental agencies or departments of health. Defer to the most stringent standard having jurisdiction and comply with CDC/HICPAC's 2003 Guidelines for Environmental Infection Control.. Ensure that specific details covering products such as syringes, specimen bags, ampules, vials, trace chemotherapeutic waste, etc., are covered by the policy. • Provide RMW segregation training for all new and existing employees, at the departmental level and annually. Annually provide Department of Transportation training for all employees preparing RMW for removal. Annually provide written RMW education information in newsletters and brochures targeted to physicians and other clinical staff, including agency staff • Demonstrate that the regulated medical waste (RMW) stream (by weight or volume) is less than 10% of the total waste stream – calculated over a minimum 12 month period after establishing a baseline, as outlined in with GGHC WM Prerequisite 2. • For the first twelve months, report RMW generation rate and percentage of overall waste stream at least quarterly to 	New to GGHC

		<p>the Joint Commission's Environment of Care (EOC) committee or equivalent decision-making body.</p> <p>WM Credit 2.2 – (1 point in addition to WM Credit 2.1)</p> <ul style="list-style-type: none"> • Demonstrate that incineration is used only to dispose of the fraction of the regulated medical waste stream required by regulations to be incinerated. Segregate waste streams to ensure that no mercury or batteries are present in the portion of regulated medical waste stream bound for incineration or any other treatment technology. When considered non-infectious (or when feasible under regulations), avoid incineration of any halogenated compound, including PVC plastic and brominated flame retardants. • Incorporate steps into the facility's Waste Management Plan (as outlined in GGHC WM Prerequisite 1) to implement maximum achievable control technology (MACT) alternatives to incineration. 	
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Environmental Services

<i>Title</i>	<i>Intent</i>	<i>Credit Goals</i>	<i>Source</i>
ES 1.1-1.2 Environmentally Preferable Cleaning: Policy Development	Develop and implement an operational policy to limit exposure of building occupants and environmental services personnel to potentially hazardous chemical, biological and particulate contaminants from cleaning products and procedures, while ensuring effective infection control processes.	<p>Develop and maintain an environmentally preferable cleaning policy for the facility that addresses all surfaces.</p> <p>ES Credit 1.1 (1 point)</p> <ul style="list-style-type: none"> Establish standard operating procedures (SOPs) addressing how an effective cleaning and hard floor and carpet maintenance system will be consistently utilized, managed, audited and effectively staffed. Outline strategies for promoting and improving hand hygiene, emphasizing hand washing in accordance with the CDC "Hand Hygiene Guidelines." Establish guidelines for safe handling and storage of cleaning chemicals used in the facility, including a plan for managing hazardous spills or mishandling incidents in accordance with Joint Commission EC3.10.3, OSHA Hazard Communication, OSHA permissible exposure limits (PEL), NIOSH recommended exposure limits (REL) and/or EPA RCRA standards. Upon hire and annually, provide site-specific training for environmental services personnel. <p>ES Credit 1.2 (1 point in addition to ES Credit 1.1)</p> <p>In addition to GGHC ES Credit 1.1, include the following criteria in the facility's environmentally preferable cleaning policy:</p> <ul style="list-style-type: none"> A commitment to phase in ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products & Materials, and ES Credit 1.6: Environmentally Preferable Cleaning: Environmentally Preferable Cleaning Equipment, granting preference to products that contain no added fragrance. A commitment to purchase cleaning products that are fragrance-free and avoid the use of fragrance-emitting devices, air fresheners, fragrance or deodorizer sprays or urinal blocks. A commitment to phase in the purchase or contracting out of sustainable floor care systems that employ "metal free" floor finish, thereby extending the period between stripping and recoating to at least twelve months. Floor care systems shall meet either Green Seal GS-40 for Industrial and Institutional Floor-Care Products OR phthalate-free products meeting Environmental Choice CCD-147 for Hard Floor Care. A commitment to collaborate with the purchasing department (or applicable staff) to phase in the installation of environmentally-preferable flooring systems that require least toxic floor care systems through the substitution of least toxic chemical care systems for current flooring systems, and consideration of replacement flooring systems that can be effectively maintained with least toxic products. Annually evaluate new technologies, procedures and processes to ensure continuous improvement. Provide a mechanism for collecting occupant feedback (both patients and staff) on odors or concerns about cleaning products or practices. 	Modified from LEED EB 2008 IEQ c3.1: Green Cleaning: High Performance Cleaning Program

ES 1.3-1.5 Environmentally Preferable Cleaning: Products & Materials	Minimize exposure of building occupants and cleaning personnel to potentially hazardous chemical, biological and particulate contaminants, and reduce use of virgin paper resources in janitorial paper and other disposable product applications through purchase and proper implementation of environmentally preferable cleaning products and materials.	<p>Achieve GGHC ES Credits 1.1 & 1.2.</p> <p>AND</p> <ul style="list-style-type: none"> Implement an environmentally preferable purchasing program for cleaning products and materials, disposable paper products and trash bags. Cleaning product and material purchases include both products for use by in-house staff and products used by outsourced service providers. Perform an annual assessment in collaboration with the Infection Control Committee and Environmental Services of all cleaning chemicals used within the facility Annually document any enhancements necessary to continue cleaning with environmentally preferred cleaners, and identify purchasing parameters for selection. <p>AND</p> <p>Credit 1.3-1.4 (2 points)</p> <ul style="list-style-type: none"> One point (up to 2 total) will be awarded for the purchase and implementation of every five categories of environmentally preferable cleaning products listed below where 100% of procurement meets one or more of the referenced standards for the category. Ensure that all procurement (e.g., General Purpose Cleaners, Carpet & Upholstery Cleaners, etc.) aligns with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1 <p><i>Note: Hand hygiene is excluded from this credit. See GGHC CM Credit 1.2 for guidance on hand hygiene processes and products.</i></p> <p>AND/OR</p> <p>Credit 1.5 (1 point)</p> <ul style="list-style-type: none"> One point will be awarded for the purchase and implementation of minimum five of the categories of disposable products listed in the credit where 100% of procurement meets the referenced standard. In addition, all disposable products shall be certified Processed Chlorine-Free® (PCF), if applicable. Ensure that all procurement aligns with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1. 	Modified from LEED EB 2008 IEQ c3.4-3.6: Green Cleaning: Purchase of Sustainable Cleaning Products and Materials
ES 1.6 Environmentally Preferable Cleaning: Equipment	Develop and implement an operational program to limit exposure of building occupants and environmental services personnel to potentially hazardous chemical, biological and particulate contaminants from cleaning equipment and procedures, while ensuring effective infection control processes.	<p>Achieve both GGHC ES Credit 1.1 & 1.2.</p> <p>AND</p> <ul style="list-style-type: none"> Develop, implement and maintain a program for the use of cleaning equipment that maximizes effective reduction of building contaminants, while meeting infection control committee recommendations and minimizing environmental and health burdens. Ensure that all procurement and cleaning practices align with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1. Where outsourced contracts are utilized, Credit Goals must be met by contractor's equipment and practices. Conduct a reassessment of the use of chemical disinfectants and sterilants in the facility based on an infection control risk assessment (ICRA) and available evidence-based resources with target to optimize disinfectant use for high touch areas as defined by the infection control committee. Utilize alternatives such as detergent and microfiber mop heads for surfaces that carry little risk of cross transmission, such as corridors. 	Modified from LEED EB 2008 IEQ c3.7: Green Cleaning: Sustainable Cleaning Equipment

		<ul style="list-style-type: none"> The cleaning equipment program shall cover the following equipment: vacuum cleaners, carpet extraction equipment, powered maintenance equipment, automated scrubbing machines, battery-powered equipment, microfiber mop technology, ergonomically designed equipment, equipment safeguards, an equipment logbook, staff training requirements. 	
ES 2 Entryway Systems	Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.	<ul style="list-style-type: none"> Utilize entryway systems (grills, grates, mats, etc.) to reduce the amount of dirt, dust, pollen and other particles entering the building at all qualifying entryways, and develop and implement the associated cleaning strategies to maintain those entryway systems. Buildings must demonstrate that at least 10 feet in length of mats are in place at all qualifying entryways unless otherwise prevented by facility layout (in which case utilize matting as close to 10 feet in length as feasible). Ensure matting is designed for interior or exterior use, as appropriate, with relevant safety features for entryway use and is certified as slip resistant by the National Floor Safety Institute. 	Modified from LEED EB 2008 IEQ c3.8: Green Cleaning: Entryway Systems
ES 3 Indoor Integrated Pest Management	Eliminate human exposure to physical and chemical hazards associated with pest management products and practices by employing environmental services operations that focus on pest prevention emphasizing non-chemical strategies that protect people from unnecessary exposure to pests and pesticides.	<ul style="list-style-type: none"> Develop an Integrated Pest Management (IPM) Program for managing pest control in the building interior that prioritizes safer alternatives to chemical pesticides while preventing economic and health damage caused by pests. Phase in implementation of the IPM program within one year. Facilities bound by current contracts that do not allow for the implementation of the IPM policy shall phase in policy implementation in accordance with contract renewal timelines. Write the IPM Program into all pest control bid specifications, including the option to review any pesticide formulation and active ingredients prior to application. The program shall eliminate the use of pesticides in the listed categories except in case of immediate endangerment to health as a result of a pest situation. Use of any pesticide in the following categories must first be reviewed by infection control and safety: The plan shall include a communication strategy to provide notification of the IPM system. The notification shall be provided directly to all building occupants. Ensure that clinical staff is notified. The program shall incorporate "Universal Notification," which requires advance notice not less than 72 hours under normal conditions and 24 hours in emergencies before a pesticide, other than a least toxic, non-volatile pesticide is applied in a building or on surrounding grounds that the building maintains. The notice shall include: Pesticide Applications <ul style="list-style-type: none"> Ensure that any pesticide applicator on the hospital campus is licensed by the state, certified to handle the pest control products being used and utilizes appropriate personal protective equipment. Ensure that all pesticide products to be used in the building are reviewed by Infection Control and Safety before use. The IPM plan shall address under what circumstances an emergency application of 	Modified from LEED EB 2008 IEQ c3.9: Green Cleaning: Indoor Integrated Pest Management

Credit Summary: Operations
Environmental Services

		pesticides in a building or on surrounding grounds being maintained by the building can be conducted without complying with the above provisions. Universal Notification strategies for pesticide application still apply under emergency applications. In addition, ensure that occupants and janitorial workers are notified within 24 hours of the pesticide application.	
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Food Service

Title	Intent	Credit Goals	Source
FS 1.1 Sustainable Food Policy & Plan	Create, promote and implement sustainable food purchasing policies and plans that support human and ecological health.	<ul style="list-style-type: none"> Develop a Sustainable Food Policy with strategies for execution aligned with Food Service Credits 2-7; goals indicating what metrics will be tracked and how success will be defined; an action plan; and, an evaluation plan. <p>AND</p> <ul style="list-style-type: none"> Develop and implement a Sustainable Food Plan according to one of the following options: <ul style="list-style-type: none"> OPTION 1: Identify support from key stakeholders and adopt and implement a food policy vision statement that links desired outcomes and values of the program to the institution's broader mission OPTION 2: Adopt and implement Health Care Without Harm's Healthy Food in Health Care Pledge 	New to GGHC
FS 1.2 Food Nutrition	Create, promote and implement sustainable food purchasing policies and plans that support human and ecological health.	<ul style="list-style-type: none"> Achieve FS Credit 1.1: Sustainable Food Policy and Plan <p>AND</p> <ul style="list-style-type: none"> Except for restricted diets, include a minimum of one fresh fruit option at each patient meal. At lunch and dinner, provide a fresh green salad and a minimum of one non-starch fresh vegetable option. For patient and cafeteria food service, offer whole grain options for minimum 50% of grains and breads (e.g., whole-wheat bread, whole-grain rolls, brown rice). For patient and cafeteria food service, provide a minimum of one protein-balanced vegetarian menu option during each meal. <p>AND</p> <ul style="list-style-type: none"> Implement a minimum of four of the seven practices outlined in the credit. 	New to GGHC
FS 2 Sustainable Food Education & Promotion	Create awareness about sustainable hospital food service initiatives among staff, patients, visitors, service providers, vendors and the community of hospital food service initiatives and the associated human health benefits.	<p>Education</p> <ul style="list-style-type: none"> Upon hire and annually, hold a minimum of 1 educational event targeted to the food service department focused on the facility's sustainability initiatives and pursuit of relevant Credit Goals in the Food Service section of the <i>Green Guide</i> and explicitly explaining the link between human health and food production. Hold a minimum of 1 educational event annually targeted to hospital employees outside of the food service department. <p>AND</p> <p>Healthy Sustainable Food Promotion</p> <ul style="list-style-type: none"> Annually implement a minimum of 3 of the listed initiatives aimed at educating hospital staff, patients, and the community about food service sustainability commitments and activities. 	New to GGHC
FS 3.1-3.3 Local, Sustainably Produced Food Purchasing	Improve human and ecological health through purchase of local and sustainably produced food products.	<p>Achieve a minimum percentage of annual combined food and beverage purchases (both in-house and contracted food service) from any combination of the following sources:</p> <ul style="list-style-type: none"> Approved to carry one or more of the listed independent third party certified ecolabels. <p>AND/OR</p> <ul style="list-style-type: none"> Carry one of the listed label claims allowed by USDA or 	Modified from LEED EB 2008 MR c5: Sustainable Purchasing: Food

		FDA. AND/OR <ul style="list-style-type: none"> Farms, ranches, <u>and</u> production/processing facilities located within a 200-mile radius of the facility. FS Credit 3.1: 15% FS Credit 3.2: 25% FS Credit 3.3: 50% 	
FS 4.1-4.2 Reusable & Non-Reusable Products: Food Service Ware	Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.	FS Credit 4.1 Reusable Food Service Ware (1 point): <ul style="list-style-type: none"> Develop and implement a program whereby all food service ware for either cafeterias or patient meals is reusable. Demonstrate that the program has been in place for a minimum one-year period. FS Credit 4.2 Non-Reusable Food Service Ware and Take Out Containers (1 point in addition to FS Credit 4.1): <ul style="list-style-type: none"> Develop and implement a program whereby 50% of single-use, non-reusable food service ware and take out containers purchased meet the "Preferred" criteria for biobased food service ware outlined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware". Demonstrate that the program has been in place for a minimum one-year period. 	New to GGHC
FS 4.3 Reusable & Non-Reusable Products: Non-Food Service Ware Items	Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.	<ul style="list-style-type: none"> Develop and implement a purchasing program for non food service ware items including, at a minimum: <ul style="list-style-type: none"> All plastic bags shall be Certified Compostable as outlined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware" OR made from a minimum of 10% post consumer material. All paper-based non food service ware items (e.g., napkins, paper towels, general purpose industrial wipes, tray liners and patient menus) purchased for cafeteria and patient food service meet the reference standards listed and are certified Processed Chlorine-Free®, if applicable. Demonstrate that the program has been in place for a minimum one-year period. 	New to GGHC
FS 4.4 Reusable & Non-Reusable Products: Bottled Water Elimination & Public Drinking Water Access	Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.	<ul style="list-style-type: none"> Eliminate single-use bottled water sales throughout the facility including vending/meetings and conferences. In cafeteria provide easy access to water derived from local public water supply and through signage clearly indicate its availability. In cafeteria provide reusable water containers (for purchase or free) and through signage or shelf space clearly indicate their availability. In vending areas and break rooms provide clear signage indicating nearest local publicly accessible water fountain. 	New to GGHC
FS 5 Hospital Supported Agriculture: Food & Farm Linkages	Support local and regional food production by increasing its visibility in the community and strengthening local agriculture infrastructure.	Develop and implement a program or programs incorporating at minimum three (3) of the listed strategies: Processing and Season Extension, Food Service Procurement, Farmers Markets, Food Box, Hospital Garden or Hospital Farm, Urban Garden Program, and/or Conference and Meeting Food Policy.	New to GGHC

FS 6.1 Food Waste Reduction, Donation & Composting	Support food security programs, soil restoration, and waste reduction through food waste reduction, donation and composting programs.	<ul style="list-style-type: none"> Develop and implement a food waste reduction and donation program for usable food, as deemed by state health code and other regional regulators. Develop and implement a food waste composting program consistent with Department of Health and solid waste regulations, for collection from all food use areas including but not limited to: catering, patient rooms (where possible by regional regulation), cafeteria and food preparation areas. Develop and implement food waste reduction, donation and food waste composting written management plans and include in the overall Waste Management Plan outlined in GGHC WM Prerequisite 1. Estimate and track pounds of composted and donated food and include under the recycling section of the Waste Management Waste Profile outlined in GGHC WM Prerequisite 2. Provide controlled areas to facilitate removal of food waste, consistent with an Integrated Pest Management (IPM) plan as outlined in GGHC ES Credit 3: Integrated Pest Management. 	New to GGHC
FS 6.2 Food Services Recycling	Increase recycling of food services generated wastes to reduce solid waste disposal in landfills and incinerators.	<p>Implement recycling for all of the following Food Service materials:</p> <ul style="list-style-type: none"> Glass, metal and plastic Corrugated boxes, boxboard and paper Shrink wrap (bagged or baled) Return pallets to vendors for reuse. 	New to GGHC
FS 7.1-7.2 Food Vendors	Establish facility-wide implementation of healthy, sustainably produced food service programs by establishing parallel policies and programs with contracted food service vendors.	In addition to complying with the relevant GGHC Food Service credits through the Food Service department, establish and maintain facility-wide implementation of Food Service credits through contracts with food vendors. Calculate based on total facility food service budget including contracted food vendors unless listed otherwise. Up to two points total available. An additional innovation point available for facilities that achieve more than two of the categories listed.	New to GGHC
FS 8.1-8.2 Chemical Management for Food Services	Minimize toxic chemical use in food services preparation and service areas, including cleaning chemicals and pest management.	<p>FS Credit 8.1: Cleaning Products</p> <ul style="list-style-type: none"> Utilize environmentally preferable cleaning products to clean food preparation and food service areas (cafeterias), kitchen equipment, surfaces and dishware. These products may include floor cleaners, drain cleaners, oven cleaners, dish detergent, glass and surface cleaners, and multipurpose cleaners. Utilize cleaning products certified under the listed specifications in GGHC ES Credits 1.3-1.4 for available product categories. Avoid phenolics in Food Service applications. Where use of a sanitizer is recommended for previously cleaned food contact surfaces, sanitizer must meet U.S. EPA Efficacy Data Requirements for Sanitizing Rinses, and be in accordance with the U.S. Food and Drug Administration Hazard Analysis and Critical Control Point (HACCP) standard. All sanitizers for food contact surfaces must meet the current U.S. Food and Drug Administration Food Code (2005). If using chlorinated sanitizers, ensure concentrations of available chlorine are no greater than 200ppm for previously cleaned food-contact surfaces in food service areas (per US EPA Efficacy Data Requirements for Sanitizing Rinses), unless required by authorities having jurisdiction (AHJ). AHJs may include state and local 	New to GGHC

		<p>health departments and/or the U.S. Food and Drug Administration.</p> <ul style="list-style-type: none"> • Use of disinfectants for hard surfaces (not food contact surfaces) in Food Services areas shall only occur as the result of explicit evaluation and recommendation by the Infection Control committee using the Infection Control Risk Assessment (ICRA) process. Ensure that the selection of any disinfectant for use on hard surfaces is an EPA-registered hospital-use disinfectant under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements. • Utilize only integrated pest management (IPM) techniques for pest management in the food services area per GGHC ES Credit 3: Integrated Pest Management. <p>FS Credit 8.2: Cutlery and Food Preparation Equipment</p> <ul style="list-style-type: none"> • Develop and implement a policy/program in consultation with the facility's Infection Control Committee and in accordance with the facility's Infection Control Risk Assessment and Audit that prohibits the purchase and use of cutlery and food preparation equipment impregnated with antimicrobials. 	
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Environmentally Preferable Purchasing

Title	Intent	Credit Goals	Source
EP Prereq 1 Mercury Reduction	Protect the health of patients, staff and visitors, and reduce disposal costs and liability, by avoiding purchase of mercury-containing equipment and devices and phasing out existing mercury sources.	<p>Equipment and Devices</p> <ul style="list-style-type: none"> • Develop a mercury reduction purchasing policy that prohibits purchase of mercury-containing equipment without prior specific approval from the Hazardous Materials Committee (or equivalent). • Create an inventory identifying all mercury-containing devices and equipment. • <i>Note: Mercury-containing equipment and devices may include, but are not limited to, the following: MRI equipment, wheel chairs, automated beds, cantor tubes, bed warmers, bougies and thermometers and other medical and laboratory equipment.</i> • Label any mercury-containing equipment or devices as "contains mercury." • <i>Note: Fluorescent lamps are exempt from this labeling and inventory requirement; however, note purchasing criteria for lamps listed below.</i> • Identify alternatives to mercury-containing clinical devices and other stand-alone medical and/or facilities equipment (excluding fluorescent lamps) and pilot through supply chain or purchasing, in accordance with the protocol for any new purchase. Develop a plan to transition to mercury-free devices with 100% completion in five years (average 20% per year.) • For dental equipment, install or confirm existence of amalgam separators that capture a minimum 98% of mercury. Ensure Proper disposal of the captured mercury in accordance with GGHC WM Prerequisite 1: Waste Management Plan. <p>Lamps</p> <p>Develop and implement a lamp purchasing policy covering the following topics:</p> <ul style="list-style-type: none"> • Purchase only illuminated exit signs certified by Energy Star®. • At the end of their useful life, replace standard (e.g. non-pulse start) metal halide lamp assemblies in interior spaces and mercury vapor High Intensity Discharge (HID) lamp assemblies with other, lower mercury lamp types. • At the end of their useful life, replace current facility lamps with low mercury fluorescent and high pressure sodium lamp assemblies as listed in the credit. • Implement a lamp-recycling program that meets or exceeds the Universal Waste regulations of the respective state. <p>Training</p> <ul style="list-style-type: none"> • Educate and annually update purchasing and department heads on the facility's mercury reduction policy, the process for purchasing mercury-free equipment and devices, and progress with the mercury phase-out plan. 	Modified from LEED EB 2008 MR c4: Sustainable Purchasing: Reduced Mercury in Lamps

Environmentally Preferable Purchasing

EP Prereq 2 Electronic Assets Environmental Management Plan	Reduce the environmental and health burdens associated with the manufacture, use and disposal of electronic products.	<ul style="list-style-type: none"> • Develop an Electronic Assets Management Plan that includes a total cost of ownership approach with strategies around Procurement, Reduction, Use-Phase Management, Responsible Reuse, and Responsible Recycling. • At the point of purchase for equipment, require manufacturers' or vendors' written commitments to equipment end-of-life management through to final disposition, including take-back, refurbishment, resale, responsible donation or recycling, and provision of asset tracking by serial number. Establish a process for tracking responsible end-of-life management for existing or inherited equipment. • Establish and maintain a HIPAA (Health Insurance Portability and Accountability Act) compliance plan for all electronic products to safeguard the privacy of personal information. 	New to GGHC
EP Credit 1 Solid Waste Reduction in Purchasing	Reduce generation of municipal solid waste through waste prevention at the point of purchase.	<ul style="list-style-type: none"> • Develop and implement a process and establish policy language for investigating waste prevention opportunities in the supply chain purchasing process for products and services. • Phase in waste reduction criteria into contracts and specifications for products and services at the point of development and renegotiation. Waste reduction criteria extend the life of a product through maintenance, reduced packaging, take back programs, leasing, switching from disposable to reusable or a change in process or preference to products for which markets exist and are readily recyclable or able to be reprocessed. • Annually educate department heads, purchasing personnel and their group purchasing organization (where appropriate) on the value of and opportunities for waste reduction. • Establish and maintain an EPP subcommittee (or equivalent decision-making body) reporting directly to the facility wide environmental stewardship committee focused on reducing waste in the supply chain. Integrate the subcommittee's work into the Integrated Operations & Maintenance Process outlined in GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process. 	New to GGHC
EP Credit 2 Toxic Chemical Reduction in Purchasing	Promote the health of building occupants, reduce disposal costs and liability, and improve health for employees through purchasing least toxic products.	EP Credit 2.1 (1 Point) – Policy/Structure Development Develop, implement and annually evaluate a comprehensive chemicals purchasing policy as part of an environmentally preferable purchasing (EPP) program for all major purchasing decisions that sets goals for the elimination of target chemicals in products and that seeks disclosure on the extent of testing of chemical ingredients in products. At a minimum, the chemicals policy shall require: <ul style="list-style-type: none"> • The development of a position and a plan of action to address classes of chemicals of concern. • Target a list of classes of chemicals for elimination from products purchased by the facility including, at a minimum the following: Phthalates (specifically those listed under California Proposition 65 (Prop 65) plus Di-isononyl phthalate (DINP)), Polyvinyl chloride, Persistent bioaccumulative toxic chemicals, Bisphenol-A, Carcinogens, mutagens and reproductive toxicants, Halogenated flame retardants. • Annually review policy, progress and goal setting with the facility's group purchasing organization (GPO), purchasing department and other relevant staffers. Identify opportunities for the GPO to participate in market shifting and advocacy on behalf of membership 	New to GGHC

		<p>organizations.</p> <p>EP Credit 2.2 (1 point in addition to EP Credit 2.1) – Implementation</p> <ul style="list-style-type: none"> Demonstrate active change in at least three of the six categories listed above, resulting in a transition to environmentally preferred products as a result of the chemical purchasing policy, including documentation in supply chain, purchasing and/or other committee. For example: An annual report could state, for example: “transitioned to DEHP- and PVC-free IV products, purchased halogenated flame retardant-free TV’s, purchased only RoHS-compliant electronic equipment, and eliminated persistent bioaccumulative and toxic chemicals from cleaning products.” 	
EP Credit 3.1-3.5 Toxic Chemical Reduction: Facility Maintenance Alterations & Additions	Promote the health of building occupants, reduce disposal costs and liability, and improve health for employees through purchasing least toxic products.	<ul style="list-style-type: none"> Establish environmentally-preferable specification and purchasing policies for building materials and products used for building maintenance, fit-outs, renovations and additions, as described in the 10 product groups below. One point (up to 5 total) will be awarded for each 10% of the total value of all applicable building materials and products based on project cost, used in maintenance, fit out, addition and renovation projects during the previous year that meet one of the 10 product criteria listed in the credit. 	Modified from LEED HC MR Credit 4: PBT Source Reduction and EQ Credit 4: Low-Emitting Materials
EP Credit 3.6 Toxic Chemical Reduction: Furniture & Medical Furnishings	Promote the health of building occupants, reduce disposal costs and liability, and improve health for employees through purchasing least toxic products.	<p>Ensure that 40% of the annual volume of all freestanding furniture and medical furnishings purchases based on cost meet the following criteria in Options 1, or 2 or 3 below.</p> <p>The dollar value of any individual product may be added towards the 40% total value if the product meets one of the following chemicals of concern criteria:</p> <p>Option 1</p> <ul style="list-style-type: none"> Furniture components, textiles, finishes or dyes: product does not contain more than one of the following chemicals or materials: <ul style="list-style-type: none"> Added urea formaldehyde Heavy metals: lead, mercury, cadmium, and antimony, except as allowed under the EU RoHS (Restriction of the Use of Certain Hazardous Substances of the European Union) Directive, Hexavalent chromium in plated finishes, except as allowed under the EU RoHS (Restriction of the Use of Certain Hazardous Substances of the European Union) Directive, Stain and non-stick treatments utilizing perfluorinated compounds (PFCs), including PFOA, All other added halogenated compounds (chlorinated and fluorinated plastics and halogenated flame retardants as listed in EPP Credit 3), except PFCs. Stain and non stick treatments utilizing perfluorinated compounds (PFCs), including PFOA. Added antimicrobial treatments containing halogenated compounds and/or silver nanoparticles. <p>OR</p> <p>Option 2</p> <ul style="list-style-type: none"> The product contains no more than two of the six above-listed categories of materials AND meets or exceeds the indoor air quality requirements of California’s Special Environmental Requirements, Specifications Section 01350, updated with California DHS Standard Practice CA/DHS/EHLB/R-174 as determined by independent 	New to GGHC

		<p>laboratory testing and using the standard office building protocol parameters.</p> <p>OR</p> <p>Option 3</p> <ul style="list-style-type: none"> Sustainably Sourced Materials criteria (GGHC EP Credit 4.1-4.5) (salvaged, recycled, rapidly renewable, FSC certified wood, local manufacture) 	
EP Credit 4.1-4.5 Sustainably Sourced Materials and Products: Facility Alterations & Additions	Reduce the environmental and health burdens of materials and products acquired for building maintenance, fit-outs, additions and renovations.	<ul style="list-style-type: none"> One point (up to 5 total) will be awarded for each 10% of the total value of all building materials and products (based on cost) used in maintenance, fit out, addition and renovation projects during the previous year that meet the following criteria: salvaged, reused, or recycled; regionally sourced/manufactured; rapidly renewable; certified wood. If the facility undergoes outside contracted projects, the calculation shall either include all of these projects or exclude them all. If concrete or steel structural elements are applied toward this credit, the project must include at least two other materials or products from CSI MasterFormat divisions other than 03 and 05 to attain the first point. 	Modified from LEED EB 2008 MR c3: Sustainable Purchasing: Facility Alterations & Additions
EP Credit 5.1-5.3 Electronics Purchasing & End of Life Management	Reduce the environmental and health burdens associated with manufacture, use and disposal of electronic products. Require take back and management services for end-of-life electronic products to safely manage hazardous compounds.	<p>EP Credit 5.1 (1 Point) – End of Life Management</p> <ul style="list-style-type: none"> Require manufacturers' or vendor's written commitments of equipment end of life management, either through take-back or recycling, in all electronics purchasing contracts. For all electronic equipment: Contract only with recyclers that have signed the Electronic Recycler's pledge of True Stewardship (E-Stewards), or that otherwise provide adequate documentation proving they recycle all useable materials and do not export hazardous waste, use prison labor or use incineration (including waste to energy). If using manufacturer or vendor take back programs, verify that they follow the same guidelines in their subcontracting of recyclers. Provide annual training to relevant staff. <p>EP Credit 5.2 (1 point in addition to EP Credit 5.1) – Office and Commercial Electronic Equipment Purchasing</p> <ul style="list-style-type: none"> Achieve EP Credit 5.1 <p>AND</p> <ul style="list-style-type: none"> Develop and implement purchasing standards requiring a minimum of 90% Energy Star labeled equipment for all Energy Star qualified office and commercial equipment. When Energy Star standards do not exist for a given product category, purchase energy-efficient products that are among the 25th percentile of lowest energy consumers for that class of equipment as designated by the Federal Energy Management Program. For computers: Develop and implement purchasing standards requiring that a minimum of 95% of electronic hardware meets or exceeds Silver level EPEAT-registration in all relevant product categories. Include the criteria for the Health Care Without Harm/Hospitals for a Healthy Environment (H2E) Computer Takeback Campaign Purchase Guidelines for Environmentally Preferable Computers (Beyond EPEAT) and the Suggested Environmental Preference and Disclosures for General (Non-computer) electronic devices in all RFPs for computers and monitors. Give preference to companies that meet the highest percentage of criteria. 	Modified from LEED EB 2008 MR c2.1-2.2: Sustainable Purchasing - Durable Goods

Environmentally Preferable Purchasing

		EP Credit 5.3 (1 point in addition to EP c5.1) – Medical Equipment Purchasing <ul style="list-style-type: none"> • Achieve EP Credit 5.1 • AND • Develop and implement purchasing standards requiring a minimum of 50% of all diagnostic imaging equipment (x-rays, MRIs, etc), sterilization, and physiological monitoring equipment (but excluding other types of medical equipment) to be among the 25th percentile of lowest energy consumers for that class of equipment. Equipment shall be compared based on their continuous (or “standby”) mode electrical energy consumption. 	
EP Credit 6.1-6.2 Office Supplies	Conserve natural resources and promote ecosystem health through purchase of environmentally preferable office supplies.	Credit 6.1 (1 point) Develop and implement an environmentally preferable office supply product purchasing policy (including in-house purchases and contracts with office supply contractors), such that 50% of all office products meet the following criteria: <ul style="list-style-type: none"> • Office paper products: Most current U.S. EPA Comprehensive Purchasing Guidelines AND meet either FSC Certified Paper requirements, Green Seal GS-07 for Printing and Writing Paper, or Green Seal GS-10 for Coated Printing Paper requirements. • Office non-paper products: Most current EPA Comprehensive Purchasing Guidelines for Office Non-Paper Products, excluding office furniture. • Educate employees on the environmentally preferable office products purchasing initiative upon hire and annually. Credit 6.1 (1 point in addition to Credit 6.1) <ul style="list-style-type: none"> • Achieve EP Credit 6.1 AND <ul style="list-style-type: none"> • Develop and implement an environmentally preferable office supply product purchasing policy (including in-house purchases and contracts with office supply contractors), such that 50% of all office paper products meet the following criteria: <ul style="list-style-type: none"> • 100% post-consumer recycled content. • Certified Processed Chlorine Free®. 	Modified from LEED EB 2008 MR c1: Sustainable Purchasing - Ongoing Consumables
EP Credit 7 Low Emitting & Fuel Efficient Fleet Vehicles	Protect human health and improve air quality by reducing emissions from fleet vehicles.	<ul style="list-style-type: none"> • Evaluate the type, size and number of fleet vehicles required to meet the needs of facility occupants, including programs such as van service for patients with ambulatory impediments and programs aimed at reducing single-person automobile use (as outlined in GGHC TO Credit 1.1). • Own, lease, or contract with a service that supplies a low-emitting and fuel-efficient or alternative fuel (e.g., biodiesel, compressed natural gas or liquid propane) vehicle fleet, defined as vehicles that are either classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board, having achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide, or utilizing ultra-low sulfur diesel fuel and equipped with EPA or California Air Resources Board verified emissions control technology. • Low-emitting and fuel-efficient or alternative fuel vehicles shall comprise minimum 50% of total fleet mileage driven annually. • Provide alternative fuel stations, either onsite or by contract, to meet 100% of the fuel needs of the alternative fuel fleet. 	Modified from LEED HC SS Credit 4.3: Alternative Transportation: Low Emitting & Fuel Efficient Vehicles

Innovation in Operations

Title	Intent	Credit Goals	Source
IN 1.1-1.4 Innovation in Operations	Provide facilities' operations, management, and upgrade teams the opportunity to achieve points for achieving environmental and health benefits beyond those already addressed by the <i>Green Guide for Health Care Operations</i> section.	<ul style="list-style-type: none"> Identify the intent of the proposed innovation credit, the proposed credit goals, the additional environmental benefits delivered and the performance metrics used to document the additional environmental benefits delivered over a minimum one-year period. Successful innovation credit proposals shall require and track continuous improvement. 	Modified from LEED EB 2008 IN c1: Innovation in Operations
IN 2.1 Documenting Sustainable Operations Cost Impacts: Overall Operating Costs	Document sustainable building operations cost impacts to increase awareness of the benefits of green facilities operations.	<ul style="list-style-type: none"> Document overall building operating costs for the previous five years (or length of building occupancy, if shorter), and track changes in overall building operating costs over a minimum one-year period. Compile building operating cost and financial impacts for a minimum of five implemented Green Guide credits on an ongoing basis. <p>OR</p> <ul style="list-style-type: none"> Annually conduct a triple bottom line sustainability report. 	Modified from LEED EB 2008 IN c3: Documenting Sustainable Building Cost Impacts
IN 2.2 Documenting Sustainable Operations Cost Impacts: Absenteeism & Health Care Cost Impacts	Document absenteeism, staff retention, health care costs and other impacts of sustainable building performance improvements.	<ul style="list-style-type: none"> Document the history of absenteeism, staff retention, and health care costs for full-time equivalent (FTE) staff for the previous five years (or length of building occupancy with a minimum of 12 months). Track changes in absenteeism, staff retention, and health care costs (claim costs and any reductions in premium costs should be provided if available) for full-time equivalent (FTE) staff relative to the pursuit of minimum five <i>Green Guide for Health Care</i> credits and set annual goals for improvement. 	New to GGHC
IN 3 Research Initiatives	Expand the body of knowledge around the long-term impact of sustainable operations initiatives by participating in third party research projects.	<ul style="list-style-type: none"> Engage in public, third party research initiatives to help discover the impact that sustainable building performance improvements have on building occupants, the local community, and/or the global environment. Correlate research metrics with <i>Green Guide for Health Care</i> credits or equivalent green operations strategies. 	New to GGHC

Integrated Operations & Education

Required

IO Prerequisite 1

Integrated Operations & Maintenance Process

Intent

Demonstrate a cross discipline approach in Operations and Maintenance decision-making and implementation to ensure safe, healthful, environmentally sensitive methods and materials.

Health Issues

Acute and long-term health care facilities operate on a continuous, 24-hour, 7-day basis. Consequently, many operations and maintenance tasks are performed with staff and patients in occupancy. As a result, it is challenging, if not impossible, to isolate building occupants from associated environmental burdens. Building operations, construction operations and maintenance procedures must be evaluated relative to health impacts on patients, who are often immuno-compromised or otherwise vulnerable to environmental issues, and on staff, who may also be vulnerable and whose responsibility to provide critical care should not be impeded by a compromised indoor environment. The Joint Commission recognizes the occupational health issues for staff working in the organization's facilities.

Credit Goals

- Develop and implement a functional cross discipline process for decision-making regarding safe, healthful and environmentally sensitive operations and maintenance and encourage continuous improvement.
- Define key organizational stakeholders and involve them in ongoing cross discipline decision-making process(es) for operations and maintenance.
- Create a Health Mission Statement that establishes the values and goals for operations and maintenance procedures and protocols, encouraging continuous improvement.

IO Prerequisite 1 continued

Integrated Operations & Maintenance Process

Suggested Documentation

- ☐ Document and annually review achievement of integrated operations & maintenance process(es) in accordance with Credit Goals by showing commitment of Senior Leadership and through meeting minutes, records, or equivalent documentation over a minimum one year period.
- ☐ Create and annually update a responsibility matrix describing which key stakeholders should be consulted for each credit or initiative.
- ☐ Compile a Health Mission Statement for operations and maintenance procedures and protocols, encouraging continuous improvement.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite with GGHC CM Prerequisite 2: Chemical Management Policy and Audit, GGHC WM Prerequisite 1: Waste Management Plan, GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development, GGHC FS Credit 1: Sustainable Food Policy and Plan, GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan.*
- Review “How to Use this Tool” in the Introduction to the GGHC *Operations* section for additional guidance on how to incorporate new construction into an integrated operations program.
- Incorporate the health mission statement outlined in the Credit Goals into the organization's Statement of Environmental Principals. A health mission statement should include goals to safeguard the health of building occupants, the local community, and the global environment while creating a high performance healing environment for the building's patients, caregivers, and staff.
- Organize and schedule regular meetings of all related Facilities Operations groups to integrate functional processes into the daily operation of the facility that jointly consider environmental and health impacts of decisions and opportunities for continuous improvement.
- Consider Joint Commission compliance as a mechanism for implementing Integrated Operations.
- Include consideration of "triple bottom line" values – economic, environmental, and social – in the health mission statement.
- Educate team members on the business case and environmental case for going green.
- Introduce all team members to reference sites and state sponsored organizations.
- Clarify with the team how goals and credit achievement will be tracked and measured, and what data metrics will be used for the different types of credits: e.g. cost/SF, lbs or tons/bed, lbs or tons/discharge, etc. Coordinated tracking will help with consistency of measurement across credits and between new and older facilities.
- Integrate roles and responsibilities regarding the facility's environmental sustainability initiatives in every employee's job description.
- When possible, participate in design and product selection activities in order to guide decisions according to appropriate operational procedures and criteria.

IO Prerequisite 1 continued

Integrated Operations & Maintenance Process

- Use evidence-based teamwork training and assessment tools to establish robust cross discipline decision-making process(es) for operations and maintenance.
- Identify a liaison between the internal integrated operations decision-making body and design and construction project teams involved with facility design projects for new construction, additions and renovations to ensure alignment with facility priorities.

Resources

Beam, Richard, "Building Green One Step at a Time" GGHC/H2E Webinar,, May 4, 2007, <http://cms.h2e-online.org/teleconferences/calendar/details/357> .

Building Design + Construction, "Green Buildings & The Bottom Line," November 2006.

Guenther, Robin and Peter Morris, "Business Case for Sustainable Health Care Buildings," GGHC/H2E Webinar, February 2006, <http://cms.h2e-online.org/teleconferences/calendar/details/237> .

Joint Commission, <http://www.jointcommission.org>, <http://cms.h2e-online.org/ee/regsandstandards/jcaho/>

International Organization for Standardization (ISO), Management Standards, http://www.iso.org/iso/management_standards.htm

Morey JC, Simon R, Jay GD, et al. Error reduction and performance improvement in the emergency department through formal teamwork training: validation results of the MedTeams project. *Health Serv Res.* 2002; 37(6): 1553–1581.

An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities. Executive Editor: Yvonne J. Cernick; 1993. ISBN: 0-87258—673-5

Sehulster LM, et al. Guidelines for Environmental Infection Control in HealthCare Facilities, 2003. Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004. <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Environmental Protection Agency (EPA), Environmental Management Systems, <http://www.epa.gov/ems/>

Wheelan (2005) *Creating Effective Teams: A Guide for Members and Leaders*, 2nd. Ed. Thousand Oaks, CA: Sage.

Wheelan S, Krasick C. The emergence, transmission and acceptance of themes in a temporary organization. *Group and Organization Management* 1993; 18: 237–260.

1 point

IO Credit 1

Education: **Staff, Patient & Community Environmental Sustainability Education**

Intent

Create and enhance awareness among staff, patients, visitors, service providers, vendors and the community of environmental sustainability and its human health benefits.

Health Issues

Through improved training and knowledge of environmental initiatives, staff and patients will be better equipped to recognize the value of environmental initiatives and their connection to health. Health care is uniquely positioned to educate the community about the health benefits associated with toxic chemical avoidance, carbon and ecological footprint reduction, and other environmental practices. To fulfill its mission to provide health and community stewardship, the connection between the environment and human health should be made evident in all facets of the health care organization, including policy development, program implementation and patient care practices.

Credit Goals

- Upon hire and, at a minimum, annually, educate all staff (including, but not limited to, physicians, nurses, interns, nursing and allied health students, board members, etc.) on their roles and responsibilities regarding the facility's environmental sustainability initiatives (as defined by IO Prerequisite 1) and the connection to human health and environmental stewardship. Train staff to report relevant activities using the responsibility matrix outlined in Suggested Documentation under IO Prerequisite 1: Integrated Operations & Maintenance Process.

Note: In many cases, education on environmental sustainability initiatives and the connection to human health and the environment can be integrated into existing training programs.

- Annually present a formal written report on progress in environmental programs and connection to human health and the environment to the facility's Board of Directors and other senior level leadership.

AND

Establish a staff education program or programs incorporating at least one of the following criteria:

- Educate staff on environmental programs and impact on human health and the environment through regular reports in the staff newsletter (minimum 4 per year) or a minimum of two dedicated staff newsletters annually.
- Develop and periodically update (minimum twice a year) an environmental poster campaign on facility environmental programs and their connection to human health and the environment targeted to staff within the facility.
- Annually recognize staff participation and leadership in environmental programs.

AND

IO Credit 1 continued

Education: **Staff, Patient & Community Environmental Sustainability Education**

Establish a communications program or programs to educate patients, visitors, and the surrounding community incorporating at least one of the following criteria:

- Develop and implement an active education program targeted to patients, visitors, and the public on facility environmental initiatives, outcomes, and the initiatives' connection to human health and the environment.
- Include reporting on the facility's progress in environmental programs, including associated health benefits to the surrounding community, in the annual report.

Suggested Documentation

- ☐ Document and annually review the facility's internal education programs and external communication programs in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process, GGHC FS Credit 2: Sustainable Food Education and Promotion, and other GGHC credits incorporating staff education into the Credit Goals.*
- Identify environmental policies and programs currently in place that align with the Credit Goals.
- Educate patients on facility environmental initiatives and their impact on human health and the environment through communication channels such as brochures, patient menus, television monitors, posters and the facility's website.
- Integrate roles and responsibilities regarding the facility's environmental sustainability initiatives in every employee's job description.
- Encourage staff participation and leadership in environmental programs through public recognition programs such as: celebratory community events, an internal awards program, poster campaigns, recognition on the facility's website, etc.
- An example of publicly-targeted education programs is information about medical waste incinerators as a major source of mercury in the environment and how a facility's efforts to eliminate mercury directly impact patient and community health and safety. Another example is to educate patients and families in the OB-GYN department on the connection between health care practices and mercury in fish, encouraging patients to avoid certain fish, and highlighting the health care organization's program to virtually eliminate mercury use in the facility. See below for sample resources.
- Provide new parents in the labor and delivery department with "healthy baby kits" addressing environmental health topics such as avoiding chemicals of concern as identified in GGHC EPP Credit 2, such as, but not limited to, Bisphenol-a, mercury, and polyvinyl chloride (PVC) products. See below for sample resources.

IO Credit 1 continued

Education: **Staff, Patient & Community Environmental Sustainability Education**

Resources

Health Care Without Harm, “A Nurse’s Role in Assessing and Addressing the Health Risks to Mothers and Babies from Environmental Exposures,” <http://www.noharm.org/us/H3MBE>

Health Care Without Harm, “Green Birthdays” report,
<http://www.noharm.org/details.cfm?type=document&id=493>

Sample educational presentation, newsletter template and other resources are available in the Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E) “Partner Toolbox” at <http://www.practicegreenhealth.org>:

- Sample facility new employee orientation training presentation and handouts
- Sample facility educational information
- Sample facility educational poster
- Sample facility environmental newsletter
- Sample facility patient education campaign
- Sample environmental communication plan
- Sample Public Health educational information for physician practice
- Sample Food Services Educational Information
- Sample environmental responsibility language for job descriptions

U.S. Environmental Protection Agency (EPA) National Listing of Fish Advisories, “What you need to know about mercury in fish and shellfish,” <http://www.epa.gov/waterscience/fish/advice/index.html>

U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Training Modules, <http://www.epa.gov/epaoswer/hotline/rmods.htm> (Note: required of staff responsible for RCRA program)

U.S. Occupational Safety and Health Administration (OSHA), <http://www.osha.gov/dcsp/ote/index.html>

Sustainable Sites Management

1 point

SSM Credit 1.1

Site Management: **Building Exterior & Hardscape Management Plan**

Intent

Encourage environmentally-sensitive building exterior and hardscape management practices that provide a clean, well-maintained and safe building exterior, while supporting high performance building operations.

Health Issues

Ongoing exterior management of a facility's hardscape is inextricably linked to occupant and community health and safety. Many detergents, window cleaning chemicals and snow removal chemicals commonly used on health care facility grounds have not been tested for their low-level, long-term health impacts. Some of these products contain Persistent Bioaccumulative and Toxic chemicals (PBTs), are classified as hazardous waste, and/or otherwise contribute to environmental pollution during their manufacture, transport, use, and/or disposal. In addition, non-toxic and least-toxic cleaning products exist for nearly every health care facility need. Monitoring the chemicals used for hardscape practices for consistency with the facility's environmental health will help ensure occupant and community health and safety. Noise and emissions from equipment are also well-documented sources of health burdens workers and to the surrounding community. Research finds that in hospitals with reduced noise levels, the patients' satisfaction with care giving increased, their sleep improved, and their blood pressure lowered; similarly, staff in low-noise environments were more positive about their jobs and indicated improved sleep. Human health effects associated with exposure to airborne toxicants, particulates, gases, and bioaerosols may include respiratory diseases (e.g., asthma, hypersensitivity pneumonitis, bronchitis); cardiovascular events (e.g., sudden death associated with particulate air pollution), among others, depending on exposure levels.

Credit Goals

- Develop and implement an environmentally-sensitive, low-impact building exterior and hardscape management plan that helps preserve surrounding ecological integrity. The plan must employ best management practices that significantly reduce the use of harmful chemicals, energy waste, water waste, air pollution, solid waste and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared to standard practices, whether direct-purchase or contracted services. The plan must address all of the following operational elements that occur on the building and grounds, as applicable:
 - **Outdoor maintenance equipment** (lawnmowers, snow plows, leaf blowers, pallet lifters, golf carts, parking trolleys, etc.) in accordance with GGHC ES Credit 1.6: Environmentally Preferable Cleaning: Cleaning Equipment and meeting the U.S. EPA Proposed Emission Standards for New Nonroad Spark-Ignition Engines, Equipment and Vessels or running on low-emitting fuels (e.g., biodiesel, compressed natural gas or liquid propane), rechargeable batteries or corded electrical equipment. All exterior equipment shall generate maximum 85 dBA noise level while operational as measured from the nearest property line, but no less than 50 feet from the source. Employees and contracted services shall utilize adequate hearing protection in accordance with the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.95 when noise levels exceed 75 dBA.
 - **Green cleaning and maintenance** products, practices and materials, including window cleaner and any detergents, in accordance with GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Products & Materials.

SSM Credit 1.1 continued

Site Management: **Building Exterior & Hardscape Management Plan**

- **Least toxic snow removal strategies** including, but not limited to: snowmelt piping, canopies or covered walkways and low impact sites for dumping snow.

Suggested Documentation

- ☐ Document and annually review the low-impact building exterior management plan in accordance with Credit Goals, specifically highlighting the actions being implemented and tracking progress.

Reference Standards

Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.95, <http://www.osha.gov>

U.S. Environmental Protection Agency (EPA), Proposed Emission Standards for New Nonroad Spark-Ignition Engines, Equipment, and Vessels, April 2007 (Document No. EPA 420-F-07-032), <http://www.epa.gov/otaq/regs/nonroad/marinesi-equiold/420f07032.htm>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 4.1: Heat Island Reduction: Non-Roof; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Products & Materials; GGHC ES Credit 1.6: Environmentally Preferable Cleaning: Cleaning Equipment, GGHC; GGHC ES Credit 2: Entryway Systems; and, GGHC ES Credit 3: Indoor Integrated Pest Management.*
- Include green cleaning and maintenance practices and materials that minimize environmental impacts in the green building exterior management plan.
- Examples of conventional gas powered machinery that can be replaced with electric equivalents include, but are not limited to: maintenance equipment and vehicles, landscaping equipment and cleaning equipment.
- Safeguard building occupants and neighboring sites from air and noise emissions associated with building exterior and hardscape management by avoiding the application of wet-applied products near outside air intake grills and by limiting work to business hours.

Resources

Boehland, J., (2005) "Hospital Heal Thyself: Greening the Design and Construction of Health Care Facilities." *Environmental Building News*, Vol. 14, No. 6.

U.S. Environmental Protection Agency (EPA), Integrated Pest Management for Schools: A How-to Manual, EPA 909-B-97-001, March 1997, <http://www.epa.gov/pesticides/ipm/>.

1 point

SSM Credit 1.2**Site Management: Integrated Pest Management,
Erosion Control & Landscape Management Plan****Intent**

Preserve ecological integrity, enhance natural diversity, and protect wildlife while supporting high performance building operations and integration into surrounding landscapes.

Health Issues

Landscape management methods and practices can have a direct impact on public health. Pesticides and fertilizers can be transported into the health care facility by air or carried in by people from the surface of soil and transmitted to patients, family and staff. According to U.S. EPA, herbicides, insecticides, and excess fertilizers are major sources of nonpoint source pollution (NPS) – the leading cause of compromised water quality in the U.S. These products can contribute to environmental pollution during their manufacture, transport, use, and/or disposal.

Credit Goals

Develop and implement an environmentally-sensitive erosion control and landscape management plan for the site's natural components. The plan must employ best management practices that significantly reduce the use of harmful chemicals, energy waste, water waste, air pollution, solid waste, and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared to standard practices, whether direct-purchase or contracted services. The plan must address the following operational elements at a minimum:

- **Outdoor Integrated Pest Management (IPM)** is a systematic approach to managing outdoor pests (plants, insects, and/or animals) in a way that minimizes risks to human health and the surrounding environment and that improves economic returns through the most effective, least risk option. Driven by these parallel goals, IPM prioritizes non-chemical intervention. When non-chemical methods have been exhausted, the approach allows minimal use of least-toxic chemical pesticides and herbicides, used only in targeted locations, and only for targeted species. IPM requires routine inspection and monitoring. The outdoor IPM plan must address all of the specific IPM requirements listed in GGHC ES Credit 3: Indoor Integrated Pest Management, including preferred use of non-chemical methods, definition of emergency conditions, and Universal Notification. The outdoor IPM plan must also integrate with any indoor IPM plan used for the building as appropriate.
- Implement **green landscape management actions**, such as using a greater variety of plants, using more native plants, reducing size of lawns, changing maintenance practices, reducing the use of power equipment, stormwater control, using low-nitrogen and phosphorous/pesticide-free fertilizer and only on an as-needed basis, composting waste, creating wildlife habitat including providing water sources for wildlife drinking and bathing, physically removing and prohibiting purchase of invasive species, protecting natural areas and using plants to reduce building heating and cooling needs. In landscape maintenance, keep vegetation, shrubs and organic mulch materials a minimum of twelve (12) inches away from structures.
- **Use native and/or drought-tolerant plants** that are naturally resistant to pests and/or that provide food and/or habitat for wildlife. Physically remove existing and prohibit purchase of invasive plant species.

SSM Credit 1.2 continued

Site Management: **Integrated Pest Management, Erosion Control & Landscape Management Plan**

- **Erosion and sedimentation control** for ongoing landscape operations (where applicable) and future construction activity. The Erosion and Sedimentation Control Plan (ESC) shall conform to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit OR local erosion and sedimentation control standards and codes, whichever is more stringent. The plan must address both site soil and potential construction materials. The plan must also include measures that prevent erosion and sedimentation, prevent polluting the air with dust or particulate matter, and restore eroded areas.
- Comply with installation and design recommendations for **maintenance of landscape technologies** such as bioswales, rain gardens, outdoor places of respite and vegetated roofs.
- **Divert landscape waste** from the waste stream via mulching, composting, or other low-impact means.

Notes:

- *For projects in urban sites with little or no building setback (i.e. zero-lot-line), GGHC SSM Credit 1.2 may be earned using vegetated roof surfaces if the plants meet the definition of non-invasive native/adapted, and if the vegetated roof surface covers at least 5% of the project site area.*
- *Native plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds.*
- *According to the National Invasive Species Information Center, invasive species are “1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” For more information, visit <http://www.invasivespeciesinfo.gov>.*

SSM Credit 1.2 continued

Site Management: **Integrated Pest Management, Erosion Control & Landscape Management Plan**

Suggested Documentation

- ❑ Document and annually review an environmentally-sensitive erosion control and landscape management plan employing best management practices in accordance with Credit Goals, specifically highlighting the actions being implemented and tracking progress.

Reference Standards

2003 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP),
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

Potential Technologies and Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Products & Materials; GGHC ES Credit 1.6: Environmentally Preferable Cleaning: Cleaning Equipment, GGHC; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; and, GGHC FS Credit 6.1: Food Donation and Composting.*
- Address overall site management practices, chemicals, fertilizers, landscape waste and pest management practices. Include such green landscape management practices in reducing the use of power equipment, improving stormwater control, using low-nitrogen and phosphorous/pesticide-free fertilizer on an as-needed basis, composting waste, applying integrated pest management, creating wildlife habitat, avoiding/physically removing invasive plants, protecting natural areas and using plants to reduce heating and cooling needs. Use mulching mowers to significantly reduce yard waste generation, fertilizer needs and water consumption through retention of organic matter.
- Plant Health Care (PHC) management is a concept in managing landscape developed from Integrated Pest Management. PHC emphasizes plant health and horticultural practice, recognizing that health is impacted not only by pests, but improper irrigation, compacted soils, and other landscape conditions.
 - Apply organic fertilizers several times annually rather than a single, heavy application.
 - Use methods of spot treatment of non-toxic or least toxic pesticides rather than area wide applications.
 - Use mulching mowers to significantly reduce yard waste generation, fertilizer needs and water consumption through retention of organic matter.
- Consider contracting with pest control companies that meet 100% of the requirements for IPM certification.
- Plant native vegetation or restore native habitat where appropriate on the site.

SSM Credit 1.2 continued

Site Management: **Integrated Pest Management, Erosion Control & Landscape Management Plan**

- Avoid use of mulch made from rubber tires due to the potential presence of contaminants. For more information about the potential hazards associated with rubber mulch, see the Connecticut Agricultural Experiment Station's Report "Examination of Crumb Rubber Produced from Recycled Tires" in Appendix 1 of the Environment & Human Health, Inc. report "Artificial Turf: Exposures to Ground-Up Rubber Tires," http://www.ehhi.org/reports/turf/turf_report07.pdf.
- On sites with populations with chemical sensitivities, consider including lime application to landscaping in the Outdoor Integrated Pest Management Universal Notification policy.

Resources

Beyond Pesticides: <http://www.beyondpesticides.org>.

J. Haugland, *Changing Cost Perceptions: An Analysis of Conservation Development*, (Elmhurst, IL: Conservation Research Institute, 2005),
http://www.nipc.org/environment/sustainable/conservationdesign/cost_analysis

Healthy Hospitals, Controlling Pest without Harmful Pesticides, 2003, Beyond Pesticides and Health Care Without Harm, <http://www.noharm.org/pesticidesCleaners/issue>

Insect Management for the InteriorScape Environment, <http://ipm.ncsu.edu/InteriorScapes/insect.html>.

National Technical Information Service (order # PB92-235951), <http://www.ntis.gov>, 800-553-6847.

Practice Greenhealth, Green Landscaping, <http://www.practicegreenhealth.org>

Practice Greenhealth, Landscape Waste Composting, <http://www.practicegreenhealth.org>

The Stormwater Manager's Resource Center, <http://www.stormwatercenter.net/>

U.S. Environmental Protection Agency (EPA) Office of Water, <http://www.epa.gov/OW>;
<http://yosemite.epa.gov/water/owrccatalog.nsf>. Search by title index. Hardcopy or microfiche:

U.S. Environmental Protection Agency (EPA) Storm Water Discharges From Construction Activities,
<http://cfpub.epa.gov/npdes/stormwater/const.cfm>

1 point

SSM Credit 2.1**Reduced Site Disturbance: Protect or Restore Open Space or Habitat****Intent**

Conserve existing natural site areas and restore damaged site areas to provide habitat and promote biodiversity.

Health Issues

Healthy ecosystems contribute to the health of people in many ways, including the health-promoting qualities of clean air and water as well as significant social, psychological and physical benefits derived from physical and visual connections to the natural environment. Health care facilities should protect, restore and enhance a site's existing natural areas as therapeutic resources for patients, staff, and visitors. Research shows that physical and visual connections to the natural environment provide social, psychological and physical benefits for patients, staff and visitors.

Credit Goals

- Protect or restore natural habitat area as follows:

$$\text{Natural Habitat Area Required} = (\text{Site Area}) (.15 - \text{Site Size Factor}) \div (\text{Floor Space Ratio})$$

For the above formula:

Floor Space Ratio = the constructed building gross floor building area including all service spaces, excluding parking areas, divided by the site area.

Site Size Factor = $(\sqrt{\text{Site Area}/\text{Site Area}})(10)$

- Improving and/or maintaining off-site areas with native or non-invasive adapted plants can contribute toward earning GGHC SSM Credit 2.1. Every 2 square feet off-site will be counted as 1 square foot on-site. Off-site areas must be documented in a contract with the owner of the off-site area that specifies the required improvement and maintenance of the off-site area.

Notes:

- The Natural Habitat Area formula requires larger areas of habitat for less densely developed sites.*
- Natural habitat area may include vegetated roof area at any building level. Non-native vegetation may be included in the calculation in courtyards, terraces, balconies, and roof space if required to survive reduced sunlight and if the area's irrigation system uses a non-potable water source, is high-efficiency, or if no permanent irrigation system is installed. For the purposes of this credit, "high-efficiency irrigation systems" are defined as irrigation systems that use minimum 30% less water than conventional sprinkler irrigation. High-efficiency irrigation systems include micro or drip irrigation systems, moisture sensors, clock timers and water-data based controllers.*
- Native plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Projects pursuing GGHC SSM Credit 2.1 and using vegetated roof surfaces may apply the vegetated roof surface to this calculation if the plants meet the definition of native/adapted.*

SSM Credit 2.1 continued

Reduced Site Disturbance: **Protect or Restore Open Space or Habitat**

- According to the National Invasive Species Information Center, invasive species are “1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” For more information, visit <http://www.invasivespeciesinfo.gov>.
- Rows of street trees spaced at or less than 1.0 x mature diameter apart qualify as natural habitat area, equal to mature diameter x length of row.
- Other ecologically appropriate features that contribute to this credit are natural site elements beyond vegetation that maintain or restore the ecological integrity of the site, including water bodies, exposed rock, un-vegetated ground or other features that are part of the historic natural landscape within the region and provide habitat value.
- Sample calculation: For 100,000 gsf site with a 200,000 gsf building; Floor Space Ratio = 2; Site Size Factor is $(316/100,000) \times 10 = 0.0316$. The natural habitat area required by formula is: $100,000 \times (.15 - 0.0316)/2 = 5,920$ gsf.

Suggested Documentation

- ☐ Develop and annually review highlighted site drawings with area calculations demonstrating the percentage of the site that has been provided/restored with native vegetation.
- ☐ Develop and annually review a habitat protection plan and backup documentation describing restoration and re-vegetation of degraded habitat areas, including use of native and non-invasive adapted vegetation.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of the credit with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan, GGHC SSM Credit 2.2: Reduced Site Disturbance: Protect or Restore Open Space or Habitat, GGHC SSM Credit 4: Heat Island Reduction, GGHC SSM Credit 5: Connection to the Natural World, GGHC FM Credit 2.1-2.5: Potable Water Use Reduction: Total Building Reduction, GGHC FM Credit 2.6: Potable Water Use Reduction: Water Efficient Landscaping, GGHC FM Credit 9: Light Pollution Reduction, and GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages.
- Perform a site survey to identify site elements and adopt a master plan for development of the project site.
- Establish clearly marked construction boundaries and provide adequate protection measures to minimize disturbance of existing site and restore previously degraded areas to their natural state.
- Minimize unnecessary ground disturbance (topsoil stripping) and removal of existing groundcover by protecting existing vegetation, including clusters or groupings of existing trees or shrub masses. Avoid planting isolated plant material.

SSM Credit 2.1 continued

Reduced Site Disturbance: **Protect or Restore Open Space or Habitat**

- Coordinate habitat, wetland, and stream preservation programs with erosion control and stormwater management goals, including soil bioengineering technologies.
- Adopt rehabilitation, restoration, and reclamation strategies for the site's watershed management.
- Restore or provide natural vegetated area with emphasis on native and limited use of adapted vegetation. Ensure that no adapted vegetation is a known invasive species. Native plants are those species that occur naturally in the particular region, state, ecosystem, and habitat without direct or indirect human actions.
- Protect and encourage the development of native vegetation.
- Encourage the development of urban green space by connecting or adding to bike paths, parks, etc.
- Plant native vegetation or restore native habitat where appropriate on the site.

Resources

J. Haugland, *Changing Cost Perceptions: An Analysis of Conservation Development* (Elmhurst, IL: Conservation Research Institute, 2005),
http://www.nipc.org/environment/sustainable/conservationdesign/cost_analysis (accessed March 1, 2006).

National Park Service, *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors: A Resource Book* (National Park Service, 1995), <http://www.nps.gov/pwro/rtca/econindx.htm>

A. Steed, *Naturalized Streetscapes: A Case Study of Crown Street, Vancouver* (City of Vancouver Greenways, Vancouver, BC: City of Vancouver Greenways, no date),
<http://www.sustainability.ca/Docs/Naturalized%20Streetscapes-AS.pdf?CFID=19075623&CFTOKEN=60214114> (accessed March 31, 2006).

Trust for Public Land, *The Economic Benefits of Open Space* (Trust for Public Land, 1999),
http://www.tpl.org/tier3_cd.cfm?content_item_id=1195&folder_id=727

1 point

SSM Credit 2.2**Reduced Site Disturbance: Structured Parking****Intent**

Conserve existing natural site areas and restore damaged site areas to provide habitat and promote biodiversity.

Health Issues

Healthy ecosystems contribute to the health of people in many ways, including the health-promoting qualities of clean air and water as well as significant social, psychological and physical benefits derived from physical and visual connections to the natural environment. Health care facilities should protect, restore and enhance a site's existing natural areas as therapeutic resources for patients, staff, and visitors. Research shows that physical and visual connections to the natural environment provide social, psychological and physical benefits for patients, staff and visitors.

Credit Goals

- Achieve SSM Credit 2.1.

AND

- Ensure that minimum 50% of total installed parking spaces meet one or more of the following criteria:
 - Onsite structured parking
 - Off-site structured parking
 - Shared existing off-site surface parking

Note: For the purposes of this credit shared off-site parking will be defined as parking shared with organizations whose peak hours of use complement the facility's parking needs. Off-site areas must be documented in a contract with the owner of the off-site area that specifies the hours of use.

Note: For the purposes of this credit, the terms "onsite" and "off-site" shall align with the project scope in use for all credits in the GGHC Operations section.

SSM Credit 2.2 continued

Reduced Site Disturbance: **Structured Parking**

Suggested Documentation

- ❑ Compile and annually review site drawings with parking calculations demonstrating compliance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of the credit with GGHC SSM Credit 2.1: Reduced Site Disturbance: Protect or Restore Open Space or Habitat, GGHC SSM Credit 4: Heat Island Reduction, GGHC SSM Credit 5: Connection to the Natural World, GGHC TO Credit 1: Alternative Transportation, and GGHC FM GGHC FM Credit 9: Light Pollution Reduction.*
- Perform a site survey to identify site elements and adopt a master plan for development of the project site.
- Select a suitable location for structured parking, minimizing its footprint to minimize site disruption. Strategies include:
 - Stacking building program and structured parking
 - Tuck-under parking
 - Sharing parking facilities with neighbors
- Coordinate habitat, wetland, and stream preservation programs with erosion control and stormwater management goals for the parking structure, including soil bioengineering technologies.
- Provide frequent shuttle service to off-site structured and shared parking.
- When constructing new structured parking facilities, refer to design strategies outlined in GGHC Version 2.2 MR Credit 7.1: Resource Use: Design for Flexibility and LEED HC MR Credit 6: Design for Flexibility regarding flexible layouts that allow for future conversion to non-parking uses.

Resources

Leonard Bier, et. al., "Parking Matters: Designing, Operating, and Financing Structured Parking in Smart Growth Communities,": July 2006, <http://www.state.nj.us/dca/osg/docs/parkingmatters070106.pdf>

Eno Transportation Foundation. Publications of particular interest: "Parking and Planning" and "Parking for Institutions and Special Events," <http://www.enotrans.com>

Whole Building Design Guide, "Parking: Outside/Structured," http://www.wbdg.org/design/park_outside.php

1 point

SSM Credit 3
Stormwater Management**Intent**

Limit the disruption of natural hydrology by the building and grounds.

Health Issues

According to the U.S. EPA¹, nonpoint source pollution (NPS) – the result of stormwater runoff – is the leading cause of compromised water quality in the U.S. In some cases, NPS has disrupted aquatic ecosystems and forced nearby communities to look elsewhere for a reliable water supply. Controlling stormwater run-off lessens contamination of receiving waters thereby safeguarding people and wildlife from exposure to waterborne pollutants, including bacteria, toxic chemicals, and lawn care nutrients that degrade water quality and increase risks of cancer, birth defects, and nervous system disorders, among others.

Credit Goals

- Develop and implement a stormwater management plan that infiltrates, collects and reuses, or evapotranspirates runoff from 15% of the rainfall falling on the whole project site:
 - During an average weather year, and
 - During the two-year, 24-hour design storm
- Implement an annual inspection program of all stormwater management facilities to confirm continued performance. Perform all routine required maintenance, necessary repairs, or stabilization within 60 days of inspection.

Suggested Documentation

- ☐ Document and annually review the stormwater management plan and associated calculations in accordance with Credit Goals.
- ☐ Maintain documentation of annual inspections, including identification of areas of erosion, maintenance needs, and repairs in accordance with Credit Goals.

Reference Standards

There are no reference standards for this credit.

¹ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/owow/nps/qa.html>

SSM Credit 3 continued

Stormwater Management

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM 2.6: Potable Water Use Reduction: Water Efficient Landscaping; and, GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills.
- Consider utilizing best management practices (BMPs) to treat runoff to remove 80% of the average annual total suspended solids (TSS) load based on existing monitoring reports. BMPs are considered to meet these criteria if (1) they are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards, or (2) there exists in-field performance monitoring data demonstrating compliance with the criteria. Data must conform to accepted protocol (e.g., Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.
- Consider establishing regular testing for pollutants in stormwater runoff.

Resources

M. E. Barber, King, S. G., Yonge, D. R., and Hathhorn, W. E. 2003, "Ecology ditch: A best management practice for storm water runoff mitigation." *J. Hydrol. Eng.*, 8 (3), 111–122.

J. N. Carleton, Grizzard, T.J., Godrej, A.N., Post, H.E., 2001. Factors affecting the performance of stormwater treatment wetlands. *Water Res.* 35 (6), 1552–1562.

M. E. Dietz, and Clausen, J. C. _2005_. "A field evaluation of rain garden flow and pollutant treatment." *Water, Air, Soil Pollution*, 167, 1–4, 123–138.

Puget Sound Action Team, *Reining in the Rain: A Case Study of the City of Bellingham's*

Teresa Durkin and Roos, Marina, *Green Guide for Health Care Sustainable Site Design: Stormwater Mitigation Technical Brief*, <http://www.gghc.org>.

J. Mentens, Raes, D., Hermy, M., 2006. Green roofs as a tool for solving the rainwater runoff problem in the urbanized 21st Century? *Landscape Urban Planning*, 7 (3), 217–226.

The Stormwater Manager's Resource Center, <http://www.stormwatercenter.net/>

Texas Water Development Board (TWDB), 2005. The Texas Manual on Rainwater Harvesting, third ed. <http://www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual3rdedition.pdf>.

Use of Rain Gardens to Manage Stormwater (Puget Sound Action Team, 2004), www.psat.wa.gov/Publications/Rain_Garden_book.pdf (accessed September 11, 2007).

U.S. Environmental Protection Agency (EPA), Guidance Specifying Management Measures for Sources of Non-Point Pollution in Coastal Water, January 1993 (Document No. EPA 840B92002), <http://www.epa.gov/owow/nps/MMGI>

N. D. VanWoert, Rowe, D.B., Andresen, J.A., Rugh, C.L., Fernandez, R.T., Xiao, L., 2005. Green roof stormwater retention: effects of roof surface, slope, and media depth. *J. Environ. Qual.* 34 (3), 1034–1044.

S. Watanabe, 1995. Study on storm water control by permeable pavement and infiltration pipes. *Water Sci. Technol.* 32 (1), 25–32.

1 point

SSM Credit 4.1Heat Island Reduction: **Non-Roof****Intent**

Reduce heat islands (temperature differences between developed and undeveloped areas) to minimize impact on microclimate and human wildlife habitat.

Health Issues

Mitigating the heat island effect results in lowering ground level temperatures near buildings thereby reducing conditions favorable for ground-level ozone (smog) formation that can lead to respiratory symptoms and illness. In addition, a cooler microclimate reduces a building's cooling load, thereby reducing energy costs, curbing reliance on fossil-fuel generated electricity, and reducing associated particulate and greenhouse gas emissions. Reducing or eliminating a facility's contribution to the regional heat-island effect also demonstrates a commitment to active involvement in slowing global climate change.

Credit Goals**OPTION A**

Use any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots):

- Shade from existing canopy or within 5 years of landscape installation, where landscaping (trees) must already be in place at the time of credit achievement.
- Shade from structures fully covered by solar photovoltaic panels.
- Shade from architectural devices or structures that have a Solar Reflectance Index (SRI) of at least 29. Implement a maintenance program that ensures these surfaces are cleaned at least every 2 years to maintain good reflectance.
- Light colored paving materials with an SRI of at least 29. Implement a maintenance program that ensures these surfaces are cleaned at least every 2 years to maintain good reflectance.
- Open grid pavement system (at least 50% pervious).

OR

OPTION B

Place a minimum of 50% of parking spaces under cover (defined as underground, under deck, under roof, or under a building). Any roof used to shade or cover parking must have an SRI of at least 29. Implement a maintenance program that ensures all SRI surfaces are cleaned at least every 2 years to maintain good reflectance. The top parking level of a multi-level parking structure is included in the total parking spaces calculation, but is not considered a roof and is not required to be an SRI surface.

Note: The Solar Reflectance Index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. To calculate the SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C1371.

SSM Credit 4.1 continued

Heat Island Reduction: **Non-Roof**

Suggested Documentation

- ❑ Develop and annually review highlighted site plans with calculations indicating that 50% of the site hardscape OR 50% of parking spaces comply with Credit Goals.

Reference Standards

American Society for Testing and Materials (ASTM), <http://www.astm.org>.

Potential Technologies & Strategies

- *Credit Synergies: Coordinate implementation of the credit with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 1.2: NEW: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 2.1: Reduced Site Disturbance: Protect or Restore Open Space or Habitat; GGHC SSM Credit 2.2: Reduced Site Disturbance: Structured Parking, GGHC SSM, GGHC SSM Credit 5: Connection to the Natural World; and, GGHC TO Credit 1: Alternative Transportation .*
- Employ strategies, materials, and landscaping techniques that reduce heat absorption of exterior materials.
- Install shading devices (calculated on June 21, noon solar time) in the form of native or climate tolerant trees and large shrubs, vegetated trellises or other exterior structures supporting vegetation.
- Eliminate blacktop hardscape surfaces and consider the use of new coatings and integral colorants for asphalt to achieve light-colored surfaces.
- Position photovoltaic cells to shade impervious surfaces. When installing photovoltaic (PV) cells as shading devices, run water beneath the PV units to recirculate the heat generated by array for process uses.
- Plant native vegetation or restore native habitat where appropriate on the site.
- In areas subject to pavement glare, consider installing manufactured or vegetated shading devices and/or planting trees.

Resources

New York Metropolitan Region, Climate Change Information Resources – Urban Heat Island Resources, http://ccir.ciesin.columbia.edu/nyc/links_impacts_heat.html

U.S. Environmental Protection Agency (EPA), Cool Pavement Report – EPA Cool Pavements Study – Task 5, http://www.epa.gov/hiri/resources/pdf/CoolPavementReport_Former%20Guide_complete.pdf

U.S. Environmental Protection Agency (EPA), Heat Island Effect, <http://www.epa.gov/hiri/index.html>

1 point

SSM Credit 4.2**Heat Island Reduction: Roof****Intent**

Reduce heat islands (temperature differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Health Issues

Mitigating the heat island effect results in lowering ground level temperatures near buildings thereby reducing conditions favorable for ground-level ozone (smog) formation that can lead to respiratory symptoms and illness. In addition, a cooler microclimate reduces a building's cooling load, thereby reducing energy costs, curbing reliance on fossil-fuel generated electricity, and reducing associated particulate and greenhouse gas emissions. Reducing or eliminating a facility's contribution to the regional heat-island effect also demonstrates a commitment to active involvement in slowing global climate change.

Credit Goals**OPTION A**

- Install and maintain roofing materials having a Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface. If more than 75% of the roof surface is covered with the SRI material, the SRI value may be lower than the required value if the resulting area-weighted equivalent SRI performance is at least as high as having the required value on 75% of the surface.
- Implement a maintenance program that ensures all SRI surfaces are cleaned at least every 2 years to maintain good reflectance.

OR

OPTION B

- Withstanding a structural verification, install and maintain a vegetated roof for at least 50% of the roof area.
- Implement a vegetated roof maintenance program in accordance with design and installation instructions.

SSM Credit 4.2 continued

Heat Island Reduction: **Roof**

OR

OPTION C

- Install and maintain high albedo and vegetated roof surfaces that, in combination, meet the following criteria: $(\text{Area of SRI Roof}/0.75) + (\text{Area of vegetated roof}/0.5) \geq \text{Total Roof Area}$

Roof Type	Slope	SRI
Low-Sloped Roof	$\leq 2:12$	78
Steep-Sloped Roof	$> 2:12$	29

Note: The Solar Reflectance Index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. To calculate the SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C1371.

Suggested Documentation

- ☐ Compile and annually review a highlighted site plan indicating roofing area calculations in accordance with Credit Goals.
- ☐ Document and annually review the facility roof maintenance program, if applicable, in accordance with Credit Goals.

Reference Standards

American Society for Testing and Materials (ASTM) Standards ASTM E 1980, ASTM E 903, ASTM E 1918, ASTM C 1549, ASTM E 408, ASTM C1371, <http://www.astm.org>.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of the credit with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 5: Connection to the Natural World; and, GGHC FM Credit 2.6: Potable Water Use Reduction: Water Efficient Landscaping.
- Consider installing high-albedo and vegetated roofs to reduce heat absorption.
- Ensure that vegetated roofs are properly maintained in accordance with design/installer instructions.
- Consider converting a vegetated roof area into a clinical space (e.g., for rehabilitation therapy, etc.) or into an outside place of respite. See GGHC SSM Credit 5.1: Connection to the Natural World: Outdoor Places of Respite for more information.

SSM Credit 4.2 continued

Heat Island Reduction: **Roof**

- Consider incorporating the roofing emissions criteria outlined in GGHC EP Credit 3.1-3.5 into facility specification criteria in addition to the SRI rating referenced under Credit Goals.
- Avoid use of mulch made from rubber tires due to the potential presence of contaminants. For more information about the potential hazards associated with rubber mulch, see the Connecticut Agricultural Experiment Station's Report "Examination of Crumb Rubber Produced from Recycled Tires" in Appendix 1 of the Environment & Human Health, Inc. report "Artificial Turf: Exposures to Ground-Up Rubber Tires," http://www.ehhi.org/reports/turf/turf_report07.pdf.

Resources

Cool Roof Rating Council, <http://www.coolroofs.org>

New York Metropolitan Region, Climate Change Information Resources – Urban Heat Island Resources, http://ccir.ciesin.columbia.edu/nyc/links_impacts_heat.html

U.S. Environmental Protection Agency (EPA) Energy Star, <http://www.energystar.gov>

U.S. Environmental Protection Agency (EPA), Heat Island Effect, <http://www.epa.gov/hiri/index.html>

1 point

SSM Credit 5.1**Connection to the Natural World: Outdoor Places of Respite****Intent**

Provide outdoor places of respite on the health care campus to connect health care patients, staff, and visitors to the health benefits of the natural environment.

Health Issues

Health care facility design should address the physical, emotional, and spiritual needs of the patients and/or residents, staff, family members, and visitors that inhabit these buildings. Privacy, confidentiality, security, dignity, comfort, orientation, and connection to nature are key elements and issues that need to be addressed in the design of supportive environments.

Places of respite connected to the natural environment are key elements in defining a supportive, high performance, healing environment with proven effects on patient, staff, and visitor well-being and improved clinical outcomes. A growing body of research indicates that patients and medical staff experience positive health benefits from access to daylight and landscape views. Providing a variety of spaces for patients, families, and caregivers to pause and experience their natural surroundings is an important facility objective.

Credit Goals

- Provide patient, staff, and visitor accessible outdoor places of respite equal to 5% of the net usable program area. Qualifying areas are defined below.

Note: For the purposes of this credit, net usable program area refers to usable areas within the scope of the project with a programmed function. It does not include closets or mechanical rooms.

- Provide additional dedicated outdoor place(s) of respite for staff equal to 2% of the net usable program area.
- Exterior places of respite shall be subject to occupancy, located within 200 feet of a building entrance or access point, and must be spaces where no medical intervention or direct medical care is delivered. Qualifying areas shall be open to fresh air, the sky and the natural elements, including seasonal weather. In addition, qualifying areas shall comply with all of the following:
 - Seating areas shall provide options for shade or indirect sun. Provide shade structures, a trellis or tree-shaded wheelchair accessible seating areas at a minimum of 1 space/ 200 sf of garden area with 1 wheelchair space per 5 seating spaces.
 - Horticulture therapy or other specific clinical special use gardens (Cancer Healing Garden, for example), unavailable to all building occupants may be used to meet up to 50% of the required area.
 - Universal access natural trails with places to pause, available to staff and/or patients. (Nature trails may comprise up to 30% of the required area, provided trail access is available within 200 feet of a building entrance.)
 - Places of respite must be designated as non-smoking in accordance with GGHC FM Prerequisite 6: Environmental Tobacco Smoke (ETS) Control.
 - Existing exterior places of respite on the hospital campus may be used to comply with this credit, provided that the location of the existing spaces meets the credit goals.

SSM Credit 5.1 continued

Connection to the Natural World: **Outdoor Places of Respite**

Suggested Documentation

- ☐ Compile and annually review the facility's net usable program area.
- ☐ Compile and annually review site plans highlighting public outdoor places of respite equal to 5% of project net program area in accordance with Credit Goals.
- ☐ Compile and annually review floor plans and site plans highlighting outdoor places of respite dedicated for staff use equal to an additional 2% of project net program area in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of the credit with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 4: Heat Island Reduction; GGHC FM Credit 2.1-2.5: Potable Water Use Reduction: Total Building Reduction; GGHC FM Credit 2.6: Potable Water Use Reduction: Water Efficient Landscaping; GGHC FM Credit 9: Light Pollution Reduction; and GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages.*
- Select appropriate locations for places of respite, taking into account:
 - Environmental factors (e.g., winds, orientation, views)
 - Programs of care (e.g., Horticultural Therapy)
 - Needs of specific patient populations (e.g., immune suppression, sunlight sensitivity)
 - Realistic levels of maintenance
- Consider issues of wayfinding and orientation, accessibility, strength and stamina, activity and interest, privacy and security, independence.
- Provide choice and variety in the design of spaces (for example, spaces that engage all the senses but also areas with limited sensory stimulation). Consider a variety of smaller spaces conveniently located throughout the facility rather than one large space. Also consider integrating these exterior spaces with interior public spaces to enhance the connection to nature throughout the facility.
- Design considerations should include freedom from distractions, such as noise from mechanical systems, facility administrative activities and medical treatments.
- Direct connection to the natural environment includes views of distant and nearby nature (such as inaccessible rooftop spaces with "green" (vegetated) roofs and mature street trees). Positive views and vistas should be considered and visual barriers into patient rooms, treatment rooms and mechanical systems should be implemented.

SSM Credit 5.1 continued

Connection to the Natural World: **Outdoor Places of Respite**

- Coordinate the integration of gardens and nature for exterior environments with the facility's environmental health and safety personnel. This includes addressing concerns of chemical sensitivities and allergens with certain high-pollen plant materials.
- Specify and install plant materials that are natural, appropriate to sun/shade requirements and hardiness zone, and able to display seasonal habitat and change. For ongoing maintenance of Outdoor Places of Respite, see GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion and Landscape Management Plan.
- Qualifying areas should not be used for regularly scheduled physical rehabilitation.
- Consider the development of on-grade gardens and green spaces that will also help integrate the facility into the surrounding community.
- For building atria and greenhouses, see GGHC v2.2 EQ Credit 8: Views and Daylight.
- For dedicated protected/preserved natural site area, see GGHC SSM Credit 2.1: Reduced Site Disturbance: Protect or Restore Open Space or Habitat.

Resources

J. Boehland, (2005) "Hospital Heal Thyself: Greening the Design and Construction of Health Care Facilities." *Environmental Building News*, Vol. 14, No. 6.

Cooper, Marcus & Barnes, M. (1999). *Healing Gardens Therapeutic Benefits and Design Recommendations*, Wiley Publications.

H.R. Rubin, and Owens, A.J., (1996). *Status Report: An Investigation to Determine Whether the Built Environment Affects Patients' Medical Outcomes*. Martinez, CA: The Center for Health Design.

Roger S. Ulrich, (1999). "Effects of Gardens on Health Outcomes: Theory and Research." In Cooper Marcus, Barnes, *Healing Gardens Therapeutic Benefits and Design Recommendations*, Wiley: New York.

Ulrich and Zimmering, (2004). *The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a-Lifetime Opportunity*, Report to The Center for Health Design for the Designing the 21st Century Hospital Project.

S. Whitehouse, Varni, J.W., Seid, M., Cooper Marcus, C., Ensberg, M.J., Jacobs, J.R., et al. (2001). "Evaluating a children's hospital garden environment: Utilization and consumer satisfaction." *Journal of Environmental Psychology*, 21(3), pp. 301-314.

1 point

SSM Credit 5.2**Connection to the Natural World: Exterior Access for Patients****Intent**

Provide outdoor places of respite on the health care campus to connect health care patients, visitors, and staff to the health benefits of the natural environment.

Health Issues

Health care facility design should address the physical, emotional, and spiritual needs of the patients and/or residents, staff, family members, and visitors that inhabit these buildings. Privacy, confidentiality, security, dignity, comfort, orientation, and connection to nature are key elements and issues that need to be addressed in the design of supportive environments.

Places of respite connected to the natural environment are key elements in defining a supportive, high performance, healing environment with proven effects on patient, staff, and visitor well-being and improved clinical outcomes. A growing body of research indicates that patients and medical staff experience positive health benefits from access to daylight and landscape views. Providing a variety of spaces for patients, families, and caregivers to pause and experience their natural surroundings is an important facility objective.

Credit Goals**OPTION 1**

- Provide direct access to an exterior courtyard, terrace or balcony with a minimum area of five square feet/patient served for 75% of all inpatients AND 75% of qualifying outpatients with clinical length of stay (LOS) greater than four hours. Vegetation (including planters) shall use either non-potable water for irrigation or a high-efficiency irrigation system.
 - Patients with length of stay greater than four hours, whose treatment makes them unable to move, such as those in Emergency, Stage 1 surgical recovery, and critical care, may be excluded. Qualifying outpatients may include Outpatient Renal Dialysis, Chemotherapy, Ambulatory Surgery Intake and Stage 2 Recovery.
 - Immediately adjacent outdoor places of respite, as defined by GGHC SSM Credit 5.1, may be used to meet this Credit Goal.
 - Qualifying spaces must be designated as non-smoking and meet the requirements of GGHC FM Prerequisite 6: Environmental Tobacco Smoke (ETS) Control.
 - Qualifying spaces must meet the requirement for outdoor air quality enumerated in GGHC FM Prerequisite 5: Outside Air Introduction & Exhaust Systems and be more than 100 feet from building exhaust air locations, loading docks, building entrances and roadways subject to idling vehicles.

OR

OPTION 2

- Develop and implement a program that facilitates regular access to outdoor places of respite for all inpatients and qualifying outpatients with clinical length of stay (LOS) greater than four hours.

Note: To comply with this credit, outdoor places of respite must meet the requirements in GGHC SSM Credit 5.1: Connection to the Natural World: Outdoor Places of Respite.

SSM Credit 5.2 continued

Connection to the Natural World: **Exterior Access for Patients**

Suggested Documentation

- ☐ Compile and annually review diagrams describing and demonstrating that 75% of all inpatients and 75% of qualifying outpatients with >4 hour LOS have access to secure and supervised outdoor space in accordance with the Credit Goals.

OR

- ☐ Document annual usage goals for the policy facilitating regular access to outdoor places of respite for inpatients and qualifying outpatients and track progress.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of the credit with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 4: Heat Island Reduction; GGHC FM Credit 2.1-2.5: Potable Water Use Reduction: Total Building Reduction; GGHC FM Credit 2.6: Potable Water Use Reduction: Water Efficient Landscaping; GGHC FM Credit 9: Light Pollution Reduction; and GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages.
- Direct access means not having to pass through another patient room, dedicated staff or service/utility space. Patient/public circulation corridors or common sitting areas, waiting and day space may be on the circulation route to the outdoor space.
- Locate patient accessible outdoor spaces in direct line of sight from the most continuously occupied staff workstation. Provide appropriate safety barriers to secure upper level patient accessible outdoor spaces.
- Locate patient accessible outdoor spaces facing the most temperate weather conditions, as determined by local climatic conditions, ideally within or with views over exterior places of respite and other natural site amenities.
- Provide planting where possible.
- Provide the majority of seating and wheelchair space in filtered sunlight. Consider additional full sunlit areas as well where possible.
- Provide medical services support, such as oxygen outlets, to allow extended use.
- Design balcony edges to ensure patient safety.

SSM Credit 5.2 continued

Connection to the Natural World: **Exterior Access for Patients**

Resources

Beneditti, Francesco, et al., (2001). "Morning sunlight reduces length of hospitalization in bipolar depression." *Journal of Affective Disorders*, 62(3), pp. 221-223.

J. Boehland, (2005) "Hospital Heal Thyself: Greening the Design and Construction of Health Care Facilities." *Environmental Building News*, Vol. 14, No. 6.

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H.R. Rubin and Owens, A.J., (1996). *Status Report: An Investigation to Determine Whether the Built Environment Affects Patients' Medical Outcomes*. Martinez, CA: The Center for Health Design.

R. Ulrich, Zimring, C., Quan, X., Joseph, A., "The Environment's Impact on Stress", pg. 37, in Marberry, S., Ed., "Improving Healthcare with Better Building Design", The Center for Health Design, 2005

Ulrich and Zimmering, (2004). *The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a-Lifetime Opportunity*, Report to The Center for Health Design for the Designing the 21st Century Hospital Project.

Roger S. Ulrich, (1999). "Effects of Gardens on Health Outcomes: Theory and Research." In Cooper Marcus, Barnes, *Healing Gardens Therapeutic Benefits and Design Recommendations*, Wiley: New York.

R.S. Ulrich, (1984). "View through a window may influence recovery from surgery." *Science*, 224 (4647), pp. 420-421.

W. Whitehouse, S., Varni, J.W., Seid, M., Cooper Marcus, C., Ensberg, M.J., Jacobs, J.R., et al. (2001). "Evaluating a children's hospital garden environment: Utilization and consumer satisfaction." *Journal of Environmental Psychology*, 21(3), pp. 301-314.

Transportation Operations

1-4 points

TO Credit 1.1-1.4

Alternative Transportation: **Commuting**

Intent

Reduce pollution and land development impacts from conventional single-occupant vehicles used for commuting.

Health Issues

Motor vehicles represent the largest single source of atmospheric pollution including nitrogen oxides (a precursor of smog); benzene (a carcinogen); other volatile organic compounds (some of which are hazardous and precursors of smog); particulate matter (a trigger of respiratory and cardiovascular illnesses and symptoms), carbon dioxide (a greenhouse gas and contributor to global climate change); and carbon monoxide (contributes to the development of atherosclerosis). By reducing emissions, alternative transportation strategies contribute to healthier air quality, benefiting the health of the building occupants and the surrounding community. Furthermore, the physical exercise involved in the most commonly practiced forms of alternative transportation (public transportation, walking and cycling) promote cardiac, respiratory, and muscular health.

Credit Goals

- Document the percentage of commuting round trips made by Full Time Equivalent (FTE) and contract peak period staff using transportation means other than single-occupant, conventionally-powered, conventionally-fueled vehicles. For the purposes of this credit, methods of alternative transportation may include, but are not limited to: walking; public transit; bicycles or other human-powered means; carpools; vanpools; low-emission; fuel-efficient or alternative fuel vehicles (e.g., biodiesel, compressed natural gas or liquid propane); compressed work weeks; and, telecommuting.
- Performance calculations are made relative to a baseline case that assumes all regular occupants commute alone in conventional automobiles. The calculations must account for seasonal variations in use of alternative commuting methods and, where possible, indicate the distribution of commute trips using each type of alternative transportation.
- Points are earned for reductions in conventional commuting trips over a minimum one-year period according to the following schedule:
 - TO Credit 1.1 (1 point): Demonstrate that 10% or more of Full Time Equivalent (FTE) and contract peak period staff commute utilizing alternative transportation methods.
 - TO Credit 1.2 (2 points): Demonstrate that 25% or more of Full Time Equivalent (FTE) and contract peak period staff commute utilizing alternative transportation methods.
 - TO Credit 1.3 (3 points): Demonstrate that 50% or more of Full Time Equivalent (FTE) and contract peak period staff commute utilizing alternative transportation methods.
 - TO Credit 1.4 (4 points): Demonstrate that 75% or more of Full Time Equivalent (FTE) and contract peak period staff commute utilizing alternative transportation methods.

TO Credit 1.1-1.4 continued

Alternative Transportation: **Commuting**

- Provide and maintain a building occupant conveyance program (shuttle-link) for buildings more than 1/2 mile from commuter rail or subway and more than 1/4 mile from established bus routes. Connect transit stops within 1/2 mile of the health care facility to main entrances using sidewalks, high-visibility crosswalks, and signage.
- Provide preferred parking for vehicles used for carpools/vanpools and for low-emitting, fuel-efficient vehicles.

Note: For the purposes of this credit, low-emitting and fuel-efficient vehicles are defined as vehicles that are either classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board or have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide.

Suggested Documentation

- ☐ Maintain quarterly records of alternative commuting transportation participants and document participation levels in accordance with the Credit Goals.
- ☐ For buildings located outside the designated distance from rail and bus lines, maintain quarterly records and results of quarterly contracts with shuttle-link service providers to document that service continues to be provided within specified distances from building.
- ☐ If the facility is located within the designated distance from rail and bus lines, maintain an updated, publicly accessible map showing the location of public transportation, their distances from the building, and a designated pathway between the transit stop and the health care facility's main entrances.
- ☐ Maintain site drawings showing preferred parking for carpool participants and low-emitting, fuel-efficient vehicles, in accordance with Credit Goals.

Reference Standards

American Council for an Energy Efficient Economy (ACEEE), <http://www.aceee.org>.

California Air Resources Board Zero Emission Vehicles (ZEV),
<http://www.arb.ca.gov/msprog/zevprog/zevprog.htm>

TO Credit 1.1-1.4 continued

Alternative Transportation: **Commuting**

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Credit in coordination with GGHC SSM Credit 2.2: Reduced Site Disturbance: Structured Parking, GGHC SSM Credit 4.1: Heat Island Reduction, GGHC TO Credit 1.5: Alternative Transportation: Allowances, and GGHC EP Credit 8: Low Emitting & Fuel Efficient Fleet Vehicles.*
- Perform a transportation survey of future building occupants to identify transportation needs.
- Consider locating future expansions in areas adequately served by public transportation, as defined in the Credit Goals.
- Establish shuttle service to encourage use of mass transit options by staff, visitors and other building occupants.
- Integrate shuttle service with the existing local transit system.
- Work cooperatively with local transportation providers to relocate or establish new transit stops on or adjacent to the institution's site.
- Retain existing preferred handicapped parking areas. Handicapped parking is inclusive of any patient population designated by the hospital as weak.
- Alternative fuel vehicle fleets such as electric-powered vehicles, biodiesel ambulances and shuttles, etc., can be used to provide inter- or intra-campus transportation, transportation to remote parking and staff housing, ambulance and ambulette fleets, and carpool/vanpool programs. See GGHC EP Credit 8: Low Emitting & Fuel Efficient Fleet Vehicles for more information.
- Biodiesel is becoming available in many markets nationwide, particularly in regions designated as non-attainment areas or where there are high levels of ground level ozone. Low sulfur diesel fuels are required nationally and can be used in all diesel engines without modifications. Biodiesel is usable in most diesel engines as well, although in some older engines may require changing of rubber gaskets and more frequent changing of filters during initial use as it cleans the engine.
- Provide high quality bicycle parking such as inverted-U racks that secure bicycles by their frames, rather than their wheels. Provide lockers and shower facilities for bicyclists.
- Establish a carpool program to assist staff in organizing efficient carpool partners.
- Collaborate with the transit system to build well-lit, acclimatized, secure passenger shelters at bus stops.
- Collaborate with local, state, and federal officials to provide alternative transportation options for home care professionals.

TO Credit 1.1-1.4 continued

Alternative Transportation: **Commuting**

Resources

American Council for an Energy Efficient Economy (ACEEE), Green Book, <http://www.greenercars.org/>

California Energy Commission, Alternative Fuel Vehicles (AFVs) and High-Efficiency Vehicles, <http://www.energy.ca.gov/afvs/>

U.S. Department of Energy (DOE), State and Federal Incentives and Laws, http://www.eere.energy.gov/afdc/incentives_laws.html

U.S. Department of Energy (DOE), Clean Cities Program, <http://www1.eere.energy.gov/cleancities/>

U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA), Fuel Economy website, <http://www.fueleconomy.gov/>

U.S. Environmental Protection Agency (EPA), Transportation and Air Quality, <http://www.epa.gov/otaq/>

1 point

TO Credit 1.5**Alternative Transportation: Allowances****Intent**

Reduce pollution and land development impacts from conventional single-occupant vehicles used for commuting.

Health Issues

Motor vehicles represent the largest single source of atmospheric pollution including nitrogen oxides (a precursor of smog); benzene (a carcinogen); particulate matter (a trigger of respiratory illness and symptoms); other volatile organic compounds (some of which are potentially hazardous and a precursors of smog); particulate matter (a trigger of respiratory and cardiovascular illnesses and symptoms), carbon dioxide (a greenhouse gas and contributor to a trigger for global climate change); and carbon monoxide (contributes to the development of atherosclerosis). probable human carcinogen). By reducing emissions, alternative transportation strategies contribute to healthier air quality, benefiting the health of the building occupants and the surrounding community. Furthermore, the physical exercise involved in the most commonly practiced forms of alternative transportation (public transportation, walking and cycling) promote cardiac, respiratory, and muscular health. Studies have found that providing equal commuting subsidies, and thus providing a choice of commuting methods, to all employees significantly reduces the rate of solo driving.

Credit Goals

Offer a financial incentive (also known as parking cash-out), other discount program, or non-monetary benefit equivalent to subsidizing on-site parking for all Full Time Equivalent (FTE) and contract peak period staff for alternative modes of travel. For the purposes of this credit, alternative modes of travel may include, but are not limited to: walking; public transit; bicycles or other human-powered means; carpools; vanpools; low-emission; fuel-efficient or alternative fuel vehicles; compressed work weeks; and, telecommuting.

TO Credit 1.5 continued

Alternative Transportation: **Allowances**

Suggested Documentation

- ☐ Maintain quarterly records of the financial incentive program, in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 2.2: Reduced Site Disturbance: Structured Parking, GGHC SSM Credit 4.1: Heat Island Reduction, GGHC TO Credit 1.1-1.4: Alternative Transportation: Commuting, and GGHC EP Credit 8: Low Emitting & Fuel Efficient Fleet Vehicles.*
- Provide discounts at nearby stores and restaurants for FTE and contract peak period staff who participate in the alternative transportation program.
- Establish and implement an awards program for employees who use environmentally-friendly, healthy means of commuting.
- Consider offering employees pre-tax deductions for alternative transportation expenses, such as bus passes.

Resources

Delaware Valley Regional Planning Commission TransitChek, <http://www.gettransitchek.org>

U.S. Department of Transportation, "Mitigating Traffic Congestion – The Role of Demand-Side Strategies," http://ops.fhwa.dot.gov/publications/mitig_traf_cong/

U.S. Environmental Protection Agency (EPA), Parking Cash Out: Implementing Commuter Benefits as One of the Nation's Best Workplaces for Commuters," http://www.lgc.org/freepub/PDF/Land_Use/presentations/parking2007/parkingcash.pdf

Facilities Management

Required

FM Prerequisite 1

Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment

Intent

Promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training and system analysis.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NO_x) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Develop and annually revise a Building Operating Plan that provides details on how the building is to be operated and maintained. The Building Operating Plan, at a minimum, shall include an occupancy schedule, equipment run time schedule, design set points for all HVAC equipment, and design lighting levels throughout the building. Identify any changes in schedules or set points for different seasons, different days of the week, and different times of day. Validate that the Building Operating Plan has been met for a minimum twelve-month period.
- Develop and annually revise a Systems Narrative that provides a brief description of the mechanical and electrical systems, equipment, and envelope systems in the building with a corresponding preventive maintenance plan for all equipment covered by the Narrative. The Systems Narrative shall include all the systems used to meet the operating conditions stated in the Building Operating Plan including, but not limited to, heating, cooling, ventilation, lighting and any building controls systems.
- Document and annually review the current Sequence of Operations for the building.
- Create and annually review a narrative of the preventative maintenance plan for equipment described in the Systems Narrative and document the preventative maintenance schedule over a minimum twelve-month period.
- Annually conduct an energy audit that meets the requirements of ASHRAE Level I – Walk-Through Assessment.

¹ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Prerequisite 1 continued

Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment

Suggested Documentation

- ❑ Compile and annually review documentation of the Building Operating Plan, Systems Narrative, Sequence of Operations, preventative maintenance plan and energy audit in accordance with Credit Goals.

Reference Standards

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), <http://www.ashrae.org>

ASHRAE Level I – Walk-Through Assessment, supporting documents available at <http://eweb.ashrae.org>:

- Evaluation of Proposed ASHRAE Energy Audit form and procedures
- A guide to analyzing and reporting building characteristics and energy use in commercial buildings.
- An expert system for commercial Building HVAC and energy audits
- Procedures for commercial building energy audits
- Energy audit Input Procedures and Forms
- Evaluation of Proposed ASHRAE Energy Audit Form and Procedures

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.*
- For facilities that have been operational less than one year constructed in accordance with the GGHC *Construction* section or LEED for Healthcare, consider demonstrating continuity of construction commissioning into operations and maintenance through a building operations review with O&M staff and occupants within ten months after substantial completion, in accordance with GGHC v2.2/LEED for Healthcare EA Credit 3: Enhanced Commissioning.
- The commissioning process activities begin by identifying the current building operating intents (Owner's Operational Requirements) and then proactively making sure that the buildings' systems are operating as necessary to meet these operating intents.
- Ensure that the commissioning program addresses, at a minimum, the following systems: heating system, cooling system, humidity control system, lighting system, safety systems, building envelope, and the building automation controls.
- Prepare a building operating plan that specifies the current operational needs of the building and identify building systems and other practices necessary to meet those needs. Outline the current sequence of operations to identify and eliminate any inefficiency.

FM Prerequisite 1 continued

Energy Efficiency Best Management Practices:

Planning, Documentation & Opportunity Assessment

- Develop and implement a preventative maintenance program to regularly monitor and optimize the performance of mechanical equipment regulating indoor comfort and the conditions delivered in occupied spaces.

Resources

“Continuous Commissioning Guidebook for Federal Energy Managers,” Federal Energy Management Program, U.S. Department of Energy (DOE), October 2002.

U.S. Environmental Protection Agency (EPA), Energy Star “Building Manual”, Stage 1 “Recommissioning” chapter http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual.

U.S. Environmental Protection Agency (EPA), Energy Star, “2003 CBECS National Average Source Energy Use and Performance Comparisons,” located at <http://www.energystar.gov/targetfinder>. This site allows comparison of energy use intensities of non-ratable spaces to industry averages. Industry averages are derived from the 2003 Commercial Buildings Energy Consumption Survey.

Required

FM Prerequisite 2

Minimum Building Energy Efficiency Performance

Intent

Establish the minimum level of energy efficiency for the building and systems.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.² Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

OPTION 1

- For building types rated by Energy Star®, annually demonstrate that the facility has achieved a score of at least 69 utilizing the EPA Energy Star® Portfolio Manager Benchmarking Tool. Ratable spaces, including acute care hospitals and medical office buildings, are those that receive a 1-100 score in Portfolio Manager which enables weather normalized comparisons to the national building stock.

OR

- For building types not rated by Energy Star, annually demonstrate that the facility has achieved an EUI of 19% above industry average in KBtu/ft²/year. Non-ratable spaces, including clinics and assisted living facilities, receive an EUI designation that is not normalized for climate nor adjusted for activities which may affect energy use.

Note: Option 1 automatically awards projects 2 points in GGHC Facilities Management Credit 1: Optimize Energy Performance.

OR

² U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Prerequisite 2 continued

Minimum Building Energy Efficiency Performance

OPTION 2

- Facilities with Energy Star scores below 69 (or, if a non-rated facility, with an EUI that does NOT achieve 19% above industry average) shall improve energy performance by at least 7% per year on average over the improvement period until they reach the threshold listed under Option 1.

AND

- Verify energy performance ratings through certification by a licensed professional engineer or facility manager, either on staff or third party.

Note: This prerequisite has been defined to require a building baseline computation that recognizes regulatory context and that is based upon actual ongoing building performance as a basis for defining performance improvement.

FM Prerequisite 2 continued

Minimum Building Energy Efficiency Performance

Suggested Documentation

- ☐ Quarterly compile the Statement of Energy Performance over a minimum one-year period from the Portfolio Manager benchmarking tool in accordance with Option 1 Credit Goals OR document the facility's plan to achieve an Energy Star score of 69 or EUI of 19% and quarterly and annual reviews of progress towards 7% improvement in energy performance in accordance with Option 2 Credit Goals.
- ☐ Compile and quarterly update a summary of the energy bills over the previous twelve months, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building annually. *Note: Energy use summaries are compiled automatically for those using EPA's Portfolio Manager benchmarking tool.*

Reference Standards

U.S. Environmental Protection Agency (EPA), Energy Star® National Energy Performance Rating System, <http://www.energystar.gov/benchmark>. Users create their own private accounts with Energy Star at no cost.

U.S. Environmental Protection Agency (EPA), Energy Star, "2003 CBECS National Average Source Energy Use and Performance Comparisons," <http://www.energystar.gov/targetfinder>. This site allows comparison of energy use intensities of non-ratable spaces to industry averages. Industry averages are derived from the 2003 Commercial Buildings Energy Consumption Survey (CBECS).

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 3: Refrigerant Management: Ozone Protection; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; GGHC FM Credit 7: On-Site & Off-Site Renewable Energy; GGHC FM Credit 8: Refrigerant Management; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; and, GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Retrofit building systems to improve energy performance while maintaining or improving health and safety requirements. Consider the following strategies as are regionally and climatically appropriate:
 - Building envelope improvements to reduce energy requirements, including, for example, insulation, window and door replacements.
 - Energy (latent and sensible) recovery.
 - Ground source heat pumps.
 - Evaporative cooling when ambient conditions allow.
 - Reduce outside airflow during unoccupied periods while maintaining appropriate pressure relationships (e.g., operating rooms) required by the 2006 Guidelines for Design and Construction of Hospitals and Healthcare Facilities. Ensure close monitoring to protect patient safety.
 - Expand unoccupied temperature dead band by automatically resetting zone temperature set points based on occupancy.

FM Prerequisite 2 continued

Minimum Building Energy Efficiency Performance

- Separate HVAC zones with constant airflow, temperature and humidity control requirements from those with single or double shift occupancy that would allow reductions in air changes or setbacks in temperature and humidity. Provide a cooling system with at least two cooling loops operated at different temperatures. This can be accomplished with separate chillers (or direct tower cooling).
- Design for high partial-load heating and cooling efficiency.
- Integrate daylighting strategies to decrease building energy demand.
- Design high efficiency chiller plants that use various technologies and strategies to reduce overall plant energy consumption at full and partial loads (such as chillers with variable speed drives on the compressors, primary-only variable flow pumping, series-counterflow chiller arrangements, etc.).
- Use low leakage air handling units to reduce overall fan horsepower while ensuring that air is properly filtered.
- Retrofit using variable speed motors, and Energy Star-rated equipment to reduce electrical consumption.
- Install energy efficiency lighting devices, such as: LED exit signs, fluorescents, Energy Star qualified lighting fixtures, and occupancy sensor controls. Ensure that all occupancy sensors are installed with capacity for manual override.
- Document the health and financial benefits of energy efficiency measures using tools such as the Healthcare Clean Energy Exchange's Energy Impact Calculator (EIC). Based on U.S. EPA and other peer-reviewed data, the EIC calculates carbon emissions and energy use health impacts such as premature deaths, chronic bronchitis, asthma attacks work loss days and hospital ER visits on a per kWh/year basis, as well as health care facilities' and external societal dollar costs per incident. Use the documented energy efficiency savings and the EIC to educate stakeholders (senior management, trustees, funders, staff, suppliers, service providers, host community, etc.) on efficiency benefits related to human and environmental health, financial, climate change risk reduction and fiduciary responsibilities. Monetize the documented energy efficiency for sale as energy efficiency credits (a.k.a. White Tags).

Resources

BetterBricks Hospitals & Healthcare website, <http://www.betterbricks.com/subHomePage.aspx?ID=1>

2006 Guidelines for Design and Construction of Hospitals and Healthcare Facilities,
<http://www.fgiguilines.org/guidelines.html>

Healthcare Clean Energy Exchange Energy Impact Calculator: <http://www.hccleanenergy.org/>

U.S. Environmental Protection Agency (EPA), Energy Star health care case studies, <http://www.energystar.gov/labeledbuildings>. Under "Selected Resources", click "Find Labeled Buildings" and display those with Profiles. Commercial buildings that have earned the ENERGY STAR are the most energy efficient in the U.S. and cost 35% less to operate than average buildings.

Required

FM Prerequisite 3

Refrigerant Management: Ozone Protection

Intent

Reduce stratospheric ozone depletion.

Health Issues

Stratospheric ozone layer depletion increases exposure to ultraviolet radiation, increasing risks of skin cancer and immune system depression. The United States is one of the world's largest emitters of ozone depleting substances. As part of the U.S. commitment to implementing the Montreal Protocol, the EPA has implemented regulations relative to the responsible management of Chlorofluorocarbons (CFCs), including programs to end the consumption and production of ozone depleting substances (ODS) and Hydrochlorofluorocarbons (HCFCs). HCFCs are a class of ozone depleting substance that have been used to replace CFC refrigerants. While HCFCs have a lower ODS rating than CFCs, the Montreal Protocol lists them in the second class of ODS to be phased out over time. In 2005, the World Meteorological Organization (WMO) reported an 8-9% decrease of ODS in the atmosphere from the peak in 1992-1994, while the level of HCFCs continues an upward trend. The U.S. has joined other countries party to the Montreal Protocol proposing an accelerated mandatory phase-out of HCFCs to bolster protection of the ozone layer. According to the United Nations Environment Programme, ozone depletion is also linked to climate change. Both trends are largely induced by human activities. Additionally, many ozone-depleting substances, such as CFC-11 and CFC-12, and some substitutes for ozone-depleting refrigerants, such as HFCs, are potent greenhouse gases.³

Credit Goals

- Zero use of Chlorofluorocarbon (CFC)-based refrigerants in new and replacement Heating, Ventilation, Air Conditioning, and Refrigerant (HVAC&R) base building equipment.
- If CFC-based refrigerant containing HVAC&R equipment is maintained in the building, implement a phase-out plan that reduces annual leakage to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting, and reduces the total leakage over the remaining life of the unit to less than 30% of its refrigerant charge.
- Small HVAC&R units (defined as containing less than 0.5 lbs of refrigerant), and other equipment, such as standard refrigerators, small water coolers, medical equipment, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the "base building" system and are not subject to the requirements of this prerequisite.

³ UNEP/GRID-Arendal, Ozone depletion and climate change, UNEP/GRID-Arendal Maps and Graphics Library, <http://maps.grida.no/go/graphic/ozone-depletion-and-climate-change> (Accessed 16 October 2008)

FM Prerequisite 3 continued

Refrigerant Management: Ozone Protection

Suggested Documentation

- ❑ Maintain documentation and evidence of an annual review demonstrating that base building HVAC&R equipment does not use CFCs. For CFC-based refrigerant containing equipment, document progress of the phase out plan in accordance with Credit Goals.

Reference Standards

U.S. Environmental Protection Agency (EPA) Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting, <http://www.epa.gov/oar/caa/contents.html>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 8: Refrigerant Management.*
- Non-CFC-based HVAC&R equipment is often more efficient than CFC-based equipment and can improve overall facility energy performance.
- Set up leakage minimization procedures and systems to meet annual leakage minimization standards and reporting requirements. For more information, see U.S. EPA's "Complying with the Section 608 Refrigerant Recycling Rule."
- When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC refrigerants and provide a replacement schedule for these refrigerants. For new buildings, specify new HVAC&R equipment in the base building that uses no CFC refrigerants.
- Specify only non-CFC-based refrigerants in all new building HVAC&R systems. Identify all existing CFC-based refrigerant uses and upgrade the equipment if economically feasible.

FM Prerequisite 3 continued

Refrigerant Management: Ozone Protection

Resources

ANSI/ASHRAE 15-2004, *Safety Standard for Refrigeration Systems* (Also defines HFCs, CFCs and HCFC by formulation, compound and common name), <http://www.ashrae.org>.

ANSI/ASHRAE Standard 34-2004, Designation and Safety Classification of Refrigerants and Addenda a thru u., <http://www.ashrae.org>.

Building Owners and Managers Association (BOMA), *The Refrigerant Manual: Managing the Phase Out of CFCs*, 1993, <http://www.boma.org>

Chartered Institution of Building Services Engineers (CIBSE), *CFCs, HCFCs and Halons - Professional and Practical Guidance on Substances that Deplete the Ozone Layer*, 2000, <http://www.cibse.org>

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), *Building Systems Analysis & Retrofit Manual*, 1995, <http://www.smacna.org>

U.S. Environmental Protection Agency (EPA), *CFC Phase-Out Schedule*, <http://www.epa.gov/ozone/title6/phaseout>

U.S. Environmental Protection Agency (EPA), *Ozone Depletion*, <http://www.epa.gov/ozone>

U.S. Environmental Protection Agency (EPA), *Significant New Alternatives Policy (SNAP)*, <http://www.epa.gov/ozone/snap/index.html>

U.S. Environmental Protection Agency (EPA), *Stratospheric Ozone Protection: Moving to Alternative Refrigerants*, <http://www.es.epa.gov/program/epaorgs/oar/altrefrg.html>

U.S. Green Building Council, *The Treatment by LEED of the Environmental Impact of HVAC Refrigerants*, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=154>

Refrigerant Definitions

CFC: Chlorine Based

HCFC: Reduced ozone depleting potential, but still containing chlorine

HFC: Hydroflourocarbon that does not contain chlorine, but that still may contribute to global warming

Natural Refrigerants: water, carbon dioxide (CO₂), Ammonia (NH₃), propane, etc.

Required

FM Prerequisite 4

Minimum Indoor Plumbing Fixture and Fitting Efficiency

Intent

Reduce indoor fixture and fitting water use within buildings to reduce the burdens on potable water supply and wastewater systems.

Health Issues

Maintaining adequate potable water supplies is a basic necessity for the health of individuals and communities. Only about 1% of the water on Earth is fresh water. Over-consumption, drought and poor water management have led thirty-six states in the U.S. to anticipate local, regional, or statewide water shortages by 2013.⁴ Processing potable water is energy intensive and thus contributes to air emissions associated with fossil fuel energy generation (for the treatment, pumping and maintenance of the potable water systems). Only about 20% of current urban water is used for drinking and sanitary purposes, with the other 80% not requiring treatment to potable standards. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies. To protect the public health, a dual or dedicated distribution system must be installed to segregate potable and reclaimed water.

Credit Goals

- Reduce potable water usage of indoor plumbing fixtures and fittings to a level equal to or below the facility baseline, calculated assuming 100% of the building's indoor plumbing fixture and fitting count were outfitted with fixtures and fittings meeting the Uniform Plumbing Code 2006 (UPC) or the International Plumbing Code (IPC) 2006 fixture and fitting performance requirements. Fixtures and fittings included in the calculations for this credit are water closets, urinals, showerheads, faucets, faucet replacement aerators and metering faucets.
- The baseline water usage is set depending on the year of substantial completion of the building's indoor plumbing system. Substantial completion is defined as either initial building construction or the last plumbing renovation of all or part of the building that included 100% retrofit of all plumbing fixtures and fittings as part of the renovation.
- Set the baseline as follows:
 - Plumbing system substantially completed in 1993 or later throughout the building – 120% of the water usage that would result if all fixtures meet the codes cited above; OR
 - Plumbing system substantially completed before 1993 throughout the building – 160% of the water usage that would result if all fixtures meet the codes cited above.
- If indoor plumbing systems were substantially completed at different times for different parts of the building, because the plumbing renovations occurred at different times, set a whole-building average baseline by prorating between the above limits. Prorate based on the proportion of plumbing fixtures installed during the plumbing renovations in each date period. Pre-1993 buildings that have had only minor fixture retrofits (aerators, showerheads, flushing valves) but no plumbing renovations may use the 160% baseline for the whole building.

⁴ U.S. EPA, <http://www.epa.gov/WaterSense/water/why.htm>

FM Prerequisite 4 continued

Minimum Indoor Plumbing Fixture and Fitting Efficiency

- Demonstrate fixture and fitting performance through calculations to compare the water use of the as-installed fixtures and fittings to the use of the UPC/IPC compliant fixtures and fittings.
- Develop and implement a policy requiring economic assessment of conversion to high-performance plumbing fixtures and fittings as part of any future indoor plumbing renovation. The assessment must account for potential water supply and disposal cost savings and maintenance cost savings.

Suggested Documentation

- ☐ Compile documentation and annually update to verify that the existing building fixture potable water use is equal to or less than the baseline calculated according to Credit Goals.
- ☐ Maintain quarterly and annual water meter data for potable water use inside the building showing that the annual fixture potable water use is equal to or less than the calculated baseline.
- ☐ Compile a policy and annual assessment of progress phasing in high-performance plumbing fixtures and fittings in accordance with Credit Goals.

Reference Standards

International Plumbing Code (IPC) 2006, <http://iccsafe.org>

Uniform Plumbing Code (UPC) 2006, <http://www.nfpa.org>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 2: Potable Water Use Reduction; and, GGHC FM Credit 5: Performance Measurement.*
- Reduce fixture potable water usage through automatic water control systems.
- Install, where possible, water conserving plumbing fixtures and fittings that meet or exceed the Uniform Plumbing Codes 2006 (UPC) or the International Plumbing Codes 2006 fixture and fitting requirements in combination with high efficiency or dry fixture and control technologies.
- Reclaim potable “grey” water drains, cooling coil condensate, and/or captured rainwater for filtration and treatment to use in non-potable process water needs such as process cooling (sterilizers) or cooling tower water make-up.

FM Prerequisite 4 continued

Minimum Indoor Plumbing Fixture and Fitting Efficiency

- Track the facility's water consumption using the water tracking feature of U.S. EPA's Energy Star® National Energy Performance Rating System, found within Portfolio Manager at <http://www.energystar.gov/benchmark>. Energy Star users create their own private accounts at no cost.
- Record meter and document reclaimed potable water use for further non-potable process use (i.e. cooling tower water make-up).
- Calculate annual fixture potable water use per occupant and per square foot.

Resources

American Society of Plumbing Engineers (ASPE), Plumbing Engineering Design Handbook, <http://www.aspe.org>

Healthcare Environmental Resource Center, Facilities Management – Water Conservation, <http://www.hercenter.org/facilitiesandgrounds/waterconserve.cfm>

New Hampshire Department of Environmental Services, Water Efficiency Practices for Health Care Facilities, <http://www.des.state.nh.us/factsheets/ws/ws-26-14.htm>

U.S. Department of the Interior, Water Measurement Manual, http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/

U.S. Environmental Protection Agency (EPA) Region 2, Pollution Prevention (P2) for the Healthcare Industry, <http://www.epa.gov/region2/p2/health.htm>

Required

FM Prerequisite 5

Outdoor Air Introduction & Exhaust Systems

Intent

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.

Health Issues

The EPA estimates that indoor air pollution is one of the top five environmental risks to public health. Indoor air can be as much as 10 times more polluted than outside air and contain many unique contaminants. Indoor air pollutants can cause problems ranging from immediate acute effects such as eye, nose, and throat irritation; sinusitis, asthma attacks, headaches; loss of coordination; and nausea; to long range chronic damage to the lungs, central nervous system, and other organ systems, depending on the specific contaminants. Poor IAQ is a leading cause of absenteeism from work and job dissatisfaction.

Credit Goals

- Modify or maintain each outdoor-air (OA) intake, supply air fan, and/or ventilation distribution system to supply at a minimum, the outdoor air ventilation rate required by ANSI/ASHRAE 62.1-2007 under the Ventilation Rate Procedure under all normal operating conditions or the minimum requirements of the relevant local licensing requirement for ventilation, whichever is more stringent, AND the air quality criteria required by ANSI/ASHRAE 62.1-2007 under all normal operating conditions. Show compliance through measurements taken at the system level (i.e. at the air handler unit). For variable air volume systems the dampers, fan speeds, etc. must be set during the test to the worst-case system conditions expected during normal ventilation operations. Each air-handler must be measured; sampling of air-handlers is prohibited.
- Implement and maintain an HVAC System Maintenance Program that incorporates a reliability centered maintenance approach to ensure the proper operations and maintenance of HVAC components as they relate to outdoor air introduction and exhaust.
- Meet the EPA Indoor Air Quality (IAQ) guidelines OR Sheet Metal & Air Conditioning Contractor's National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings Under Construction to ensure the proper operations and maintenance of HVAC components as they relate to IAQ.
- Test and maintain the operation of all building general and local exhaust systems, including but not limited to, bathroom, shower, utility areas, paint shops, print shops, laboratories, kitchen, parking, copy rooms, and large volume shredding exhaust systems.

FM Prerequisite 5 continued

Outside Air Introduction & Exhaust Systems

Suggested Documentation

- ☐ Annually compile a letter and backup tabular information from a mechanical engineer HVAC system specialist, or other qualified NSF testing and certification contractor demonstrating the general dilution ventilation and specialty local exhaust systems serving the building are operating as designed AND that the existing building outdoor-air (OA) ventilation distribution system supplies at least the outdoor air ventilation rate and air quality criteria required by ANSI/ASHRAE 62.1-2007 or the minimum requirements of the relevant local licensing requirement for ventilation, in accordance with the Credit Goals.
- ☐ Compile annual documentation verifying that HVAC components meet the EPA Indoor Air Quality (IAQ) guidelines OR Sheet Metal & Air Conditioning Contractor's National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings Under Construction in accordance with Credit Goals.
- ☐ Document and annually review the activity and successes associated with the HVAC System Maintenance Program, in accordance with Credit Goals.
- ☐ Annually compile a letter and backup tabular information of the most recent four quarterly inspections of the building OA/exhaust air system in accordance with Credit Goals and signed by a mechanical engineer or HVAC system specialist demonstrating that the exhaust air HVAC systems serving the building are operating as designed.

Reference Standards

ANSI/ASHRAE 62.1-2007, <http://www.ashrae.org>

NSF International, <http://www.nsf.org>

Sheet Metal & Air Conditioning Contractor's National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings Under Construction, <http://www.smacna.org>

U.S. Environmental Protection Agency (EPA) "Building Air Quality: A Guide for Building Owners and Facility Managers", Document No. 402-F-91-102, December 1991, <http://www.epa.gov/iaq/largebldgs/graphics/iaq.pdf>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite with GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment and GGHC FM Credit 3: Existing Building Commissioning.*
- Maintaining indoor air quality begins with careful monitoring of outside air at intakes into the indoor air distribution systems, as well as the systems' exhaust components. Coupling properly designed, operated and maintained mechanical equipment with low-emitting materials can ensure healthy indoor air.
- Conduct a visual inspection of OA air vent/dampers and remove any OA air vent/louver obstructions that restrict full OA capacity from entering the distribution system.

FM Prerequisite 5 continued

Outside Air Introduction & Exhaust Systems

- Conduct airflow monitoring to document OA in terms of CFM. Compare measured flow to designed flow for each unit.
- Test the operation of each exhaust fan and verify that exhaust airflow meets design requirements/intentions, including demonstrating adequate capture velocity at the source interface. The U.S. EPA Guidelines for HVAC System Maintenance provide guidance on developing, implementing and maintaining an HVAC System Maintenance Program to ensure the proper operations and maintenance of HVAC components as they relate to IAQ.
- Place all components noted above in the institution's preventative maintenance system.

Resources

American Conference of Governmental Industrial Hygienists (ACGIH®), *Industrial Ventilation; A Manual of Recommended Practice, 25th Edition (2004)*, ACGIH®, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634. <http://www.acgih.org/store/>

Harvard University, <http://www.greencampus.harvard.edu/theresource/tech-prod/hvac-exhaust/>

Industrial Ventilation; A Manual of Recommended Practice, 25th Edition (2004), ACGIH®, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634.

U.S. Environmental Protection Agency (EPA), Indoor Air Quality in Large Buildings, <http://www.epa.gov/iaq/largebldgs/>

Required

FM Prerequisite 6

Environmental Tobacco Smoke (ETS) Control

Intent

Prevent exposure of building occupants, indoor surfaces, and systems to Environmental Tobacco Smoke (ETS).

Health Issues

There are well-known health risks associated with Environmental Tobacco Smoke (or "secondhand smoke"). A 1993 report published by the U.S. EPA, *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*, concluded that secondhand smoke causes lung cancer in adult nonsmokers and impairs the respiratory health of children, corroborating earlier studies undertaken by the National Academy of Sciences and the U.S. Surgeon General. The EPA report classified secondhand smoke as a known human carcinogen, indicating sufficient evidence of the substance causing cancer in humans. The California EPA finds that ETS is a cause of breast cancer. ETS also increases the risk of premature birth, low birth weight, sudden infant death syndrome, and middle ear infections in children. Research has found that smoke-free workplaces are healthier for occupants. Smoke-free policies reduce the number of employees who start smoking, reduce the number of cigarettes smoked by employees by an average of 3.1 per day and reduce the number of employees who smoke by 3.8 percent. Reduced employee smoking prevalence reduces absenteeism, increases productivity, and reduces direct health care costs.

Credit Goals

- Prohibit smoking from the campus, including all buildings and public outdoor spaces.

Note: For the purposes of this credit, a campus is defined as all facilities within the registered project's scope that are owned, leased and operated by the organization.

Exceptions:

Only in licensed residential health care facilities, psychiatric units and substance abuse clinics where the functional program requires accommodation for smokers may there be an exception to establish smoking areas according to the following criteria:

- Prohibit smoking in the building except in designated smoking areas.
- Locate any exterior designated smoking areas at least 50 feet (15.24 meters) away from building entries, operable windows, outdoor air intakes, bus stops, disabled parking, and other locations where occupants could inadvertently come in contact with ETS when occupying, entering or leaving the building.

FM Prerequisite 6 continued

Environmental Tobacco Smoke (ETS) Control

- Provide one or more designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room(s) must be directly exhausted to the outdoors, away from air intakes and building entry paths, with no re-circulation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable deck-to-deck partitions, operated at a negative pressure compared with the surrounding spaces of at least an average of 5 Pa (0.02 inches of water gauge) and with a minimum of 1 Pa (0.004 inches of water) when the door(s) to the smoking room are closed.
- Initially verify performance of the smoking room differential air pressures by conducting 15 minutes of measurement, with a minimum of one measurement every 10 seconds, of the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking room closed. Annually verify continued performance. The testing will be conducted with each space configured for worst-case conditions for transport of air from the smoking rooms to adjacent spaces.

Suggested Documentation

- ☐ Document and annually review the effectiveness of a written no-smoking policy. Maintain publicly displayed signage on the property .
- ☐ Residential facilities that accommodate smoking: Prepare and annually update a copy of the building site plan indicating designated smoking areas and their distances from entries, operable windows, air intakes, and other locations where occupants could inadvertently come in contact with ETS. Demonstrate achievement of the Credit Goals for designated smoking rooms through annual testing and monitoring records or equivalent documentation over a minimum one-year period.

Reference Standards

There is no reference standard for this credit.

FM Prerequisite 6 continued

Environmental Tobacco Smoke (ETS) Control

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this prerequisite with GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment and GGHC FM Credit 3: Existing Building Commissioning.
- Develop and implement a smoking-free/smoke-free policy including, at a minimum: defined smoke free facilities; publicly available information on the dangers of smoking and second hand smoke and the benefits of smoking cessation programs; a prohibition on the sale of tobacco products on the hospital campus; and, enforcement mechanisms for facility occupants in violation of the policy.
- Develop and implement smoking/ smoke-free policies.¹ Include within the policies an overview of the smoke free facilities, information on the dangers of smoking and second hand smoke, prohibiting the sale of tobacco products on the hospital campus, and the enforcement of policies.
- According to the U.S. EPA, "A smoke-free workplace is safer and healthier with reduced hazards, risks and costs for all employees and encourages a reduction in employee smoking. Smoke-free policies reduce the number of employees who start smoking, reduce the number of cigarettes smoked by employees by an average of 3.1 per day and reduce the number of employees who smoke by 3.8 percent. Reduced employee smoking prevalence reduces absenteeism, increases productivity, reduces direct health care costs, and may make it possible to negotiate lower health, life and disability coverage."^{2&3}
- Promote Smoking Cessation and Employee Wellness programs such as the Quit for Life Program, preventive health care and wellness programs, and poster campaigns to post information about the dangers of smoking and second hand smoke in designated smoking areas and in other public areas.
- Offer other health and wellness programs and benefits, such as health care deductions, for participating in a Health Screening program and meeting established standards for tobacco usage, body-mass index, blood pressure and cholesterol.
- Display the smoke-free policy both in the facility and on the facility's website.
- Consider performing additional testing of the designated smoking room with the door open, operating exhaust sufficient to create a negative pressure with respect to the adjacent spaces of at least 1 Pa (0.004 inches water gauge).

Resources

Centers for Disease Control and Prevention, <http://www.cdc.gov/tobacco/pubsl.html>.

Quit for Life Program, <http://www.freeclear.com>

Tobacco Free Partners, <http://www.tobaccofreepartners.org>

University of Arkansas Medical Center; Smoke Free Hospital Tool Kit: A Guide for Implementing Smoke Free Policies, http://www.uams.edu/coph/reports/SmokeFree_Toolkit/Hospital%20Toolkit%20Text.pdf

U.S. Environmental Protection Agency (EPA), Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders, <http://cfpub1.epa.gov/ncea/cfm/recorddisplay.cfm?deid=2835>.

1-15 points (2 Mandatory)

FM Credit 1

Optimize Energy Efficiency Performance

Intent

Achieve an increased level of energy efficiency performance relative to typical buildings of similar type to reduce environmental and health burdens associated with excessive energy use.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.⁵ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Demonstrate either the EPA Energy Star® score or the Energy Use Intensity (EUI) that the facility has achieved according to the table below over a minimum twelve-months. Utilize the EPA benchmarking system within the Portfolio Manager Benchmarking Tool for building types addressed by Energy Star.
- Verify energy performance ratings through certification by a licensed professional engineer or facility manager, either on staff or third party.
- An energy meter(s) that measures all energy use for a minimum twelve-month period of each building in the project is required. Each building's energy performance must be based on actual metered energy consumption for both the GGHC project building(s) and all comparable buildings used for the benchmark. A full 12 months of continuous measured energy data is required.
- Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization, or a tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

Note: GGHC FM Prerequisite 2 automatically awards projects 2 points under this credit.

⁵ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 1 continued

Optimize Energy Performance

	Ratable Spaces*	Non-ratable Spaces**
Credit 1.1 (1 point - Required)	Energy Star score of 67	EUI is 17% better than average
Credit 1.2 (2 points – Required)	Energy Star score of 69	EUI is 19% better than average
Credit 1.3 (3 points)	Energy Star score of 71	EUI is 21% better than average
Credit 1.4 (4 points)	Energy Star score of 73	EUI is 23% better than average
Credit 1.5 (5 points)	Energy Star score of 75	EUI is 25% better than average
Credit 1.6 (6 points)	Energy Star score of 77	EUI is 27% better than average
Credit 1.7 (7points)	Energy Star score of 79	EUI is 29% better than average
Credit 1.8 (8 points)	Energy Star score of 81	EUI is 31% better than average
Credit 1.9 (9 points)	Energy Star score of 83	EUI is 33% better than average
Credit 1.10 (10 points)	Energy Star score of 85	EUI is 35% better than average
Credit 1.11 (11 points)	Energy Star score of 87	EUI is 37% better than average
Credit 1.12 (12 points)	Energy Star score of 89	EUI is 39% better than average
Credit 1.13 (13 points)	Energy Star score of 91	EUI is 41% better than average
Credit 1.14 (14 points)	Energy Star score of 93	EUI is 43% better than average
Credit 1.15 (15 points)	Energy Star score of 95+	EUI is 45% better than average

*Ratable spaces, including acute care hospitals and medical office buildings, are those that receive a 1-100 score in Portfolio Manager, which enables weather normalized comparisons to the national building stock.

**Non-ratable spaces, including clinics and assisted living facilities, receive an EUI only, which is not normalized for climate nor adjusted for activities which may affect energy use.

FM Credit 1 continued

Optimize Energy Performance

Suggested Documentation

- ☐ Compile the Statement of Energy Performance over a minimum one-year period from the Portfolio Manager benchmarking tool in accordance with Credit Goals.
- ☐ Compile and quarterly update a summary of the energy bills over the previous twelve months, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building annually. *Note: Energy use summaries are compiled automatically for those using EPA's Portfolio Manager benchmarking tool.*

Reference Standards

U.S. Environmental Protection Agency (EPA), Energy Star® National Energy Performance Rating System, within Portfolio Manager at <http://www.energystar.gov/benchmark>. Energy Star users create their own private accounts at no cost.

U.S. Environmental Protection Agency (EPA), "2003 CBECS National Average Source Energy Use and Performance Comparisons," <http://www.energystar.gov/targetfinder>. This site allows comparison of energy use intensities of non-ratable spaces to industry averages. Industry averages are derived from the 2003 Commercial Buildings Energy Consumption Survey (CBECS).

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Prerequisite 3: Refrigerant Management: Ozone Protection; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; GGHC FM Credit 7: On-Site & Off-Site Renewable Energy; GGHC FM Credit 8: Refrigerant Management; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; and, GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Implement energy-efficiency retrofits and energy-saving techniques to reduce energy use to the level required to earn this credit.
- Retrofit building systems to improve energy performance while maintaining or improving health and safety requirements. Consider the following strategies as are regionally and climatically appropriate:
 - Building envelope improvements to reduce energy requirements, including insulation, window and door replacements.
 - Energy (latent and sensible) recovery.
 - Ground source heat pumps.
 - Evaporative cooling when ambient conditions allow.
 - Reduce outside airflow during unoccupied periods.
 - Expand unoccupied temperature dead band by automatically resetting zone temperature set points based on occupancy.

FM Credit 1 continued

Optimize Energy Performance

- Separate HVAC zones with constant airflow, temperature and humidity control requirements from those with single or double shift occupancy that would allow reductions in air changes or setbacks in temperature and humidity.
- Provide a cooling system with at least two cooling loops operated at different temperatures. This can be accomplished with separate chillers (or direct tower cooling).
- Design for high part-load heating and cooling efficiency.
- Integrate daylighting to decrease building energy costs.
- Design high efficiency chiller plants that use various technologies and strategies to reduce overall plant energy consumption at full and part loads (such as chillers with variable speed drives on the compressors, primary-only variable flow pumping, series-counterflow chiller arrangements, etc.).
- Use low leakage air handling units to reduce overall fan horsepower while ensuring that air is properly filtered.
- Retrofit using variable speed motors, and Energy Star® rated equipment to reduce electrical consumption.
- Install energy efficiency lighting devices, such as: LED exit signs, fluorescents, Energy Star qualified lighting fixtures, and Occupancy sensor controls.
- Annually apply for the ENERGY STAR award from the U.S. EPA for Energy Star scores that are 75 or higher. The ENERGY STAR is awarded for a specific year to indicate superior energy performance. A facility that has earned the ENERGY STAR can re-apply one year after the previous year's application, provided the facility still maintains at least a 75.
- Document the health and financial benefits of energy efficiency measures using tools such as the Healthcare Clean Energy Exchange's Energy Impact Calculator (EIC). Based on EPA and other peer-reviewed data, the EIC calculates carbon emissions and energy use health impacts such as premature deaths, chronic bronchitis, asthma attacks work loss days and hospital ER visits on a per kWh/year basis, as well as healthcare facilities' and external societal dollar costs per incident. Use the documented energy efficiency savings and the EIC to educate stakeholders (senior management, trustees, funders, staff, suppliers, service providers, host community, etc.) on efficiency benefits related to human and environmental health, financial, climate change risk reduction and fiduciary responsibilities. Monetize the documented energy efficiency for sale as energy efficiency credits (a.k.a. White Tags).

Resources

BetterBricks Hospitals & Healthcare website, <http://www.betterbricks.com/subHomePage.aspx?ID=1>

Healthcare Clean Energy Exchange Energy Impact Calculator: <http://www.hccleanenergy.org/>

U.S. Environmental Protection Agency (EPA), Energy Star health care case studies, <http://www.energystar.gov/labeledbuildings>. Under "Selected Resources", click "Find Labeled Buildings" and display those with Profiles. Commercial buildings that have earned the ENERGY STAR are the most energy efficient in the U.S. and cost 35% less to operate than average buildings.

1-5 points

FM Credit 2.1-2.5

Potable Water Use Reduction: Total Building Reduction

Intent

Maximize indoor potable water use efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Health Issues

Maintaining adequate potable water supplies is a basic necessity for the health of individuals and communities. Only about 1% of the water on Earth is fresh water. Over-consumption, drought and poor water management have led thirty-six states in the U.S. to anticipate local, regional, or statewide water shortages by 2013.⁶ Processing potable water is energy intensive and thus contributes to air emissions associated with fossil fuel energy generation (for the treatment, pumping and maintenance of the potable water systems). Only about 20% of current urban water is used for drinking and sanitary purposes, with the other 80% not requiring treatment to potable standards. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies. To protect the public health, a dual or dedicated distribution system must be installed to segregate potable and reclaimed water.

Credit Goals

- Ensure no once-through potable water use for interior water features. If potable water is used in interior or exterior water features, it shall be separately metered and the water features' consumption shall be excluded from the numerator of the water reduction calculations outlined in the table below.
- Develop and implement strategies and systems that in aggregate produce a percentage reduction of total building potable water use from a facility baseline measured over a minimum one-year period. At least one meter for the overall building water use is required.
- Develop potable water use reduction strategies in collaboration with the facility infection control committee to minimize potential infection control risks.

Note: See FM Credit 5.3: Performance Measurement: Enhanced Water Metering for more information about sub-metering potable water use.

Credit 2.1 (1 point)	Reduce total building potable water use by 10% when compared with the facility's measured baseline.
Credit 2.2 (2 points)	Reduce total building potable water use by 20% when compared with the facility's measured baseline.
Credit 2.3 (3 points)	Reduce total building potable water use by 30% when compared with the facility's measured baseline.
Credit 2.4 (4 points)	Reduce total building potable water use by 40% when compared with the facility's measured baseline.
Credit 2.5 (5 points)	Reduce total building potable water use by 50% when compared with the facility's measured baseline.

⁶ U.S. EPA, <http://www.epa.gov/WaterSense/water/why.htm>

FM Credit 2.1-2.5 continued

Potable Water Use Reduction: **Total Building Reduction**

Suggested Documentation

- ☐ Compile and annually review documentation verifying that no once-through potable water is used for interior water features.
- ☐ Demonstrate that the existing building total potable water use is less than the facility's measured baseline using calculations, fixture cut sheets, results of direct measurement, photographs and other equivalent documentation over a minimum one year period. Exclude interior and exterior water features from the baseline in accordance with Credit Goals.
- ☐ Compile quarterly and annual water meter data for water use in the building supporting the documentation of the annual total building potable water use.

Reference Standards

There is no referenced standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Prerequisite 4: Minimum Indoor Plumbing Fixture and Fitting Efficiency; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 2: Potable Water Use Reduction; GGHC FM Credit 3: Existing Building Commissioning; and, GGHC FM Credit 5: Performance Measurement.*
- Reduce fixture water usage through automatic controls and other actions.
- Specify water conserving plumbing fixtures and fittings that exceed the Uniform Plumbing Code 2006 (UPC) or the International Plumbing Code (IPC) 2006 fixture and fitting performance requirements in combination with high efficiency or dry fixture and control technologies.
- Reclaim potable water drains for filtration and treatment to use in process non-potable water needs, reducing the facility's overall consumption (i.e. cooling tower make-up, sterilizer steam quench, or other process cooling needs).
- Track the facility's water consumption using the water tracking feature of EPA's Energy Star® National Energy Performance Rating System, found within Portfolio Manager at <http://www.energystar.gov/benchmark>. Energy Star users create their own private accounts at no cost.

FM Credit 2.1-2.5 continued

Potable Water Use Reduction: **Total Building Reduction**

Resources

American Society of Plumbing Engineers (ASPE), Plumbing Engineering Design Handbook,
<http://www.aspe.org>

Healthcare Environmental Resource Center, Facilities Management – Water Conservation,
<http://www.hercenter.org/facilitiesandgrounds/waterconserve.cfm>

Maryland Department of the Environment, Water Saving Tips for Health Care Facilities,
http://www.mde.state.md.us/Programs/WaterPrograms/Water_Conservation/Business_Tips/health.asp

New Hampshire Department of Environmental Services, Water Efficiency Practices for Health Care Facilities, <http://www.des.state.nh.us/factsheets/ws/ws-26-14.htm>

Practice Greenhealth, Water Conservation Tools, <http://www.practicegreenhealth.org>

U.S. Department of the Interior, Water Measurement Manual,
http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/

U.S. Environmental Protection Agency (EPA) Region 2, Pollution Prevention (P2) for the Healthcare Industry, <http://www.epa.gov/region2/p2/health.htm>

1 point

FM Credit 2.6

Potable Water Use Reduction: **Water Efficient Landscaping**

Intent

Eliminate the use of potable water or other natural surface/subsurface resources available on or near the facility site for landscape irrigation.

Health Issues

Maintaining adequate potable water supplies is a basic necessity for the health of individuals and communities. Only about 1% of the water on Earth is fresh water. Over-consumption, drought and poor water management have led thirty-six states in the U.S. to anticipate local, regional, or statewide water shortages by 2013.⁷ Processing potable water is energy intensive and thus contributes to air emissions associated with fossil fuel energy generation (for the treatment, pumping and maintenance of the potable water systems). Only about 20% of current urban water is used for drinking and sanitary purposes, with the other 80% not requiring treatment to potable standards. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies. To protect the public health, a dual or dedicated distribution system must be installed to segregate potable and reclaimed water.

Credit Goals

- Use only captured rainwater, recycled wastewater, recycled greywater, or water treated and conveyed by a public agency specifically for non-potable uses for irrigation.
OR
- Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within one year of installation and plants are weaned in accordance with design and installation instructions.

AND

- In urban settings, where there is no lawn or landscaping, this credit can be earned by eliminating the use of potable water for watering any roof and/or courtyard garden space or outdoor planters, provided that the planters and/or garden space cover at least 5% of the building site area (including, building footprint, hardscape area, parking footprint, etc.). If the planters and/or garden space cover less than 5% of the building site area, the project is ineligible for this credit.

Note: For the purposes of this credit, potable water shall be defined in accordance with health regulations having jurisdiction.

Note: If authorities having jurisdiction (e.g., Infection Control) do not permit irrigation using non-potable water sources, vegetated areas in accordance with SSM Credit 4.2: Heat Island Effect: Roof; SSM Credit 5.1: Connection to the Natural World: Outdoor Places of Respite; and/or SSM Credit 5.2: Connection to the Natural World: Exterior Access for Patients comply with this credit if they install a high-efficiency irrigation system. For the purposes of this credit, "high-efficiency irrigation systems" are defined as irrigation systems that use minimum 30% less water than conventional sprinkler irrigation. High-efficiency irrigation systems include micro or drip irrigation systems, moisture sensors, clock timers and water-data based controllers.

⁷ U.S. EPA, <http://www.epa.gov/WaterSense/water/why.htm>

FM Credit 2.6 continued

Potable Water Use Reduction: **Water Efficient Landscaping**

Suggested Documentation

- ☐ Compile and annually update documentation such as a brief narrative description, system schematics, and photographs demonstrating non-potable water use in irrigation in accordance with the Credit Goals. Include a description about how the irrigation system is connected to the non-potable water source and how that non-potable water is treated/filtered and managed.
- ☐ Compile records of sign off from the head of facility management for the facility on the annual meter readings documenting the amount of non-potable water used for irrigation.
- ☐ Compile and annually review quarterly water meter readings supporting the documentation of the reduction in potable water use for irrigation as well as quarterly reports that document the maintenance activities implemented to ensure proper operation of the irrigation system.
- ☐ In urban settings with no lawn or landscaping, compile documentation verifying that the planters and/or garden space cover at least 5% of the building site area in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Prerequisite 4: Minimum Indoor Plumbing Fixture and Fitting Efficiency; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 2: Potable Water Use Reduction; GGHC FM Credit 3: Existing Building Commissioning; and, GGHC FM Credit 5: Performance Measurement.*
- Implement and maintain high efficiency irrigation technologies that include micro irrigation, moisture sensors, or weather data based controllers.
- Feed irrigation systems with captured rainwater, gray water (site or municipal), or on-site treated wastewater. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies.
- Consider eliminating use of an irrigation system. Consider use of xeriscaping principles. Select water-efficient, native or adapted, non-invasive climate tolerant plantings.
- Track the facility's water consumption using the water tracking feature of U.S. EPA's Energy Star® National Energy Performance Rating System, found within Portfolio Manager at <http://www.energystar.gov/benchmark>.

FM Credit 2.6 continued

Potable Water Use Reduction: **Water Efficient Landscaping**

Resources

American Rainwater Catchment Systems Association (ARCSA), <http://www.arcsa-usa.org>

Teresa Durkin and Marita Roos, *Green Guide for Health Care* Sustainable Site Design: Stormwater Mitigation Technical Brief, <http://www.gghc.org>.

The Irrigation Association, <http://www.irrigation.org>; Certification program, <http://www.irrigation.org/certification/default.aspx?pg=default.htm&id=18>

The Sustainable Sites Initiative, <http://www.sustainablesites.org/>

Texas Evapotranspiration Website, <http://texaset.tamu.edu>

U.S. Department of Energy (DOE) Federal Energy Management Program, Water Efficiency Best Management Practice #14 – Alternate Water Sources, http://www1.eere.energy.gov/femp/water/water_bmp14.html

U.S. Environmental Protection Agency (EPA), Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, December 2007, <http://www.epa.gov/owow/nps/lid/costs07/>

1-2 points

FM Credit 2.7 & 2.8

Potable Water Use Reduction: Cooling Tower

Intent

Reduce potable water consumption for cooling tower equipment through effective water management and/or use of non-potable make-up water.

Health Issues

Maintaining adequate potable water supplies is a basic necessity for the health of individuals and communities. Only about 1% of the water on Earth is fresh water. Over-consumption, drought and poor water management have led thirty-six states in the U.S. to anticipate local, regional, or statewide water shortages by 2013.⁸ Processing potable water is energy intensive and thus contributes to air emissions associated with fossil fuel energy generation (for the treatment, pumping and maintenance of the potable water systems). Only about 20% of current urban water is used for drinking and sanitary purposes, with the other 80% not requiring treatment to potable standards. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies. To protect the public health, a dual or dedicated distribution system must be installed to segregate potable and reclaimed water.

Credit Goals

FM Credit 2.7: Cooling Tower Chemical Management (1 point)

- Develop and implement a water management plan for the cooling tower that addresses chemical treatment, bleed-off, biological control and staff training as it relates to cooling tower maintenance.
- Improve water efficiency by installing and/or maintaining a conductivity meter and automatic controls to adjust the bleed rate and maintain proper concentration at all times.
- Employ non-toxic treatment chemicals or chemical-free cooling tower systems that meet NACE International Standard 7K189, "Control Factors in Performance Testing of Nonchemical Water Treatment Devices," 1997, and that demonstrate effectiveness in controlling at minimum, *Legionella spp.* per the 2003 CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities.

Note: For the purposes of this credit, "non-toxic treatment chemicals" are defined as chemicals free of components listed by the U.S. DOT (Department of Transportation), OSHA (Occupational Safety and Health Administration), or EPA (Environmental Protection Agency) as toxic or hazardous.

⁸ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/WaterSense/water/why.htm>

FM Credit 2.7 & 2.8 continued

Potable Water Use Reduction: **Cooling Tower**

FM Credit 2.8: Cooling Tower Non-Potable Water Source Use (1 point)

- Use make-up water that consists of at least 50% non-potable water over a minimum one-year period, such as:
 - Harvested rainwater
 - Air conditioner condensate
 - Swimming pool filter backwash water
 - Cooling tower blowdown
 - Pass-through (once-through) cooling and reverse osmosis water
 - Foundation drain water
 - Municipally reclaimed water
 - Steam condensate
 - Processed cooling water
 - Any other appropriate on-site water source that is not from a well (aquifer), river, or lake
- Develop and implement a measurement program that verifies make-up water quantities used from non-potable sources.

Note: An innovation point is available to facilities reducing potable water use as cooling tower makeup by 100% over a minimum 12-month period.

Note: For the purposes of this credit, potable water shall be defined in accordance with health regulations having jurisdiction.

Note: Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization, or a tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

Suggested Documentation

FM Credit 2.7:

- ☐ Document and annually review the facility's water management plan addressing chemical treatment, bleed-off, biological control and staff training as it relates to cooling tower maintenance in accordance with Credit Goals.
- ☐ Document and annually review records of installation and periodic maintenance for cooling tower conductivity meter(s) and automatic controls.
- ☐ Compile annual documentation of the cooling tower's treatment chemicals (if any) in accordance with Credit Goals.

FM Credit 2.8:

- ☐ Document and annually review the percent of cooling tower makeup water from non-potable sources and its provenance over a minimum one-year period.

FM Credit 2.7 & 2.8 continued

Potable Water Use Reduction: **Cooling Tower**

Reference Standards

NACE International (formerly National Association of Corrosion Engineers) Standard 7K189, "Control Factors in Performance Testing of Nonchemical Water Treatment Devices," 1997, <http://www.nace.org>

U.S. Centers for Disease Control and Prevention, 2003 CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities, http://www.cdc.gov/ncidod/dhqp/gl_environmentinfection.html

U.S. Department of Transportation Federal Hazardous Materials Transportation Law (Title 49 CFR), <http://www.phmsa.dot.gov>

U.S. Environmental Protection Agency (EPA) Toxic Substances Control Act, Toxic Substances Control Act, <http://www.epa.gov/lawsregs/laws/tsca.html>

U.S. Occupational Safety and Healthy Administration (OSHA), Hazardous and Toxic Substances, <http://www.osha.gov/SLTC/hazardoustoxicsubstances/index.html>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Prerequisite 4: Minimum Indoor Plumbing Fixture and Fitting Efficiency; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 2: Potable Water Use Reduction; and, GGHC FM Credit 5: Performance Measurement.*
- Work with a water treatment specialist to develop a water management strategy addressing the appropriate chemical treatment and bleed-off to ensure proper concentration levels in the cooling tower. Also, develop a biocide treatment program to avoid biological contamination and the risk of Legionella in the building.
- Identify non-potable water sources that may be suitable for use in the cooling tower make-up water. Ensure that the water meets the cooling tower manufacturer's guidelines in terms of water purity and adjust the chemical treatment program accordingly.
- Explore technologies and strategies to eliminate chemical waste to drain in cooling tower and boiler blowdown. Treat blowdown so that chemical treatment can be reclaimed for re-use.

Resources

Cooling Technology Institute, <http://www.cti.org/>

Federal Energy Management Program Best Management Practice (BMP) #8 – Cooling Tower Management, <http://www.p2pays.org/ref/21/20923.htm>

1 point

FM Credit 3.1

Existing Building Commissioning: **Investigation & Analysis**

Intent

Through a systematic process, develop an understanding of the operation of the facility's major energy using systems, options for optimizing the building's energy performance and a plan to achieve energy savings.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.⁹ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Document the breakdown of energy use in the building.
- Annually list identified capital improvements that will provide cost-effective energy savings and document the cost benefit analysis associated with each.

AND

- Conduct one of the following:
 - Commissioning Process
 - Develop and bi-annually review a retrocommissioning, recommissioning or ongoing commissioning plan for the facility's major energy using systems and envelope systems.
 - Bi-annually conduct the Investigation and Analysis Phases
 - Bi-annually list operating problems impacting occupant comfort and energy use, and develop potential operational changes that will solve them.

OR

- ASHRAE Level II Energy Audit
 - Bi-Annually conduct an energy audit that meets the requirements of ASHRAE, Level II – Energy Survey and Analysis.
 - Bi-Annually perform a savings and cost analysis of all practical measures that meet the owner's constraints and economic criteria, along with a discussion of any effect on operation and maintenance procedures.

⁹ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 3.1 continued

Existing Building Commissioning: Investigation & Analysis

Suggested Documentation

- ☐ Compile and maintain documentation of the breakdown of energy use in the building and capital improvements that will provide cost-effective energy savings in accordance with Credit Goals.
- ☐ Compile and maintain documentation of an annual commissioning plan OR energy audit in accordance with Credit Goals.

Reference Standards

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), <http://www.ashrae.org>

The following ASHRAE Documents available at <http://eweb.ashrae.org>

- Evaluation of Proposed ASHRAE Energy Audit form and procedures
- A guide to analyzing and reporting building characteristics and energy use in commercial buildings.
- An expert system for commercial building HVAC and energy audits
- Procedures for commercial building energy audits
- Energy audit Input Procedures and Forms
- Evaluation of Proposed ASHRAE Energy Audit Form and Procedures

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.*
- The commissioning process activities begin by identifying the current building operating intents (Owner's Operational Requirements) and then proactively making sure that the buildings' systems are operating as necessary to meet these operating intents.
- Ensure that the commissioning program addresses, at a minimum, the following: heating system, cooling system, humidity control system, lighting system, safety systems, building envelope, and the building automation controls.
- Investigate evidence of simultaneous heating and cooling as a basis for recommendations of adjustments to building systems management.
- Include test and balances investigation activities as part of the commissioning process to determine the actual amounts of outside air and exhaust air.

FM Credit 3.1 continued

Existing Building Commissioning: **Investigation & Analysis**

Resources

“Continuous Commissioning Guidebook for Federal Energy Managers,” Federal Energy Management Program, US Department of Energy (DOE), October 2002.

U.S. Environmental Protection Agency (EPA) Energy Star, “Building Manual”, Stage 1 “Recommissioning” chapter, http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual.

U.S. Environmental Protection Agency (EPA) Energy Star, “2003 CBECS National Average Source Energy Use and Performance Comparisons,” <http://www.energystar.gov/targetfinder>. This site allows comparison of energy use intensities of non-ratable spaces to industry averages. Industry averages are derived from the 2003 Commercial Buildings Energy Consumption Survey (CBECS).

1 point

FM Credit 3.2

Existing Building Commissioning: Implementation

Intent

Implement minor improvements and identify planned capital projects to ensure that the facility's major energy using systems are repaired, operated, and maintained effectively to optimize the buildings' energy performance.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹⁰ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Annually develop and evaluate a five-year capital plan for major retrofits or upgrades including implementation of no- or low-cost operational improvements.
- Provide training in accordance with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff for facility management staff at the point of hire and annually that builds awareness and skills in a broad range of sustainable building operations subject matter, including energy efficiency and building, savings and benchmarking, and equipment and systems operation and maintenance.
- Annually demonstrate the observed and/or anticipated financial costs and benefits of measures that were implemented.
- Update the building's Building Operating Plan as necessary to reflect any changes in the occupancy schedule, equipment run time schedule, design set points, and lighting levels.

¹⁰ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 3.2 continued

Existing Building Commissioning: **Implementation**

Suggested Documentation

- ☐ Compile and maintain documentation of the five-year capital plan for major retrofits or upgrades in accordance with Credit Goals.
- ☐ Compile and maintain documentation of individual staff annual training in accordance with Credit Goals.
- ☐ Compile and maintain documentation of the observed and/or anticipated financial costs and benefits of implemented energy efficiency measures in accordance with Credit Goals.
- ☐ Maintain documentation of the building's Building Operating Plan in accordance with Credit Goals.

Reference Standards

There are no reference standards for the credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.*
- The commissioning process activities begin by identifying the current building operating intents (Owner's Operational Requirements) and then proactively making sure that the buildings' systems are operating as necessary to meet these operating intents.
- Engage building operators in the commissioning process through the following steps:
 - Help develop objectives and compile a list of possible improvements and known problems
 - Gather up-to-date building documentation
 - Perform appropriate preventive maintenance tasks prior to commissioning
 - Perform simple repairs and improvements as the project progresses
 - Assist with diagnostic monitoring and functional testing
 - Implement or assist with implementing the selected improvements
 - Operational narratives
- Ensure that the commissioning program addresses, at a minimum, the following: heating system, cooling system, humidity control system, lighting system, safety systems, building envelope, and the building automation controls.
- If an outside person is hired for commissioning services, verify that the contractor's technical personnel are specially qualified and competent to complete the work.

FM Credit 3.2 continued

Existing Building Commissioning: **Implementation**

Resources

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Learning Institute Courses, <http://www.ASHRAE-eLearning.org>

Example Courses: Fundamentals of Standard 62.1 (Indoor Air Quality), Fundamentals of Standard 90.1 (HVAC Equipment Efficiency Standards), Fundamentals of HVAC Systems, Fundamentals of HVAC control Systems

Building Operator Certification (BOC®), <http://www.theBOC.info>

Example classes: BOC 214 – Building Commissioning; BOC 105 – Operation & Maintenance Strategies for Sustainable Buildings.

Building Owners & Managers International (BOMI), <http://www.bomi.org>

Example Courses: Buildings Systems Maintenance Certificate (SMC), Facilities Management Certificate (FMC)

“Continuous Commissioning Guidebook for Federal Energy Managers,” Federal Energy Management Program, U.S. Department of Energy (DOE), October 2002.

U.S. Environmental Protection Agency (EPA) Energy Star, “Building Manual”, Stage 1 “Recommissioning” chapter, http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual.

1 point

FM Credit 3.3

Existing Building Commissioning: **Ongoing Commissioning**

Intent

Use commissioning to address constant changes in facility occupancy, usage, maintenance and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and provided service.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NO_x) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹¹ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Implement an ongoing commissioning program that includes elements of planning, system testing, performance verification, corrective action response, ongoing measurement and documentation to proactively address operating problems.
- Create and annually revise a written plan that summarizes the overall commissioning cycle for the building by equipment or building system group. The ongoing commissioning cycle shall not exceed 24 months. This plan must include a building equipment list, performance measurement frequency for each equipment item and steps to respond to deviation from expected performance parameters.
- Track progress of the ongoing commissioning program against a baseline of two years previous to the current year.
- Update the Building Operating Plan and/or Systems Narrative as necessary to reflect any changes in the occupancy schedule, equipment run time schedule, design set points, lighting levels, or system specifications.

¹¹ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 3.3 continued

Existing Building Commissioning: **Ongoing Commissioning**

Suggested Documentation

- ☐ Compile and maintain documentation of the ongoing commissioning program, updating the baseline to reference two years previous to the current year.
- ☐ Compile and maintain documentation of a written plan that summarizes the overall commissioning cycle in accordance with Credit Goals.
- ☐ Maintain documentation of the building's Building Operating Plan in accordance with Credit Goals.

Reference Standards

There are no reference standards for the credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.*
- The commissioning process activities begin by identifying the current building operating intents (Owner's Operational Requirements) and then proactively making sure that the buildings' systems are operating as necessary to meet these operating intents.
- Ensure that the commissioning program addresses, at a minimum, the following: heating system, cooling system, humidity control system, lighting system, safety systems, building envelope, and the building automation controls.
- Incorporate into the commissioning program regular inspections of the mechanical ventilation system to identify if the filters are clean, not overloaded and without leaks or tears and insure that drip pans are free of standing water or other contaminants.

Resources

"Continuous Commissioning Guidebook for Federal Energy Managers," Federal Energy Management Program, U.S. Department of Energy (DOE), October 2002.

U.S. Environmental Protection Agency (EPA) Energy Star, "Building Manual", Stage 1 "Recommissioning" chapter, http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual.

U.S. Environmental Protection Agency (EPA) Energy Star, "2003 CBECS National Average Source Energy Use and Performance Comparisons," located at <http://www.energystar.gov/targetfinder>. This site allows comparison of energy use intensities of non-ratable spaces to industry averages. Industry averages are derived from the 2003 Commercial Buildings Energy Consumption Survey (CBECS).

1 point

FM Credit 4.1

Building Operations & Maintenance: **Staff Education**

Intent

Support appropriate training for facilities maintenance and engineering staff in monitoring, operations and maintenance of building systems to ensure the facility delivers target building performance goals over the life of the building.

Health Issues

Ongoing facilities operations and maintenance procedures for building systems are inextricably linked to occupant health and safety. Monitoring operations and maintenance practices for consistency with original design intent of mechanical and other building systems with facility environmental and health policies helps to ensure that indoor air quality and mechanical performance standards are sustained over the life of the building.

Credit Goals

- Develop and implement a continuing education program for facilities management operations and maintenance staff that provides each staff person with primary building maintenance responsibilities with minimum 8 hours per year of continuing education courses above and beyond licensure requirements on topics covered in the GGHC Facilities Management section such as building systems operations, continuous commissioning, maintenance, energy and water efficient building operations and maintenance practices, and/or achieving sustainable building performance. Qualifying courses shall meet the quality standards for continuing education required by the staff member's licensing board.

Note: Coordinate implementation of this credit with pursuit of Prerequisites and Credits in the GGHC Facilities Management section.

FM Credit 4.1 continued

Building Operations & Maintenance: **Staff Education**

Suggested Documentation

- ☐ Document and annually review records of the training received by building operations and maintenance staff in accordance with Credit Goals. Compile training certificates listing the staff member's name, course titles, relevant course reference citations, course certification body, hours of training, and annual total training hours.
- ☐ Document and annually review records of the calculated annual average training hours for all building operations and maintenance staff in accordance with the Credit Goals.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with all prerequisites and credits in the GGHC Facilities Management section.*
- Ensure that all maintenance staff is trained in optimal operations and maintenance practices within their scope of work at hire and annually.
- Arrange on-site or off-site training for building operations and maintenance staff that addresses:
 - Building and building systems operation
 - Maintenance
 - Achieving sustainable building performance

Resources

American Institute of Architects (AIA), <http://www.aia.org>

(ASHE), <http://www.ashe.org>

American Society of Healthcare Engineering Educational Offerings, <http://www.ashe.org/ashe/education/>

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Learning Institute Courses, <http://www.ASHRAE-eLearning.org>

American Trainco, <http://www.AmericanTrainco.com>

Building Owners & Managers Institute International (BOMI) International, Courses & Seminars, <http://www.bomi.org/CourseOfferingList.aspx?id=154>

International Facility Management Association (IFMA), <http://www.ifma.org>

Practice Greenhealth, <http://www.practicegreenhealth.org>

U.S. Environmental Protection Agency (EPA), <http://www.epa.gov>

U.S. Green Building Council (USGBC), <http://www.usgbc.org>

1 point

FM Credit 4.2

Building Operations & Maintenance: **Building Systems Maintenance**

Intent

Support appropriate training, monitoring, operations and maintenance for buildings and building systems to ensure they deliver target building performance goals over the life of the building.

Health Issues

Ongoing operations and maintenance procedures are inextricably linked to the protection of occupant health and safety. Preventive maintenance practices including adequate training for operations and maintenance staff ensures consistency with original design intent. In combination with facility environmental/health policies, preventive maintenance improves the wellbeing of patients, staff and visitors by safeguarding indoor air quality, infection prevention and control and mechanical performance.

Credit Goals

- Establish and maintain a comprehensive best practices equipment preventive maintenance program that provides in-house resources and/or contractual services to deliver maintenance.
- If operating a new building, require that the operating and maintenance documentation provided to the building owner contain meaningful, appropriate, and system/equipment-specific training materials from the design/construction team explaining the sustainable building goals and anticipated performance.
- Use a formal Computerized Maintenance Management System (CMMS) to track equipment and trigger preventive maintenance, document history, and manage the maintenance program.

Suggested Documentation

- ☐ Demonstrate ongoing building systems maintenance in accordance with the Credit Goals through minimum one-year documentation of in-house resources and/or contractual services to deliver post warranty equipment maintenance.
- ☐ If operating a new building, compile and store in an easily accessible place the operating and maintenance documentation provided by the design/construction team.
- ☐ Compile and annually review documentation associated with the Computerized Maintenance Management System, including actions (such as repairs) triggered by the CMMS.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; and, GGHC FM Credit 5: Performance Measurement.

FM Credit 4.2 continued

Building Operations & Maintenance: **Building Systems Maintenance**

- Establish a maintenance program that includes regular weekly inspections with inspection logs and meeting minutes narrative observations, findings, and actions taken. Document rationale for inspections frequency.
- Use existing documentation protocols and methodologies to demonstrate ongoing credit achievement.
- Have in place a computer-based Building Automation System (BAS) that monitors and controls key building systems including, but not limited to, heating, cooling, ventilation, and lighting. Have a preventive maintenance program in place that ensures BAS components are tested and repaired or replaced according to the manufacturer's recommended interval. Demonstrate that the facility's BAS is being used to inform decisions regarding changes in building operations and energy saving investments.
- Consider implementing Reliability Centered Maintenance (RCM) protocols.- RCM is a statistical method of optimizing the preventive and predictive maintenance programs for assets, with the goal of maximizing the assets' availability and performance at the lowest total cost of ownership and life-cycle cost. It is a systematic approach to developing a focused, effective and cost-efficient preventive and predictive maintenance program. The program objectives also include increasing asset reliability, availability, and maintainability, while focusing on reducing life-cycle cost and total cost of ownership.

Resources

2006 Guidelines for Design and Construction of Hospitals and Healthcare Facilities,
http://www.aia.org/aah_gd_hospcons

The Association for Facilities Engineering, <http://www.afe.org>

BetterBricks, <http://www.betterbricks.org>

"Certified Plant Maintenance Manager Review Book," The Association for Facilities Engineering, Cincinnati, OH. Release Version 2.02, August 2004.

Sehulster LM, et al. Guidelines for environmental infection control in health-care facilities. Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004, <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

Trout, Tim, "Reliability Centered Maintenance Can Often Increase Efficiency And Reduce Risk And Expense To An Organization," "Facilities Engineering Journal," November/December 2004. <http://www.fmlink.com/ProfResources/Magazines/article.cgi?AFE:afe1104c.htm>

Whole Building Design Guide, "Facilities Operations & Maintenance," <http://www.wbdg.org/om/om.php>

1 point

FM Credit 4.3

Building Operations & Maintenance: **Building Systems Monitoring**

Intent

Provide capacity for ventilation system monitoring to help sustain long-term occupant comfort and well-being.

Health Issues

Ongoing operations and maintenance procedures are inextricably linked to the protection of occupant health and safety. Preventive maintenance practices including adequate training for operations and maintenance staff ensures consistency with original design intent. In combination with facility environmental/health policies, preventive maintenance improves the wellbeing of patients, staff and visitors by safeguarding indoor air quality, infection prevention and control and mechanical performance.

Credit Goals

Install permanent, continuous monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain minimum outdoor airflow rates under all operating conditions.

For all mechanical ventilation systems:

- An outdoor airflow measurement device must be provided that is capable of measuring (and, if necessary, controlling) the minimum outdoor airflow rate at all expected system operating conditions within 15% of the design minimum outdoor air rate. Monitoring must be performed for at least 80% of the building total outdoor air intake flow serving occupied spaces.
- The outdoor airflow measurement device(s) must take measurements at the system level (i.e. at the air handling unit).
- The outdoor airflow measurement device shall be monitored by a control system capable of and is configured to trend outdoor airflow in intervals no longer than 15 minutes apart for a period of no less than six months.
- The control system shall be capable of and configured to generate an alarm visible to the system operator if the minimum outdoor air rate falls more than 15% below the design minimum rate.
- All measurement devices must be calibrated within the manufacturer's recommended interval.

For mechanical ventilation systems that predominantly serve densely occupied spaces with a design occupant density greater than or equal to 25 people per 1,000 square feet (40 square feet per person):

- Have a CO₂ sensor or sampling location for each densely occupied space and compare with outdoor ambient CO₂ concentrations. Each sampling location shall be between 3 feet and 6 feet above the floor.
- Test and calibrate CO₂ sensors to have an accuracy of no less than 75ppm or 5% of the reading, whichever is greater. Sensors must be tested and calibrated at least once every year or per the manufacturers' recommendation or other required regulations, whichever time period is shorter.
- Monitor CO₂ sensors with a system configured to trend CO₂ concentrations in intervals no longer than 30 minutes apart.

FM Credit 4.3 continued

Building Operations & Maintenance: **Building Systems Monitoring**

- Configure system capability to generate an alarm visible to a system operator and, if desired, to building occupants if the CO₂ concentration in any zone rises more than 15% above that corresponding to the minimum outdoor air rate required by ASHRAE Standard 62 (see GGHC FM Prerequisite 5: Outside Air Introduction & Exhaust Systems).
- CO₂ sensors may be used for demand-controlled ventilation, provided the control strategy complies with ASHRAE Standard 62 (see GGHC FM Prerequisite 5: Outside Air Introduction & Exhaust Systems), including maintaining the area-based component of the design ventilation rate.

Note: If the total square footage of all dense space is less than 5% of total occupied square footage, the project is exempt from this section. Rooms less than 150 square feet are also exempt.

For natural ventilation systems (as permitted by code and infection control policy):

- CO₂ sensors located in the breathing zone of every densely populated room.
- CO₂ sensors located in the breathing zone of every natural ventilation zone,
- CO₂ sensors shall provide an audible or visual alarm to the occupants in the space and building management if CO₂ conditions are greater than 530 parts per million above outdoor CO₂ levels or 1,000 parts per million absolute. The alarm signal shall indicate that ventilation adjustments (i.e. opening windows) are required in the affected space.
- Permanently open areas must meet the requirements of ASHRAE 62.1-2007, section 5.1.
- All monitoring devices must be calibrated within the manufacturer's recommended interval.

Note: If the total square footage of all space served by natural ventilation systems is less than 5% of total occupied square footage, the project is exempt from this section. Rooms less than 150 square feet are also exempt.

FM Credit 4.3 continued

Building Operations & Maintenance: **Building Systems Monitoring**

Suggested Documentation

- ☐ Compile and annually review documentation of the continuous monitoring systems in accordance with Credit Goals.
- ☐ Annually document alarms that occurred, responses, and corrective actions taken. Include analysis of the root cause and short term and long-term actions.
- ☐ Annually document the percent of time desired conditions are delivered in the building on a floor area weighted basis.

Reference Standards

ANSI/ASHRAE 62.1-2007, <http://www.ashrae.org>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; and, GGHC FM Credit 5: Performance Measurement.*
- Use automated systems that monitor equipment function and indoor space conditions, identify system problems automatically and issue an alarm that initiates procedures to fix the problems identified.
- Install carbon dioxide and airflow measurement equipment and feed the information to the HVAC system and/or Building Automation System (BAS) to trigger corrective action, if applicable. If such automatic controls are not feasible with the building systems, use the measurement equipment to trigger alarms that inform building operators or occupants of a possible deficiency in outdoor air delivery.

Resources

2006 Guidelines for Design and Construction of Hospitals and Healthcare Facilities,
http://www.aia.org/aah_gd_hospcons

U.S. Department of Energy (DOE) Federal Technology Alert, "Demand-Controlled Ventilation Using CO₂ Sensors," http://www1.eere.energy.gov/femp/pdfs/fta_co2.pdf

1-2 points

FM Credit 5.1-5.2

Performance Measurement: **System-Level Energy Metering**

Intent

Provide accurate energy use information to support energy management and identify opportunities for additional energy-saving improvements.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹² Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Develop a breakdown of energy use in the building, either through GGHC FM Credit 3.1 & 3.2 or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end use applications. This analysis of major energy use categories must have been conducted within the past two years.

AND

- Based on the energy use breakdown, employ system-level metering covering the total expected annual energy consumption of the building. Permanent metering and recording is required. All types of submetering are permitted.
 - **FM Credit 5.1** (1 point): Demonstrate that system-level metering is in place covering at least 40% of the total expected annual energy consumption of the building. Further, at least one of the largest two energy use categories from the breakdown report must be covered to at least an 80% extent (i.e., if energy use in the largest two categories is each 100 BTU/yr, at least 80 BTU/yr in one of them must be metered).
 - **FM Credit 5.2** (1 point in addition to FM Credit 5.1): Demonstrate that system-level metering is in place covering at least 80% of the total expected annual energy consumption of the building. Further, at least two of the three largest energy use categories from the breakdown report must be covered to at least an 80% extent.

Note: Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization, or a tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

¹² U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 5.1-5.2 continued

Performance Measurement: **System-Level Energy Metering**

Suggested Documentation

- ☐ Compile and annually review documentation of the breakdown of energy use and percentage of system-level metering in accordance with Credit Goals.
- ☐ For each item metered prepare a description of the performance improvement program implemented using the data gathered to improve system/building performance over a minimum one-year period.
- ☐ Prepare quarterly reports on the metered data gathered and for each item metered a report card of its performance. Include one day of actual output for all data recorded in the report.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; and, GGHC FM Credit 5: Performance Measurement.*
- Use International Performance Measurement and Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy Savings to track energy savings of specific energy efficiency measures implemented in the facility.
- Establish and maintain continuous metering for the following major energy users in health care facilities:
 - Lighting systems and controls.
 - Separate building electric consumption that allows aggregation of all process electric loads.
 - Separate building natural gas consumption that allows aggregation of all process natural gas loads.
 - Chilled water system efficiency at variable loads (kW/ton) or cooling loads (for non-chilled water systems).
 - Cooling load.
 - Air and water economizer and heat recovery cycle operation.
 - Boiler efficiencies.
 - Building specific process energy systems and equipment efficiency.
 - Constant and variable motor loads.
 - Variable frequency drive (VFD) operation.
 - Air distribution, static pressure and ventilation air volumes.

FM Credit 5.1-5.2 continued

Performance Measurement: **System-Level Energy Metering**

- Identify, through an energy audit, building commissioning or some other means, how the buildings systems are consuming energy. Based on the energy use profile, develop a metering plan to capture the most significant building loads.
- Use output from the meters to identify any changes in consumption and opportunities for energy-saving improvements.
- Develop and implement a plan for periodically inspecting the meter data.

Resources

International Performance Measurement and Verification Protocol, Volume 1, 2001 Version,
<http://www.nrel.gov/docs/fy02osti/31505.pdf>

1 point

FM Credit 5.3

Performance Measurement: Enhanced Water Metering

Intent

Measure building and subsystem water performance over time to understand consumption patterns and identify opportunities for additional water savings.

Health Issues

Maintaining adequate potable water supplies is a basic necessity for the health of individuals and communities. Only about 1% of the water on Earth is fresh water. Over-consumption, drought and poor water management have led thirty-six states in the U.S. to anticipate local, regional, or statewide water shortages by 2013.¹³ Processing potable water is energy intensive and thus contributes to air emissions associated with fossil fuel energy generation (for the treatment, pumping and maintenance of the potable water systems). Only about 20% of current urban water is used for drinking and sanitary purposes, with the other 80% not requiring treatment to potable standards. Using reclaimed water for selected applications can reduce costs and preserve precious potable water supplies. To protect the public health, a dual or dedicated distribution system must be installed to segregate potable and reclaimed water.

Credit Goals

- Have in place permanently installed metering devices to measure potable water use, as applicable to the facility. One point is earned for sub-metering that captures 85% of water consumption from among the following list:
 - Water use in laboratory
 - Water use in dietary department
 - Water use in central sterile and processing department
 - Water use in laundry
 - Water use in radiology and imaging department
 - Water use in surgical suite
 - Purified water system (reverse osmosis and/or de-ionized) and filter backwash water
 - Outdoor irrigation systems
 - Cooling tower make-up and filter backwash water
 - Steam boiler system make-up water
 - Closed loop hydronic system make-up water
 - Water use in mechanical equipment, including pumps.
 - Water-cooled equipment and cooling towers

Note: Meters must measure potable water use at a minimum, but applicants may also meter gray or reclaimed water as applicable to meet the requirements of this credit. Metering must be continuous and data-logged to allow for an analysis of time trends. The project must compile monthly and annual summaries of results for each subsystem metered.

Note: Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization, or a tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

¹³ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/WaterSense/water/why.htm>

FM Credit 5.3 continued

Performance Measurement: Enhanced Water Metering

Suggested Documentation

- ☐ Establish and annually review a Water Measurement & Verification Plan.
- ☐ Compile annual documentation verifying that the sub-metering locates a minimum of 85% of the total non conditioned water usage.
- ☐ Compile documentation and annually review the monitoring system, including cut sheets of sensors and the data collection system.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC SSM Credit 5: Connection to the Natural World; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Prerequisite 4: Minimum Indoor Plumbing Fixture and Fitting Efficiency; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 2: Potable Water Use Reduction; and, GGHC FM Credit 5: Performance Measurement.*
- Install subsystem-level water metering to measure and track potable water consumption by specific building systems; prioritize metering for those systems that use the most potable water.
- Use measured system data to identify opportunities to reduce potable water use.

Resources

American Society of Plumbing Engineers (ASPE), Plumbing Engineering Design Handbook, <http://www.aspe.org>

Healthcare Environmental Resource Center, Facilities Management – Water Conservation, <http://www.hercenter.org/facilitiesandgrounds/waterconserve.cfm>

Practice Greenhealth water conservation tools, <http://www.practicegreenhealth.org>.

International Performance Measurement and Verification Protocol, Volume 1, 2002, <http://www.nrel.gov/docs/fy02osti/31505.pdf>

Maryland Department of the Environment, Water Saving Tips for Health Care Facilities, http://www.mde.state.md.us/Programs/WaterPrograms/Water_Conservation/Business_Tips/health.asp

New Hampshire Department of Environmental Services, Water Efficiency Practices for Health Care Facilities, <http://www.des.state.nh.us/factsheets/ws/ws-26-14.htm>

U.S. Department of the Interior, Water Measurement Manual, http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/

U.S. Environmental Protection Agency (EPA) Region 2, Pollution Prevention (P2) for the Healthcare Industry, <http://www.epa.gov/region2/p2/health.htm>

1 point

FM Credit 5.4

Performance Measurement: **Emissions Reduction Reporting**

Intent

Document emission reduction benefits of building efficiency measures.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NOx) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹⁴ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Identify building performance parameters that reduce conventional energy use and emissions, quantify those reductions, and report them to a formal tracking program.
- Meet all standards of California South Coast Air Quality Management District or local regulations or permit, whichever is more stringent, for all products of combustion.
- Track and record the significant emission reductions including those delivered by energy efficiency, renewable energy and other building emission reduction actions. Emissions to be tracked may include, but are not limited to: carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrogen oxides (NOx), mercury (Hg), small particulates (PM_{2.5}), large particulates (PM₁₀), and volatile organic compounds (VOCs).
- Report the reductions in emissions resulting from these energy efficiency and renewable operations using a third party voluntary reporting/certification program including, but not limited to: EPA Climate Leaders, Energy Star® or WRI/WBCSD protocols.
- Retire at least 10% of the emission reductions annually, delivered by the energy efficiency actions through a third party voluntary certification program. (To meet this requirement the third party voluntary emission reduction certification and emission reduction retirement programs must be programs of credible organizations. Third party programs shall notify any applicable local or regional emission reduction registries of the reported emission reductions.)

AND

¹⁴ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 5.4 continued

Performance Measurement: **Emission Reduction Reporting**

- Develop and implement a review process to upgrade existing equipment to the best technological system of continuous emissions reduction available every five years or when retrofitting or upgrading, whichever comes first.
- Utilize biodiesel fuels or other low-emitting fuel (e.g., biodiesel, compressed natural gas or liquid propane) for generators and other diesel equipment, unless replacing fuels will void the equipment warranty.

AND

- Ask the suppliers of goods and services for the building to do the same by implementing the actions listed above annually or at the point of contract renewal.

Suggested Documentation

- ☐ Calculate and compile a an annual report of compliance with California South Coast Air Quality Management District (or similar) standards for products of combustion, emissions reduction efforts, and the resulting reductions for the significant types of environmental emissions resulting from the energy efficiency operations and other emission reduction actions in accordance with Credit Goals using the emission reduction calculation protocol of a third party voluntary certification program.
- ☐ Document the retirement of at least 10% of the emission reductions annually, delivered by the energy efficiency measures, Renewable Energy and other emission reduction actions, through a third party voluntary certification program.
- ☐ Ensure that a third party voluntary certification program has notified any applicable local or regional emission reduction registries of the reported annual emission reductions.
- ☐ Compile documentation of the facility review process for upgrading existing equipment to the best technological system of continuous emissions reduction in accordance with Credit Goals.
- ☐ Compile documentation of equipment using low-emitting fuel and annually review opportunities to expand the program.
- ☐ Compile documentation of conversations with suppliers of goods and services for the building in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit in coordination with GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; and, GGHC CM Credit 1: Indoor Chemical Contaminant Prevention.

FM Credit 5.4 continued

Performance Measurement: **Emission Reduction Reporting**

- Annually store an electronic copy of the Statement of Energy Performance from EPA's Portfolio Manager benchmarking tool, documenting the carbon inventory of the facility, found at <http://www.energystar.gov/benchmark>. Energy Star users create their own private accounts at no cost.
- ENERGY STAR qualified buildings emit less carbon than typical buildings. Annually apply for the ENERGY STAR award from the U.S. EPA for building scores that are 75 or higher. The ENERGY STAR is awarded for a specific year to indicate low carbon emissions from superior energy performance. Review the energy efficiency strategies listed under ENERGY STAR qualified facility profiles to gather best practices for emission reduction. Profiles of Energy Star qualified facilities list the energy efficiency strategies that helped them achieve Energy Star status.
- Energy efficient strategies can be achieved at a low cost yielding significant emission reductions.
- The prescriptive path for energy efficiency outlined in LEED for Healthcare offers a package of emission reduction measures that models have shown to reduce energy use in a new acute care health care facility by at least 14% in all U.S. bioclimatic regions.
- Document the health and financial benefits of energy efficiency measures using tools such as the Healthcare Clean Energy Exchange's Energy Impact Calculator (EIC). Based on EPA and other peer-reviewed data, the EIC calculates carbon emissions and energy use health impacts such as premature deaths, chronic bronchitis, asthma attacks work loss days and hospital ER visits on a per kWh/year basis, as well as health care facilities' and external societal dollar costs per incident. Use the documented energy efficiency savings and the EIC to educate stakeholders (senior management, trustees, funders, staff, suppliers, service providers, host community, etc.) on efficiency benefits related to human and environmental health, financial, climate change risk reduction and fiduciary responsibilities. Monetize the documented energy efficiency for sale as energy efficiency credits (a.k.a. White Tags).
- Use the EIC or equivalent cost/benefit data to enhance investment in renewable energy systems, renewable energy credits or renewable energy purchases.
- Request that the suppliers of fossil fuels report energy savings, Renewable Energy use and other emission reduction actions. Report all types of resulting emissions reductions annually and retire at least 10% of these reductions through a third party voluntary certification program and ask their suppliers of goods and services to do the same.
- Ensure that equipment warranty will not be affected through the use of bio-diesel or other low-emitting fuels.

Resources

Carbon Disclosure Project, <http://www.cdproject.net>

Chicago Climate Exchange, <http://www.chicagoclimatex.com>

Healthcare Clean Energy Exchange Energy Impact Calculator, <http://www.hccleanenergy.org/>

U.S. Environmental Protection Agency (EPA) Energy Star, <http://www.energystar.gov>

1 point

FM Credit 6

IAQ Management: **Maintaining Indoor Air Quality**

Intent

Enhance Indoor Air Quality (IAQ) performance by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting indoor air quality problems when they occur and maintaining the well-being of the occupants.

Health Issues

The EPA estimates that indoor air pollution is one of the top five environmental risks to public health. Indoor air can be as much as 10 times more polluted than outside air and contain many unique contaminants. Waste anesthetic gases (WAGs), potent ozone depleting substances that leak into the air in operating rooms during the delivery of anesthesia, can contain harmful chemicals such as nitrous oxide and halogenated compounds. Exposure to WAGs can cause acute reactions such as headaches, fatigue and nausea. Several studies have also linked low-level, long-term exposure of operating room staff to WAGs with higher instances of birth defects and cancer.¹⁵ Indoor air pollutants can cause problems ranging from immediate acute effects such as eye, nose, and throat irritation; sinusitis, asthma attacks, headaches; loss of coordination; and nausea; to long range chronic damage to the lungs, central nervous system, and other organ systems, depending on the specific contaminants, and can contribute to the development of chemical sensitivities. Poor IAQ is a leading cause of absenteeism from work and job dissatisfaction.

Credit Goals

- Develop and implement on an ongoing basis an IAQ management program in accordance with infection control and prevention protocols in the 2003 CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities AND in accordance with either “A Guide to Managing Indoor Air Quality in Health Care Organizations”, Joint Commission, 1997 OR the U.S. EPA document “Indoor Air Quality Building Education and Assessment Model (I-BEAM),” EPA Reference Number 402-C-01-001, December 2002.
- Verify that the facility’s Indoor Air Quality (IAQ) management plan requires routine review of locations of sterilization equipment, copiers, paint shops, and other indoor pollutant sources requiring air monitoring to ensure that healthy IAQ will be maintained.
- Verify that the facility annually undertakes air testing and complies with regulatory limits for any substance listed in OSHA Table Z-1-Limits for Air Contaminants.
- Annually evaluate the plan’s success responding to IAQ incidents. Analyze and determine the root causes of IAQ incidents and compile documentation on the short term and long-term actions taken.

AND

- Maintain a minimum annual indoor air quality satisfaction rate of 80% reported by an annual survey of facility occupants, in accordance with ASHRAE 62.1-2007. In acute care settings, survey staff in both administrative and clinical settings; in residential health care occupancies, survey both residents and staff.

¹⁵ U.S. Environmental Protection Agency (EPA), <http://www.cdc.gov/niosh/docs/2007-151/>

FM Credit 6 continued

IAQ Management: **Maintaining Indoor Air Quality**

Suggested Documentation

- ☐ Compile and annually review documentation of an IAQ management program for the facility demonstrating compliance with the referenced standard and requiring routine review of locations of indoor pollutant sources and annual air testing for OSHA Table Z-1-Limits for Air Contaminants over a minimum one-year period in accordance with Credit Goals.
- ☐ Compile and annually review the facility's IAQ satisfaction rate and IAQ incidents, in accordance with Credit Goals.

Reference Standards

Joint Commission, "A Guide to Managing Indoor Air Quality in Health Care Organizations", 1997.

Sehulster LM, et al. Guidelines for Environmental Infection Control in HealthCare Facilities, 2003. Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004. <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Environmental Protection Agency (EPA) document "Indoor Air Quality Building Education and Assessment Model (I-BEAM)," EPA Reference Number 402-C-01-001, December 2002, <http://www.epa.gov/iaq/largebldgs/i-beam/index.html>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC FM Prerequisite 3: Refrigerant Management – Ozone Protection; GGHC FM Prerequisite 5: Outdoor Air Introduction & Exhaust Systems; GGHC FM Credit 5: Performance Measurement; GGHC FM Credit 8: Refrigerant Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention, and GGHC ES Credit 1: Environmentally Preferable Cleaning.*
- Establish and implement a program to enhance IAQ performance by optimizing practices to prevent the development of indoor air quality problems on an ongoing basis, thereby enhancing the well being of the building occupants.
 - Evaluate systems to identify potential IAQ problems.
 - Include in the program a plan for preventing moisture accumulation and mold in the building. For additional information, see the U.S. Environmental Protection Agency (EPA) website, <http://www.epa.gov/iaq/largebldgs/baqtoc.html>
 - Demonstrate compliance using existing infection control/maintenance reports.
 - Monitor building temperature, relative humidity and CO₂ levels, note changes, and investigate trends.
- Reduce occupant exposure to waste anesthetic gases (WAGs) in the post anesthesia care unit (PACU) and intensive care unit (ICU). Utilize climate control and scavenging devices to prevent staff and patient exposure to WAGs.

FM Credit 6 continued

IAQ Management: **Maintaining Indoor Air Quality**

- Establishing guiding principles for indoor air quality associated with operations and maintenance is important to ensure established thresholds are achieved and maintained during the life of the building. Procedures to monitor compliance with design intent should be standard practice. These strategies can be categorized by type and prioritized as follows:
 - *Ventilation* (refer to GGHC FM Prerequisite 5: Outside Air Introduction & Exhaust Systems). Monitor mechanical ventilation air change rates required by health code standards, zoning areas where contaminants are generated.
 - *Building Materials* (refer to GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions and GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings). Significant sources of indoor air pollution are materials and products used in the building, such as cleaning compounds, adhesives, paints, carpeting, upholstery, manufactured wood products and other components of furniture, including medical furniture & equipment, each of which may emit volatile organic compounds (VOCs), including formaldehyde.
 - *Source Control* (refer to GGHC CM Credit 1: Indoor Chemical Contaminant Prevention, GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal, and GGHC EP Credit 1: Solid Waste Prevention in Purchasing). Sources can include outdoor pollutants, indoor chemical use (including glutaraldehyde and other sterilizing agents and methylene chloride, used in adhesive removers, paint stripper, and aerosol spray paints), cleaning products, fragrances and pesticides.
 - *Building Operations and Maintenance* (refer to GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Credit 1: Existing Building Commissioning; and, GGHC FM Credit 4: Building Operations & Maintenance). Improperly functioning building equipment can lead to indoor environmental quality, whether through mechanical malfunction or introducing pollutants or airborne microbes to the indoor air. Regular maintenance and commissioning of building systems equipment is required to ensure that the building functions as designed.

Resources

High Performance Building Guidelines, New York City DDC, 1999.
<http://www.nyc.gov/html/ddc/html/ddcgreen/reports.html>

1-4 points

FM Credit 7.1-7.4

On-Site and Off-Site Renewable Energy

Intent

Encourage and recognize increasing levels of on-site and off-site renewable energy in order to reduce environmental and health burdens associated with fossil fuel energy use.

Health Issues

Coal-fired power plants, the largest source of energy production in the U.S., are major contributors to particulate pollution, which can increase the risk of asthma, respiratory diseases, and heart attacks. Power plant emissions amplify their contribution to global climate change by releasing greenhouse gases such as carbon dioxide and nitrogen oxide (NO_x) into the atmosphere through smoke stacks. Sulfur dioxide emissions contribute to acid rain. Furthermore, according to the U.S. EPA, coal-fired power plants are the largest source of human-caused mercury emissions.¹⁶ Mercury released to the environment enters the aquatic food chain and contaminates fish consumed by people and wildlife. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on brain development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Energy efficiency can enhance human health by reducing particulate, chemical and greenhouse gas emissions associated with fossil-fuel based combustion and electrical generation, thereby improving outdoor air quality and curbing global climate change and acid rain.

Credit Goals

- Fulfill some or all of the building's total energy use through the use of on-site or off-site renewable energy systems. Points are earned according to the following table. The percentages shown in the table are the percentages of building energy use over a minimum one year period that are met by renewable energy.
- Off-site renewable energy sources shall be defined by the Center for Resource Solutions (CRS) Green-e products certification requirements, or the equivalent. Green power may be procured from a Green-e certified power marketer, a Green-e accredited utility program, or through Green-e certified Tradable Renewable Certificates, or the equivalent. For on-site renewable energy that is claimed for this credit, the associated environmental attributes must be retained or retired and cannot be sold. If the green power is not Green-e certified, equivalence must exist for both major Green-e program components: 1) current green power performance standards, and 2) independent, third party verification that those standards are being met by the green power supplier over time.
- If the on-site renewable energy for this credit is leased through a Purchase Power Agreement, the amount of energy generated on-site shall only count towards the credit if the energy is used by the facility or if the facility purchases Green-e certificates equivalent to the amount of on-site renewable energy generation.
- Up to the four-point limit, any combination of individual actions will be awarded the sum of the points allocated to those individual actions. For example, one point would be awarded for implementing 1% of on-site renewable energy and two additional points would be awarded for meeting 50% of the building's energy load with renewable power or certificates over a minimum twelve-month period.

¹⁶ U.S. Environmental Protection Agency (EPA), <http://www.epa.gov/camr/basic.htm>

FM Credit 7 continued

On-Site and Off-Site Renewable Energy

- Projects shall compile proof of a contract to purchase RECs for a minimum of two years and shall also make a commitment to purchase RECs on an ongoing basis beyond that contract.
- Only projects meeting an Energy Star® score of 75 or Energy Use Intensity (EUI) of 25% better than average in accordance with GGHC FM Credit 1: Optimize Energy Performance may pursue more than one point under the off-site renewable energy certificates compliance pathway.

Total Points	On-site Renewable Energy		Off-site Renewable Energy/ Certificates
1	1%	OR	25%
2	3%	OR	50%
3	5%	OR	75%
4	10%	OR	100%

FM Credit 7.1-7.4 continued

On-Site and Off-Site Renewable Energy

Suggested Documentation

- ☐ Compile and annually update system schematic diagrams and narrative highlighting on-site renewable energy systems installed in the facility.
- ☐ Meter energy output of on-site Renewable Energy system over minimum twelve-months in accordance with Credit Goals.
- ☐ Compile calculations documenting the percentage of the building's total energy requirements that was supplied by on-site Renewable Energy systems for the most recent twelve-month period.

AND/OR

- ☐ Calculate the percentage of the building's total energy requirements that was met with renewable power or certificates over a minimum twelve-month period in accordance with Credit Goals. If the off-site renewable power or certificates exceed 25% of the total facility energy usage, annually update documentation verifying that the facility has attained an Energy Star score of 75 or above or an Energy Use Intensity of 25% better than average for non-rated facilities.
- ☐ Compile and annually review documentation demonstrating that the supplied renewable power or certificates over the minimum twelve-month period met the referenced Green-e requirements or the equivalent.
- ☐ Demonstrate a commitment to ongoing purchases of renewable power or certificates at the same or higher level over the next 12 month period through contracts, certificates of purchase or equivalent documentation.

Reference Standards

Center for Resource Solutions Green-e Products Certification Requirements, <http://www.green-e.org>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC IO Credit 1.1: Education: Building Operations & Maintenance Staff; GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Prerequisite 3: Refrigerant Management: Ozone Protection; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; GGHC FM Credit 5: Performance Measurement; and, GGHC FM Credit 8: Refrigerant Management.*
- To establish on-site renewable energy sources without capital expenditures, enter into a Purchase Power Agreement with a renewable energy services provider.
- Design and specify the use of on-site nonpolluting renewable technologies to contribute to the total energy requirements of the facility. Consider and employ solar, geothermal, wind, biomass (other than unsustainably harvested wood) and biogas technologies. Purchase renewable energy or renewable energy tradable certificates to meet some or all of the building's energy requirements.
- Utilize best practice web-based reverse auction procurement technology, such as Practice Greenhealth's Healthcare Clean Energy Exchange <http://www.hccleanenergy.org>, for purchases of green power, renewable energy certificates, and/or natural gas bundled with carbon offsets.

FM Credit 7.1-7.4 continued

On-Site and Off-Site Renewable Energy

- Review historic building electrical consumption trends.
- Research power providers in the area and select a provider that guarantees that a fraction of its delivered electric power is derived from net nonpolluting renewable technologies.
- If the project is in an open market state, investigate green power and power marketers licensed to provide power in that state.
- Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass or low-impact hydro sources.
- Establish a renewable power policy that mandates continued on-site production or purchasing Green-e certificates.
- Annually apply for the Energy Star award from the U.S. EPA for building scores that are 75 or higher. The Energy Star is awarded for a specific year to indicate low carbon emissions from superior energy performance.
- Use the Healthcare Clean Energy Exchange's Energy Impact Calculator (EIC) or equivalent cost/benefit data to enhance investment in renewable energy systems, renewable energy credits or renewable energy purchases. Based on U.S. EPA and other peer-reviewed data, the EIC calculates carbon emissions and energy use health impacts such as premature deaths, chronic bronchitis, asthma attacks work loss days and hospital ER visits on a per kWh/year basis, as well as health care facilities' and external societal dollar costs per incident.
- Use renewable energy commitments and the EIC to educate stakeholders (senior management, trustees, funders, staff, suppliers, service providers, host community, etc.) on clean power benefits related to human and environmental health, financial, climate change risk reduction and fiduciary responsibilities.
- Use the Healthcare Clean Energy Exchange to auction off to the highest bidder the renewable energy credits (RECS) generated by on-site renewable energy systems. The Healthcare Clean Energy Exchange is a reverse auction program (as of 2008, in a pilot stage) to assist health care providers in lowering energy bills while increasing the percentage of clean energy in their energy procurement portfolio.

Resources

American Bioenergy Association, <http://www.biomass.org>

American Wind Energy Association (AWEA), <http://www.awea.org>

Database of State Incentives for Renewable Energy (DSIRE), <http://www.dsireusa.org>

Green Power Network, <http://www.eere.energy.gov/greenpower>

Healthcare Clean Energy Exchange, <http://www.hccleanenergy.org>

National Center for Photovoltaics (NCPV), <http://www.nrel.gov/ncpv>

U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), <http://www.eere.energy.gov>

U.S. Environmental Protection Agency (EPA) Green Power Partnership, <http://www.epa.gov/greenpower/index.htm>

1 point

FM Credit 8

Refrigerant Management

Intent

Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.

Health Issues

Stratospheric ozone layer depletion increases exposure to ultraviolet radiation, increasing risks of skin cancer and immune system depression. The United States is one of the world's largest emitters of ozone depleting substances. As part of the U.S. commitment to implementing the Montreal Protocol, the EPA has implemented regulations relative to the responsible management of Chlorofluorocarbons (CFCs), including programs to end the consumption and production of ozone depleting substances (ODS) and Hydrochlorofluorocarbons (HCFCs). HCFCs are a class of ozone depleting substance that have been used to replace CFC refrigerants. While HCFCs have a lower ODS rating than CFCs, the Montreal Protocol lists them in the second class of ODS to be phased out over time. In 2005, the World Meteorological Organization (WMO) reported an 8-9% decrease of ODS in the atmosphere from the peak in 1992-1994, while the level of HCFCs continues an upward trend. The U.S. has joined other countries party to the Montreal Protocol proposing an accelerated mandatory phase-out of HCFCs to bolster protection of the ozone layer.

Credit Goals

OPTION A

- Do not use refrigerants in base building HVAC&R systems.
- Small HVAC&R units (defined as containing less than 0.5 lbs of refrigerant), and other equipment such as standard refrigerators, small water coolers, medical equipment, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the "base building" system and are not subject to the requirements of this credit.

OR

FM Credit 8 continued

Refrigerant Management

OPTION B

- Select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming. The base building HVAC&R equipment shall comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential.

$$LCGWP + (LCODP \times 10^5) \leq 100$$

Where:

LCODP = $[ODPr \times (Lr \times Life + Mr) \times Rc] / Life$

LCGWP = $[GWPr \times (Lr \times Life + Mr) \times Rc] / Life$

LCODP: Lifecycle Ozone Depletion Potential (lbCFC11/Ton-Year)

LCGWP: Lifecycle Direct Global Warming Potential (lbCO₂/Ton-Year)

GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lbCO₂/lbr)

ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 lbCFC11/lbr)

Lr: Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

Mr: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

Rc: Refrigerant Charge (0.5 to 5.0 lbs of refrigerant per ton of cooling capacity)

Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

- For multiple types of equipment, a weighted average of all base building level HVAC&R equipment shall be applied using the following formula:

$$[\sum (LCGWP + LCODP \times 10^5) \times Q_{unit}] / Q_{total} \leq 100$$

Where:

Q_{unit} = Cooling capacity of an individual HVAC or refrigeration unit (Tons)

Q_{total} = Total cooling capacity of all HVAC or refrigeration

- Small HVAC&R units (defined as containing less than 0.5 lbs of refrigerant), and other equipment such as standard refrigerators, small water coolers, medical equipment, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the "base building" system and are not subject to the requirements of this credit.

AND

- Do not install fire suppression systems that contain ozone-depleting substances (CFCs, HCFCs or Halons).

FM Credit 8 continued

Refrigerant Management

Suggested Documentation

- ☐ Document the alternative technologies applied to base building HVAC&R systems in accordance with Credit Goals.

OR

- ☐ Establish and annually update documentation verifying that emissions of refrigerants from base building HVAC&R equipment comply with the formula outlined in the Credit Goals.

Reference Standards

There are no reference standards for this credit. Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC FM Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment; GGHC FM Prerequisite 2: Minimum Energy Efficiency Performance; GGHC FM Prerequisite 3: Refrigerant Management: Ozone Protection; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC FM Credit 3: Existing Building Commissioning; and, GGHC FM Credit 5: Performance Measurement.*
- Set up loss minimization procedures and systems to meet annual loss minimization standards and reporting requirements.
- Based on useful life and refrigerant type, develop a strategy to replace equipment starting with equipment containing Halons, CFCs and HCFCs in largest quantities and in worse condition. Select HVAC&R replacement equipment with reduced refrigerant charge and increased equipment life.
- Maintain HVAC&R equipment to prevent leakage of refrigerant to the atmosphere.
- Consider reducing or eliminating CFC or HCFCs in plumbing systems, refrigerators, freezers, water coolers, lab equipment and other non-building systems.

FM Credit 8 continued

Refrigerant Management

Resources

ANSI/ASHRAE 15-2004, *Safety Standard for Refrigeration Systems* (Also defines HFCs, CFCs and HCFC by formulation, compound and common name).

Chartered Institution of Building Services Engineers (CIBSE), CFCs, HCFCs and Halons - Professional and Practical Guidance on Substances that Deplete the Ozone Layer, 2000, <http://www.cibse.org>

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), Building Systems Analysis & Retrofit Manual, 1995, <http://www.smacna.org>

U.S. Environmental Protection Agency (EPA), Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting, <http://www.epa.gov/oar/caa/contents.html>.

U.S. Environmental Protection Agency (EPA), Ozone Depletion, <http://www.epa.gov/ozone>

U.S. Environmental Protection Agency (EPA), Phase-Out of Ozone Depleting Substances, <http://www.epa.gov/ozone/title6/phaseout/>

U.S. Environmental Protection Agency (EPA), Significant New Alternatives Policy (SNAP), <http://www.epa.gov/ozone/snap/index.html>

U.S. Environmental Protection Agency (EPA), Stratospheric Ozone Protection: Moving to Alternative Refrigerants, <http://www.es.epa.gov/program/epaorgs/oar/altrefrg.html>

U.S. Green Building Council, The Treatment by LEED of the Environmental Impact of HVAC Refrigerants, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=154>

1 point

FM Credit 9

Light Pollution Reduction

Intent

Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.

Health Issues

Light pollution is caused by excessive or poorly focused outdoor lighting reflecting off the sky dome, thereby brightening the nocturnal ambient environment. Studies have found a potential link between light pollution and hormone production, specifically related to melatonin and estrogen levels in women. Light at night reduces melatonin levels, which can be causally related to elevated estrogen levels in women and increased responsiveness of estrogen-dependent tissues to cellular proliferation. Collectively, these changes are linked to increased breast cancer risk. Light-related decreases in melatonin may also increase the risk of other kinds of cancer. Studies showing links to other cancers such as lung and prostate cancer have led the International Agency for Research on Cancer, a branch of the World Health Organization, to label overnight shift work as a probable carcinogen. Light pollution has also been found to disrupt nocturnal ecosystems, for example, confusing animal navigation and/or suppressing signals for seasonal behavior such as mating and pollination. Light pollution can also contribute to the collapse of local and regional ecosystems. For example, excessive artificial light and sky glow has been linked to exacerbating algal blooms by preventing zooplankton from consuming surface algae. Health care facilities can help protect their local and regional ecosystem by eliminating on-site light pollution by installing properly designed exterior lighting.

Credit Goals

FOR INTERIOR LIGHTING

- The angle of maximum candela from each interior luminaire as located in the building shall intersect opaque building interior surfaces and not exit out through the windows.
- In spaces with fenestration that do not function 24/7, all non-emergency interior lighting shall be automatically controlled to turn off during non-business hours. Provide up to 2-hour manual override capability for after hours use.

AND

FOR EXTERIOR LIGHTING

- Zone and control lights so as to restrict full night lighting to the following areas: Emergency Department, a small employee parking area, a small visitor parking area, pedestrian walkways, and circulation routes. Reduce sight lighting by 50% in all other non-essential areas after 11pm.
- Only light areas as required for safety and comfort. Do not exceed 80% of the lighting power densities for exterior areas and 50% for building facades and landscape features as defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.

FM Credit 9 continued

Light Pollution Reduction

- All projects shall be classified under one of the following zones, as defined in IESNA RP-33, and shall follow all of the requirements for that specific zone.
- For Lighting Zones 2, 3, and 4 - For site boundaries that abut public right-of-way, light trespass requirements may be met relative to the curb line shared by the public right-of-way and the site instead of the site boundary.
- For ALL Zones - Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site, is allowed to use the centerline of the public roadway as the site boundary for 2 times the driveway width.

LZ1 — Dark (Park and Rural Settings)

Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles at the site boundary and beyond. Document that 0% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2 — Low (Residential areas)

Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal footcandles 10 feet beyond the site boundary. Document that no more than 2% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

LZ3 — Medium (Commercial/Industrial, High-Density Residential)

Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal footcandles 15 feet beyond the site. Document that no more than 5% of the total initial designed fixture lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

LZ4 — High (Major City Centers, Entertainment Districts)

Design exterior lighting so that all site and building mounted luminaires produce a maximum initial illuminance value no greater than 0.60 horizontal and vertical footcandles at the site boundary and no greater than 0.01 horizontal footcandles 15 feet beyond the site. Document that no more than 10% of the total initial designed site lumens are emitted at an angle of 90 degrees or higher from nadir (straight down). For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

FM Credit 9 continued

Light Pollution Reduction

Suggested Documentation

- ☐ Compile and annually review documentation verifying that interior lighting complies with Credit Goals.
- ☐ Compile and annually review an electrical site plan showing the zoning of the light fixtures and the control system for the fixtures and a brief exterior lighting system narrative describing the lighting objectives and the measures taken to meet the ambient light and direct beam illumination requirements.

Reference Standards

Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments (RP-33-99), <http://www.iesna.org>.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of the credit with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan, GGHC SSM Credit 2.2: Reduced Site Disturbance: Protect or Restore Open Space or Habitat, GGHC SSM Credit 4: Heat Island Reduction, GGHC SSM Credit 5: Connection to the Natural World.*
- Implement site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution.
- Minimize site lighting where possible and model the site lighting using a computer model.
- Technologies to reduce light pollution include:
 - Full cutoff luminaries
 - Low-reflectance surfaces
 - Low-angle spotlights
- Maintain even site lighting to avoid “hot spots” that could cause glare.

Resources

Illuminating Engineering Society of North America, <http://www.iesna.org>

International Dark-Sky Association, <http://www.darksky.org/>

Chemical Management

Required

CM Prerequisite 1

Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management

Intent

Reduce the potential exposure of building occupants to polychlorinated biphenyls and equivalents (PCBs), PCB combustion by-products, and asbestos-containing materials (ACM). Prevent associated harmful effects of these hazardous materials in new and existing buildings.

Health Issues

The 209 chemicals classified as polychlorinated biphenyls (PCBs) are persistent, bioaccumulative, and toxic chemicals (PBTs). PBTs are toxic chemicals of particular health concern because they do not break down quickly in the environment, they become widely distributed geographically and they bio-magnify or concentrate in the tissue of living organisms as they move up the food chain. PCBs are associated with a variety of adverse health effects, including cancer and effects on the immune, reproductive, nervous, and endocrine systems. These can occur even with very low exposure levels. The 1996 U.S. EPA reassessment of PCBs determined that PCBs are probable human carcinogens; other agencies, including the International Agency for Research on Cancer, the National Toxicology Program, and the National Institute for Occupational Safety and Health, have reached similar conclusions.

Asbestos exposure increases the risk of mesothelioma (a kind of cancer of the lung, chest and/or abdominal lining), other forms of lung cancer, and asbestosis (a chronic form of lung disease). To minimize exposure of building occupants, regulatory authorities require remediation of asbestos-containing materials, either through a process of encapsulation or removal. Asbestos abatement undertaken during renovation while the building is partially occupied should take special precautions to ensure 100% containment of asbestos containing material

Credit Goals

OPTION 1: New Construction (operational less than one year)

- Verify that materials containing polychlorinated biphenyls and equivalents (PCB's), PCB combustion by-products and asbestos-containing materials (ACM) are not present in the building or on the site.

OR

CM Prerequisite 1 continued

Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management

OPTION 2: Existing Facilities (operational more than one year)

- Develop and implement a program for the discovery, testing and mitigation of PCB-containing materials and ACM to ensure proper removal and appropriate disposal as the facility is upgraded and equipment is replaced.
- Identify the applicable regulatory requirements for identification and proper disposal of PCBs and ACM.
- Maintain a current survey of the facility to identify where PCBs and ACM may be remaining in the building and on the site.

Suggested Documentation

OPTION 1

- ☐ Obtain a letter from the facility manager, an accredited HAZMAT (Hazardous Materials) program manager or inspector stating that PCBs and ACM are not present in the building, on the building exterior or on the site.

OR

OPTION 2

- ☐ Annually review the previously completed PCB or ACM work done on the building and on the building site and use these data to prepare the history-based component of the survey for the building and the site that describes: (1) where PCBs and ACM have been removed; (2) where PCBs and ACM remain; and, (3) how the remaining PCBs and ACM are being addressed.
- ☐ For PCB-containing facility equipment, document regular inspections and maintenance checks for leaks and spills.
- ☐ As equipment is phased out, document that PCBs have been removed and disposed of in accordance with regulatory requirements and the HAZMAT management program.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Credit 2: Regulated Medical Waste Reduction; and, FS Credit 8: Chemical Management for Food Services.*
- Review the current HAZMAT management program, and prepare a description of the program that identifies the applicable regulatory requirements and explains how the program will address PCBs and ACM remaining in the building on an ongoing basis. For PCB-containing facility equipment, conduct regular surveys for leaks and spills.

CM Prerequisite 1 continued

Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management

- Update the PCB and ACM survey with current information by: (1) sampling additional likely locations in the building and on the site for PCBs and ACM; and (2) testing samples to see if PCBs and/or ACM are present. If the annual review identifies any previously unknown contamination, add these to the description of how the hazardous materials (HAZMAT) management program is addressing PCBs and ACM remaining in the building on an ongoing basis.
- Engage an environmental testing agency and licensed abatement professional to audit building systems and materials and determine protocols and procedures to encapsulate or remove materials as appropriate.
- Consider replacing transformers using PCBs or mineral oil with natural ester fluids, which are biodegradable and can reduce the need for firewalls and deluge systems, as well as spill containment.

Resources

Environmental Health and Safety Online. *PCB Regulatory Guidance*, <http://www.ehso.com/PCBregs.htm>

U.S. Code of Federal Regulations (CFR) 29 CFR 1910.1001: Asbestos, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9995

U.S. Code of Federal Regulations (CFR) 29 CFR 1910.1000: Air Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9991&p_table=STANDARDS

U.S. Code of Federal Regulations (CFR) 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions; current edition, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr761_main_02.tpl

U.S. Code of Federal Regulations (CFR). Standards Interpretations: CFR 1910.1000 TABLE Z-1. PCBs in Fluorescent Light Fixtures, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=19530

U.S. Code of Federal Regulations (CFR) 40 CFR Part 61, Subpart M - National Emission Standard for Asbestos, <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=5f3a0078f49318bbfcfe734644bae34e&rgn=div6&view=text&node=40:8.0.1.1.1.13&idno=40>

U.S. Environmental Protection Agency (EPA) Technical Factsheet on: POLYCHLORINATED BIPHENYLS (PCBs), <http://www.epa.gov/OGWDW/dwh/t-soc/pcbs.html>

U.S. Environmental Protection Agency (EPA) PCB Home Page, <http://www.epa.gov/opptintr/pcb>

U.S. Environmental Protection Agency (EPA) Region 4. *Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance*, <http://www.epa.gov/Region4/air/asbestos/asbmatl.htm>

U.S. Environmental Protection Agency (EPA), *Introduction to Indoor Air Quality: Asbestos*, <http://www.epa.gov/iaq/asbestos.html>

U.S. Occupational Safety and Health Administration (OSHA). *Safety and Health Topics: Asbestos*, <http://www.osha.gov/SLTC/asbestos/>

Required

CM Prerequisite 2

Chemical Management Policy and Audit

Intent

Institute a comprehensive chemical management policy and audit process to establish a framework of policies and procedures to reduce and eliminate the use, emission and improper disposal of chemical hazards and toxic materials within the healthcare facility and to the surrounding community.

Health Issues

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

Credit Goals

- Develop a comprehensive chemical management policy (per Joint Commission Environment of Care Standard 3.10.1) that includes processes for all receiving, identification and characterization, handling, storing and disposing of all hazardous chemicals, materials and waste, and includes staff training and education, labeling, proper use, air monitoring, and employee health monitoring as appropriate, with special consideration for chemicals/materials that have been identified for increased risk of occupational exposure by state and federal regulations. Additionally, ensure coordination and compliance with GGHC WM Prerequisite 1: Waste Management Plan.
- Undertake an internal hazardous chemical/material audit (per Joint Commission Environment of Care Standard 3.10.2, Element of Performance 2: Hazardous Materials and Hazardous Waste Inventory) to determine use by each department, and properly characterize chemical/materials. Include a description of all chemical storage areas, identify secondary containment measures and evaluate proper labeling, according to OSHA's Hazard Communication Standard and U.S. EPA's Resource Conservation and Recovery Act (RCRA).
- Develop and implement an occupational health strategy addressing potential occupational exposure issues and goals for improvement. An occupational health strategy regularly and systematically identifies hazardous exposures in the workplace and uses elements from the OSHA Hierarchy of Controls to protect workers. Mechanisms for worker participation in decision-making are a critical component of the strategy.

CM Prerequisite 2 continued

Chemical Management Policy and Audit

Suggested Documentation

- ☐ Document the implementation of the hazardous chemical management policy and annual inventory results in accordance with Credit Goals.
- ☐ Compile and annually update documentation demonstrating a Hazard Communication and/or Hazardous Chemical Management Plan over the previous twelve-month period, including, but not limited to: MSDS management, staff training and complete inventory of all hazardous materials. Include, at a minimum, the name of the chemical or compound, hazardous classification, usage and quantities, safety and environmental precautions, waste disposal requirements, and monitoring requirements.
- ☐ Compile and annually update an occupational health strategy in accordance with Credit Goals.

Reference Standards

Joint Commission. Environment of Care Standard 3.10.1, <http://www.jointcommission.org>

Joint Commission. Environment of Care Standard 3.10.2, Element of Performance 2: Hazardous Materials and Hazardous Waste Inventory, <http://www.jointcommission.org>

Occupational Safety and Health Administration (OSHA), Hazard Communication Standard, <http://www.osha.gov/SLTC/hazardcommunications/standards.html>

U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), <http://www.epa.gov/epaoswer/osw/laws-reg.htm>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*

CM Prerequisite 2 continued

Chemical Management Policy and Audit

- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewerage authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Sources of chemicals in health care facilities that may be potentially environmentally harmful include those discharged into the sanitary sewer system generated from their use. Areas of use include clinical laboratory, building system operations, environmental services (e.g. solvents and disinfectants), food services (e.g. soaps, chlorine), and diagnostic and treatment areas (e.g. glutaraldehyde, radioactive substances). Set up an onsite review with POTW to determine chemicals and substances of concern that may be entering wastewater, and ensure proper management techniques are in place.
- A hospital's main wastewater discharge flow may not warrant pre-treatment (except neutralization or radioactive decontamination). However, partial flows from hospital functional areas (e.g., laboratories, oncology, and pathology) should be carefully evaluated for opportunities to reduce discharge and improve quality.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Use automated laboratory equipment that maximizes sample throughput while minimizing sample size, reagent quantity, and waste streams. Utilize microscale chemistry to minimize use of lab chemicals and solvents where possible. Work with EHS personnel and wastewater authorities in developing an action plan.
- Explore technologies and strategies to eliminate chemical waste to drain in cooling tower and boiler blowdown. Treat blowdown so that chemical treatment can be reclaimed for re-use.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments such as ozonation or ultraviolet germicidal irradiation (UVGI) for applications such as cooling tower basins.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.
- Avoid discharging concentrates of disinfecting and cleaning agents should be avoided — particularly chlorine, phenols, quaternary ammonium compounds, and products containing nonylphenol (potentially estrogenic effect) and strong cleaning ingredients.
- Approach FDA, other regulating agencies, manufacturers and group purchasing organizations about creating and developing a registration system for approving safe use and effective alternatives to glutaraldehyde and ethylene oxide (ETO) and other high level disinfectants and sterilants.

CM Prerequisite 2 continued

Chemical Management Policy and Audit

Resources

American National Standards Institute. ST58-1996, Safe Use and Handling of Glutaraldehyde-based Products in Healthcare Facilities.

Best Practices for the Safe Use of Glutaraldehyde in Health Care. OSHA Publication 3258, (2006), 261 KB PDF, 48 pages.

Joint Commission Environment of Care EC.3.10,
<http://www.jointcommission.org/NR/rdonlyres/266E870D-BEB4-48CC-9ABC-2EC3210C8291/0/BHC2008ECChapter.pdf>

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group, Types of Hospital Water, <http://www.masco.org/mercury/techid/types.html>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth> or <http://www.h2e-online.org/tools/chemplan.htm>

U.S. Centers for Disease Control and Prevention (CDC), 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004,
<http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Centers for Disease Control and Prevention, CDC/HICPAC Disinfection and Sterilization Guidelines, 2008

U.S. Environmental Protection Agency (EPA), National Emission Standards for Hospital Ethylene Oxide Sterilizers, <http://www.epa.gov/fedrgstr/EPA-AIR/2007/December/Day-28/a25233.htm>

U.S. Environmental Protection Agency (EPA), SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses,
http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air~Contaminants,
http://www.osha.gov/pls/oshaweb/owadis.show_document?p_table=PREAMBLES&p_id=771

U.S. Occupational Safety and Health Administration (OSHA), Use of Latex Surgical Exam Gloves for Protection Against Glutaraldehyde

Required

CM Prerequisite 3

Community Contaminant Reduction: Leaks & Spills

Intent

Mitigate leaks and spills and waterborne effluents to prevent releasing waterborne environmental, health and safety burdens to the site neighbors and surrounding community.

Health Issues

Health care facilities have the potential to contaminate wastewater, stormwater and surface and groundwater through releases from a variety of sources. Water contamination on a health care campus may include heavy metals such as mercury, silver and chromium, pharmaceuticals, cyanide, sulfur, nitrates, chloride, fats, oils and grease (FOG), synthetic oils, fuel oil, and laboratory chemicals, to name a few. Often, wastewater treatment plants have limited capacity to treat or filter out many of these contaminants. Wastewater effluents may therefore expose people and wildlife to a variety of chemical contaminants originating at the health care facility. By minimizing or eliminating use of these chemicals, controlling releases of waste, and actively monitoring wastewater, health care facilities can contribute to protecting the health of the surrounding community.

Credit Goals

- Develop and implement a policy that complies with U.S. EPA Spill Prevention Control Countermeasures Regulations (SPCC) containment and engineering controls and all applicable state and local administrative codes pertaining to storage tanks to manage above- and below-ground storage of fuels and chemicals in order to minimize risk from leakage and spills.
- Develop and implement an emergency response plan to contain leaks and spills from above- and below-ground storage tanks in accordance with applicable state and local administrative codes pertaining to petroleum storage tanks.
- Ensure that outdoor hazardous waste storage areas include secondary containment provisions, a locked enclosure, an emergency phone and proper labeling with the date and documentation of all chemicals stored onsite per the U.S. EPA Resource Conservation and Recovery Act (RCRA) or state or local regulations, whichever is most stringent. Assure that RCRA rules are followed for time limitations on hazardous waste storage areas.
- Develop and implement a plan to prevent materials/substances from dumpsters, compactors and outdoor hazardous or medical waste storage areas from entering stormwater runoff, and inspect and monitor storm drains at least quarterly to ensure proper clearance.

CM Prerequisite 3 continued

Community Contaminant Reduction: Leaks & Spills

Suggested Documentation

- ❑ Compile and annually update outdoor chemical storage policy and procedures, an emergency response plan to contain leaks and spills, secondary containment provisions on outdoor storage facilities and a plan to manage stormwater runoff from dumpsters, compactors and outdoor hazardous or medical waste storage areas, in accordance with Credit Goals.
- ❑ Document and annually review the success of the outdoor chemical storage policy. Analyze and determine the root causes of incidents and compile documentation on the short term and long term actions taken.

Reference Standards

U.S. Environmental Protection Agency (EPA) Clean Water Act, Spill Prevention Control Countermeasures Regulations (SPCC), <http://www.epa.gov/oilspill/>

U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA), 40 CFR Part 264 & 265, <http://www.epa.gov/epaoswer/osw/laws-reg.htm>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Develop a facility wide policy governing the controlled and secure outdoor storage of hazardous chemicals and fuels, both for incoming deliveries and outgoing waste products.
- Utilize double wall fuel supply pipe to prevent unintentional spills and leakage from contaminating aquifers and stormwater.

Resources

Environmental Health and Safety Online. Hazardous Materials Guide for First Responders - General Approach to a Hazmat Incident, <http://www.ehso.com/EmergencyResponseOLevel.htm>

For guidance on Underground Storage Tanks visit the facility's State Administrative Code.

U.S. Code of Federal Regulations (CFR). 40 CFR 112: *Spill Prevention Control and Countermeasures- Leaks and Spills.*

U.S. Code of Federal Regulations (CFR) 40 CFR 122.26: *National Pollutant Discharge Elimination System (NPDES)-Stormwater Discharges,*
http://a257.g.akamaitech.net/7/257/2422/06sept20031800/edocket.access.gpo.gov/cfr_2003/julqtr/pdf/40cfr122.26.pdf

CM Prerequisite 3 continued

Community Contaminant Reduction: **Leaks & Spills**

U.S. Code of Federal Regulations (CFR) 40 CFR 403: *General Pretreatment Regulations for Existing and New Sources of Pollution*, http://www.access.gpo.gov/nara/cfr/waisidx_03/40cfr403_03.html

U.S. Code of Federal Regulations (CFR) 40 CFR 280, 281 and 282.50-282.105. *Underground Storage Tanks*, <http://www.epa.gov/OUST/fedlaws/cfr.htm#40cfr302.4>

U.S. Department of Transportation. *Hazardous Materials Transportation Act*. Details regulations, emergency response, training and shipment requirements for transporting hazardous materials. Requirements for packaging, labeling and transporting infectious substances, 49 CFR 171-180, <http://www.myregs.com/dotrspa/>

U.S. Environmental Protection Agency (EPA), Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (Document No. EPA-840-B-92-002), <http://www.epa.gov/OW>

U.S. Environmental Protection Agency (EPA), Stormwater Management Guidance. http://cfpub.epa.gov/npdes/home.cfm?program_id=6

U.S. Environmental Protection Agency (EPA), Healthcare Sector Notebook. Profile of the Healthcare Industry - Including Hospitals, Physicians Offices, Dental Offices, Nursing Homes, etc., <http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/health.html>

1 point

CM Credit 1.1

Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

Intent

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

Health Issues

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

Credit Goals

- Develop and implement a policy banning discharge of chemicals into the sanitary sewer without express permission and acknowledgment of the Hazardous Materials Officer or other staff member responsible for regulatory compliance. Report to local Publicly Owned Treatment Works (POTW) on all planned chemical releases to wastewater to ensure regulatory compliance.
- Test wastewater discharge at minimum quarterly to ensure that nitrates, mercury and other heavy metals, cyanide and other toxic substances are not entering the sanitary sewer at concentrations greater than federal, state or locally regulated levels. Mercury shall be eliminated from wastewater down to 30 parts per trillion per EPA Method 1631E (40 CFR Part 136). Ensure that chemical and biological oxygen demand levels meet local publicly-owned treatment works (POTW) standards.

CM Credit 1.1 continued

Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

Suggested Documentation

- ☐ Compile and annually review the policy banning discharge of chemicals into the sanitary sewer in accordance with Credit Goals.
- ☐ Compile and annually review documentation verifying that quarterly tests of wastewater discharge meet the standards outlined in Credit Goals.

Reference Standards

U.S. Code of Federal Regulations. 40 CFR Part 136—Guidelines Establishing Test Procedures for the Analysis of Pollutants,
http://a257.g.akamaitech.net/7/257/2422/05dec20031700/edocket.access.gpo.gov/cfr_2003/julqtr/pdf/40cfr136.3.pdf

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewerage authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Sources of toxic chemicals from health care facilities include infectious substances, laboratory discharge, building system operations, housekeeping (e.g. solvents and disinfectants), food services (e.g. soaps, chlorine), and diagnostic and treatment areas (e.g. glutaraldehyde, radioactive substances). Set up an onsite review with POTW to determine chemicals and substances of concern that may be entering wastewater, and ensure proper management techniques are in place.
- A hospital's main wastewater discharge flow may not warrant pre-treatment (except neutralization or radioactive decontamination). However, partial flows from hospital functional areas (e.g., laboratories, oncology, and pathology) should be carefully evaluated for opportunities to reduce discharge and improve quality.

CM Credit 1.1 continued

Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.
- Avoid discharging concentrates of disinfecting and cleaning agents— particularly chlorine, phenols, quaternary ammonium compounds, and products containing nonylphenol (potentially estrogenic effect) and strong cleaning ingredients.

Resources

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group, Types of Hospital Water, <http://www.masco.org/mercury/techid/types.html>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguide.html#step6>

1-3 points

CM Credit 1.2-1.4

Indoor Chemical Contaminant Reduction: Hand Hygiene Products, Sterilization & High Level Disinfection

Intent

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

Health Issues

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

Credit Goals

CM Credit 1.2: Hand Hygiene Products (1 point)

- In collaboration with the infection control committee, use the infection control risk analysis (ICRA) process to determine which areas of the facility may require the use of antimicrobial hand soaps. Avoid the use of hand soaps containing antimicrobials for any area not recommended by the ICRA process, as a mechanism to reduce the volume of antimicrobials entering the sanitary sewer and thus the environment. For hand soaps not containing antimicrobials, utilize selection criteria for hand soaps per GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development and GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Products & Materials.
- In addition to meeting environmental and efficacy criteria, ensure that hand hygiene products have a low irritancy potential, particularly when these products must be used multiple times per shift. To maximize acceptance of hand-hygiene products by health care providers, solicit input from these staff regarding the feel, fragrance, and skin tolerance of products under consideration.

Note: Alcohol-based hand sanitizers are excluded from this credit.

CM Credit 1.3: Sterilization (1 point)

- Replace the sterilant ethylene oxide (EtO) with safer alternatives for a minimum of 90% of equipment requiring sterilization.
- Where EtO must be used due to incompatibility or regulatory recommendations, ensure that reprocessing units are enclosed under negative pressurization and utilize local exhaust ventilation in accordance with OSHA Standard 29 CFR 1910.1047 and NIOSH "Current Intelligence Bulletin-52: Ethylene Oxide Sterilizers in Healthcare Facilities (1997, October 22)" and the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Monitor exposure to ensure that the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) and the OSHA Permissible Exposure Limit (PEL) of 1 ppm for an 8 hour time weighted average with a 5 ppm excursion level is never exceeded. In addition, meet state permitting requirements for use of EtO sterilizer reprocessing units.

CM Credit 1.2-1.4 continued

Indoor Chemical Contaminant Reduction: Hand Hygiene Products, Sterilization & High Level Disinfection

CM Credit 1.4: High Level Disinfection (1 point)

- Replace the high level disinfectant (HDL) glutaraldehyde with safer alternatives for a minimum of 90% of equipment requiring high level disinfection.
- Where glutaraldehyde must be used due to incompatibility or regulatory recommendations:
 - Ensure that enclosed reprocessing units limit the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) threshold of 0.05 ppm or less, and use local exhaust ventilation (capture velocity of at least 100 feet per minute and at least 10 air exchanges per hour) per NIOSH's Glutaraldehyde: Occupational Hazards in Hospitals. Units must also operate in accordance with the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Additionally, glutaraldehyde shall never be used or stored in a direct patient care area.
 - Replace manual disinfection with automatic machine washers/disinfectors to minimize staff exposure to liquid disinfectants.

Suggested Documentation

CM Credit 1.2

- ☐ Compile documentation of the results from the infection control risk analysis (ICRA) process determining which areas of the facility require the use of antimicrobial hand soaps.
- ☐ Document the program ensuring avoidance of hand soaps containing antimicrobials for any area not recommended by the ICRA process.
- ☐ Compile and annually review hand soap purchasing practices in accordance with Credit Goals.
- ☐ Document staff feedback on hand hygiene products in accordance with Credit Goals.

CM Credit 1.3

- ☐ Compile and annually update documentation demonstrating minimum 90% reduction of ethylene oxide in accordance with Credit Goals.
- ☐ In facilities where EtO continue in use, compile and annually review documentation verifying compliance with the reference standards safeguarding staff from exposure during sterilization procedures.

CM Credit 1.4

- ☐ Compile and annually update documentation demonstrating minimum 90% reduction of glutaraldehyde in accordance with Credit Goals.
- ☐ In facilities where glutaraldehyde continues in use, compile and annually review documentation verifying compliance with procedures safeguarding staff from exposure during disinfection procedures in accordance with Credit Goals.

CM Credit 1.2-1.4 continued

Indoor Chemical Contaminant Reduction: Hand Hygiene Products, Sterilization & High Level Disinfection

Reference Standards

American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Value for Glutaraldehyde, <http://www.acgih.org>

American Society for Gastrointestinal Endoscopy, "Infection Control During Gastrointestinal Endoscopy: Guidelines for Clinical Application," ASGE Publication No. 1035, 1998. <http://www.asge.org/WorkArea/downloadasset.aspx?id=3382>

American Society for Gastrointestinal Endoscopy. "Multi-Society Guideline for Reprocessing Flexible Gastrointestinal Endoscopes." *Gastrointestinal Endoscopy*, 2003; 58: 1-8.

U.S. Centers for Disease Control and Prevention, CDC/HICPAC Disinfection and Sterilization Guidelines, 2008, <http://www.cdc.gov/ncidod/dhqp/sterile.html> (Note: This standard will become available in 2008.)

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), "Current Intelligence Bulletin-52: Ethylene Oxide Sterilizers in Healthcare Facilities (1997, October 22)," http://www.cdc.gov/niosh/89115_52.html#General%20Control%20Methods

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), *Glutaraldehyde: Occupational Hazards in Hospitals*, <http://www.cdc.gov/niosh/pdfs/01-115.pdf>

U.S. Occupational Safety and Health Administration (OSHA), Standard 29 CFR 1910.1047 (Ethylene Oxide), http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10070

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services.
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Alternatives to sterilant ethylene oxide (EtO) include other low temperature sterilization methods that include vaporized hydrogen peroxide, hydrogen peroxide-gas plasma, liquid peracetic acid, and ozone.
- Approach FDA, other regulating agencies, manufacturers and group purchasing organizations about creating and developing a registration system for approving safe use and effective alternatives to glutaraldehyde and ethylene oxide (ETO) and other high level disinfectants and sterilants.

CM Credit 1.2-1.4 continued

Indoor Chemical Contaminant Reduction: **Hand Hygiene Products, Sterilization & High Level Disinfection**

Resources

American National Standards Institute. ANSI/AAMI ST58-1996, Safe Use and Handling of Glutaraldehyde-based Products in Healthcare Facilities, AAMI, 3330 Washington Blvd., Arlington, VA 22201.

American Society for Healthcare Environmental Services (ASHES), Practice Guidance, <http://www.ASHES.org>

Best Practices for the Safe Use of Glutaraldehyde in Health Care. OSHA Publication 3258, (2006), 261 KB PDF, <http://www.osha.gov/Publications/glutaraldehyde.pdf>

Centers for Disease Control and Prevention. Hand Hygiene in Healthcare Settings, 2002, <http://www.cdc.gov/nicdod/dhqp/index.html>

Centers for Disease Control and Prevention. Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006, <http://www.cdc.gov/nicdod/dhqp/index.html>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E)), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

U.S. Centers for Disease Control and Prevention, 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004, <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), Glutaraldehyde Occupational Hazards in Hospitals. Publication No. 2001-115, (2001, May), <http://www.cdc.gov/niosh/2001-115.html>

U.S. Environmental Protection Agency (EPA), Antimicrobial Science Policies, Disinfectant Technical Science Section (DIS/TSS), <http://www.epa.gov/oppad001/sciencepolicy.htm>

U.S. Environmental Protection Agency (EPA), Selected EPA-Registered Disinfectants (EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses, <http://www.epa.gov/oppad001/chemregindex.htm>

U.S. Environmental Protection Agency (EPA), National Emission Standards for Hospital Ethylene Oxide Sterilizers, <http://www.epa.gov/fedrgstr/EPA-AIR/2007/December/Day-28/a25233.htm>

U.S. Environmental Protection Agency (EPA), Sanitizing Rinses (for previously cleaned food-contact surfaces), DIS/TSS-4 Jan 30, 1979, http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants. OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air-Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771

CM Credit 1.2-1.4 continued

Indoor Chemical Contaminant Reduction:

Hand Hygiene Products, Sterilization & High Level Disinfection

U.S. Occupational Safety and Health Administration (OSHA), Ethylene Oxide Gas,
<http://www.osha.gov/SLTC/etools/hospital/central/central.html#ExposuretoEthyleneOxideGas>

U.S. Occupational Safety and Health Administration (OSHA), Use of Latex Surgical Exam Gloves for Protection Against Glutaraldehyde. OSHA Standard Interpretation, (1997, October 3).

World Health Organization (WHO), Hand hygiene guideline:
http://www.who.int/patientsafety/events/05/HH_en.pdf

1 point

CM Credit 1.5

Indoor Chemical Contaminant Reduction: **Laboratories**

Intent

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

Health Issues

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

Credit Goals

- Develop and implement a laboratory solvent reprocessing program for alcohols, xylene and formalin in the laboratory.
- Phase out use of mercury-containing fixatives, stains and laboratory equipment where safe and effective alternatives exist, as outlined in the Sustainable Hospital Project's "List of Mercury-free Alternatives in the Lab."
- Use automated laboratory equipment that maximizes sample throughput while minimizing sample size, reagent quantity, and waste streams. Utilize microscale chemistry to minimize use of lab chemicals and solvents where possible. Work with Environmental Health & Safety (EHS) personnel and wastewater authorities in developing an action plan.
- Use either local exhaust controls or other HVAC design element(s) that facilitate safe removal of chemical vapors, to minimize occupational exposure in laboratory per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.

CM Credit 1.5 continued

Indoor Chemical Contaminant Reduction: **Laboratories**

Suggested Documentation

- ☐ Document volume of chemical solvents reprocessed, avoided purchase cost of new chemicals and avoided hazardous waste disposal calls in accordance with Credit Goals.
- ☐ Document and annually review mercury phase-out plan progress, including an inventory of alternative mercury-free fixatives, stains and laboratory equipment in use.
- ☐ Compile documentation and annually review progress in phasing in microscale chemistry in labs.
- ☐ Document and annually evaluate effectiveness of local exhaust controls or other HVAC design elements that facilitate safe removal of chemical vapors in accordance with Credit Goals.

Reference Standards

Sustainable Hospital Project, "List of Mercury-free Alternatives in the Lab."
http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Cat&id=18

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.
- For more comprehensive guidance on environmental strategies for laboratories, refer to Labs for the 21st Century, <http://www.labs21century.gov>.
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.

CM Credit 1.5 continued

Indoor Chemical Contaminant Reduction: **Laboratories**

- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewerage authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.

Resources

Labs for the 21st Century, <http://www.labs21century.gov>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

National Microscale Chemistry Center, <http://www.microscale.org/about.asp>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguid.html#step6>

U.S. Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air-Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771. OSHA Standard Interpretation, (1997, October 3).

U.S. Environmental Protection Agency (EPA), SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html

1 point

CM Credit 1.6

Indoor Chemical Contaminant Reduction: **Radiology**

Intent

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

Health Issues

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

Credit Goals

- Recycle silver and used lead aprons from Radiology.
- Ensure that fixer solution from x-ray technology (where not digital) is properly captured and disposed of. Do not dispose to sanitary sewer unless tested for heavy metal content.
- Use either local exhaust controls or other HVAC design element(s) that facilitates safe removal of chemical vapors, to minimize occupational exposure in radiology per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.

CM Credit 1.6 continued

Indoor Chemical Contaminant Reduction: Radiology

Suggested Documentation

- ☐ Document amounts of silver and lead recycled from Radiology, and final disposition of all fixer solution.
- ☐ Document and annually evaluate effectiveness of local exhaust controls or other HVAC design elements that facilitate safe removal of chemical vapors in accordance with Credit Goals.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- For more comprehensive guidance on environmental strategies for laboratories, refer to Labs for the 21st Century, <http://www.labs21century.gov>.
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewerage authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.

CM Credit 1.6 continued

Indoor Chemical Contaminant Reduction: **Radiology**

Resources

Labs for the 21st Century, <http://www.labs21century.gov>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

National Microscale Chemistry Center, <http://www.microscale.org/about.asp>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguid.html#step6>

U.S. Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992

U.S. Environmental Protection Agency (EPA) SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air~Contaminants, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771. OSHA Standard Interpretation, (1997, October 3).

1-2 points

CM Credit 2.1 & 2.2

Pharmaceutical Minimization, Management & Disposal

Intent

Safeguard human and ecological health through minimization and proper management and disposal of pharmaceuticals and associated wastes.

Health Issues

The disposal of pharmaceuticals is governed by a complex web of regulations, many of which are outdated and ineffective in protecting human and ecosystem health. A study by the US Geological Survey found pharmaceutical residue in 80% of U.S. lakes, streams and rivers tested in 1999 and 2000, including estrogenic agents, anti-hypertensives, anti-depressants, anti-inflammatory agents, and anti-seizure medications. Moreover, many of these same medications have now been reported at low levels in the drinking water of several major U.S. cities. Scientists are still analyzing the impact of these and other chemicals on the health of the ecosystem and human health. . Many pharmaceuticals are disposed of through the solid waste stream from which they can leach into groundwater. Those disposed of through the sanitary sewer can contaminate surface and ultimately groundwater. Furthermore, wastewater treatment facilities in the U.S. are not designed to remove or destroy pharmaceutical wastes. Pharmaceuticals disposed of in the regulated medical waste stream can pose risks to environmental services staff, waste handlers at treatment facilities, and the environment. It is imperative that health care organizations both minimize pharmaceutical waste at its source and properly handle and manage these drugs at the end of their useful life.

Credit Goals

CM Credit 2.1 (1 point)

- Utilize a formulary review process to characterize hazardous pharmaceuticals per National Institute for Occupational Safety and Health (NIOSH) and U.S. EPA Resource Conservation and Recovery Act (RCRA) guidance and regulations.
- Based on the results of the formulary review, develop and implement a policy and program for the receipt, handling, storage, labeling, transport and end disposal of all pharmaceuticals, as well as staff education and training. Both policy and program should include at a minimum:
 - Proper characterization of all waste pharmaceuticals per the formulary review process.
 - Identification of proper specifications for pharmaceuticals that can be accepted for rebate/disposal through reverse distribution.
 - A comprehensive description of segregation practices for different classes of pharmaceuticals, including P-listed, U-listed and characteristic wastes per U.S. EPA Resource Conservation and Recovery Act (RCRA).
 - Segregation and management as hazardous waste of *all* bulk chemotherapy drug waste.
 - Proper compounding and handling procedures, including appropriate Personal Protective Equipment (PPE) for all drugs.
 - Evaluation and adoption of protective treatment and disposal options for all pharmaceuticals.
 - Proper management of any nuclear medicine formulation.

CM Credit 2.1-2.2 continued

Pharmaceutical Minimization, Management & Disposal

CM Credit 2.2 (1 point in addition to CM Credit 2.1)

- Minimize the generation of waste pharmaceuticals by implementing the following processes:
 - Improve inventory control processes.
 - Reduce the number of pharmaceuticals dispensed and returned that cannot be re-prescribed.
 - Substitute less toxic pharmaceuticals or mechanical methods for products containing toxic substances such as persistent bioaccumulative toxic chemicals (PBTs).
 - Minimize packaging and container weight of pharmaceutical products and formulations.
 - Minimize personal protective equipment waste. Mix chemicals in batches, minimize spills, and institute regular staff training.
- Institute best management practices for the handling and disposal of non-regulated pharmaceuticals that act as teratogens, mutagens, carcinogens, endocrine disruptors, reproductive and developmental toxicants or pose a threat to ecosystem health. *Note: Until new technologies have been developed and legalized, the best management practice for disposal of non-regulated pharmaceuticals is incineration with regulated medical waste. As a result, facilities should actively minimize pharmaceutical waste wherever possible.*
- Utilize stock rotation strategies to rotate pharmaceuticals close to the expiration date back into high-use areas such as crash carts or the pharmacy as a means of pharmaceutical waste minimization.
- Ensure all pharmaceutical samples are logged into the facility, and only allow those samples with an expiration of one year or longer.

Note: An innovation point is available to facilities that ban all antibiotics and active pharmaceutical formulations from discharge into the sanitary sewer and develop and implement an education program for patients and staff on proper disposal methods for used and expired pharmaceuticals.

Suggested Documentation

Credit 2.1

- ☐ Compile and annually review documentation of a formulary review process to characterize hazardous pharmaceuticals in accordance with Credit Goals.
- ☐ Compile and annually update the policy and program for the receipt, handling, storage, labeling, transport and end disposal of all pharmaceuticals and staff education and training, in accordance with Credit Goals.

Credit 2.2

- ☐ Compile and annually review the success of the pharmaceutical minimization program as outlined in the Credit Goals.
- ☐ Compile and annually update implementation of best management practices for non-regulated pharmaceuticals that act as teratogens, mutagens, carcinogens, endocrine disruptors, developmental toxicants or pose a threat to ecosystem health in accordance with Credit Goals.
- ☐ Collect and track data on volumes and kinds of pharmaceuticals generated in each department, stock rotation and corresponding cost data.
- ☐ Maintain a log of all pharmaceutical samples brought into facility.

CM Credit 2.1-2.2 continued

Pharmaceutical Minimization, Management & Disposal

Reference Standards

National Institute for Occupational Safety and Health (NIOSH). NIOSH Publication No. 2004-165, "Preventing Occupational Exposure to Antineoplastic and Other Hazardous Drugs in Health Care Settings," <http://www.cdc.gov/niosh/docs/2004-165/>

U.S. Environmental Protection Agency (EPA), Resource Conservation Recovery Act (RCRA), <http://www.epa.gov/rcraonline/>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Credit 2: Regulated Medical Waste Reduction; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Discontinue sewerage of all pharmaceuticals where possible and advocate updating state regulations to prohibit this practice.
- Examine all non-hazardous pharmaceutical waste and segregate it into dedicated containers for disposal at a regulated landfill permitted to accept non-hazardous pharmaceutical waste.
- Avoid uncontrolled disposal of mercury-containing drugs, diagnostic agents (e.g., Thiomersal®), disinfectants (e.g., Merbromin®, Mercurochrome® and Nitromersol®), and diuretic agents (e.g., mercurphyllin).
- Consider banning all pharmaceutical samples from the facility.

Resources

American Society of Health-System Pharmacists (ASHP). ASHP Technical Assistance Bulletin on Handling Cytotoxic and Hazardous Drugs [ASHP 1990]. An informed discussion of the dangers and safe handling procedures for hazardous drugs. www.osha.gov/dts/tib/tib_data/tib20011221.pdf

Centers for Disease Control (CDC) and National Institutes of Health (NIH). Primary Containment for Biohazards [CDC/NIH 2000]. Provides guidance on the selection, installation, testing, and use of BSCs. <http://www.cdc.gov/od/ohs/biosfty/bsc/bsc.htm>

National Institutes of Health (NIH), Recommendations for the Safe Handling of Cytotoxic Drugs [NIH 2002]. Includes recommendations for the safe preparation and administration of cytotoxic drugs. http://dohs.ors.od.nih.gov/pdf/Recommendations_for_the_Safe_Use_of_Handling_of_Cytotoxic_Drugs.pdf

National Sanitation Foundation (NSF) and American National Standards Institute (ANSI). NSF/ANSI 49–2002 Class II (Laminar Flow) Biosafety Cabinetry [NSF/ANSI 2002]. Addresses classification and certification of Class II BSCs and provides a definition for Class III BSCs. http://www.nsf.org/business/biosafety_cabinetry/index.asp

CM Credit 2.1-2.2 continued

Pharmaceutical Minimization, Management & Disposal

Oncology Nursing Society. *Chemotherapy and Biotherapy Guidelines and Recommendations for Practice*, Ed. M. Polovich, J.M. White, & L.O. Kelleher, L.O., 2001. Provides complete guidelines for the administration of antineoplastic drugs, including safe handling guidelines.

Oncology Nursing Society. *Safe Handling of Hazardous Drugs*, Ed. M. Polovich, 2003. Includes proper handling guidelines for hazardous drugs.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Chemical Minimization Plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>

U.S. Centers for Disease Control and Prevention(CDC), Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition, 2007.<http://www.cdc.gov/od/ohs/biosfty/bmbl5/bmbl5toc.htm>

U.S. Environmental Protection Agency (EPA),
<http://web.archive.org/web/20030627025308/www.epa.gov/esd/chemistry/ppcp/greenpharmacy-intro.htm>.

United States Pharmacopoeia. Chapter <797> Pharmaceutical Compounding — Sterile Preparations, 2004, <http://www.usp.org/USPNF/pf/generalChapter797.html> Details the procedures and requirements for compounding sterile preparations and sets standards applicable to all settings in which sterile preparations are compounded.

World Health Organization - Guide to Pharmaceutical Disposal,
http://www.who.int/immunization_safety/publications/waste_management/en/Guidelines_safe_disposal_unwanted_pharmaceuticals.pdf

Waste Management

Required

WM Prerequisite 1 Waste Management Plan

Intent

Institute a waste management plan to establish a framework of policies and procedures with a goal of zero waste.

Health Issues

U.S. hospitals generate approximately 6,600 tons of waste per day, with non-hazardous solid waste representing up to 80% of the total. All waste is preventable to a certain extent. And, the majority of non-hazardous solid waste can be recycled, composted, or otherwise diverted from landfill or incineration. Since the 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association mandating reduction in total waste volumes, hospitals have initiated ambitious waste prevention, sorting and recycling programs. Recycling protects natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and reducing the amount of waste sent to landfills and incinerators.

In response to the 1996 EPA finding that medical waste incineration was a major source of dioxin emissions in the United States, many hospitals have dramatically reduced the volume of medical waste and transitioned from incineration to alternative treatment technologies, where possible. A responsible plan for managing materials reduces the potential for accidental employee exposure, improper material segregation and environmental contamination.

Credit Goals

- Develop and implement a Waste Management Plan in compliance with the Waste Management Sections of the Joint Commission Environment of Care Standard 3.10 coordinating the facility's various waste policies into a single framework including but not limited to: a definition of the facility's waste streams, source reduction, solid waste management, construction and demolition debris recycling, segregation, recycling, reuse, spill response, mercury elimination, composting, low level radioactive waste monitoring, hazardous materials, pharmaceuticals, universal waste, employee education, donation policy and others as identified in the GGHC Waste Management section.
- The Waste Management Plan must include the following:
 - A tracking and reporting mechanism for waste and material weight or volume and associated cost information, as detailed in GGHC WM Prerequisite 2 Waste Generation Profile and Measurement.
 - Logistics for receiving, handling, returning, storing, spill response, and safe disposal of hazardous materials, recyclables and waste.
- Set clear expectations for facility-wide responsibility regarding required participation in environmental programs that cross several department lines.
- Provide departmental access to the plan and educate new and existing employees through annual staff education programs.

WM Prerequisite 1 continued

Waste Management Plan

- Establish and maintain a process for continuous review and updates of the plan on an annual basis with documentation in a committee structure, or equivalent decision-making body.

Note: An Environmental Management System (EMS) may be used to comply with this Prerequisite when waste management is addressed.

Suggested Documentation

- ☐ Compile a Waste Management Plan in accordance with Credit Goals.
- ☐ Annually demonstrate plan updates and review by showing commitment of Senior Leadership and through meeting minutes, records, or equivalent documentation over the past twelve-month period.
- ☐ Compile waste information tracking and reporting documentation on a minimum quarterly basis, demonstrated through tables and meeting minutes.

Reference Standards

U.S. Environmental Protection Agency (EPA) Environmental Management System (EMS), <http://www.epa.gov/ems/> An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. This Web site provides information and resources related to EMS for businesses, associations, the public, and state and federal agencies.

Joint Commission Environment of Care Standard 3.10, <http://www.jointcommission.org>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Refer to the Waste Management Sections of the Joint Commission Environment of Care Standard for additional information on setting up a Waste Management Plan. <http://www.h2e-online.org/jcaho.htm> or <http://www.practicegreenhealth.org>
- Identify opportunities for standardization among hospitals within the same health system.
- Provide Waste Plan for all new employees and annually.
- “Zero Waste” refers to a redefinition of waste streams. In a “zero waste” system, potential waste is reduced at its source through purchasing practices, and the eventual waste streams of a facility or organization are either returned to the natural world or recycled/reused in the manmade environment.

WM Prerequisite 1 continued

Waste Management Plan

Resources

American Society for Healthcare Environmental Services™, *An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities*, 1993.

Practice Greenhealth's "Ten Steps to Environmental Sustainability with Practice Greenhealth" webinar (both recorded and offered monthly via <http://www.practicegreenhealth.org>)

Practice Greenhealth's "Creating the Environmental Imperative in Healthcare: a Guide for Healthcare Executives," <http://www.practicegreenhealth.org>

Practice Greenhealth's Waste Profiler, <http://www.practicegreenhealth.org>

U.S. Environmental Protection Agency (EPA), WasteWise, <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/index.htm>

Zero Waste Standards, <http://www.zwia.org/standards.html>

Required

WM Prerequisite 2

Waste Generation Profile & Measurement

Intent

Establish baseline generation rates of all waste categories to enhance environmental goal setting and performance tracking.

Health Issues

U.S. hospitals generate approximately 6,600 tons of waste per day, with non-hazardous solid waste representing up to 80% of the total. All waste is preventable to a certain extent. And, the majority of non-hazardous solid waste can be recycled, composted, or otherwise diverted from landfill or incineration. Since the 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association mandating reduction in total waste volumes, hospitals have initiated ambitious waste prevention, sorting and recycling programs. Recycling protects natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and reducing the amount of waste sent to landfills and incinerators.

In response to the 1996 EPA finding that medical waste incineration was a major source of dioxin emissions in the United States, many hospitals have dramatically reduced the volume of medical waste and transitioned from incineration to alternative treatment technologies, where possible. Focusing waste reduction efforts on hazardous material use, management, recycling and proper disposal reduces disposal fees, increases regulatory compliance and worker safety, and reduces harmful emissions such as particulate air pollution and the release of mercury and other heavy metals generated by incineration.

Credit Goals

- Collect waste stream data and establish a tracking mechanism through invoice review and waste and recycling vendor reporting to establish a current baseline identifying the types and amounts of waste stream categories in weight or volume per month and cost per month for a minimum one year period. Characterize major waste streams including, at a minimum: regulated medical waste, solid waste, hazardous waste and recyclables. Calculate the percentage represented by each waste stream to help determine the focus of the waste reduction program. .
- Annually set waste segregation and reduction goals in alignment with GGHC WM Credits 1-3.
- Standardize vendors (where beneficial) and operations, and set up a data collection procedure, based on new data on materials and wastes.
- Identify waste data baseline and convert to adjusted patient day using the following calculation:

$$(\text{Total Patient Revenue}/\text{In-patient Revenue}) \times \text{Total Patient Days} = \text{Adjusted Patient Days}.$$

Note: Calculating data into adjusted patient day allows facilities to benchmark within their system, regionally or nationally. This equation normalizes data across facility type.
- At a minimum of quarterly, report waste profile to Joint Commission's Environment of Care (EOC) committee or equivalent decision-making body to measure the impact of the segregation programs, to continuously improve waste prevention and recycling efforts and to identify areas of continued focus.

WM Prerequisite 2 continued

Waste Generation Profile & Measurement

Suggested Documentation

- ☐ Compile waste stream data and the waste tracking mechanism, including percentage calculations and adjusted patient day in accordance with Credit Goals.
- ☐ Annually demonstrate plan updates, goal setting and review of progress through compiled meeting minutes, records or equivalent documentation from the previous twelve-month period in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Using the Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E) national benchmark data, develop action plans to address waste prevention, recycling, reuse and segregation improvement strategies.
- Join Practice Greenhealth's (formerly Hospitals for a Healthy Environment or H2E) free monthly webinar, "Ten Steps to Getting Started With Practice Greenhealth," <http://www.practicegreenhealth.org> in Webinar section.
- Use Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E) Data Collection Tool to facilitate data coordination, analysis, benchmarking and reporting.
- Through working with Accounts Payable and Purchasing, ensure that all waste and recycling vendors are accounted for and that every waste material removal is included in the baseline profile.
- Consider developing baseline waste data for the Food Services Department in order to directly measure the impact of food waste prevention, donation, composting and recycling in the Food Services Area.
- Consider developing baseline waste data for the Operating Room (Surgical Services) in order to directly measure the impact of waste prevention, donation, reprocessing, reuse, recycling, fluid management and segregation practices, specific to the operating room.
- Provide the Waste Management Plan developed for GGHC EM Prerequisite 1: Waste Management Plan to all new employees and annually to ensure education of all staffers on waste and recycling protocol.
- Include a tour of waste and recycling storage areas in New Employee Orientation.

WM Prerequisite 2 continued

Waste Generation Profile & Measurement

Resources

American Society for Healthcare Environmental Services™, An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities, 1993.

Practice Greenhealth's "Ten Steps to Environmental Sustainability with Practice Greenhealth" webinar (both recorded and offered monthly via <http://www.practicegreenhealth.org>)

Practice Greenhealth's "Ten Steps for Senior Healthcare Executives,"
<http://www.practicegreenhealth.org>

Practice Greenhealth's Waste Profiler, <http://www.practicegreenhealth.org>

Sehulster LM, et al. Guidelines for environmental infection control in health-care facilities. 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004, <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

State Regulator Locator, <http://www.practicegreenhealth.org>

U.S. Environmental Protection Agency (EPA), WasteWise, <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/index.htm>

U.S. Environmental Protection Agency (EPA), Environmental Management System, (EMS) <http://www.epa.gov/ems/> An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. This Web site provides information and resources related to EMS for businesses, associations, the public, and state and federal agencies

Required

WM Prerequisite 3 Solid Waste Land Disposal

Intent

Prevent contamination of the land associated with improper disposal of toxic, hazardous, infectious or radiological substances.

Health Issues

Health care facilities have the potential to contaminate the land by improperly disposing of a wide variety of substances including pharmaceuticals, hazardous chemicals and heavy metals, infectious waste, radiologicals and other wastes that require special disposal. Improper disposal can expose sanitary workers to hazardous substances. Once deposited in an inappropriate landfill, these substances can contaminate air, surface- and ground-water and surrounding land, potentially exposing people and wildlife in the surrounding community. Moreover, water treatment plants do not remove or destroy many of these substances, potentially leading to population-wide exposures to low levels of toxic, hazardous, or radiological substances through drinking water systems. Health care facilities should develop waste minimization, segregation and disposal programs that meet all applicable regulatory requirements and prevent contamination of the surrounding community. Facilities should also select waste contractors that treat or handle waste in the most environmentally responsible manner available while meeting all applicable government regulations.

Credit Goals

- Verify that contractors selected for solid, medical or hazardous waste treatment are licensed and permitted by the state.
- Ensure contract language with waste contractors requires full compliance with applicable state disposal rules for applicable waste types.
- Select contractors and technologies for medical, hazardous and mixed waste treatment that meet Maximum Achievable Control Technology (MACT) standards. Verify company compliance with environmental standards utilizing EPA's ECHO Compliance Database.
- Ensure contract language with waste contractors requires verification that chemotherapeutic agents, regulated medical waste, pathological waste, sharps, hazardous materials and low level radioactive waste are properly transported.

Suggested Documentation

- ☐ Compile and annually update records of solid, medical or hazardous waste treatment contractors' licensures, permits, and compliance with Maximum Achievable Control Technology (MACT) standards in accordance with Credit Goals.
- ☐ Compile and annually update documentation of contracts in accordance with Credit Goals.
- ☐ Track and annually review contract language preventing improper shipping and final disposal of chemotherapeutic agents, regulated medical waste, pathological waste, sharps, hazardous materials and low level radioactive waste in accordance with Credit Goals.

WM Prerequisite 3 continued

Solid Waste Land Disposal

Reference Standards

U.S. Environmental Protection Agency (EPA) NESHAPS. Maximum Achievable Control Technology (MACT) Standards, <http://www.epa.gov/combustion/>

U.S. Environmental Protection Agency (EPA) Enforcement and Compliance History Online (ECHO), <http://www.epa-echo.gov/echo/>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Conduct site tours at all Treatment, Storage and Disposal facilities to ensure regulatory compliance.
- Implement waste segregation programs facility-wide to prevent mixing of waste types.
- Review regulated medical waste (RMW) definitions for the state where the facility is located and develop and implement a RMW minimization plan in accordance with the regulatory body's definition.
- Establish regular contact (at a minimum annual) and build relationships with waste vendors, haulers, landfills and transfer stations.
- Keep a contact list of appropriate regulatory contacts on hand for each waste stream. When in doubt, ask regulators for help interpreting the best response to a situation.

Resources

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Hazardous Waste Regulations-State Locator Tool, <http://www.practicegreenhealth.org> or <http://cms.h2e-online.org/hz.html>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Regulated Medical Waste Regulations-State Locator Tool, <http://www.practicegreenhealth.org>, <http://cms.h2e-online.org/ee/rmw/state-rmw-regulations/>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Universal Waste Regulations-State Locator Tool, <http://www.h2e-online.org/uw.html>

U.S. Nuclear Regulatory Commission, <http://www.nrc.gov/>

1-3 points

WM Credit 1.1-1.3

Solid Waste & Material Management: **Waste Prevention & Reduction**

Intent

Reduce solid waste disposal in land, air and water through prevention, reuse, recycling, donation and composting.

Health Issues

U.S. hospitals generate approximately 6,600 tons of waste per day, with non-hazardous solid waste representing up to 80% of the total. All waste is preventable to a certain extent. And, the majority of non-hazardous solid waste can be recycled, composted, or otherwise diverted from landfill or incineration. Since the 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association mandating reduction in total waste volumes, hospitals have initiated ambitious waste prevention, sorting and recycling programs. Recycling protects natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and reducing the amount of waste sent to landfills and incinerators.

In response to the 1996 EPA finding that medical waste incineration was a major source of dioxin emissions in the United States, many hospitals have dramatically reduced the volume of medical waste and transitioned from incineration to alternative treatment technologies, where possible. Focusing waste reduction efforts on hazardous material use, management, recycling and proper disposal reduces disposal fees, increases regulatory compliance and worker safety, and reduces harmful emissions such as particulate air pollution and the release of mercury and other heavy metals generated by incineration.

Credit Goals

- Measure, track and report annual reduction in total solid waste as indicated in the table below. Incorporate steps/policies into the facility's Waste Management Plan (GGHC WM Prerequisite 1) to eliminate, minimize, recycle, substitute, donate and safely dispose of wastes to reduce overall waste generation. Policies shall address, at a minimum, the types of products that are recycled or otherwise diverted, specifications for the collection and storage containers, frequency of pick up, vendor information and in-house contact information.

Note: Construction and Demolition debris of any kind are excluded from this calculation.

Credit 1.1 (1 point)	Achieve 15% waste diversion or 25 pounds of Non-regulated Medical Waste per adjusted patient day in waste.
Credit 1.2 (2 points total)	Achieve an additional 20% waste diversion to achieve 35% waste reduction rate (1 point in addition to 1.1) or achieve 20 pounds of Non-regulated Medical Waste per adjusted patient day.
Credit 1.3 (3 points total)	Achieve an additional 15% waste diversion to achieve 50% reduction rate (1 point in addition to 1.2) or 15 pounds of Non-regulated Medical Waste per adjusted patient day.
Note: For an innovation point achieve the following:	Continue decreasing the waste generation rate by 2% per year towards achieving zero waste status, defined as 90% diversion.

WM Credit 1.1-1.3 continued

Solid Waste & Material Management: **Total Waste Prevention & Reduction**

**Note: see GGHC WM Prerequisite 2 for adjusted patient day baseline calculations.*

(Total Patient Revenue/In-patient Revenue) X Total Patient Days = Adjusted Patient Days.

Calculating data into adjusted patient day allows facilities to benchmark within their system, regionally or nationally. This equation normalizes data across facility type, although others prefer percentage of overall waste.

***Note: Baseline is the amount of wastes generated per category as outlined in WM Prerequisite 2.*

AND

- Conduct site inspections at minimum on contract renewal for all final waste treatment, storage and disposal facilities for solid waste (landfill), medical waste, hazardous waste, radioactive substances, and mixed waste, and include in contract language a requirement that companies notify the health care facility of any significant change in treatment technology, process or final disposal location that requires permit modification.
- Avoid municipal waste incineration for all waste streams, except where required. (See GGHC WM Credit 2.2: Regulated Medical Waste Reduction.)

Suggested Documentation

- ☐ Compile and annually review documentation tracking waste diversion over the baseline established in GGHC WM Prerequisite 2: Waste Generation Profile. Include quarterly summary reports on the total waste produced, with hauler documentation and calculations of the amount of each type of waste that has been disposed of, recycled, or otherwise diverted.
- ☐ Compile annually update, and incorporate in the Waste Management Plan (GGHC WM Prerequisite 1) applicable written policies for waste prevention, reuse and recycling programs and avoidance of municipal waste incineration for all waste streams in accordance with Credit Goals.
- ☐ Compile receipts, purchase order or invoices for all contracted waste diversion services such as recycling pick up and removal.
- ☐ Compile documentation of site inspections for all final waste treatment, storage and disposal facilities for solid waste (landfill), medical waste, hazardous waste, radioactive substances, and mixed waste in accordance with Credit Goals.

Reference Standards

There are no reference standards for this credit.

WM Credit 1.1-1.3 continued

Solid Waste & Material Management: **Total Waste Prevention & Reduction**

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Calculate the percentage recycled in comparison to the overall waste stream, inclusive of hazardous, regulated medical waste and nonregulated solid waste.
- Calculate furniture, fixtures and equipment salvaged from renovations as part of the total solid waste diversion plan.
- Educate staff on the waste reduction program and the importance of waste stream segregation using training posters, videos, signage, memos and newsletters.
- To convert a waste calculation from volume to weight: Density of waste x Volume of waste = Weight of waste, where density equals weight per unit volume. For more information on converting between weight and volume, visit http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-008.html
- Prevent waste at the source, wherever possible. Include waste management expertise from Environmental Services/Housekeeping (or equivalent) on the facility's environmentally preferable purchasing committee or supply chain to assist with waste prevention activities. See GGHC EP Credit 1: Solid Waste Prevention in Purchasing.
- Identify service providers and vendors in region to implement the simplest source segregation and recycling programs. Single stream or commingled programs (mixed materials, like glass, metal and plastic) can reduce the number of bins, increasing the waste diversion rate through simplicity and maximizing collection rates.
- Review the following materials to ensure there is a plan for proper management from a waste volume perspective:
 - Recycling: paper, plastic, glass, metal, construction and demolition, blue wrap, shrink wrap, etc.
 - Universal Wastes: batteries, bulbs, ballasts, other mercury containing equipment, electronic waste, etc.
- Operational strategies include substitution of disposable food service products and Operating Room instruments and linens; substitution of reusable for disposable gowns; and, reduction in packaging waste through specific contractual terms with supply vendors.
- "Zero Waste" refers to a redefinition of waste streams. In a "zero waste" system, potential waste is reduced at its source through purchasing practices, and the eventual waste streams of a facility or organization are either returned to the natural world or recycled/reused in the manmade environment.
- Research whether the facility is subject to a state or local law requiring certain levels of recycling.
- Consider educational and employee engagement strategies such as using posters and container signage to promote recycling or shared saving initiatives, parties, promotional events, give aways, etc.

WM Credit 1.1-1.3 continued

Solid Waste & Material Management: **Total Waste Prevention & Reduction**

- Consider this table for waste segregation guidance

Waste Type	Definition	Target as % of Total Waste	General Disposal Methods	Typical Cost for Disposal
Waste Reduction Programs (recycling, reuse, source reduction)	Reducing: using less product in the first place - generating less waste. Reusing: materials exchanges - using a product until it is no longer usable! Recycling: Refuse which is re-processed into new products.	Beginner: 10-15% Intermediate: 15- 25% Expert: 25– 35% Star >35%	Most recyclables are shipped off-site for processing and subsequent reuse.	Cardboard and paper should generate a revenue; Glass and plastics typically cost Objective: total cost of program should beat landfill costs (i.e. avoided landfill costs pay for the program)
Infectious Waste (RMW, bio-hazard)	Solid or liquid wastes that have a <u>significant</u> potential for transmitting infection or require special handling due to state regulations, and some federal regulations.	Beginner: 15-20% Intermediate: 12-15% Expert: 8– 12% Star <8%	Treatment- like autoclave then landfill 10% of <u>total</u> RMW is path waste that may require incineration	Off-site treatment: \$0.26 - \$0.38 per lb; \$520 – \$760 per ton
Hazardous Chemical Waste	Solid or liquid waste containing flammable, toxic, corrosive or reactive chemicals. Also includes a “special hazards” category (ex. - radioactive). And “listed” wastes.	Varies regionally, but deserves focus if less than 1%. Too little hazardous waste can be an indicator of improper disposal	Managed according to OSHA, EPA and local and state regulations and shipped off site for proper disposal.	Up to \$5000 per ton depending upon material
General Solid Waste	Solid wastes that are <u>not</u> hazardous, infectious or recyclable. May include packaging, plastics, food, and general refuse.	Beginner: 70-75% Intermediate: 60-70% Expert: 50-60% Star <50%	Landfill or municipal solid waste incinerator	Wide range depending upon area of country: \$0.02 - \$.50 per lb.: \$33-\$100 per ton

WM Credit 1.1-1.3 continued

Solid Waste & Material Management: **Total Waste Prevention & Reduction**

Resources

The American Hospital Association (AHA) and the United States Environmental Protection Agency (U.S. EPA) signed a Memorandum of Understanding identifying goals to reduce the impact of health care facilities on the environment, including specific waste reduction goals.
<http://www.h2e-online.org/about/mou.htm>.

American Society for Healthcare Environmental Services™, An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities, 1993.

California Integrated Waste Management Board, Hospital Waste Reduction, February 1999,
<http://www.ciwmb.ca.gov>

OSHA Bloodborne Pathogens Standard, 1991,
<http://www.osha.gov/SLTC/bloodbornepathogens/index.html>

Practice Greenhealth's "Ten Steps to Environmental Sustainability with Practice Greenhealth" webinar (both recorded and offered monthly via <http://www.practicegreenhealth.org>)

Practice Greenhealth's "Ten Steps for Senior Healthcare Executives,"
<http://www.practicegreenhealth.org>

Practice Greenhealth's Waste Profiler, <http://www.practicegreenhealth.org>

Sehulster LM, et al. Guidelines for environmental infection control in healthcare facilities. 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004. available at: www.cdc.gov/ncidod/hip/enviro/guide.htm

U.S. Environmental Protection Agency (EPA), MATT designation,
<http://www.epa.gov/oar/oaqps/takingtoxics/p2.html>

U.S. Environmental Protection Agency (EPA), WasteWise, <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/index.htm>

Zero Waste Standards, <http://www.zwia.org/standards.html>

1 point

WM Credit 1.4

Solid Waste & Material Management: Recycling & Reuse of Facility Alterations & Additions

Intent

Reduce amount of waste associated with renovations and alterations through deconstruction, material reuse, donation and recycling.

Health Issues

The U.S. EPA estimates that more than 30% of municipal solid waste is generated by construction and demolition activities. Typical construction projects generate approximately 2.2 pounds of waste per square foot, which equates to over 110 thousand tons of construction waste annually based on current rates of over 100 million square feet of annual average health care construction. A 1998 study by the New York State Department of Health found that women living near solid waste landfills have a four-fold increased chance of bladder cancer or leukemia, based on data from 38 landfills, while a 1989 study by the U.S. EPA found elevated cancers of the bladder, lung, stomach and rectum in counties with the highest concentration of waste sites. Municipal solid waste incinerators emit hydrocarbons, heavy metals, dioxins and furans, acid gases, sulfur dioxide, nitrogen oxides and particulates, exposure to each of which poses risks to human health. Diversion of construction and demolition (C&D) debris through salvaging and recycling extends the life of existing landfills and reduces demand for virgin resources thereby curbing unhealthy air and water emissions resulting from resource extraction, manufacturing with virgin feedstocks and from landfill and incineration operations.

Credit Goals

- Develop and implement a process (both written and in practice) to conduct a walk-through of areas prior to renovation to identify wastes, materials, deconstruction opportunities, supplies and equipment for reuse, donation or proper cleanup and disposal in preparation for the renovation. Set up a system to coordinate responsible parties to reduce waste and conserve financial and natural resources prior to area demolition.
- Include in the Waste Management Plan (as defined in GGHC WM Prerequisite 1) a waste diversion program covering materials for facility renovations, demolitions, refits and new construction additions. This applies only to base building elements permanently or semi-permanently attached to the building itself that enter the waste stream during facility renovations, demolitions, refits and new construction additions. Examples include, but are not limited to, building components and structures (wall studs, insulation, doors, windows); panels; attached finishings (drywall, trim, ceiling panels); carpet and other flooring material; adhesives; sealants; paints and coatings.

Note: Materials considered furniture, fixtures and equipment (FF&E) are not considered base building elements and are excluded from this credit. See GGHC WM Credit 1.1-1.3 for the solid waste calculation including FF&E. Mechanical, electrical and plumbing components and specialty items such as elevators are also excluded from this credit.

WM Credit 1.4 continued

Solid Waste & Material Management:

Recycling & Reuse of Facility Alterations & Additions

- Divert minimum 50% of waste, calculated by weight or volume, generated annually by all facility alterations and additions from disposal to landfills and incineration facilities through recycling and reuse. If the facility undergoes outside contracted projects, the calculation shall either include all of these projects in the calculation or exclude them all.

Note: An innovation point is available to facilities that divert minimum 70% of waste, calculated by weight or volume, generated by facility alterations and additions from disposal to landfills and incineration facilities through recycling and reuse.

Note: See the "Facility Alteration & Additions" section in the Introduction to the GGHC Operations section for a definition of the scope of construction projects to be included in the credit calculation.

Suggested Documentation

- ☐ Document and annually review the success of the pre-construction walk-through program in accordance with Credit Goals, including walk-through dates, follow up, responsible individuals and impact on the project's waste diversion percentage.
- ☐ Document and annually review evidence that the waste diversion program meets a minimum 50% annual threshold in accordance with Credit Goals.
- ☐ Compile ongoing documentation of contract language requiring applicable contractors and subcontractors to participate in the recycling, reuse and donation program.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.
- Incorporate waste management policies applicable to any facility alteration and addition projects occurring on the site into the Waste Management Plan.
- Withhold the responsible party's pay check before the area is relinquished, to ensure proper attention is given to coordinate proper segregation of waste materials prior to departure. For example, if a grant has ended for a research study, the responsible party has to be part of the walk through to identify proper segregation and removal of hazardous, infectious or otherwise regulated materials so they are safely and legally discarded.
- Identify licensed haulers and processors of recyclable materials.

WM Credit 1.4 continued

Solid Waste & Material Management: Recycling & Reuse of Facility Alterations & Additions

- Identify markets for salvaged materials.
- Employ deconstruction, salvage and recycling strategies and processes.
- Document the cost for recycling, salvaging and reusing materials.
- Incorporate source reduction on the job site as an integral part of the plan to reduce solid waste.
- Investigate salvaging/recycling lighting fixture pans when retrofitting.
- Consider recycling:
 - Cardboard
 - Metal
 - Brick
 - Acoustical board and tile
 - Concrete
 - Plastic
 - Clean wood
 - Glass
 - Gypsum wallboard
 - Carpet
 - Insulation
- Designate a specific area on the construction site appropriate for either on-site or off-site sorting of materials.
- Record efforts throughout the construction process.
- Identify construction haulers and recyclers to handle the designated materials.
- Reuse unpainted gypsum board waste as a soil amendment if appropriate to project soil conditions.
- Note that salvage may include donation of materials to charitable organizations such as Habitat for Humanity.
- Pay particular attention to lead in C&D debris, which is often used as components of Radiation Protection Systems. Separate sheet lead radiation protection, lead lined gypsum board products, and lead-lined doors and frames for reuse, salvage or reprocessing. Salvage all lead-lined glazing products for reuse or reprocessing.

Resources

Associated General Contractors of America. *Constructing an Environmental Management System: Guidelines and Templates for Contractors*, <http://www.agc.org>

Building Materials Reuse Association. Scroll down for link to their directory which lists organizations/companies around the country that can assist with salvage and deconstruction on old hospitals (and other buildings) being taken down or remodeled. <http://www.ubma.org/>

Construction and Demolition Waste Recycling Information, California Integrated Waste Management Board (CIWMB), <http://www.ciwmb.ca.gov/ConDemo/Materials/>.

WM Credit 1.4 continued

Solid Waste & Material Management: Recycling & Reuse of Facility Alterations & Additions

Construction Industry Compliance Assistance, How to find C&D regulations in your region and find a Construction and Demolition recycler; Construction Assistance; Compliance Assistance, including Construction and Demolition Debris State Resources, <http://cicacenter.org/solidregs.html>

Construction Waste Management Database, US Government Services Administration (GSA), <http://www.wbdg.org/ccbref/cwm.php>. Free online service for those seeking companies that recycle construction debris in their area.

"Deconstruction – The First Step in Green Building", Waste-Match. NY Wa\$teMatch fosters environmentally sound economic development by doing research on solid waste reduction and resource recovery practices and by cultivating new opportunities in sustainable business. <http://wastematch.org/>

Institution Recycling Network document "Recycling Construction and Demolition Wastes – A Guide for Architects and Contractors." The site also includes sample specifications for Construction and Demolition Recycling. These specifications can be included in Requests for Proposals and contract language to assure that recycling will be part of the project. They allow the specification writer to identify what materials are to be recycled, and include planning, reporting, and recordkeeping requirements. The site also shares case studies demonstrating the cost effectiveness. <http://www.wastemiser.com/resources.html>

King County – Sample specification as well as other useful data, <http://www.metrokc.gov/dnrp/swd/construction-recycling/documents.asp>

Massachusetts Department of Environmental Protection – Construction & Demolition Waste Plan, <http://www.mass.gov/dep/recycle/cdhome.htm>

Recycling and Waste Management During Construction, City of Seattle, <http://www.metrokc.gov/procure/green/wastemgt.htm>.

StopWaste.org - StopWaste.Org is the Alameda County, CA Waste Management Authority and the Alameda County Source Reduction and Recycling Board operating as one public agency. <http://www.stopwaste.org/home/index.asp?page=292>

U.S. Environmental Protection Agency (EPA), Construction and Demolition Debris Page, <http://www.epa.gov/epaoswer/non-hw/debris-new/index.htm>

Waste Spec: Waste Specifications for Construction Waste Reduction, Reuse and Recycling, Triangle J Council of Governments, July, 1995, <http://www.tjcog.dst.nc.us>

Whole Building Design Guide, Construction Waste Management Database. The Whole Building Design Guide provides government and industry practitioners with one-stop access to up-to-date information on a wide range of building-related guidance, criteria and technology from a 'whole buildings' perspective. <http://www.wbdg.org/tools/cwm.php>

1-2 points

WM Credit 2.1-2.2

Regulated Medical Waste Reduction

Intent

Reduce disposal of regulated medical waste to landfills, incinerators and alternative treatment plants through improved segregation, change of work practices and use of emerging technology.

Health Issues

U.S. hospitals generate approximately 6,600 tons of waste per day, with non-hazardous solid waste representing up to 80% of the total. All waste is preventable to a certain extent. And, the majority of non-hazardous solid waste can be recycled, composted, or otherwise diverted from landfill or incineration. Since the 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association mandating reduction in total waste volumes, hospitals have initiated ambitious waste prevention, sorting and recycling programs. Recycling protects natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and reducing the amount of waste sent to landfills and incinerators.

In response to the 1996 EPA finding that medical waste incineration was a major source of dioxin emissions in the United States, many hospitals have dramatically reduced the volume of medical waste and transitioned from incineration to alternative treatment technologies, where possible. Focusing waste reduction efforts on hazardous material use, management, recycling and proper disposal reduces disposal fees, increases regulatory compliance and worker safety, and reduces harmful emissions such as particulate air pollution and the release of mercury and other heavy metals generated by incineration.

Credit Goals

WM Credit 2.1 (1 point)

- Develop a facility policy for regulated medical waste disposal in collaboration with infection control and environmental services that is based on and references the definition of regulated medical waste (RMW) established by Authorities Having Jurisdiction (AHJs). AHJs for RMW may include the U.S. Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen Standard or state-level environmental agencies or departments of health. Defer to the most stringent standard having jurisdiction and comply with CDC/HICPAC's 2003 Guidelines for Environmental Infection Control.. Ensure that specific details covering products such as syringes, specimen bags, ampules, vials, trace chemotherapeutic waste, etc., are covered by the policy.
- Provide RMW segregation training for all new and existing employees, at the departmental level and annually.
- Demonstrate that the regulated medical waste (RMW) stream (by weight or volume) is less than 10% of the total waste stream – calculated over a minimum 12 month period after establishing a baseline, as outlined in with GGHC WM Prerequisite 2.
- Annually provide Department of Transportation training for all employees preparing RMW for removal.
- Annually provide written RMW education information in newsletters and brochures targeted to physicians and other clinical staff, including agency staff.

WM Credit 2.1-2.2 continued

Regulated Medical Waste Reduction

- For the first twelve months, report RMW generation rate and percentage of overall waste stream at least quarterly to the Joint Commission's Environment of Care (EOC) committee or equivalent decision-making body. (See GGHC WM Prerequisite 2: Waste Generation Profile.) Thereafter, report annually.

WM Credit 2.2 – (1 point in addition to WM Credit 2.1)

- Demonstrate that incineration is used only to dispose of the fraction of the regulated medical waste stream required by regulations to be incinerated. Segregate waste streams to ensure that no mercury or batteries are present in the portion of regulated medical waste stream bound for incineration or any other treatment technology. When considered non-infectious (or when feasible under regulations), avoid incineration of any halogenated compound, including PVC plastic and brominated flame retardants.
- Incorporate steps into the facility's Waste Management Plan (as outlined in GGHC WM Prerequisite 1) to implement maximum achievable control technology (MACT) alternatives to incineration.

Note: Pyrolysis and plasma-arc are not considered an acceptable alternative to incineration.

Suggested Documentation

WM Credit 2.1

- ☐ Track and annually review the definition of RMW, the RMW policy and RMW sources and reduction (by weight) over a minimum of one-year period as part of the Waste Management Plan outlined on GGHC WM Prerequisite 1. Use the baseline defined in GGHC WM Prerequisite 2: Waste Generation Profile to calculate compliance with Credit Goals.
- ☐ Compile and annually update staff training records and RMW information included in clinical newsletters and brochures in accordance with Credit Goals.
- ☐ Compile quarterly updates of the facility's RMW generation rate and percentage of overall waste stream to the Joint Commission's Environment of Care (EOC) committee or equivalent decision-making body through meeting minutes, records, or equivalent documentation over the past 12-month period.

WM Credit 2.2

- ☐ Document and annually review on-site alternative (non-incineration and non-pyrolysis) medical waste treatment technologies and a description of the technology selected OR maintain a contract with a provider for off-site alternate (non-incineration and non-pyrolysis) technology waste treatment.

Reference Standards

CDC/HICPAC's Guidelines for Environmental Infection Control, 2003,
http://www.cdc.gov/ncidod/dhqp/gl_envirioninfection.html

U.S. Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen Standard (1910.1030),
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051

WM Credit 2.1-2.2 continued

Regulated Medical Waste Reduction

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this Prerequisite with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Use state regulations to frame the facility definition of Regulated Medical Waste, recognizing that while state by state definitions exist, much of the regulations are open to interpretation and require a team approach to the facility's Regulated Medical Waste definition. For example, in a laboratory, all disposable devices should be laid out and identified for disposal as sharps, Regulated Medical Waste, autoclave and regular waste disposal. Many of these determinations are based on the perceived risk and whether something is deemed a "sharp."
- Reducing medical waste volumes lowers disposal costs, while proper waste stream management allows for safer, effective disposal methods.
- Assess all RMW-generating locations and maximize reduction opportunities. Assess each location for detailed function.
- Track RMW generation rate as a performance indicator under Joint Commission Hazardous Material and Waste Management Plan.
- Consider incentivizing workers to improve segregation of RMW through promotions like movie tickets, cash, etc., that share the savings generated by the RMW program.
- Provide adequate training for all staff to ensure only appropriate discards are disposed of in appropriate puncture and leak proof receptacles.
- Assess and implement proper placement of RMW receptacles to discourage inappropriate disposal. Affix a label to the lid of all RMW containers, clearly identifying what kind of waste should be deposited.
- Install engineering controls for suction canister evacuation in operating rooms and other high volume areas.
- Consider employing reusable sharps containers and reusable surgical containers and fluid management systems as a means to reduce RMW. Develop contract language or policy to ensure reusable containers are properly cleaned prior to re-use.
- In collaboration with infection control and safety committees, assess the potential to utilize single-use device reprocessing in accordance with the U.S. Food and Drug Administration Enforcement Priorities for Single-Use Devices Reprocessed by Third Parties and Hospitals (<http://www.fda.gov/cdrh/comp/guidance/1168.pdf>) as a means to reduce RMW and generate cost savings while ensuring patient safety.
- Conduct RMW rounds periodically, inspecting waste segregation practices. Document on-the-spot retraining, where necessary.
- Work with the communications department to develop training and educational information such as posters and educational memos targeted to RMW reduction.

WM Credit 2.1-2.2 continued

Regulated Medical Waste Reduction

Resources

Health Care Without Harm, Non-Incineration Medical Waste Treatment Technologies, August 2001, <http://www.noharm.org>

Katami, Takeo, et al (2002) "Formation of PCDDs, PCDFs, and Coplanar PCBs from Polyvinyl Chloride during Combustion in an Incinerator" *Environ. Sci. Technol.*, 36, 1320-1324.

Minnesota Technical Assistance Program (MNTAP), Suction Canister waste Reduction, <http://www.Mntap.umn.edu/health/91-canister.htm>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), 10-Step Guide to Regulated Medical Waste Reduction, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/pubs/tensteps/Rmw10steps.pdf>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Alternative Treatment Technology *Stat Green* Success Story, <http://www.h2e-online.org/pubs/STATGreen/July2005.pdf>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Regulated Medical Waste page, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/waste-inf.htm>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Single Use Device Reprocessing Page, <http://www.practicegreenhealth.org> or <http://cms.h2e-online.org/ee/waste-reduction/waste-minimization/single-use-device-reprocessing/>

Regulated Medical Waste State Regulations locator, <http://www.hercenter.org/rmw/rmwlocator.html>

Suction Canister Waste Reduction, <http://www.mntap.umn.edu/health/91-canister.htm>

Thornton, Joe, PhD., "Environmental Impacts of Polyvinyl Chloride Building Materials, Healthy Building Network, Washington, DC, 2002, p. 56. (Analysis of salt and organochlorine content and dioxin formation in combustion)

U.S. Environmental Protection Agency (EPA), Resource Conservation Recovery Act (RCRA), <http://www.epa.gov/rcraonline/>.

U.S. Occupational Safety and Health Administration (OSHA), Bloodborne Pathogens Standard, <http://www.osha.gov/SLTC/bloodbornepathogens/>

Wagner, J., Green, A. 1993. Correlation of chlorinated organic compound emissions from incineration with chlorinated organic input. *Chemosphere* 26 (11): 2039-2054

Environmental Services

1-2 points

ES Credit 1.1-1.2

Environmentally Preferable Cleaning: **Policy Development**

Intent

Develop and implement an operational policy to limit exposure of building occupants and environmental services personnel to potentially hazardous chemical, biological and particulate contaminants from cleaning products and procedures, while ensuring effective infection control processes.

Health Issues

Sustainable cleaning practices are an essential part of sustainable building. Traditional cleaning products present a variety of human health and ecological concerns. They may contribute to poor indoor air quality and contain chemicals that cause cancer, reproductive disorders, respiratory ailments, eye and skin irritation, central nervous system impairment, and other human health effects. Cleaning products have also been shown to be a primary cause of work-related asthma, particularly in nurses and cleaning staff. In addition, some of these products contain Persistent Bioaccumulative and Toxic chemicals (PBTs), are classified as hazardous waste, and/or otherwise contribute to environmental pollution during their manufacture, transport, use, and/or disposal. In health care settings, continuous 24/7 building occupancy leads to the requirement for cleaning while the building is occupied. Non-toxic and least-toxic cleaning products exist for nearly every health care facility need.

Credit Goals

Develop and maintain an environmentally preferable cleaning policy for the facility addressing GGHC ES Credits 1.3-1.5 & 1.6 in addition to the criteria listed below. At a minimum, the policy must address all surfaces, including: floors, walls, furniture and stationary and rolling stock medical equipment.

Note: This credit does not apply to Food Service areas. Visit GGHC FS Credit 8.1-8.2: Chemical Management for Food Services for more information.

AND

ES Credit 1.1-1.2 continued

Environmentally Preferable Cleaning: Policy Development

ES Credit 1.1 (1 point)

Include the following criteria in the facility's environmentally preferable cleaning policy:

- Establish standard operating procedures (SOPs) addressing how an effective cleaning and hard floor and carpet maintenance system will be consistently utilized, managed, audited and effectively staffed. The SOPs shall include the following criteria:
 - Differentiation of cleaning zones within the facility as defined by infection control and environmental services policies and procedures. (e.g., from high touch, patient areas to general administration areas as delineated by an infection control committee risk assessment) to determine the kinds of cleaning products and processes to be used within each area. Based on the infection control risk assessment process, minimize use of disinfectants where not necessary for infection control reasons. Differentiation shall be based on the 2003 U.S. Centers for Disease Control and Prevention (CDC) *Guidelines for Environmental Infection Control in Healthcare Facilities*, CDC *Management of Multidrug-Resistant Organisms in Healthcare Settings*, 2006, and the American Society for Healthcare Environmental Services (ASHES) *Practice Guidance*.
 - For areas that require disinfection, use only EPA-registered hospital-use disinfectants " under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements.
 - Establish cleaning protocols that protect vulnerable building occupants.
 - Procedures for environmentally preferable cleaning of rolling stock, moveable medical equipment and non-critical patient care equipment as defined by the 2003 CDC *Guidelines for Environmental Infection Control in Healthcare Facilities* and EPA-registered hospital-use disinfectants under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).
 - Specifications for the use of chemical concentrates with appropriate dilution systems to minimize chemical use.
 - Manufacturer calibration of dispensing equipment at a minimum annually.
- Outline strategies for promoting and improving hand hygiene, emphasizing hand washing in accordance with the CDC "Hand Hygiene Guidelines."
- Establish guidelines for safe handling and storage of cleaning chemicals used in the facility, including a plan for managing hazardous spills or mishandling incidents in accordance with Joint Commission EC3.10.3, OSHA Hazard Communication, OSHA permissible exposure limits (PEL), NIOSH recommended exposure limits (REL) and/or EPA RCRA standards.
- Upon hire and annually, provide site-specific training for environmental services personnel in proper cleaning and disinfecting techniques, the proper concentration and dilutions for each chemical in use, and the hazards, use, maintenance, recycling and disposal of cleaning chemicals, dispensing equipment and packaging.

ES Credit 1.1-1.2 continued

Environmentally Preferable Cleaning: Policy Development

ES Credit 1.2 (1 point in addition to ES Credit 1.1)

In addition to GGHC ES Credit 1.1, include the following criteria in the facility's environmentally preferable cleaning policy:

- A commitment to phase in the purchase and implementation of sustainable cleaning and hard floor and carpet care products meeting the sustainability criteria outlined in ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products & Materials, granting preference to products that contain no added fragrance.
- A commitment to purchase cleaning products that are fragrance-free, to minimize impact on employees and vulnerable patient populations, and avoid the use of fragrance-emitting devices, air fresheners, fragrance or deodorizer sprays or urinal blocks.
- A commitment to phase in the purchase, lease, or contract use of cleaning equipment that reduces impact on Indoor Air Quality (IAQ), as outlined in ES Credit 1.6: Environmentally Preferable Cleaning: Environmentally Preferable Cleaning Equipment.
- A commitment to phase in the purchase or contracting out of sustainable floor care systems that employ "metal free" floor finish, thereby extending the period between stripping and recoating to at least twelve months. Floor care systems shall meet either Green Seal GS-40 for Industrial and Institutional Floor-Care Products OR phthalate-free products meeting Environmental Choice CCD-147 for Hard Floor Care.
- A commitment to collaborate with the purchasing department (or applicable staff) to phase in the installation of environmentally-preferable flooring systems, as defined in GGHC EP c3.1-3.5: Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions, that require least toxic floor care systems, as defined in GGHC ES Credit 1.3-1.5, through the substitution of least toxic chemical care systems for current flooring systems, and consideration of replacement flooring systems that can be effectively maintained with least toxic products.
- Annually evaluate new technologies, procedures and processes to ensure continuous improvement.
- Provide a mechanism for collecting occupant feedback (both patients and staff) on odors or concerns about cleaning products.

Suggested Documentation

- ☐ Compile documentation (e.g., records, inspections, etc.) and annually review progress associated with the environmentally preferable cleaning policy and its implementation in accordance with Credit Goals.

ES Credit 1.1-1.2 continued

Environmentally Preferable Cleaning: Policy Development

Reference Standards

American Society for Healthcare Environmental Serves (ASHES), Practice Guidance, <http://www.ASHES.org>

Centers for Disease Control and Prevention. 2003. "Guidelines for Environmental Infection Control in Healthcare Facilities," <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm>

Centers for Disease Control and Prevention. 2002. "Hand Hygiene Guidelines Factsheet," <http://www.cdc.gov/od/oc/media/pressrel/fs021025.htm>

Centers for Disease Control and Prevention. 2006. *CDC Management of Multidrug-Resistant Organisms in Healthcare Settings*, www.cdc.gov/ncidod/dhqp/pdf/ar/mdroguideline2006.pdf

Environmental Choice CCD-147 for Hard Floor Care, <http://www.ecologo.org>

Green Seal GS-40 for Industrial and Institutional Floor-Care Products, <http://www.greenseal.org/standards/industrialcleaners.htm>

Green Seal GS-41 for Industrial and Institutional Hand Cleaners, <http://www.greenseal.org> Joint Commission Environment of Care Standard EC3.10.3, <http://www.jointcommission.org> National Institute for Occupational Safety and Health (NIOSH), recommended exposure limits (REL), <http://www.cdc.gov/niosh/npg/>

U.S. Environmental Protection Agency (EPA), 40 CFR Parts 152, 156, and 158. Exemption of certain pesticide substances from Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements. Amended 1996. Federal Register 1996;61:8876-9, <http://www.epa.gov/oecaerth/civil/fifra/index.html>

U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), <http://www.epa.gov/rcraonline/>

U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication, <http://www.osha.gov/SLTC/hazardcommunications/index.html>

U.S. Occupational Safety and Health Administration (OSHA), Permissible Exposure Limits (PEL), <http://www.osha.gov/SLTC/pel/index.html>

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC FM Credit 6: IAQ Management Plan; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC ES Credit 1: Environmentally Preferable Cleaning; GGHC ES Credit 2: Entryway Systems; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 8: Chemical Management for Food Services; and GGHC EP Credit 2: Toxicity Prevention in Purchasing.
- Collaborate with the Infection Control Committee to identify areas where use of disinfectants can be minimized or eliminated such as floors that have not come into contact with blood or body fluids or contamination from multi-drug resistant organisms.

ES Credit 1.1-1.2 continued

Environmentally Preferable Cleaning: Policy Development

- Design operations and maintenance practices to ensure that the building functions at its highest levels of energy efficiency and indoor air quality performance, including scheduling maintenance and cleaning practices to maximize energy savings and occupant health and comfort.
- To decrease risk of cross contamination or transmission of infection, work with the Infection Control Committee to define and implement a color-coding system for cleaning chemicals. The Infection Control Committee and Environmental Services should work together to educate staff on the selected color-coding system.
- Replace aerosolized cleaning application methods in favor of pour and wipe to decrease airborne concentrations of chemicals. Use portion control devices such as mechanical dispensers, which help insure the safe mixing of cleaning solutions and reduce packaging and chemical consumption.
- Use chemicals that are automatically diluted using cold water, and/or use a chemical measuring and dilution control system that limits worker exposure to chemical concentrates.
- Refer to applicable state and local ordinances and guidelines; many states are enacting green standards for building maintenance.
- Specify textiles (upholstery) that can be cleansed with water-based, not solvent-based cleaners.
- Choose bathroom paper products with a preference for recycled content, chlorine free products. See GGHC ES Credit 1.5 for specifications.
- Utilize cleaning recommendations stated in the Public Health Notification from FDA, CDC, EPA and OSHA: Avoiding Hazards with Using Cleaners and Disinfectants on Electronic Medical Equipment, October 2007.

Resources

California Air Resources Board, <http://www.calregs.com>

Inform. *Cleaning for Health: Products and Practices for a Safer Indoor Environment*, August 2002, <http://www.informinc.org/cleanforhealth.php>

National Institute of Building Sciences, Indoor Environmental Quality (IEQ) Project, Operations & Maintenance, <http://ieq.nibs.org/om/>

Bruno Nicklaus, Cleaning and Maintenance Management. *Be mindful of green pitfalls, components, benefits. Helpful tips to consider when developing a green cleaning program.* July 2007, http://www.ungerglobal.com/worxcms_files/CMM.GreenCleaningBenefits.7.07.pdf

Public Health Notification from FDA, CDC, EPA and OSHA: Avoiding Hazards with Using Cleaners and Disinfectants on Electronic Medical Equipment. Oct. 2007, <http://www.fda.gov/cdrh/safety/103107-cleaners.html>

Practice Greenhealth, *Ten Step Guide To Green Cleaning*, <http://www.practicegreenhealth.org>

Practice Greenhealth, *Green Cleaning Webpage*, <http://www.practicegreenhealth.org>

ES Credit 1.1-1.2 continued

Environmentally Preferable Cleaning: Policy Development

Spaulding EH. Role of chemical disinfection in preventing nosocomial infections. In: Proceedings of the International Conference on Nosocomial Infections, 1970. Brachman PS, Eickhoff TC, eds. Chicago, IL: American Hospital Association, 1971:247--54.

U.S. Centers for Disease Control and Prevention. Appendix A: Regulatory Framework for Disinfectants and Sterilants. MMWR. *Recommendations and Reports*. December 19, 2003 / 52(RR17); 62-64, <http://www.cdc.gov/MMWR/preview/mmwrhtml/rr5217a2.htm>

U.S. Department of Labor, Occupational Safety and Health Administration. 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; needlesticks and other sharps injuries; final rule. Federal Register 2001;66:5317--25. As amended from and includes 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; final rule. Federal Register 1991;56:64174—82, <http://www.osha.gov/SLTC/dentistry/index.html>.

U.S. Environmental Protection Agency (EPA), 40 CFR Parts 152, 156, and 158. Exemption of certain pesticide substances from federal insecticide, fungicide, and rodenticide act requirements. Amended 1996. Federal Register 1996;61:8876-9, <http://www.epa.gov/lawsregs/search/40cfr.html>

U.S. Environmental Protection Agency (EPA), Antimicrobial Science Policies, Disinfectant Technical Science Section (DIS/TSS), <http://www.epa.gov/oppad001/sciencepolicy.htm>

U.S. Environmental Protection Agency (EPA), Sanitizing Rinses (for previously cleaned food-contact surfaces), DIS/TSS-4 Jan 30, 1979, http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm

U.S. Environmental Protection Agency (EPA), Selected EPA-Registered Disinfectants (EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses, <http://www.epa.gov/oppad001/chemregindex.htm>

U.S. Food and Drug Administration (FDA) and U.S. Environmental Protection Agency (EPA). Memorandum of understanding between the FDA and EPA: notice regarding matters of mutual responsibility---regulation of liquid chemical germicides intended for use on medical devices. Rockville, MD: US Department of Health and Human Services, Public Health Service, Food and Drug Administration, US Environmental Protection Agency, 1993.

US Food and Drug Administration (FDA). Interim measures for registration of antimicrobial products/liquid chemical germicides with medical device use claims under the memorandum of understanding between EPA and FDA. Rockville, MD: US Department of Health and Human Services, Food and Drug Administration, 1994.

US Food and Drug Administration (FDA). Guidance for industry and FDA reviewers: content and format of premarket notification [510(k)] submissions for liquid chemical sterilants/high level disinfectants. Rockville, MD: US Department of Health and Human Services, Food and Drug Administration, 2000, <http://www.fda.gov/cdrh/ode/397.pdf>.

1-3 points

ES Credit 1.3-1.5

Environmentally Preferable Cleaning: Products & Materials

Intent

Minimize exposure of building occupants and cleaning personnel to potentially hazardous chemical, biological and particulate contaminants, and reduce use of virgin paper resources in janitorial paper and other disposable product applications through purchase and proper implementation of environmentally preferable cleaning products and materials.

Health Issues

Sustainable cleaning practices are an essential part of sustainable building. Traditional cleaning products present a variety of human health and ecological concerns. They may contribute to poor indoor air quality and contain chemicals that cause cancer, reproductive disorders, respiratory ailments (including occupational asthma), eye and skin irritation, central nervous system impairment, and other human health effects. In addition, some of these products contain persistent bioaccumulative and toxic chemicals (PBTs), are classified as hazardous waste, and/or otherwise contribute to environmental pollution during their manufacture, transport, use, and/or disposal. In health care settings, continuous 24/7 building occupancy leads to the requirement for cleaning while the building is occupied.

Each year, US commercial and institutional users consume 4.5 billion pounds of janitorial paper and 35 billion plastic trash liners. Paper products with high recycled content reduce sulfur and greenhouse gas emissions during manufacture, conserve virgin forest resources and contribute to healthier forest ecosystems.

Non-toxic and least-toxic cleaning products and materials exist for general cleaning purposes in a health care facility. By working with infection control committees, hospitals can reduce the amount of unnecessary disinfection as part of their toxicity reduction and indoor air quality improvement plan.

Credit Goals

Note: This credit does not apply to Food Service areas. Visit GGHC FS Credit 8.1-8.2: Chemical Management for Food Services for more information.

- Achieve GGHC ES Credits 1.1 & 1.2.

AND

- Implement an environmentally preferable purchasing program for cleaning products and materials, disposable paper products and trash bags. Cleaning product and material purchases include both products for use by in-house staff and products used by outsourced service providers. Perform an annual assessment in collaboration with the Infection Control Committee and Environmental Services of all cleaning chemicals used within the facility.
- Annually document any enhancements necessary to continue cleaning with environmentally preferred cleaners, including cleaners that are not referenced in GGHC ES Credit 1.1, and identify purchasing parameters for cleaning chemical selection (e.g. chemical ingredients, fragrance level, etc.).

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

AND

ES Credit 1.3-1.4 (2 points)

- One point (up to 2 total) will be awarded for the purchase and implementation of every five categories of environmentally preferable cleaning products listed below where 100% of procurement meets one or more of the referenced standards for the category. Ensure that all procurement (e.g., General Purpose Cleaners, Carpet & Upholstery Cleaners, etc.) aligns with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1.

Note: Hand hygiene is excluded from this credit. See GGHC CM Credit 1.2 for guidance on hand hygiene processes and products.

CLEANER TYPE	REFERENCE STANDARDS
General Purpose Cleaners/Hard Surface Cleaners	<ul style="list-style-type: none"> Environmental Choice CCD-146 for Hard Surface Cleaners Green Seal GS-37 for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes
Glass Cleaners	<ul style="list-style-type: none"> Environmental Choice CCD 146 for Hard Surface Cleaners Green Seal GS-37 for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes
Carpet & Upholstery Cleaners	<ul style="list-style-type: none"> Environmental Choice CCD-148 for Carpet and Upholstery Care Green Seal GS-37 for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes
Cleaning & Degreasing Compounds	<ul style="list-style-type: none"> Environmental Choice CCD-110 for Cleaning and Degreasing Compounds Green Seal GS-34 for Cleaning and Degreasing Agents
Floor Cleaners/Strippers/Waxes	<ul style="list-style-type: none"> Environmental Choice CCD-147 for Hard Floor Care Green Seal GS-40 for Industrial and Institutional Floor-Care Products
Metal Polish	<ul style="list-style-type: none"> California Code of Regulations maximum allowable VOC levels for the specific product category
Drain/Grease Trap Additives	<ul style="list-style-type: none"> Environmental Choice CCD-113 for Drain or Grease Traps Additives
Fragrances/Odor Control Additive	<ul style="list-style-type: none"> Environmental Choice CCD-112 for Digestion Additives for Cleaning and Odor Control Environmental Choice CCD-115 for Odor Control Additives
Laundry Soaps/Cleaners	<ul style="list-style-type: none"> Non-phosphated (NP) detergents, and detergents formulated without nonylphenol ethoxylate (NPL)ⁱ. Also review Design for the Environment's (DfE) Key Characteristics of Laundry Detergent Ingredients GreenSeal GC-11 Environmental Criteria for Powdered Laundry Bleach

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

AND/OR

ES Credit 1.5 (1 point)

- One point will be awarded for the purchase and implementation of minimum five of the below categories of disposable products where 100% of procurement meets the referenced standard listed below. In addition, all disposable products shall be certified Processed Chlorine-Free® (PCF), if applicable. Ensure that all procurement aligns with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1.

DISPOSABLE PRODUCT	REFERENCE STANDARDS
Toilet tissue	<ul style="list-style-type: none"> Green Seal GS-01 for Tissue Paper
Paper hand towels	<ul style="list-style-type: none"> Green Seal GS-09 for Paper Towels and Napkins
Industrial wipes	<ul style="list-style-type: none"> Most current EPA Comprehensive Purchasing Guidelines
Facial tissues	<ul style="list-style-type: none"> Green Seal GS-01 for Tissue Paper
Plastic trash liners- solid waste	<ul style="list-style-type: none"> Environmental Choice CCD-126 for Plastic Film Products
Plastic trash liners- medical waste	<ul style="list-style-type: none"> Environmental Choice CCD-126 for Plastic Film Products Cadmium-free
Plastic trash liners- chemotherapy	<ul style="list-style-type: none"> Environmental Choice CCD-126 for Plastic Film Products

Note: Recycled content thresholds referenced in Green Seal standards meet or exceed the U.S. EPA Comprehensive Purchasing Guidelines.

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

Suggested Documentation

- ☐ Compile and annually revise documentation (e.g., records, inspections, cost data, etc.) of sustainable cleaning products and materials purchasing in accordance with Credit Goals.

Reference Standards

Green Seal GS-01 for Tissue Paper, <http://www.greenseal.org>

Green Seal GS-09 for Paper Towels and Napkins, <http://www.greenseal.org>

Green Seal GS-34 for Cleaning and Degreasing Agents, <http://www.greenseal.org>

Green Seal GS-37 for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes, <http://www.greenseal.org>

Green Seal GS-40 for Industrial and Institutional Floor-Care Products, <http://www.greenseal.org>

Green Seal GS-41 for Industrial and Institutional Hand Cleaners, <http://www.greenseal.org>

Environmental Choice CCD-104 for Hand Cleaners / Hand Soaps, <http://www.ecologo.org>

Environmental Choice CCD-110 for Cleaning and Degreasing Compounds, <http://www.ecologo.org>

Environmental Choice CCD-112 for Digestion Additives for Cleaning and Odor Control, <http://www.ecologo.org>

Environmental Choice CCD-113 for Drain or Grease Traps Additives, <http://www.ecologo.org>

Environmental Choice CCD-115 for Odor Control Additives, <http://www.ecologo.org>

Environmental Choice CCD-146 for Hard Surface Cleaners, <http://www.ecologo.org>

Environmental Choice CCD-147 for Hard Floor Care, <http://www.ecologo.org>

Environmental Choice CCD-148 for Carpet and Upholstery Care, <http://www.ecologo.org>

California Code of Regulations. Maximum Allowable VOC Levels, <http://www.calregs.com> and <http://www.green.ca.gov/EPP/building/cleaning.htm>

U.S. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines, <http://www.epa.gov/cpg/>

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC FM Credit 6: IAQ Management Plan; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC ES Credit 1: Environmentally Preferable Cleaning; GGHC ES Credit 2: Entryway Systems; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 4: Reusable and Non-Reusable Products; GGHC FS Credit 8: Chemical Management for Food Services; GGHC EP Credit 2: Toxicity Prevention in Purchasing; and, GGHC EP Credit 6: Office Supplies.*
- Ensure that all disinfectants meet 2003 CDC Guidelines for Environmental Infection Control and EPA-registered hospital-use disinfectants. Consider working with manufacturers and vendors to source disinfectants that also meet either California Code of Regulations maximum allowable VOC levels for the specific product category or Environmental Choice CCD-166: Disinfectants and Disinfectant-Cleaners.
- New cleaners should be chosen according to product attributes (e.g. proven efficacy for infection reduction, fragrance-free, staff comfort, etc.), group/service purchasing contract restrictions, EPA and FDA product certification, registration or clearance, and operational changes necessitated by the product.
- Evaluate paper dispensing systems, equipment and staff training to ensure optimal product efficacy. Use large rolls in paper towel dispensers and hands-free dispensers that limit paper portions wherever possible. Avoid C-fold or multi-fold paper towel systems.
- Prohibit products that are manufactured with carcinogens, mutagens and teratogens; aerosols; asthma-causing agents (asthmagens), respiratory irritants, and chemicals that aggravate existing respiratory conditions; neurotoxins; endocrine modifiers; benzene-based solvents, butoxyethanol, chlorinated organic solvents, and paradichlorobenzene; very acidic or alkaline products; anti-microbial agents in hand soaps for patients and visitors; persistent, bioaccumulative and toxic chemicals (PBTs); and products requiring disposal as hazardous waste.
- Use combination cleaner/disinfectants and dyes judiciously and only as necessary or where appropriate.

Resources

American Academy of Asthma, Allergy and Occupational Immunology. *Database on Occupational Asthma*, <http://www.remcomp.com/asmanet/asmapro/asmawork.htm>

American Society for Healthcare Environmental Services (ASHES) Practice Guidance, <http://www.ASHES.org>

Stephen Ashkin, and Holly, David, *Green Cleaning for Dummies*. 2007, <http://www.greencleaningfordummies.com/>

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

ASTM E1971-98, *Active Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings*,
http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGES/E1971.htm?L+mystore+ajps3214+1204066185

California Consumer Products Regulation. *Regulation for Reducing Volatile Organic Compound Emissions from Consumer Products*, <http://www.arb.ca.gov/consprod/regs/cp.pdf>

California Environmental Protection Agency and the Thomson Property Group. *Greening Your Building Toward Your Bottom Line*, <http://www.documents.dgs.ca.gov/green/EPP/Greening.pdf>

Code of Practice of the International Fragrance Association,
<http://www.ifraorg.org/Home/Code,%20Standards%20Compliance/page.aspx/8>

Centers for Disease Control and Prevention Guidelines for Environmental Infection Control in Health Care Facilities, http://www.cdc.gov/ncidod/hip/enviro/Enviro_guide_03.pdf

Center for a New American Dream, *Institutional Purchasing*,
<http://www.newdream.org/procure/products/clean.php>

Health Care Without Harm. *Guide to Choosing Safer Products & Chemicals: Implementing Chemicals Policy in Health Care*. 2007.

Carole LeBlanc, PhD, *The Massachusetts Toxic Use Reduction Institute: Surface Solutions Laboratory*, <http://www.cleansolutions.org/>

Environmental Choice CCD-166: Disinfectants and Disinfectant-Cleaners,
http://www.responsiblepurchasing.org/UserFiles/File/Cleaners/Standards/CCD_166_Disinfectants_2007.pdf

Minnesota Office of Environmental Assistance. *Choosing Environmentally Preferable Cleaners*,
<http://www.moea.state.mn.us/lc/choosing.cfm>

NAS Review Draft of EPA's *Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* (2004),
<http://www.epa.gov/ncea/pdfs/dioxin/nas-review/>

Pennsylvania Department of General Services. *The Pennsylvania Green Building Operations and Maintenance Manual*, http://www.dgs.state.pa.us/dgs/lib/dgs/green_bldg/greenbuildingbook.pdf

Practice Greenhealth, <http://www.practicegreenhealth.org>

Sustainable Hospitals Project, *Microfiber Mops and Cloths*, http://sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Cat&id=31

U.S. Centers for Disease Control and Prevention, CDC Guidelines for Hand Hygiene in Healthcare Settings, 2002, <http://www.cdc.gov/ncidod/dhqp/index.html>

U.S. Centers for Disease Control and Prevention, CDC Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006, <http://www.cdc.gov/ncidod/dhqp/index.html>

U.S. Environmental Protection Agency (EPA), Antimicrobial Science Policies, Disinfectant Technical Science Section (DIS/TSS), <http://www.epa.gov/oppad001/sciencepolicy.htm>

ES Credit 1.3-1.5 continued

Environmentally Preferable Cleaning: Products & Materials

U.S. Environmental Protection Agency (EPA), Design for the Environment (DfE) program, <http://www.epa.gov/dfe/pubs/projects/formulat/formpart.htm>

U.S. Environmental Protection Agency (EPA), *Environmentally Preferable Purchasing*, <http://www.epa.gov/epp/>

U.S. Environmental Protection Agency (EPA), Sanitizing Rinses (for previously cleaned food-contact surfaces), DIS/TSS-4 Jan 30, 1979, http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm

U.S. Environmental Protection Agency (EPA), Region 9. Using Microfiber Mops in Hospitals - Fact Sheet/Case Study, <http://www.epa.gov/region09/waste/p2/projects/hospital/mops.pdf>

U.S. Environmental Protection Agency (EPA), Selected EPA-Registered Disinfectants (EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses, <http://www.epa.gov/oppad001/chemregindex.htm>

1 point

ES Credit 1.6

Environmentally Preferable Cleaning: Equipment

Intent

Develop and implement an operational program to limit exposure of building occupants and environmental services personnel to potentially hazardous chemical, biological and particulate contaminants from cleaning equipment and procedures, while ensuring effective infection control processes.

Health Issues

Sustainable cleaning practices are an essential part of sustainable building. Traditional cleaning products present a variety of human health and ecological concerns. They may contribute to poor indoor air quality and contain chemicals that cause cancer, reproductive disorders, respiratory ailments (including occupational asthma), eye and skin irritation, central nervous system impairment, and other human health effects. In addition, some of these products contain persistent bioaccumulative and toxic chemicals (PBTs), are classified as hazardous waste, and/or otherwise contribute to environmental pollution during their manufacture, transport, use, and/or disposal. In health care settings, continuous 24/7 building occupancy leads to the requirement for cleaning while the building is occupied. Non-toxic and least-toxic cleaning products and materials exist for general cleaning purposes in a health care facility. By working with infection control committees, hospitals can reduce the amount of unnecessary disinfection as part of their toxicity reduction and indoor air quality improvement plan. The use of certain cleaning equipment can contribute to increased particulate matter in the air, increased mold and fungi in carpets, increased ergonomic discomfort, noise irritation and increased occupational asthma.

Credit Goals

Note: This credit does not apply to Food Service areas. Visit GGHC FS Credit 8.1-8.2: Chemical Management for Food Services for more information.

Note: Visit SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management for comprehensive guidance on cleaning outdoor spaces.

- Achieve both GGHC ES Credit 1.1 & 1.2.

AND

- Develop, implement and maintain a program for the use of cleaning equipment that maximizes effective reduction of building contaminants, while meeting infection control committee recommendations and minimizing environmental and health burdens. Ensure that all procurement and cleaning practices align with the infection control risk assessment and environmentally preferable cleaning policy outlined in GGHC ES Credit 1.1. Where outsourced contracts are utilized, Credit Goals must be met by contractor's equipment and practices.

ES Credit 1.6 continued

Environmentally Preferable Cleaning: **Equipment**

- Conduct a reassessment of the use of chemical disinfectants and sterilants in the facility based on an infection control risk assessment (ICRA) and available evidence-based resources with target to optimize disinfectant use for high touch areas as defined by the infection control committee. Utilize alternatives such as detergent and microfiber mop heads for surfaces that carry little risk of cross transmission, such as corridors.
- The cleaning equipment program requires the following for all types of powered machines:
 - Safeguards such as rollers, bumpers or other machine design elements that reduce impact damage to the facility (Example: radius edge rotomold tanks or shrouds).
 - Designed to minimize vibration, noise, and user fatigue and reported in the user manual in accordance with ISO 5349-1 for arm vibrations and ISO 2631-1 for vibration to which the whole body is subjected and for sound pressure at operator's ear ISO 11201.
 - Equipped with environmentally preferable "sealed" batteries such as dry cell, VRLAs such as gel or absorbent glass mat (AGM), or Lithium-Ion if battery powered.
 - Operate with a sound level of less than 70 db unless otherwise noted below.
- In addition to the requirements above, the following is required for specific machine types:
 - **Vacuum cleaners** certified by the Carpet & Rug Institute Seal of Approval/Green Label Program and are capable of capturing 99.97% of particulates 0.3 microns in size.
 - **Carpet extraction equipment** used for restorative deep cleaning certified by the Carpet & Rug Institute's "Seal of Approval" Testing Program for Certified Deep Cleaning Extractors. Carpet extraction equipment shall be capable of removing sufficient moisture such that carpets can dry in less than 24 hours.
 - **Powered maintenance equipment** including electric and battery-powered floor buffers, burnishers and automatic scrubbers equipped with vacuums, guards and/or other devices for capturing fine particulates.
 - **Automated scrubbing machines** equipped with solution flow mechanisms such as variable-speed feed pumps, proportional valves or solenoids, on-board chemical metering or chemical cartridges to optimize the use of cleaning products, or alternatively may use only tap water with no added cleaning products for specifically designed equipment. Utilize cleaning products that meet the requirements of ES Credit 1.3-1.5 Use recyclable refillable cartridges where applicable, and ensure cartridges are not overfilled with cleaning product.
 - Replace string mops with **microfiber mop technology** to reduce cleaning product and water consumption, prevent cross-contamination and improve ergonomics.
 - Powered equipment **ergonomically designed** to minimize vibration, noise and user fatigue.
 - A **logbook** for all powered cleaning equipment to document the date of equipment purchase, all repair and maintenance activities and vendor specification sheets for each type of equipment in use.
 - Require **staff training** on proper equipment operating techniques before use.

ES Credit 1.6 continued

Environmentally Preferable Cleaning: **Equipment**

Suggested Documentation

- ☐ Compile and annually review a record of the cleaning equipment used in the facility and a log of the maintenance for each piece of equipment over a minimum one-year period in accordance with Credit Goals.
- ☐ Provide and annually review standard operating protocols and training materials for all cleaning equipment in use at the facility.

Reference Standards

Carpet & Rug Institute "Green Label" Testing Program Vacuums Cleaner Criteria,
<http://www.carpet-rug.org/>

Carpet & Rug Institute's "Seal of Approval" Testing Program for Certified Deep Cleaning Extractors. <http://www.carpet-rug.org/>

ISO 5349-1: Mechanical Vibration, International Organization for Standardization,
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32355

ISO 2631-1: Mechanical Vibration and Shock, International Organization for Standardization,
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7612

ISO 11201: Acoustics, International Organization for Standardization,
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=21252

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC FM Credit 6: IAQ Management Plan; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC ES Credit 1: Environmentally Preferable Cleaning; GGHC ES Credit 2: Entryway Systems; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 8: Chemical Management for Food Services; and GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Evaluate the cleaning equipment currently in use and create a plan for upgrades to maximize effective reduction of building contaminants with minimum environmental impact while maintaining consistency with the environmentally preferable cleaning equipment policy.
- Implement a microfiber mopping pilot program in certain hospital areas. Measure chemical and water use and measure infection rate before and after pilot implementation.
- Consider installing flooring choices that do not require regular stripping or polishing.
- Integrate proper cleaning and sanitizing procedures into protocols for the operation of carpet extraction equipment to minimize risk of cross-contamination between areas.

ES Credit 1.6 continued

Environmentally Preferable Cleaning: **Equipment**

Resources

American Society for Healthcare Environmental Services (ASHES), Practice Guidance, <http://www.Ashes.org>

Green Seal. GS 42: Environmental Standard for Cleaning Services, http://www.greenseal.org/certification/cleaning_services_gs-42.pdf

Practice Greenhealth, *Step Guide To Green Cleaning*, <http://www.practicegreenhealth.org>

Rutala WA, Gergen MF, Weber DJ, "Microbiologic evaluation of microfiber mops for surface disinfection." American Journal of Infection Control. 2007 Nov;35(9):569

1 point

ES Credit 2

Entryway Systems

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.

Health Issues

Dirt, pollen, particulate matter and microorganisms are often brought into the facility on the shoes of patients, staff and visitors. 85% of all soil that enters a building is on the feet of building occupants. The substances are then able to enter the air circulation and HVAC system of the facility and can pose a potential risk to human health. The International Sanitary Supply Association (ISSA) has estimated that it costs \$600 to find and remove one pound of soil after it has been allowed to enter an average building. By capturing or preventing these substances from entering the building by utilizing a matting system, facilities can prevent potential contamination of the HVAC system and therefore prevent potential harm to patients, visitors and staff. Additionally, removing the substances concentrated in the matting system can be less expensive and time-consuming than removing it from the rest of the building.

Credit Goals

- Utilize entryway systems (grills, grates, mats, etc.) to reduce the amount of dirt, dust, pollen and other particles entering the building at all qualifying entryways, and develop and implement the associated cleaning strategies to maintain those entryway systems. Buildings must demonstrate that at least 10 feet in length of mats are in place at all qualifying entryways unless otherwise prevented by facility layout (in which case utilize matting as close to 10 feet in length as feasible).
- Ensure matting is designed for interior or exterior use, as appropriate, with relevant safety features for entryway use and is certified as slip resistant by the National Floor Safety Institute.

Note: Qualifying entryways are those that serve as regular entry points for building users. Entryways to emergency treatment areas, entryways that are not in use, and entryways that only serve as emergency exits may be excluded from the requirements of this credit.

ES Credit 2 continued

Entryway Systems

Suggested Documentation

- ☐ Compile and annually revise diagrams illustrating entryway mats at all qualifying entryways in accordance with Credit Goals.
- ☐ Include the entryway cleaning program in the Environmentally Preferable Cleaning Policy (outlined in GGHC ES credit 1.1-1.2).
- ☐ Compile and annually review documentation of the entryway cleaning program, the number of incidents that occurred, responses, and corrective actions taken. Include analysis of the root cause and short term and long-term actions.

Reference Standards

National Floor Safety Institute. Standards for Slip Resistant Floor Coverings,
http://www.nfsi.org/certified_products.php

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC FM Credit 6: IAQ Management Plan; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC ES Credit 1: Environmentally Preferable Cleaning; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 8: Chemical Management for Food Services; and GGHC EP Credit 2: Toxicity Prevention in Purchasing.* Consider installing exterior entryway systems to minimize the amount of dust and particulates entering the facility.
- Design entryway systems to minimize barriers for people with disabilities, particularly technologies such as walkers and wheelchairs.
- Avoid plants, trees and bushes in building entrance areas that are varieties that yield berries, flowers and leaves that are likely to be tracked into the building.
- Provide a water spigot and electrical outlet at entryways for maintenance and cleaning activities.
- Assess current entryways to identify “high-traffic” entryways.
- Adapt entryway cleaning strategies and mat placement based on geographical climate of facility. (E.g. Facilities located in northern states may require additional walk-off mats outdoors due to snow, salt and ice.)
- Collaborate with the Infection Control Committee to identify opportunities through an Infection Control Risk Assessment (ICRA) for implementing air pressure relationships at major facility entryways that minimize entry of dust and particulates into the facility in accordance with GGHC v2.2 EQ Credit 5: Exterior Pollutant Source Control.

ES Credit 2 continued

Entryway Systems

Resources

Environmental Building News, "Keeping Pollutants Out: Entryway Design for Green Buildings,"
<http://www.buildinggreen.com/auth/article.cfm?fileName=101001a.xml>

Rona Fried, *Contracting Profits*, "Green-Dusting Methods Mean Better IAQ." November 2006.
<http://www.cleanlink.com/cp/article.asp?id=5642&keywords=indoor%20air%20quality,%20iaq,%20green,%20rona%20fried>

National Floor Safety Institute, <http://www.nfsi.org/>

OneSource, "Five Features of Effective Green Cleaning Programs," http://www.one-source.com/en/five_features.html

1 point

ES Credit 3

Indoor Integrated Pest Management

Intent

Eliminate human exposure to physical and chemical hazards associated with pest management products and practices by employing environmental services operations that focus on pest prevention emphasizing non-chemical strategies that protect people from unnecessary exposure to pests and pesticides.

Health Issues

The health of building occupants and the health of the local ecosystem is directly affected by the use of chemical pesticides, including insecticides, herbicides, fungicides, and rodenticides. U.S. EPA states that, "economic benefits from pesticide use are not achieved without potential risks to human health and the environment due to the toxicity of pesticide chemicals."¹ Although the toxicity of individual pesticides vary, typical symptoms that can result from an acute pesticide exposure include nausea, dizziness, headaches, aching joints, mental disorientation, inability to concentrate, vomiting, convulsions, skin irritations, flu-like symptoms and asthma-like problems. Pesticides are linked to a wide range of chronic health problems including cancer, birth defects, genetic damage, neurological, psychological and behavioral effects, blood disorders, chemical sensitivities, reproductive effects, endocrine disruption, and abnormalities in liver, kidney, and immune system function. Studies show that children living in households where pesticides are used suffer elevated rates of leukemia, brain cancer and soft tissue sarcoma. Pregnant women, children, the chemically sensitive, elderly and chronically ill are at greater risk from pesticide exposure than others. Studies in laboratory animals raise concerns that patients taking certain medications may also have heightened reactions to some pesticides. Pesticides can affect the immune and nervous system and result in increased problems with allergies, asthma, and hypersensitivity to chemicals. Some pesticides also are suspected endocrine disruptors that can adversely affect hormone balance or disrupt normal function in the organs that hormones regulate. In health care environments, pesticides may impact the indoor air quality both in their exterior applications proximate to air intakes, and in the use of chemical pesticides for indoor pest control.

Credit Goals

Note: This credit does not apply to Food Service areas. Visit GGHC FS Credit 8.1-8.2: Chemical Management for Food Services for more information.

Develop an Integrated Pest Management (IPM) Program for managing pest control in the building interior that prioritizes safer alternatives to chemical pesticides while preventing economic and health damage caused by pests.

- Include the following attributes in the IPM Program:
 1. Methods of identifying pests and monitoring levels of infestation;

¹ Aspelin, A., et al. 1999. *Pesticide Industry Sales and Usage: 1996 and 1997 Market Estimates*. Office of Prevention, Pesticides and Toxic Substances. U.S. EPA. 733-R-99-001. Washington DC. Page 2.

ES Credit 3 continued

Indoor Integrated Pest Management

2. Stated action thresholds, or the level of infestation that can be tolerated;
 3. A list of preventive actions or corrective actions to be employed such as sanitation, structural repairs, and ongoing maintenance, establishing good soil health, mechanical and biological controls and cultural practices.
 4. Sound IPM practices that fulfill a supportive role with preventative health programs, minimize operational disruptions, and combine proactive measures with the application of least toxic pesticides—only as a last resort.
 5. An IPM controls approach: exclusion, access denial, and habitat modification/harborage. Only implement a least hazardous chemical control strategy when all non-chemical approaches have been exhausted and have failed to address the problem.
- Phase in implementation of the IPM program within one year. Facilities bound by current contracts that do not allow for the implementation of the IPM policy shall phase in policy implementation in accordance with contract renewal timelines.
 - Write the IPM Program into all pest control bid specifications, including the option to review any pesticide formulation and active ingredients prior to application.
 - The program shall eliminate the use of pesticides in any of the following categories except in case of immediate endangerment to health as a result of a pest situation. Use of any pesticide in the following categories must first be reviewed by infection control and safety:
 - Pesticides in U.S. EPA Categories I and II (i.e., those with highest acute toxicity);
 - Pesticides linked to cancer — U.S. EPA Class A, B, C carcinogens and chemicals known to the state of California to cause cancer under Proposition 65.
 - Pesticides that interfere with human hormones and/or cause birth defects or reproductive or developmental harm, e.g., those identified as reproductive or developmental toxins or suspected endocrine disruptors by the U.S. EPA Endocrine Disruptor Screening Program or chemicals known to California to be reproductive toxins under Proposition 65.
 - Pesticides in the carbamate (carbaryl, bendiocarb, etc.), organophosphate (diazinon, acephate, etc.) or pyrethroid (cyfluthrin, permethrin, etc.) chemical family and phenoxy herbicides (2,4-D, mecoprop, etc.); and,
 - Pesticide products that contain inert ingredients categorized by the U.S. EPA as “List 1: Inerts of Toxicological Concern” (dioctyl phthalate, formaldehyde, hydroquinone, isophorone, nonylphenol, phenol, and rhodamine).
 - The plan shall include a communication strategy to provide notification of the IPM system. The notification shall be provided directly to all building occupants. Ensure that clinical staff is notified. The program shall incorporate “Universal Notification,” which requires advance notice not less than 72 hours under normal conditions and 24 hours in emergencies before a pesticide, other than a least toxic, non-volatile pesticide is applied in a building or on surrounding grounds that the building maintains. The notice shall include:
 - A description of the Integrated Pest Management system and a list of all pesticides, including any least toxic pesticide that may be used in the building as part of the Integrated Pest Management system;

ES Credit 3 continued

Indoor Integrated Pest Management

- The name, address, and telephone number of the contact person for IPM questions or concerns (responsible party);
- A statement that the contact person is responsible for maintaining the product label and material safety data sheet (MSDS) of each pesticide used in the building and that the label or MSDS is available for review upon request, and that the contact person is available for information and comment.
- Clarify to hospital staff that the responsible department (normally Environmental Services) be contacted first in the case of any pest sightings—contractors or health agencies should only be contacted through responsible department/contact person.
- Pesticide Applications
 - Ensure that any pesticide applicator on the hospital campus is licensed by the state, certified to handle the pest control products being used and utilizes appropriate personal protective equipment.
 - Ensure that all pesticide products to be used in the building are reviewed by Infection Control and Safety before use.
 - The IPM plan shall address under what circumstances an emergency application of pesticides in a building or on surrounding grounds being maintained by the building can be conducted without complying with the above provisions. Universal Notification strategies for pesticide application still apply under emergency applications. In addition, ensure that occupants and janitorial workers are notified within 24 hours of the pesticide application.

ES Credit 3 continued

Indoor Integrated Pest Management

Suggested Documentation

- ☐ Compile and annually review the Integrated Pest Management (IPM) Program developed in accordance with Credit Goals.
- ☐ Compile documentation of the phase-in of the IPM program including the inclusion of IPM requirements in all pest control bid specifications, in accordance with Credit Goals. Demonstrate that the Integrated Pest Management Program has been followed for a minimum one-year period.
- ☐ Compile and annually update a list of all pesticide products that have been reviewed and approved for use in emergency situations.
- ☐ Publicly display the IPM Program's communication strategy. Update annually.

Reference Standards

State of California. Proposition 65, http://www.oehha.org/prop65/prop65_list/Newlist.html

U.S. Environmental Protection Agency (EPA) Endocrine Disruptor Screening Program (EDSP), <http://www.epa.gov/endo/>

U.S. Environmental Protection Agency (EPA) Class A, B, C Carcinogens, <http://www.epa.gov/pesticides/carlist/index.html>

U.S. Environmental Protection Agency (EPA), Inert Ingredients of Pesticide Products, "List 1: Inerts of Toxicological Concern," <http://www.epa.gov/opprd001/inerts/fr54.htm>

U.S. Environmental Protection Agency (EPA), Pesticides: Label Review Manual, <http://www.epa.gov/oppfead1/labeling/lrm/chap-07.htm>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC FM Credit 6: IAQ Management Plan; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC ES Credit 1: Environmentally Preferable Cleaning; GGHC ES Credit 2: Entryway Systems; GGHC FS Credit 8: Chemical Management for Food Services; and GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Integrated Pest Management (IPM) is a coordinated approach to pest control that seeks to prevent unacceptable levels of pests by the most cost-effective means with the least possible hazard to building occupants, workers, and the environment. The focus of IPM is on non-chemical prevention of pest problems. IPM emphasizes consideration of all management options. Preferential management methods include cultural, mechanical, physical, and biological controls, with a least hazardous pesticide used only as a last resort.

ES Credit 3 continued

Indoor Integrated Pest Management

- “Least toxic” or low risk pesticides refers to those that have low or no acute or chronic toxicity to humans, affect a narrow range of species, and are formulated for application in a manner that limits or eliminates exposure of humans and other non-target organisms. Examples include products formulated as baits (e.g., boric acid), pastes or gels which do not, insecticidal and herbicidal soaps; and microbial pesticides (e.g., *bacillus thuringiensis* (B.t.) formulated from fungi, bacteria, or viruses that are only toxic to specific pest species but harmless to humans, and natural substances such as corn gluten meal. See EPA website for list of pesticides (<http://www.epa.gov/pesticides/ipm/>).
- Designate an IPM Coordinator (or other title) for the facility to serve as point of contact for contract pest service provider. The IPM Coordinator should be consulted prior to any and all pesticide applications and should meet regularly with pest management service provider(s) to review state and operation of IPM for the facility.
- Develop a plan for training of all hospital staff on pests, pesticides, and their role in the facility IPM program in coordination with GGHC IO Credit 1: Education: Staff, Patient and Community Environmental Sustainability Education.
- Basic IPM strategies include maintenance and repair of the basic structural integrity of the building, including:
 - Design and construct buildings to be as pest resistant as possible and maintain them well. Ensure that building roofs are included, that nets for bird/pigeon activity are checked on a regular basis, that roof parapets and caps are sealed, and that any other devices on the roofs such as traps or bait stations are placed at documented locations and regularly checked.
 - Eliminate cracks and holes to keep pests out. Lightly dust gaps between walls and other voids with boric acid before closing them up. Inspect the grounds area around buildings and fill burrows with pea gravel.
 - Ensure that devices such as bait stations placed in outside areas are locked, secured, clean and in good working order. Rodents do not like dusty and unclean bait stations.
 - Use physical barriers to block pest entry and movement (such as door sweeps, screens at chimneys and air intakes, doors and windows).
- Implement and enforce sanitation procedures to limit pests’ access to food and drink. Address leaky faucets, condensation on pipes, and all edibles. Store refuse in tightly sealed containers, and in controlled areas of the building. Clean tipper trucks and other waste conveyance equipment regularly to minimize pests.
- If using an outsourced contract, ensure IPM policy is included in all pest control bid specifications. Invite the contractor to provide onsite training on prevention and maintenance for in-house staff. Ensure the contractor is licensed by the state and has liability insurance.
- Consider contracting with pest control companies that meet 100% of the requirements for IPM certification.

ES Credit 3 continued

Indoor Integrated Pest Management

Resources

Preparing IPM programs and Examples

- American Society of Healthcare Environmental Services (ASHES), Recommended Practice Series: Integrated Pest Management. American Society for Healthcare Environmental Services of the American Hospital Association. Chicago, IL. 2005.
- Beyond Pesticides, <http://www.beyondpesticides.org>
- Beyond Pesticides and Health Care Without Harm, Healthy Hospitals, Controlling Pests without Harmful Pesticides, 2003, <http://www.noharm.org/pesticidesCleaners/issue>
- GreenShield Certification for Pest Control Companies, <http://greenshieldcertified.org/>
- Insect Management for the Intiorscape Environment, <http://ipm.ncsu.edu/InteriorScapes/insect.html>.
- Integrated Pest Management in Health Care Facilities Project, "Taking Toxics Out of Maryland's Health Care Sector: Transitioning to Green Pest Management Practices to Protect Health and the Environment," October 2008 <http://www.beyondpesticides.org/hospitals/index>.
- National Pest Management Association, <http://www.pestworld.org/>
- Practice Greenhealth Ten Step Guide to Implementing an Integrated Pest Management Program, 2006, <http://www.practicegreenhealth.org>
- U.S. Environmental Protection Agency (EPA), Integrated Pest Management for Schools: A How-to Manual, EPA 909-B-97-001, March, 1997 <http://www.epa.gov/pesticides/ipm/>.

For Information on Pesticides and Health

- EXTTOXNET Pesticide Information Profiles (PIP), <http://ace.ace.orst.edu/info/exttoxnet> .
- Federal Food Drug and Cosmetic Act (FFDCA), http://www.law.cornell.edu/uscode/html/uscode21/usc_sup_01_21_10_9.html
- Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), <http://www4.law.cornell.edu/uscode/7/ch6.html>
- Maryland Pesticide Network, Pesticides and Public Health: Critical Literature on Human Health 2001-2005, <http://www.mdpestnet.org/publications/MPN-Periodical7.zip>

ES Credit 3 continued

Indoor Integrated Pest Management

- Med-Chi, the Maryland State Medical Society and the Maryland Pesticide NQetwork, Pesticide Related Illness: Identifying the Threat, Treating the Problem. DVD Training Set. <http://www.mdpestnet.org/dvd.htm>
- Pesticide Action Network, Pesticide Database, <http://www.pesticideinfo.org>
- Pesticide Registration Improvement Act (PRIA) of 2003, <http://www.epa.gov/opp00001/regulating/fifra.pdf#page=96>
- U.S. Environmental Protection Agency (EPA) Food Quality Protection Act of 1996, <http://www.epa.gov/pesticides/regulating/laws/fqpa/index.htm>
- U.S. Environmental Protection Agency (EPA), Recognition and Management of Pesticide Poisonings. 5th Edition, <http://www.epa.gov/oppfead1/safety/healthcare/handbook/handbook.htm>
- U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), <http://www.epa.gov/rcraonline/>
- U.S. Environmental Protection Agency (EPA), Pesticides: List of Restricted or Cancelled Uses, <http://www.epa.gov/pesticides/regulating/restricted.htm>

For information on Alternatives to Pesticides

- Beyond Pesticides, 701 E Street, SE, Suite 200 Washington, DC 20003, <http://www.beyondpesticides.org>.
- The Bio-Integral Resource Center (BIRC), PO Box 7414, Berkeley, CA 94704, <http://www.birc.org>.
- Northwest Coalition for Alternatives to Pesticides, PO Box 1393 Eugene, OR 97440-1393, <http://www.pesticide.org>.
- Organic Materials Review Institute (OMRI), Box 11558 Eugene OR 97440 USA 541-343-7600 541-343-8971 (fax)
- Washington Toxics Coalition, 4516 University Way, Seattle, WA 98105, <http://www.watoxics.org>.

ⁱ United Kingdom. Statutory Instrument 2004 No. 1816. The Controls on Nonylphenol and Nonylphenol Ethoxylate Regulations 2004, <http://www.opsi.gov.uk/si/si2004/20041816.htm>

Food Service

1 point

FS Credit 1.1

Sustainable Food Policy & Plan

Intent

Create, promote and implement sustainable food purchasing policies and plans that support human and ecological health.

Health Issues

Shifts in the U.S. food system over the last century are compromising human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on concentrated monocropping. This contributes to declining diversity of food crops necessary to fulfill human nutritional needs, while also leading to a loss of biodiversity. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate. This long travel distance disconnects growers from consumers, increases opportunities for food contamination and nutrient loss.

Routine use of antibiotics in animal agriculture has been shown to increase antibiotic resistance among bacteria that cause human infections. Pesticide drift, field dust, waste burning, toxic gases from degrading manure, and diesel exhaust from transporting food long distances are all factors related to food production that contribute to asthma, cardiovascular disease and lung cancer. Commercial fertilizers and pesticides contaminate surface- and ground-water in many locales. Large-scale animal feedlot operations contribute to water pollution with biologically active hormones, nitrates and other breakdown products of untreated animal waste. Calorie-rich, nutrient-poor diets contribute to obesity, diabetes, cancer, and a variety of degenerative diseases. By moving toward a healthier and more sustainable food system, health care can help alleviate human health problems associated with inadequate or inappropriate nutrition, antibiotic resistance, air and water contamination, and global health issues such as climate change.

Credit Goals

Develop a Sustainable Food Policy with the following minimum components:

- Strategies for execution aligned with Food Service Credits 2-7 (e.g., working with current or alternative suppliers, giving purchasing preference to certified and local foods (defined for the purposes of this credit as sourced from within a 200-mile radius), developing an on-site farmers market, holding seminars).
- Goals indicating what metrics will be tracked and how success will be defined.
- Action plan establishing expectations of everyone involved in implementation (e.g., both in-house and contracted food service staff).
- Evaluation plan that specifies a means and process for evaluating effectiveness and for making adjustments to the plan when necessary.

AND

FS Credit 1.1 continued

Sustainable Food Policy & Plan

Develop and implement a Sustainable Food Plan according to one of the following options:

OPTION 1

- Identify support from key stakeholders as indicated through involvement or sign-off.
- Adopt and implement a food policy vision statement that links desired outcomes and values of the program to the institution's broader mission by addressing key issues in the food system affecting the health of individuals, communities and the environment, including:
 - Antibiotic Resistance
 - Air and Water Pollution
 - Worker Health and Safety

OR

OPTION 2

- Adopt and implement Health Care Without Harm's Healthy Food in Health Care Pledge.

FS Credit 1.1 continued

Sustainable Food Policy & Plan

Suggested Documentation

- ☐ Develop and annually review a written sustainable food policy and plan in accordance with Credit Goals.
- ☐ Compile and annually update evidence that the policy and plan have undergone an internal approval process by both food service and institutional leadership.

Reference Standard

Healthy Food in Health Care Pledge: <http://www.noharm.org/us/food/pledge>

Potential Strategies and Technologies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 5: Connection to the Natural World; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.*
- RFP and Contract language for contractors and suppliers that clearly incorporate the expectations laid out in the policy.
- A sustainable food policy and plan may encompass a wide array of an institution's food-related sustainability initiatives. These may include, but are not limited to, purchasing of sustainable foods, beverages and bio-based service ware, community initiatives supporting food connections, use of reusable service ware, and education and promotion for these efforts. A food policy and plan will guide the activities related to the other points available under the Food Credit.
- Follow best practices for establishing a successful policy as outlined in the Green Guide for Health Care Food Technical Brief (<http://www.gghc.org>).

FS Credit 1.1 continued

Sustainable Food Policy & Plan

Resources

Catholic Health Care West Food and Nutrition Services Vision Statement,
<http://www.foodalliance.org/sustainablefoodpolicy/samples/Catholic%20Healthcare%20West%20Vision%20Statement.pdf>

Jamie Harvie, Michelle Gottlieb, Roberta Anderson, and Marie Kulick, *Green Guide for Health Care Food Technical Brief*, <http://www.gghc.org>

Health Care Without Harm, Healthy Food Workgroup, <http://healthyfoodinhealthcare.org>

Healthy Food in Health Care Pledge: <http://www.noharm.org/us/food/pledge>

Kaiser Permanente's Comprehensive Food Policy (2006),
<http://www.foodalliance.org/sustainablefoodpolicy/kaise/Kaiser%20Permanente%20Comprehensive%20Food%20Policy%202006.pdf>

The Sustainable Food Policy Project, <http://www.sustainablefoodpolicy.org>

1 point

FS Credit 1.2

Food Nutrition

Intent

Create, promote and implement sustainable food purchasing policies and plans that support human and ecological health.

Health Issues

Major shifts in the U.S. food system over the last century are compromising having negative impacts on human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on concentrated monocropping. This contributes to the decline in production of diversity of food crops necessary to fulfill human nutritional needs, while also leading to a loss of biodiversity. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate. This long travel distance system disconnects the growers from the consumers, and increases opportunities for food contamination and loss of nutrients during transportation. While this industrial food system initially contributed to higher yields, productivity has declined, and serious long-term impacts on human and environmental health have become apparent.

Routine use of antibiotics in animal agriculture has been shown to increase antibiotic resistance among bacteria that cause human infections. Pesticide drift, field dust, waste burning, toxic gases from degrading manure, and diesel exhaust from transporting food long distances are all factors related to food production that contribute to asthma, cardiovascular disease and lung cancer. Commercial fertilizers and pesticides contaminate surface- and ground-water in many locales. Large-scale animal feedlot operations contribute to water pollution with biologically active hormones, nitrates and other breakdown products of untreated animal waste. Calorie-rich, nutrient-poor diets contribute to obesity, diabetes, cancer, and a variety of degenerative diseases. By moving toward a healthier and more sustainable food system, health care can help alleviate human health problems associated with inadequate or inappropriate nutrition, antibiotic resistance, air and water contamination, and global health issues such as climate change.

Credit Goals

- Achieve FS Credit 1.1: Sustainable Food Policy and Plan

AND

- Except for restricted diets, include a minimum of one fresh fruit option at each patient meal. At lunch and dinner, provide a fresh green salad and a minimum of one non-starch fresh vegetable option.
- For patient and cafeteria food service, offer whole grain options for minimum 50% of grains and breads (e.g., whole-wheat bread, whole-grain rolls, brown rice).
- For patient and cafeteria food service, provide a minimum of one protein-balanced vegetarian menu option during each meal.

AND

- Implement a minimum of four of the following practices:
 - **Wholesome Soup:** Other than for restricted diets menus, all patient and cafeteria soups are made from scratch (with the exception of canned legumes and tomatoes).
 - **Meat Free Option:** Cafeteria and patient food meat-free one day per week.

FS Credit 1.2 continued

Food Nutrition

- **Trans Fats and Healthy Oils:** Eliminate all products that contain trans (partially hydrogenated) fats* and fully hydrogenated fats; AND, create a heart-healthy oils purchasing policy and modify all recipes to use cooking oils high in monounsaturated and polyunsaturated fatty acids.
* “Zero Trans Fats” should be the goal when total elimination is not possible.
- **Fried Food Elimination:** Eliminate deep fried foods from patient menus and cafeteria.
- **Nanotech Foods:** Develop and implement a policy requiring disclosure and elimination of nanotech additives in food, nutritional supplements and food serviceware and packaging by food service contractors, food distributors, food producers, food processors and General Purchasing Organizations (GPOs).
- **Food Color and Additives:** Develop and implement a purchasing policy and program to eliminate from cafeteria and regular patient meal food service processed food products containing food additives including artificial coloring and flavoring in accordance with the Center for Science in the Public Interest’s Food Additives Avoid List. <http://www.cspinet.org/reports/chemcuisine.htm>
- **Healthy Vending and Snacks** 100% of facility-wide vending machines and Cafeteria Pre-packaged snacks offer:
 - Minimum 75% (by quantity) nutritionally healthy foods as defined by the Chula Vista Healthy Vending Policy (with PI modifications).
 - Minimum 20% (by quantity) sustainable foods in accordance with FS Credit 3: Local, Sustainably Produced Food Purchasing.
- **Promote Breast Feeding:** Develop and implement a breastfeeding program as outlined in the UNICEF/WHO’s document “The Ten Steps to Successful Breastfeeding for Hospitals” and eliminate the standard practice of free formula giveaways.

FS Credit 1.2 continued

Food Nutrition

Suggested Documentation

- ☐ Document and annually review program to offer fresh fruit and vegetables, whole grains and breads, and vegetarian menu options through cafeteria and patient food service in accordance with Credit Goals.
- ☐ Compile and annually update evidence that a minimum four of the nutritional practices outlined in the Credit Goals have been implemented.

Reference Standard

Center for Science in the Public Interest, Food Additives Report, Avoid List.
<http://www.cspinet.org/reports/chemcuisine.htm>

Chula Vista Healthy Vending Policy (with PI modifications),
http://www.preventioninstitute.org/sa/policies/policy_detail.php?pid=120

Potential Strategies and Technologies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 5: Connection to the Natural World; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.*
- Develop a template letter for the food supply chain and General Purchasing Organization (GPO) indicating the facility's interest in disclosure of foods with trans fats, additives, and nanotechnology. Request labeling of these items in electronic catalogues, especially during contract renewal negotiations. Share the facility's approach with other facilities using the same food suppliers or using the same GPO. Compile the responses from suppliers and share with other hospitals.
- Educate food service and dietary staff on issues around nanotechnology and food additives using newsletters and internal listserves.
- Provide education and in-house training on climate change and its relationship to meat production.
- Labeling programs should not require a "meat-free" or "vegetarian" label on all meat-free options.
- Use listserves or websites such as Health Care Without Harm's <http://www.healthyfoodinhealthcare.org> website to research case studies and examples of other facilities that have accomplished these goals.
- Contract with vending companies that offer nutritionally dense foods and are third party eco-labeled organic or other.

FS Credit 1.2 continued

Food Nutrition

Resources

Catholic Health Care West Food and Nutrition Services Vision Statement,
<http://www.foodalliance.org/sustainablefoodpolicy/samples/Catholic%20Healthcare%20West%20Vision%20Statement.pdf>

European Trade Union Confederation (ETUC) Resolution on nanotechnologies and nanomaterials,
<http://www.etuc.org/a/5163>

European Trade Union Institute – Research, Education, Health & Safety (ETUCI-REHS) NANOCAP Project, http://hesa.etui-rehs.org/uk/dossiers/dossier.asp?dos_pk=18,

Jamie Harvie, Michelle Gottlieb, and Marie Kulick, *Green Guide for Health Care* Food Technical Brief,
<http://www.gghc.org>

Johns Hopkins Bloomberg School of Public Health Meatless Mondays,
http://www.meatlessmonday.com/site/PageServer?pagename=a_index

Health Care Without Harm, Healthy Food Workgroup, <http://healthyfoodinhealthcare.org>

Healthy Food in Health Care Pledge: <http://www.noharm.org/us/food/pledge>

Kaiser Permanente's Comprehensive Food Policy (2006),
<http://www.foodalliance.org/sustainablefoodpolicy/kaise/Kaiser%20Permanente%20Comprehensive%20Food%20Policy%202006.pdf>

Out of the laboratory and on to our plates: Nanotechnology in food and agriculture,
<http://nano.foe.org.au/node/220>

"Protecting, Promoting and Supporting Breast-Feeding -The special role of maternity services." A Joint WHO/UNICEF Statement, WHO, Geneva, 1989.
<http://www.unsystem.org/scn/archives/scnnewsextractsmay91/ch4.htm>

Kenneth D. Rosenberg, John D. Stull, Michelle R. Adler, Laurin J. Kasehagen, Andrea Crivelli-Kovach. "Impact of Hospital Policies on Breastfeeding Outcomes," *Breastfeeding Medicine*. June 1, 2008, 3(2): 110-116. doi:10.1089/bfm.2007.0039. <http://www.liebertonline.com/doi/abs/10.1089/bfm.2007.0039>

The Sustainable Food Policy Project, <http://www.sustainablefoodpolicy.org> U.S. Centers for Disease Control and Prevention (CDC), The CDC Guide to Breastfeeding Interventions,
http://www.cdc.gov/BREASTFEEDING/pdf/BF_guide_1.pdf

1 point

FS Credit 2

Sustainable Food Education & Promotion

Intent

Create awareness about sustainable hospital food service initiatives among staff, patients, visitors, service providers, vendors and the community of hospital food service initiatives and the associated human health benefits.

Health Issues

Shifts in the U.S. food system over the last century are compromising human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on concentrated monocropping. This contributes to declining diversity of food crops necessary to fulfill human nutritional needs, while also leading to a loss of biodiversity. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate. This long travel distance disconnects growers from consumers, increases opportunities for food contamination and nutrient loss.

Routine use of antibiotics in animal agriculture has been shown to increase antibiotic resistance among bacteria that cause human infections. Pesticide drift, field dust, waste burning, toxic gases from degrading manure, and diesel exhaust from transporting food long distances are all factors related to food production that contribute to asthma, cardiovascular disease and lung cancer. Commercial fertilizers and pesticides contaminate surface- and ground-water in many locales. Large-scale animal feedlot operations contribute to water pollution with biologically active hormones, nitrates and other breakdown products of untreated animal waste. Calorie-rich, nutrient-poor diets contribute to obesity, diabetes, cancer, and a variety of degenerative diseases. By moving toward a healthier and more sustainable food system, health care can help alleviate human health problems associated with inadequate or inappropriate nutrition, antibiotic resistance, air and water contamination, and global health issues such as climate change.

Credit Goals

Education

- Upon hire and annually, hold a minimum of one (1) educational event targeted to the food service department (both in-house and contracted food service staff), focused on the facility's sustainability initiatives and pursuit of relevant Credit Goals in the Food Service section of the *Green Guide* and explicitly explaining the link between human health and food production.
- Hold a minimum of one (1) educational event annually targeted to hospital employees outside of the food service department (e.g., senior management, environmental services, physicians, nurses) focused on the facility's sustainability initiatives and pursuit of relevant Credit Goals in the Food Service section of the *Green Guide*.

Note: This portion of the credit goal can also be accomplished by holding a single educational event that targets both food service staff and the broader community.

AND

FS Credit 2 continued

Sustainable Food Education & Promotion

Healthy Sustainable Food Promotion

Annually implement a minimum of three (3) of the following initiatives aimed at educating hospital staff, patients, and the community about food service sustainability commitments and activities:

- Post and annually update a signed copy of the facility's Food Policy or Healthy Food in Health Care Pledge in accordance with GGHC FS Credit 1 or other information on the facility's sustainability initiatives in a visible site within the hospital and on the hospital website explicitly explaining the link between human health and food production.
- Establish and maintain a program to inform cafeteria consumers of specific product offerings that are seasonal, organic, locally grown, and/or sustainably grown/produced, etc. in accordance with GGHC FS Credit 3.
- Establish and maintain a program to inform patients of menu items that are seasonal, organic, locally and/or sustainably grown/produced, etc. in accordance with GGHC FS Credit 3.
- Host special events targeted to patients, employees, and visitors that promote the facility's sustainable food products and initiatives and explicitly explain the link between human health and food production.
- Hold special events (onsite or offsite) targeted to the larger community highlighting the facility's commitment to supporting healthy, local, seasonal, organic, and sustainable foods and food systems and explicitly explaining the relationship between human health and food production and distribution.

Note: For the purposes of this Credit, "local" is defined as sourced from within a 200-mile radius.

FS Credit 2 continued

Sustainable Food Education & Promotion

Suggested Documentation

- ☐ Maintain and annually update a file of annual reporting, communications program, sample menus, table tent cards, posters, newsletters and other documents to demonstrate compliance with Credit Goals.
- ☐ Maintain and annually update new employee and annual educational information, including for example, Power Point presentations, handouts, sign in sheets and agendas.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Credit 1.2: Education: Staff, Patient, and Community Environmental Sustainability Education; GGHC SSM Credit 1: Site Management; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 5: Connection to the Natural World; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.*
- Advertise the facility's sustainable food initiatives through media venues such as the local newspaper.
- In-service educational programs for food service staff should include the credit goals and relevant information embedded in the GGHC Food Service Credit. Programs should be geared specifically for food service staff including management, chefs, nutritionists and dietitians, line prep etc. Options include: roundtables, seasonal cooking demonstrations, farm visits, webinars, etc. See Health Care Without Harm website (<http://www.noharm.org>) for sample programs and ideas.
- Organize a tour of a local farm for hospital staff and/or community members as part of the education program and to build relationships with the local growing community.
- Educational programs for non-food service hospital employees should be geared to senior management, environmental services, physicians, nurses etc. Options include: grand rounds for health professionals, brown bag seminars or roundtables, webinars, cooking demonstrations, farm visits, etc. See Health Care Without Harm website (<http://www.noharm.org>) for sample programs and ideas.

FS Credit 2 continued

Sustainable Food Education & Promotion

- There are many ways to inform cafeteria consumers of the local/seasonal/organic and sustainable foods on the menu, for example:
 - Post point of sale materials (tent cards, signage etc.) within the cafeteria that highlight the daily sustainable offerings;
 - Inform the consumers if milk/coffee creamers are rGBH free; and/or,
 - Identify the farms/ranches/bakeries where the products were purchased – including pictures whenever possible.
- Provide continuing education credit opportunities to employees, where applicable, as an incentive to attend events.
- Ask suppliers and vendors to provide signage promoting the facility's healthy, sustainably produced food practices (e.g., rGBH free stickers, Fair Trade coffee, pictures of farmers).
- Include specific indications of local/seasonal/organic and sustainable options in patient menus, such as a star or other icon next to such items, a list of what is being offered that day, logos from relevant organizations/vendors (e.g., Buy Fresh, Buy Local).
- Use special events to promote sustainable foods, for example: host a farmer's lunch with all local/seasonal foods; invite local farmers to meet with customers; host a cooking demonstration featuring the local products of the day; host a special holiday meal featuring locally and sustainably grown foods. See the Resource section for templates and suggestions for such events.
- Expand the special events to involve and inform the larger community. Host a special Farmer's Market Day and invite local community groups, political leaders, etc. Partner with local community groups at offsite events such as farmer's markets, community gardens, and other forums which can connect the facility's sustainable food service with other food and fitness initiatives within the larger community.
- Seek out organizations that support your efforts to promote local and sustainable products such as Buy Fresh, Buy Local campaigns, etc. Network with state and local agricultural departments for information on local events, farmer's markets etc
- Seek out speakers from local and national sustainability organizations that can participate in educational events.
- Take advantage of the facility's website as a forum for promoting sustainability initiatives.

Resources

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care Food Technical Brief*, <http://www.gghc.org>

Health Care Without Harm, <http://healthyfoodinhealthcare.org>

Healthy Food in Health Care Pledge: <http://www.noharm.org/us/food/pledge>

Fletcher Allen Health Care, Nutrition Services, <http://www.fahc.org/Nutrition/Services/services.html>

But Fresh, Buy Local Chapters, <http://www.foodroutes.org/bfbl-chapters.jsp#chapter-list>MORE

1-3 points

FS Credit 3.1-3.3

Local, Sustainably Produced Food Purchasing

Intent

Improve human and ecological health through purchase of local and sustainably produced food products.

Health Issues

Shifts in the U.S. food system over the last century are compromising human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on concentrated monocropping. This contributes to declining diversity of food crops necessary to fulfill human nutritional needs, while also leading to a loss of biodiversity. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate. This long travel distance disconnects growers from consumers, increases opportunities for food contamination and nutrient loss.

Routine use of antibiotics in animal agriculture has been shown to increase antibiotic resistance among bacteria that cause human infections. Pesticide drift, field dust, waste burning, toxic gases from degrading manure, and diesel exhaust from transporting food long distances are all factors related to food production that contribute to asthma, cardiovascular disease and lung cancer. Commercial fertilizers and pesticides contaminate surface- and ground-water in many locales. Large-scale animal feedlot operations contribute to water pollution with biologically active hormones, nitrates and other breakdown products of untreated animal waste. Calorie-rich, nutrient-poor diets contribute to obesity, diabetes, cancer, and a variety of degenerative diseases. By moving toward a healthier and more sustainable food system, health care can help alleviate human health problems associated with inadequate or inappropriate nutrition, antibiotic resistance, air and water contamination, and global health issues such as climate change.

Credit Goals

- Achieve a minimum percentage of annual combined food and beverage purchases (both in-house and contracted food service) from any combination of the following sources:
 - Approved to carry one or more of the following independent third party certified eco-labels: USDA Certified Organic, Food Alliance Certified, Rainforest Alliance Certified, Protected Harvest, Fair Trade Certified, Bird Friendly, Certified Humane Raised and Handled, Animal Welfare Approved, Salmon Safe, Marine Stewardship Council or other eco-label that has transparent and meaningful standards and independent verification processes. See Consumers Union Greener Choices Eco-Label Center for individual label ratings. Go to www.greenerchoices.org/eco-labels/eco-home.cfm

Note: Additional information about eco-labels is available in the Green Guide for Health Care Food Technical Brief, <http://www.gghc.org>.

AND/OR

- Carry one of the following label claims allowed by USDA or FDA: "Raised without antibiotics" or "No antibiotics administered" (poultry and meat products); "Raised without antibiotics that cause antibiotic resistance in humans" (poultry); "Raised without added hormones" or "No hormones added" (beef and lamb only); "No genetically engineered ingredients" (products made from corn, soy, canola or their derivatives); "rBGH-free", "rBST-free", or a statement such as "our farmers pledge not to use rBGH or rBST"/"Our farmers pledge not to use artificial hormones" (milk, butter, cheese, yogurt, ice cream, sour cream, cottage cheese); "Grass-fed" (products from ruminants such as beef cattle, dairy cattle, lamb); .

AND/OR

FS Credit 3.1-3.3 continued

Local, Sustainably Produced Food Purchasing

- Farms, ranches, and production/processing facilities located within a 200-mile radius of the facility.

Note: All food items that are processed must be sourced from within a 200-mile radius to meet the intent of this Credit Goal. For processed foods with multiple ingredients, including breads and other bakery items, only products with the majority of ingredients (>50% by weight) produced within the 200-mile radius may be included in the calculation.

Credit	Point total	Minimum Percentage (combined food and beverage purchases, based on cost)
3.1	1 point	15%
3.2	2 points	25%
3.3	3 points	50%

Reference Table: Third Party Certified Eco-Labels

Products	Animal Welfare Approved	Bird Friendly	Certified Humane Raised & Handled	Certified USDA Organic	Fair Trade Certified	Food Alliance Cert.	Marine Steward -ship Council	Protected Harvest	Rainforest Alliance Certified	Salmon Safe
Beef/ Bison	X		X	X		X				X
Lamb	X		X	X		X				X
Pork	X		X	X		X				
Poultry	X		X	X		X				
Coffee		X		X	X				X	
Tea				X	X				X	
Fruit Juices				X					X	X
Wine				X						X
Milk			X	X		X				X
Eggs			X	X		X				X
Cheese			X	X		X				
Yogurt				X						
Fruit				X	X	X		X	X	X
Vegetables				X		X		X		X
Breads				X						
Cereals				X						
Grains				X	X	X				
Sugar				X	X					
Processed Foods				X		X				
Cocoa				X	X				X	
Chocolate				X	X				X	
Nuts				X		X				
Oils				X		X				
Snacks				X						
Premade soups				X						
Fish							X			

FS Credit 3.1-3.3 continued

Local, Sustainably Produced Food Purchasing

General Label Claims

Label Claim	Food Category
"Raised without antibiotics" or "No antibiotics administered"	poultry and meat
"Raised without antibiotics that cause antibiotic resistance in humans"	poultry
"Raised without added hormones" or "No hormones added"	beef and lamb
"No genetically engineered ingredients"	products made from corn, soy, canola or their derivatives
"rBGH-free", "rBST-free", or something to this effect "our farmers pledge not to use rBGH or rBST"/"Our farmers pledge not to use artificial hormones"	milk, butter, cheese, yogurt, ice cream, sour cream, cottage cheese
"Grass-fed"	products from ruminant animals such as beef cattle, dairy cattle, lamb

Suggested Documentation

- ☐ Demonstrate through annual purchasing records that combined food and beverage purchases from food service operations (patient food and cafeterias), based on total cost, have met the credit goals over a minimum one-year period.

Reference Standards

Note: For additional information on the Reference Standards for this credit, view the Green Guide for Health Care Food Technical Brief, <http://www.gghc.org>

Bird Friendly, <http://www.si.edu/smbc>

Certified Humane Raised and Handled, <http://www.certifiedhumane.com>

Certified USDA Organic, <http://www.ams.usda.gov/NOP/indexNet.htm>

Fair Trade Certified™, <http://www.transfairusa.org>

Food Alliance Certified, <http://www.foodalliance.org>

Grass Fed, <http://www.usda.gov>

Marine Stewardship Council, <http://www.msc.org>

Raised Without Antibiotics/No Antibiotics Administered,
http://www.fsis.usda.gov/Fact_Sheets/Meat_&_Poultry_Labeling_Terms/index.asp

FS Credit 3.1-3.3 continued

Local, Sustainably Produced Food Purchasing

Raised without antibiotics that cause antibiotic resistance in humans,
http://www.fsis.usda.gov/Regulations/Use_of_Ionophores/index.asp

Raised without added hormones/No hormones added,
http://www.fsis.usda.gov/Fact_Sheets/Meat_&_Poultry_Labeling_Terms/index.asp

Protected Harvest, <http://www.protectedharvest.org>

Rainforest Alliance Certified, <http://www.rainforest-alliance.org/index.cfm>

Salmon Safe, <http://www.salmonsafe.org/>

U.S. Department of Agriculture, Food Labeling,
http://fnic.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=1&tax_subject=273

U.S. Food and Drug Administration, Labeling and Nutrition, <http://www.cfsan.fda.gov/label.html>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services; and, EP Credit 1: Solid Waste Prevention in Purchasing.*
- There is no single definition for sustainable agriculture; however, such a system includes characteristics such as:
 - **Conservation and preservation:** The use of land and other natural resources does not deplete their existence and therefore makes those resources available to future generations. Agrichemicals (ie., chemical products used in agriculture for insecticides, herbicides, fertilizers, etc.) are not conducive to sustainability, and therefore should be used minimally and only when necessary. Conservation in agriculture includes soil conservation, water conservation and protection, and energy conservation during the production process.
 - **Animal welfare:** Sustainably-raised animals are treated humanely and with respect, and are well cared for. They are permitted to carry out their natural behaviors, such as grazing, rooting or pecking, and are provided with a natural diet appropriate for their species.
 - **Biodiversity:** Rotation of a variety of plant and animal types can enrich soil nutrients, prevent disease, and minimize pest outbreaks, whereas continued support of a single species depletes those resources used by that species alone. Ecosystem is integral to sustainability.
 - **Economic viability:** In a sustainable agricultural system, farmers earn fair prices for their products that are appropriate to their reasonable costs. A sustainable system does not depend on subsidies, treats workers fairly, and pays wages and benefits that provides a meaningful livelihood to farmers to enable them to continue their work.

FS Credit 3.1-3.3 continued

Local, Sustainably Produced Food Purchasing

The following strategies can be used to identify food and beverages that meet some or all of the characteristics of sustainable agriculture:

- **Third-party certification/eco-labels:** Third-party certifications provide independent verification that standards have been met. These certifications usually include on-farm/ ranch inspections to verify that standards have been met. It is also important that the standards are meaningful and developed through an open process by parties free of any conflict of interest. Certifications such as USDA Organic and the others mentioned herein have been deemed “Highly Meaningful” by Consumers Union, <http://www.eco-labels.org>.
- **Marketing claims:** Some common marketing claims, such as those allowed by USDA or FDA and listed above, can be used by purchasers to identify products that offer measurable social and environmental benefits. These claims are usually a statement made by the producer, sometimes with a signed affidavit as the only verification; thus, they do not represent independent third-party verification.
- **Local, independent family farms/ranches:** Many small, local farm sources subscribe to sustainable agriculture practices and deserve support, though they may lack the resources or have been unable to complete the transition to obtain state or USDA organic certification. Sustainable agriculture is plant and food animal cultivation that is healthful and humane, economically viable, environmentally sound, and socially just.
- **Work directly with farmers/ranchers, local distributors and the facility’s Group Purchasing Organization (GPO):** Participate in GPO selection process for food vendors.
- **Identify Local and Independent Family Farms:** The definition of what is “local” may differ in various regions of the country. Ideally foods will travel less than 200 miles or 4-5 hours from the farm to the facility. In areas with abundant year round produce, purchasing even closer is often possible. Purchasing preference should be given to independent family farm/ ranch or cooperative/ network of independent family farms/ ranches where farmers/ ranchers own, labor on and earn a meaningful livelihood from their farms. Similarly, the definition of “family farm” is not always uniform. At the time this document went to print, one eco-label could be used to identify producers that met both family farm and sustainability criteria- the Animal Welfare Institute’s “Animal Welfare Approved” label, which applies to poultry and other meat products (<http://www.awionline.org>). However, the Association of Family Farms (AFF) has adopted similar draft standards for an AFF eco-label that purchasers will be able to use in the future to identify a wide range of sustainably produced products on family farms (<http://www.familyfood.net>).

Resources

Eat Well Guide, <http://www.eatwellguide.org/index.cfm>.

FoodRoutes, <http://www.foodroutes.org>

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care Food Technical Brief*, <http://www.gghc.org>

Health Care Without Harm, <http://healthyfoodinhealthcare.org>

National Rural Catholic Conference on the Ethics of Eating, <http://www.ncrlc.com/>

Organic Trade Association (OTA), <http://www.ota.com/index.html>.

1-2 points

FS Credit 4.1-4.2

Reusable & Non-Reusable Products: Food Service Ware

Intent

Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.

Health Issues

Each year, health care institutions purchase billions of pounds of janitorial paper including napkins and other paper products, plastic trash liners, and paper and fossil-fuel based plastic packaging and other disposable food service items. Disposable products provide some benefits to hospitals—ease of use, minimal maintenance and reduced dishwashing needs. Yet, when most of these single-use items leave the facility after use, they are disposed in landfills, incinerated, or pollute the world's oceans where they can harm humans, wildlife, and the environment and contribute to other negative impacts including depletion of nonrenewable resources, release of greenhouse gas emissions; generation of air and water pollutants from manufacturing, shipping and disposal; introduction of toxic chemicals into the environment during production, use and disposal; and, food contamination through chemicals leaching from packaging and food service ware. Hospitals can help mitigate these impacts by reducing overall use of packaging and other disposable products and by purchasing reusable products or those made from recycled or renewable materials and without use of hazardous chemicals.

Credit Goals

FS Credit 4.1 Reusable Food Service Ware (1 point):

- Develop and implement a program whereby all food service ware for either cafeterias or patient meals is reusable. Demonstrate that the program has been in place for a minimum one-year period.

Note: Food service ware includes plates and covers, cutlery, bowls, hot and cold cups, and cafeteria and patient trays.

Note: An innovation point is available for converting to reusable food service ware for both cafeterias and patient meals.

FS Credit 4.2 Non-Reusable Food Service Ware and Take Out Containers (1 point in addition to FS Credit 4.1):

- Develop and implement a program whereby 50% of single-use, non-reusable food service ware and take-out containers purchased meet the "Preferred" criteria for biobased food service ware outlined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware". Demonstrate that the program has been in place for a minimum one-year period.

Note: An innovation point is available if 50% of single-use, non-reusable food service ware and take-out containers purchased meet the "More Preferred" criteria for biobased food service ware outlined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware".

FS Credit 4.1-4.2 continued

Reusable & Non-Reusable Products: Food Service Ware

Suggested Documentation

- ❑ Maintain documentation from suppliers that demonstrates how purchased products meet the "preferred" or "more preferred" criteria in accordance with Credit Goals over a minimum one-year period.

Reference Standards

Health Care Without Harm, "Choosing Environmentally Preferable Food Service Ware-Reusable and Sustainable Biobased Products," <http://www.noharm.org/details.cfm?ID=1456&type=document>

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products and Materials; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services; GGHC EP Credit 1: Solid Waste Prevention in Purchasing.
- Reduce overall use of packaging by requesting suppliers to eliminate excess packaging. Coordinate with GGHC EP Credit 1: Solid Waste Prevention in Purchasing.
- Control use of disposable food ware and take out containers by storing them behind the counter and requiring patrons to request them.
- Purchase reusable products. When disposable products are required, purchase items with high recycled or renewable material content and manufactured without the use of highly hazardous chemicals as defined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware."
- Employ the following on-line calculator to determine the cost savings of switching to reusable cups and bowls, http://www.nyc.gov/html/nycwasteless/html/in_business/measurement_tools_cupsbowls.shtml
- Employ the suggested supplier survey questions in the HCWH fact sheet "Choosing Environmentally Preferable Food Service Ware" to identify environmentally preferable food service ware.
- Purchase food in bulk containers where possible and distribute condiments from behind the counter rather than offering self-service.

FS Credit 4.1-4.2 continued

Reusable & Non-Reusable Products: **Food Service Ware**

Resources

Case study: U.S. Environmental Protection Agency (EPA) Green Cafeterias,
<http://www.practicegreenhealth.org>

Case study: Harvard University cafeteria switching to reusable cups,
<http://web.indstate.edu/recycle/IOR3.html>

Case study: Switching to reusable trays in the NYC school system (scroll to number 5-Waste prevention in Schools), http://www.informinc.org/cwp_shortlist.php

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care Food Technical Brief*, <http://www.gghc.org>

Health Care Without Harm, "Choosing Environmentally Preferable Food Service Ware,"
<http://www.noharm.org>

Health Care Without Harm, Sample Policy for Purchasing Reusable Products, <http://www.noharm.org>

1 point

FS Credit 4.3

Reusable & Non-Reusable Products: **Non-Food Service Ware Items**

Intent

Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.

Health Issues

Each year, health care institutions purchase billions of pounds of janitorial paper including napkins and other paper products, plastic trash liners, and paper and fossil-fuel based plastic packaging and other disposable food service items. Disposable products provide some benefits to hospitals—ease of use, minimal maintenance and reduced dishwashing needs. Yet, when most of these single-use items leave the facility after use, they are disposed in landfills, incinerated, or pollute the world's oceans where they can harm humans, wildlife, and the environment and contribute to other negative impacts including depletion of nonrenewable resources, release of greenhouse gas emissions; generation of air and water pollutants from manufacturing, shipping and disposal; introduction of toxic chemicals into the environment during production, use and disposal; and, food contamination through chemicals leaching from packaging and food service ware. Hospitals can help mitigate these impacts by reducing overall use of packaging and other disposable products and by purchasing reusable products or those made from recycled or renewable materials and without use of hazardous chemicals.

Credit Goals

- Develop and implement a purchasing program for non-food service ware items that includes, at a minimum, the following criteria:
 - All plastic bags shall be Certified Compostable as outlined in the Health Care Without Harm fact sheet "Choosing Environmentally Preferable Food Service Ware" (Table 1, Criterion 5) OR made from a minimum of 10% post consumer recycled content material.
 - Coordinate purchasing practices for non-food service ware items with GGHC WM Prerequisite 1: Waste Management Plan and GGHC FS Credit 6.2: Food Services Recycling.
 - All paper-based non-food service ware items (e.g., napkins, paper towels, general purpose industrial wipes, tray liners and patient menus) purchased for cafeteria and patient food service meet the reference standards listed below and are certified Processed Chlorine-Free®, if applicable. Demonstrate that the program has been in place for a minimum one-year period.

PRODUCT	REFERENCE STANDARDS
Napkins	• Green Seal GS-09 for Paper Towels and Napkins
Paper Towels	• Green Seal GS-09 for Paper Towels and Napkins
Kitchen Towels	• Environmental Choice CCD-085 for Kitchen Towels
General Purpose Industrial Wipes	• Most current EPA Comprehensive Purchasing Guidelines
Tray Liners	• Green Seal GS-07 for Printing and Writing Paper • Green Seal GS-10 for Coated Printing Paper
Patient Menus – Uncoated Paper	• Green Seal GS-07 for Printing and Writing Paper
Patient Menus – Coated Paper	• Green Seal GS-10 for Coated Printing Paper
Paper Products used in Preparation of Food	• Green Seal GS-08 for Paper Products Used in the Preparation of Food

Note: Recycled content thresholds referenced in Green Seal standards meet or exceed the U.S. EPA Comprehensive Purchasing Guidelines.

FS Credit 4.3 continued

Reusable & Non-Reusable Products: **Non-Food Service Ware Items**

Suggested Documentation

- ☐ Maintain documentation from suppliers that demonstrates how products meet the "preferred" or "more preferred" criteria in accordance with Credit Goals over a minimum one-year period.

Reference Standards

U.S. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines,
<http://www.epa.gov/cpg/products.htm>.

Green Seal, <http://www.greenseal.org>

Health Care Without Harm, "Choosing Environmentally Preferable Food Service Ware-Reusable and Sustainable Biobased Products," <http://www.noharm.org/details.cfm?ID=1456&type=document>

Processed Chlorine-Free®, <http://chlorinefreeproducts.org/marks.htm>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products and Materials; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services; GGHC EP Credit 1: Solid Waste Prevention in Purchasing.*
- Reduce overall use of packaging by requesting suppliers to eliminate excess packaging. Coordinate with GGHC EP Credit 1: Solid Waste Prevention in Purchasing.
- Install roll type dispensers to limit quantities of paper products used. Use large rolls wherever possible, and hands-free dispensers that limit paper portions. Do not use C-fold or multi-fold paper towel systems.
- Reduce paper consumption through strategies such as digital data storage, double-sided copying, computer-generated reports, and intranet communication.
- Control napkin use via distribution points instead of making them readily available via dispensers.
- Eliminate unnecessary use of trash can liners.
- Purchase reusable products. When disposable products are required, purchase items with high recycled or renewable material content and manufactured without the use of highly hazardous chemicals.

FS Credit 4.3 continued

Reusable & Non-Reusable Products: **Non-Food Service Ware Items**

- Employ the suggested supplier survey questions in the HCWH fact sheet “Choosing Environmentally Preferable Food Service Ware” to identify environmentally preferable food service ware.
- Purchase food in bulk containers where possible and distribute condiments from behind the counter rather than offering self-service.

Resources

Case study: U.S. Environmental Protection Agency (EPA) Green Cafeterias,
<http://www.practicegreenhealth.org>

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care* Food Technical Brief, <http://www.gghc.org>

Processed Chlorine-Free® certified products, <http://www.chlorinefreeproducts.org/endorsed.htm>

Reach for Unbleached-Choosing Chlorine-Free Paper and Paper Products,
<http://www.noharm.org/details.cfm?type=document&id=598>

Recycled Content Products Directory, <http://www.ciwmb.ca.gov/RCP/>

1 point

FS Credit 4.4

Reusable & Non-Reusable Products: Bottled Water Elimination & Public Drinking Water Access

Intent

Support environmental stewardship of virgin resources by purchasing reusable and non-reusable products.

Health Issues

Water is essential to life. As such, access to water is a human right. Increasingly, commercial bottled water sales are supplanting public access to public water supplies, while 40% of commercially sold bottled water in the U.S. and Canada is derived from municipal tap water. Bottled water travels many miles from the source, resulting in the burning of fossil fuels during production and through transport and contributing to global greenhouse gases and other emissions. Bottled water also contributes to the billions of plastic bottles deposited annually in landfills and to the plastic contamination of the marine environment. Bottled water also erodes support for public water supply and infrastructure and may restrict drinking water access in some areas from populations with reduced economic means.

Credit Goals

- Eliminate single-use bottled water sales throughout the facility including vending/meetings and conferences.
- In cafeteria provide easy access to water derived from local public water supply and through signage clearly indicate its availability.
- In cafeteria provide reusable water containers (for purchase or free) and through signage or shelf space clearly indicate their availability.
- In vending areas and break rooms provide clear signage indicating nearest local publicly accessible water fountain.

FS Credit 4.4 continued

Reusable & Non-Reusable Products:

Bottled Water Elimination & Public Drinking Water Access

Suggested Documentation

- ☐ Document the facility's purchasing policy to eliminate single-use bottled water sales throughout facility including vending/meetings and conferences.
- ☐ Demonstrate through documentation such as photographs and purchasing/sales records that the cafeteria provides easy access to water derived from local public water supply, availability of reusable water containers, and appropriate signage in the cafeteria and next to vending machines in accordance with Credit Goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Sustainable Cleaning Products and Materials; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.
- For meetings, provide pitchers and reusable glasses.
- At nursing stations provide pitchers or consider installation of water filters at taps in nursing stations.
- In the cafeteria, provide easily accessed and publicly identified public water source.
- Install water fountains throughout the facility.
- Sign the Think Outside the Bottle Institutional Pledge <http://www.thinkoutsidethebottle.org>

Resources

Think Outside the Bottle Campaign, <http://www.thinkoutsidethebottle.org>

Blue Ocean Society resources on Marine Plastic <http://www.blueoceansociety.org/plastics.htm>

Food and Water Watch <http://www.foodandwaterwatch.org/water/bottled>

1 point

FS Credit 5

Hospital Supported Agriculture: Food & Farm Linkages

Intent

Support local and regional food production by increasing its visibility in the community and strengthening local agriculture infrastructure.

Health Issues

Locally produced and distributed foods in the local market may reduce the fuel consumption and accompanying emissions associated with long distance transport. Furthermore, sustainably-produced food often comes from small or mid-sized farms on the edges of cities and therefore contributes to the preservation of farmland and open space near urban areas. Supporting locally owned and managed farms reinforces the economic well-being of producers and communities. Many communities are considered food deserts, lacking access to fresh and/or local foods. By providing access to fresh local foods, health care institutions can help improve consumption of nutritious food and awareness about fresh healthy foods while supporting the local economy.

Credit Goals

Develop and implement a program or programs incorporating a minimum of three (3) of the following:

- **Processing and Season Extension** – Beyond direct food purchases, develop and support relationships with at least one local farm, not-for-profit farming organization, and/or meat or produce processing facility to extend the seasonal availability of local food for the facility.
- **Food Service Procurement** - Proactively coordinate with local family managed or owned farm(s) to match planting decisions with purchasing intentions prior to growing season.
- **Farmers Markets** - Host and promote local (within immediate service area or neighborhood) or on-site farmers markets during growing season.
- **Food Box** - Actively promote Community Supported Agriculture (CSA) food box programs for patients, employees and/or community residents. Host CSA pick up locations on-site.
- **Hospital Garden or Hospital Farm** - Support on-site or off-site hospital owned food producing garden(s) and/or farm(s).
- **Urban Garden Program** – Provide direct or in-kind support for not-for-profit urban food producing community garden organization(s).
- **Conference and Meeting Food Policy** – Develop and implement a policy requiring sustainable purchases in accordance with GGHC FS Credit 3 for minimum 50% of combined food and beverage purchases (by cost) at all facility-sponsored or -hosted conferences and workshops (both onsite and with contracted hotels or conference centers).

Note: An innovation point is available to facilities implementing two additional criteria.

Note: For the purposes of this Credit, "local" is defined as sourced from within a 200-mile radius.

FS Credit 5 continued

Hospital Supported Agriculture: Food and Farm Linkages

Suggested Documentation

- ❑ Compile and annually revise records of hospital-supported agriculture in accordance with the Credit Goals.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 5: Connection to the Natural World; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.*
- Fresh, nutritious food is available at farmers markets across the United States. Many hospitals and health systems, e.g., Kaiser Permanente, host seasonal farmers markets on-site. Farmers markets support local farms, reduce food miles, and help to increase access to healthy food for patients, staff and local community residents.
- Hospital or Community Supported Agriculture (CSA) is a way to support local farmers and sustainable agriculture; establish direct connections between consumers and farmers; and, increase access to nutritious, seasonal, high quality, and mostly organic food. In practice, CSAs often involve a system of weekly delivery or pick-up of vegetables, as well as flowers, fruits, herbs and occasionally milk or meat products. By making a financial commitment to a farm, CSA participants become "members" or "subscribers" of the CSA. Most CSA farmers prefer that members pay for the season up-front, but some farmers will accept weekly or monthly payments. Potential drop-off sites include hospitals, childcare centers, and/or local schools or other sites where families regularly visit. Alternatively facilities can include rebates or discounts through their employee wellness programs
- In many urban areas, vacant lots have been converted into urban gardens. Studies have shown that urban gardens have a measurable impact on the surrounding community's level of nutrition and that access to community gardens is an important strategy for improving vegetable consumption. Health care campuses can implement or host community gardens.
- Incorporating requirements for sourcing locally and sustainably into hotel and conference center contracts helps provide greater support and demand for sustainable foods.
- Over the last several decades the number of local processing facilities has declined through industrial consolidation. A variety of season extending techniques such as hoop houses, cold storage and state approved processing facilities such as mobile butchering buses support producers' access to markets.

FS Credit 5 continued

Hospital Supported Agriculture: Food & Farm Linkages

Resources

Janet Bachmann, "Farmers' Markets: Marketing and Business Guide." Resources on how to start a Farmers Market, <http://attra.ncat.org/attra-pub/PDF/farmmarket.pdf> Community Food Security Coalition, <http://www.foodsecurity.org/>.

Food Med, <http://www.foodmed.org>

Health Care Without Harm, Farmers' Markets and CSAs on Hospital Grounds, <http://www.noharm.org/details.cfm?ID=1134&type=document>

Health Care Without Harm Food website, <http://www.healthyfoodinhealthcare.org>

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care* Food Technical Brief, <http://www.gghc.org>

Kaiser Permanente Farmers Market Resource Guide, <http://www.noharm.org/details.cfm?ID=1112&type=document>

Marie Kulick, *Healthy Food, Healthy Hospitals, Healthy Communities*, includes several case studies on hospital-based farmers' markets, <http://www.healthobservatory.org/library.cfm?refid=72927>.

Local Harvest. Information and listings on CSA's throughout the US and many other resources on local food production. <http://www.localharvest.org/csa/>. Lots to Gardens, supported by the Sisters of Charity Health System in Maine, is a youth and community driven organization that uses sustainable urban agriculture to create access to fresh food, and to nurture healthy youth and a healthy community, <http://www.stmarysmaine.com/about/foundation/special/lots.html>.

Model local, nutritious, Sustainable Food at Conferences, Meetings and Workshops Society for Nutrition Education, "Guidelines To Increase The Use Of Local Foods At Meetings," <http://www.sne.org/guidelinesformetings.htm> and downloadable brochure "A Sense of Place: Serving Local Food at Your Meeting," http://www.sne.org/locfoods_n.pdf

Plow to Plate, <http://www.plowtoplate.org> - hospital-sponsored community coalition supporting local farms, food, and health

Ripe for Change: Rethinking California's Food Economy addresses the root causes of breakdown in the food economy and points to solutions and case studies of how an alternative vision can work, <http://www.isec.org.uk/ripeforchange.html>

Urban Community Gardens, <http://www.mindspring.com/~communitygardens/orgs.html>

U.S. Department of Agriculture, Food and Nutrition. The primary focus of this program is food security. <http://www.fns.usda.gov/fsec/>

1 point

FS Credit 6.1

Food Waste Reduction, Donation & Composting

Intent

Support food security programs, soil restoration, and waste reduction through food waste reduction, donation and composting programs.

Health Issues

According to the U.S. EPA, roughly 20% of food produced in the U.S. is disposed of prior to consumption.¹ A 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association targeted a reduction in total waste volume. Food and food waste products are the second largest constituent of the health care waste stream, comprising close to 20% of the solid waste volume in medical facilities with food service operations. Food donations both reduce facility solid waste disposal costs and reduce the need to produce and purchase duplicate food items for non-profits and charities such as homeless shelters and food kitchens. Beneficial reuse of organic matter diverts waste constituents from disposal while also contributing to ecosystem health. Composting organic matter and applying it to the soil increases soil micronutrients, and reduces reliance on chemical fertilizers and their associated industrial, ecologic and health burdens.

Credit Goals

- Develop and implement a food waste reduction and donation program for usable food, as deemed by state health code and other regional regulators.
- Develop and implement a food waste composting program consistent with Department of Health and solid waste regulations, for collection from all food use areas including but not limited to: catering, patient rooms (where possible by regional regulation), cafeteria and food preparation areas.
- Develop and implement food waste reduction, donation and food waste composting written management plans and include in the overall Waste Management Plan outlined in GGHC WM Prerequisite 1.
- Estimate and track pounds of composted and donated food and include under the recycling section of the Waste Management Waste Profile outlined in GGHC WM Prerequisite 2.
- Provide controlled areas to facilitate removal of food waste, consistent with an Integrated Pest Management (IPM) plan as outlined in GGHC ES Credit 3: Integrated Pest Management.

¹ U.S. Environmental Protection Agency EPA, <http://www.epa.gov/wastewise/pubs/wwupda7.pdf>

FS Credit 6.1 continued

Food Waste Reduction, Donation & Composting

Suggested Documentation

- ☐ Compile and annually review documentation demonstrating food waste reduction by tracking waste data (by weight) through the Waste Generation and Profile outlined in GGHC WM Prerequisite 2 Waste Generation Profile and Measurement.
- ☐ Compile and annually review reduction, donation and compost plan and include updates in the Waste Management Plan: GGHC WM Prerequisite 1.
- ☐ Prepare and annually update a space program and plan showing the area(s) dedicated to food waste collection and storage (and composting if applicable).
- ☐ Compile and annually review copies of contract(s) with food waste hauler, composter, food donation contractor (or others) demonstrating compliance with credit goals.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1: Site Management; GGHC SSM Credit 2: Reduced Site Disturbance; GGHC SSM Credit 5: Connection to the Natural World; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.2: Food Services Recycling; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.
- Implement food service programs to reduce volume of unconsumed prepared food. Strategies include such programmatic innovations as “room service”, “meals on demand,” “just in time” food preparation, control of excessive late trays (duplicate patient trays), mitigate sometimes wasteful catering and physician feeding procedures, maximize yields from fresh produce and meat, and limit spoilage through improved handling procedures, or other programs that have been demonstrated to reduce the quantity of unconsumed food.
- Store food waste destined for composting in secure locations outside of patient areas to protect the building occupants from coming in contact with it.
- Work with state environmental regulator and/or policy makers to pull entities together to find outlets and support composting in a health care environment.
- A hospital’s food preparation area generates the largest amount of food waste, by weight, and is a good place to start implementation of the food donation and waste reduction program.
- Site material and waste handling areas as close to the food services department as possible to facilitate baling and/or storage of recyclables and waste for preparation and storage prior to removal.

FS Credit 6.1 continued

Food Waste Reduction, Donation & Composting

- Implement on-site composting programs for food wastes and compostable non-reusable food service items, or contract with private or municipal compost ventures or small-scale farmers for handling of food waste.
- Include the requirements associated with the food waste collection system in the space program, including storage spaces. Determine size of spaces based upon volume of projected waste and length of time anticipated for storage. Consider Integrated Pest Management issues outlined in GGHC ES Credit 4: Integrated Pest Management in design.
- Donate Emergency Preparedness food to a food bank one month prior to the food's expiration date.
- Adjust inventory levels on perishables to reduce waste due to spoilage or dehydration.
- Request that suppliers take back shipping boxes for reuse or recycling.
- Distribute condiments from behind the counter instead of offering self-service.
- Educate cafeteria users through signage and brochures.
- Review state Department of Health Code for guidance on food composting in a health care facility.

Resources

Food Donation Page from Minnesota Technical Assistance Program

<http://www.mntap.umn.edu/source/13-4/Sr998-g7.htm>

Jamie Harvie, Michelle Gottlieb, Roberta Anderson and Marie Kulick, *Green Guide for Health Care Food* Technical Brief, <http://www.gghc.org>

Health Care Without Harm's Environmentally Preferable Purchasing Food Service Ware Fact Sheet, <http://www.noharm.org/details.cfm?ID=1456&type=document>

Health Care Without Harm's Biobased food service ware and fact sheet, <http://www.noharm.org/details.cfm?ID=1659&type=document>

Practice Greenhealth, 10-Step Guide to Composting in Healthcare Facilities, <http://www.practicegreenhealth.org>

Practice Greenhealth, Composting Page, <http://www.practicegreenhealth.org>

Practice Greenhealth, Donation and Surplus Programs, <http://www.practicegreenhealth.org>

U.S. Environmental Protection Agency (EPA) food waste reduction fact sheet, <http://www.epa.gov/epaoswer/non-hw/reduce/food/food.htm>

U.S. Environmental Protection Agency (EPA) food donation fact sheet, <http://www.epa.gov/wastewise/pubs/wwupda7.pdf>

U.S. Environmental Protection Agency (EPA) WasteWise program, <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/index.htm>

1 point

FS Credit 6.2

Food Services Recycling

Intent

Increase recycling of food services generated wastes to reduce solid waste disposal in landfills and incinerators.

Health Issues

According to the U.S. EPA, roughly 20% of food produced in the U.S. is disposed of prior to consumption.² All waste is preventable to a certain extent. And, the majority of non-hazardous solid waste can be recycled, composted, or otherwise diverted from landfill or incineration. Since the 1998 Memorandum of Understanding between the U.S. EPA and the American Hospital Association mandating reduction in total waste volumes, hospitals have initiated ambitious waste prevention, sorting and recycling programs. Food and food waste products are the second largest constituent of the health care waste stream, comprising close to 20% of the solid waste volume in medical facilities with food service operations. Recycling conserves natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and reducing the amount of waste sent to landfills and incinerators.

Credit Goals

Implement recycling for all of the following Food Service materials:

- Glass, metal and plastic (preferably in a single stream, upon availability in region).
- Corrugated boxes, boxboard and paper
- Shrink wrap (bagged or baled)
- Return pallets to vendors for reuse.

Suggested Documentation

- ☐ Compile and annually review documentation demonstrating food waste reduction through recycling by tracking recycling data (by weight) through the waste management plan outlined in GGHC WM Prerequisite 1.
- ☐ Track recycling and reuse pounds for inclusion in waste profile tracking as outlined in GGHC WM Prerequisite 2.
- ☐ Prepare and annually update a space program and plan showing the area(s) dedicated to recycling collection and storage.
- ☐ Compile and annually review copies of contract(s) with recyclers demonstrating compliance with credit goals.

Reference Standards

There is no reference standard for this credit.

² U.S. Environmental Protection Agency EPA, <http://www.epa.gov/wastewise/pubs/wwupda7.pdf>

FS Credit 6.2 continued

Food Services Recycling

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 7: Food Vendors; GGHC FS Credit 8: Chemical Management for Food Services.*
- Consider purchasing a baler, which can be used to compact a variety of types of materials from cans to plastics to shrink wrap to boxes.
- Site material and waste handling areas as close to the food services department as possible to facilitate baling and/or storage of recyclables and waste for preparation and storage prior to removal. Some facilities store bagged recyclables and when they have enough, they bale them into a size that makes storage easier and prepares the material for pick up by recycler. Other facilities place recyclables into a collection container (for example, a 5 yard container) that is serviced by the recycling vendor.
- If compliance is a problem in the cafeteria, consider eliminating waste and recycling containers so that all trays are returned with wastes/recyclables on the trays and employees properly segregate recyclables from the trays.
- Educate patients and visitors through signage on patient menus and on tent cards in the cafeteria.
- Place recycling bins next to beverage dispensing machines.
- Expand bottle and can collection to break areas, patient lounges and wherever soda machines are located throughout the facility. Service receptacles daily consistent with infection control protocols.
- Request that suppliers take back shipping boxes for reuse or recycling.
- Purchase food in bulk containers where possible and distribute condiments from behind the counter rather than offering self-service.
- Integrate food service waste reduction efforts into overall facility environmental initiatives, recognizing their role in an overall environmental sustainability program.

Resources

Practice Greenhealth Waste Reduction Page: <http://www.practicegreenhealth.org>

Practice Greenhealth Specific Material Recycling Page, <http://www.practicegreenhealth.org>

1-2 points

Food Credit 7.1-7.2

Food Vendors

Intent

Establish facility-wide implementation of healthy, sustainably produced food service programs by establishing parallel policies and programs with contracted food service vendors.

Health Issues

Shifts in the U.S. food system over the last century are compromising human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on concentrated monocropping. This contributes to declining diversity of food crops necessary to fulfill human nutritional needs, while also leading to a loss of biodiversity. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate. This long travel distance disconnects growers from consumers, increases opportunities for food contamination and nutrient loss.

Routine use of antibiotics in animal agriculture has been shown to increase antibiotic resistance among bacteria that cause human infections. Pesticide drift, field dust, waste burning, toxic gases from degrading manure, and diesel exhaust from transporting food long distances are all factors related to food production that contribute to asthma, cardiovascular disease and lung cancer. Commercial fertilizers and pesticides contaminate surface- and ground-water in many locales. Large-scale animal feedlot operations contribute to water pollution with biologically active hormones, nitrates and other breakdown products of untreated animal waste. Calorie-rich, nutrient-poor diets contribute to obesity, diabetes, cancer, and a variety of degenerative diseases. By moving toward a healthier and more sustainable food system, health care can help alleviate human health problems associated with inadequate or inappropriate nutrition, antibiotic resistance, air and water contamination, and global health issues such as climate change.

Credit Goals

In addition to complying with the relevant GGHC Food Service credits through the Food Service department, establish and maintain facility-wide implementation of Food Service credits through contracts with food vendors. Calculate based on total facility food service budget including contracted food vendors unless listed otherwise. Up to two points total available. Additional innovation points available for facilities that achieve more than two of the categories listed below.

1 point	100% of all food service operations attain all 3 points under FS Credit 3: Local, Sustainably Produced Food Purchasing.
1 point	100% of all food service operations attain at least 2 points under FS Credit 4: Reusable and Non-reusable Products.
1 point	100% of all food service operations attain FS Credit 6: Food Donation and Waste Reduction.

**Note: For the purposes of this credit, nutritionally healthy vending machine food is defined as meeting the Kaiser Permanente Minimum Standard for Healthy Food and Beverage Selections in Vending Machines or equivalent.*

Food Credit 7.1-7.2 continued

Food Vendors

Suggested Documentation

- ☐ Demonstrate through purchasing records that combined annual facility wide food service purchases meet Credit Goals. Review and revise records annually.
- ☐ Compile and annually review vendor contracts requiring compliance with relevant GGHC Food Service credit goals.

Reference Standards

Kaiser Permanente Minimum Standard for Healthy Food and Beverage Selections in Vending Machines, <http://www.foodalliance.org/sustainablefoodpolicy/kaise/Kaiser%20Permanente%20Healthy%20Vending%20Standards.pdf>

Potential Technologies and Strategies

Refer to Potential Technologies and Strategies associated with GGHC FS c3: Local, Sustainably Produced Food Purchasing, GGHC FS c4: Reusable and Non-Reusable Products, and GGHC FS c6: Food Donation and Waste Reduction.

Resources

See also Resources associated with GGHC FS c3: Local, Sustainably Produced Food Purchasing, GGHC FS c4: Reusable and Non-Reusable Products, and GGHC FS c6: Food Donation and Waste Reduction.

- American Medical Association, 2006 survey of fast food in healthcare facilities. The report found that of the 234 hospitals surveyed, 42 percent were selling brand-name fast food on their campuses. <http://www.amsa.org/cph/healthyhospitals.cfm>
- The Health Collaborative Healthy Vending Guidelines: A Fit City Initiative San Antonio, Texas, <http://www.healthcollaborative.net/assets/pdf/vendingcriteria.pdf>
- Kaiser Permanente Minimum Standard for Healthy Food and Beverage Selections in Vending Machine, www.foodalliance.org/sustainablefoodpolicy/kaise/Kaiser%20Permanente%20Healthy%20Vending%20Standards.pdf
- University of Michigan Health System and Ann Arbor VA Medical Center, 2002. The report found 38% of the nation's top health institutions had regional or national fast food franchises on their main medical campuses. <http://www.med.umich.edu/opm/newspage/2002/fastfood.htm>

1-2 points

FS Credit 8.1-8.2

Chemical Management for Food Services

Intent

Minimize toxic chemical use in food services preparation and service areas, including cleaning chemicals and pest management.

Health Issues

The health of building occupants and the local ecosystem can be directly impacted by the chemicals and materials used for clinical and facility operations. Sustainable cleaning practices are an essential part of sustainable building. Some cleaning products use toxic chemicals hazardous to human health and the environment. Some chemicals can compromise indoor air quality and cause cancer, reproductive disorders, respiratory ailments (including occupational asthma), eye and skin irritation, central nervous system impairment, and other ailments. In addition, some chemicals used in these products are classified as persistent, bioaccumulative and toxic (PBT), are classified as hazardous waste, and/or otherwise contribute to environmental pollution during their manufacture, transport, use, and/or disposal. Non-toxic and least-toxic cleaning products and materials are available on the market that meet or exceed health care facilities' performance requirements. By working in consultation with infection control committees, hospitals can minimize unnecessary disinfection as part of their toxic chemical reduction and indoor air quality improvement plans. The emerging field of nanotechnology presents potential benefits to society, while also posing risks associated with nanoscale materials' ability to cross biological barriers that protect human organs and tissues. Preliminary studies have reported toxic effects of nanomaterials on the lungs, heart, reproductive system, kidneys, and skin. Given uncertainty about the toxic effects of nanomaterials, a precautionary approach regarding their use is appropriate.

Credit Goals

FS Credit 8.1: Cleaning Products

- Utilize environmentally preferable cleaning products to clean food preparation and food service areas (cafeterias), kitchen equipment, surfaces and dishware. These products may include floor cleaners, drain cleaners, oven cleaners, dish detergent, glass and surface cleaners, and multipurpose cleaners and sanitizers meeting the following criteria:
 - Utilize cleaning products certified under the listed specifications in GGHC ES Credits 1.3-1.4 for available product categories.
 - Avoid phenolics in Food Service applications.
 - Where use of a sanitizer is recommended for previously cleaned food contact surfaces, sanitizer must meet U.S. EPA Efficacy Data Requirements for Sanitizing Rinses, and be in accordance with the U.S. Food and Drug Administration Hazard Analysis and Critical Control Point (HACCP) standard. All sanitizers for food contact surfaces must meet the current U.S. Food and Drug Administration Food Code (2005).
 - If using chlorinated sanitizers, ensure concentrations of available chlorine are no greater than 200ppm for previously cleaned food-contact surfaces in food service areas (per U.S. EPA Efficacy Data Requirements for Sanitizing Rinses), unless required by authorities having jurisdiction (AHJ). AHJs may include state and local health departments and/or the U.S. Food and Drug Administration.

FS Credit 8.1-8.2 continued

Chemical Management for Food Services

- Use of disinfectants for hard surfaces (not food contact surfaces) in Food Services areas shall only occur as the result of explicit evaluation and recommendation by the Infection Control committee using the Infection Control Risk Assessment (ICRA) process. Ensure that the selection of any disinfectant for use on hard surfaces is an EPA-registered hospital-use disinfectant under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements.
- Utilize only integrated pest management (IPM) techniques for pest management in the food services area per GGHC ES Credit 3: Integrated Pest Management.

FS Credit 8.2: Cutlery and Food Preparation Equipment

- Develop and implement a policy/program in consultation with the facility's Infection Control Committee and in accordance with the facility's Infection Control Risk Assessment and Audit that prohibits the purchase and use of cutlery and food preparation equipment impregnated with antimicrobials.

Suggested Documentation

FS Credit 8.1

- ☐ Compile and revise annually an inventory of cleaning products used in food services areas in accordance with Credit Goals.
- ☐ Document and annually review use of IPM techniques for pest management in food services areas.
- ☐ Compile and review annually documentation of contractors' agreement to abide by the chemical management program outlined in Credit Goals.

FS Credit 8.2

- ☐ Document and annually review progress of the policy/program to prohibit impregnated antimicrobials from cutlery and food preparation equipment in accordance with Credit Goals.

Reference Standard

U.S. Environmental Protection Agency (EPA), 40 CFR Parts 152, 156, and 158. Exemption of certain pesticide substances from Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements. Amended 1996. Federal Register 1996;61:8876-9, <http://www.epa.gov/oecaerth/civil/fifra/index.html>

U.S. Environmental Protection Agency (EPA), Efficacy Data Requirements for Sanitizing Rinses (for previously cleaned food-contact surfaces). Jan. 30, 1979, http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm

U.S. Food and Drug Administration Food Code, <http://www.cfsan.fda.gov/~dms/foodcode.html>

U.S. Food and Drug Administration Hazard Analysis and Critical Control Point (HACCP), <http://www.cfsan.fda.gov/~lrd/haccp.html>

FS Credit 8.1-8.2 continued

Chemical Management for Food Services

Potential Technologies and Strategies

Refer to the Potential Technologies and Strategies in GGHC ES Credit 1 and Credit 3.

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development; GGHC ES Credit 3: Indoor Integrated Pest Management; GGHC FS Credit 1: Sustainable Food Policy and Plan; GGHC FS Credit 2: Sustainable Food Education and Promotion; GGHC FS Credit 3: Local, Sustainably Produced Food Purchasing; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC FS Credit 5: Hospital Supported Agriculture: Food and Farm Linkages; GGHC FS Credit 6.1: Food Donation and Composting; GGHC FS Credit 6.2: Food Services Recycling; and, GGHC FS Credit 7: Food Vendors.*
- Meet with health department liaison and food services director to determine organisms of concern in foodborne illnesses and review environmentally preferable cleaning product specifications to ensure adequate protection through food storage, preparation, and food service cleaning policies and procedures.
- Work with facilities maintenance and food service staff to identify facility fixes, maintenance activities, and methods to improve physical building pest barriers in the food services area.

Resources

Refer to the Resources section in GGHC ES Credit 1 and ES Credit 3.

European Trade Union Confederation (ETUC) Resolution on nanotechnologies and nanomaterials, <http://www.etuc.org/a/5163>

European Trade Union Institute – Research, Education, Health & Safety (ETUCI-REHS) NANOCAP Project, http://hesa.etui-rehs.org/uk/dossiers/dossier.asp?dos_pk=18,

Out of the laboratory and on to our plates: Nanotechnology in food and agriculture, <http://nano.foe.org.au/node/220>

U.S. Centers for Disease Control and Prevention (CDC) Guidelines for Environmental Infection Control in Healthcare, 2003, http://www.cdc.gov/ncidod/dhqp/gl_environmentinfection.html

U.S. Environmental Protection Agency (EPA), Antimicrobial Science Policies, Disinfectant Technical Science Section (DIS/TSS), <http://www.epa.gov/oppad001/sciencepolicy.htm>

U.S. Environmental Protection Agency (EPA), Sanitizing Rinses (for previously cleaned food-contact surfaces), DIS/TSS-4 Jan 30, 1979, http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm

Environmentally Preferable Purchasing

Required

EP Prerequisite 1

Mercury Reduction

Intent

Protect the health of patients, staff and visitors, and reduce disposal costs and liability, by avoiding purchase of mercury-containing equipment and devices and phasing out existing mercury sources.

Health Issues

In 1998, a Memorandum of Understanding between the American Hospital Association and the U.S. EPA set new goals for hospital pollution prevention. One of the top priorities was the virtual elimination of mercury and mercury-containing devices from the hospital purchasing and waste stream. Mercury is a potent neurotoxin. The most sensitive health effect of mercury is an adverse impact on the neurological development of fetuses, infants and children. Low-level prenatal exposure can result in language, memory and attention deficits in children who were exposed in utero. Since the establishment of the MOU, hospitals have substantially reduced the purchase of mercury-containing chemicals and medical devices and found substitutes for many mercury-containing pharmaceuticals. Some hospitals have eliminated mercury purchases completely.

Credit Goals

Equipment and Devices

- Develop a mercury reduction purchasing policy that prohibits purchase of mercury-containing equipment without prior specific approval from the Hazardous Materials Committee (or equivalent).
- Create an inventory identifying all mercury-containing devices and equipment.

Note: Mercury-containing equipment and devices may include, but are not limited to, the following: MRI equipment, wheel chairs, automated beds, cantor tubes, bed warmers, bougies and thermometers and other medical and laboratory equipment.

- Label any mercury-containing equipment or devices as “contains mercury.”

Note: Fluorescent lamps are exempt from this labeling and inventory requirement; however, note purchasing criteria for lamps listed below.

- Identify alternatives to mercury-containing clinical devices and other stand-alone medical and/or facilities equipment (excluding fluorescent lamps) and pilot through supply chain or purchasing, in accordance with the protocol for any new purchase. Develop a plan to transition to mercury-free devices with 100% completion in five years (average 20% per year.)
- For dental equipment, install or confirm existence of amalgam separators that capture a minimum 98% of mercury. Ensure Proper disposal of the captured mercury in accordance with GGHC WM Prerequisite 1: Waste Management Plan.

EP Prerequisite 1 continued

Mercury Reduction

Lamps

Develop and implement a lamp purchasing policy covering the following topics:

- Purchase only illuminated exit signs certified by Energy Star®.
- At the end of their useful life, replace standard (e.g. non-pulse start) metal halide lamp assemblies in interior spaces and mercury vapor High Intensity Discharge (HID) lamp assemblies with other, lower mercury lamp types.
- At the end of their useful life, replace current facility lamps with low mercury fluorescent and high pressure sodium lamp assemblies as follows:

Fluorescent Lamp	Criteria
All T-12 lamps	Phase out entirely
Eight-foot T-8 (Standard and High Output)	Maximum 10 mg mercury
Four-foot T-8 (Standard and High Output)	Maximum 3.5 mg mercury
Three-foot T-8	Maximum 6 mg mercury
Two-foot T-8	Maximum 6 mg mercury
U-Bent T-8	Maximum 8 mg mercury
28-watt T-5	Maximum 2.5 mg mercury
24-watt T5HO (High Output)	Maximum 2.5 mg mercury
54-watt T5HO (High Output)	Maximum 2.5 mg mercury
22-watt Circular T-5	Phase out entirely
Compact fluorescent lamps	Maximum 5 mg mercury - Energy Star® qualified, (excluding pin base lamps)
High Pressure Sodium Lamp	Criteria
50-watt HPS	Maximum 18 mg mercury
70-150-watt HPS	Maximum 15 mg mercury
200-watt or greater HPS	Maximum 32 mg mercury

- Implement a lamp-recycling program that meets or exceeds the Universal Waste regulations of the respective state.

EP Prerequisite 1 continued**Mercury Reduction****Training**

- ☐ Educate and annually update purchasing and department heads on the facility's mercury reduction policy, the process for purchasing mercury-free equipment and devices, and progress with the mercury phase-out plan.

Suggested Documentation**Equipment and Devices**

- ☐ Compile documentation of the facility's mercury reduction purchasing policy and annually review progress in accordance with Credit Goals.
- ☐ Compile an inventory identifying all mercury containing devices and equipment and mercury-free alternatives in accordance with Credit Goals. Label any identified mercury-containing equipment or devices as "contains mercury."
- ☐ Compile documentation verifying that amalgam separators able to capture a minimum of 98% mercury are installed on all applicable dental equipment in accordance with Credit Goals.

Lamps

- ☐ Demonstrate that lamp purchasing over a minimum one-year period complies with the Credit Goals, based on documentation for each type of mercury-containing lamp. Document performance of the fluorescent lamp recycling program, including the number and percentage of mercury-containing lamps recycled and final disposition, in accordance with Credit Goals.

Training

- ☐ Document an annual or more frequent training of all relevant employees on proper segregation of mercury until phase-out is complete.

Reference Standards

U.S. Environmental Protection Agency (EPA) Energy Star, <http://www.energystar.gov>

U.S. Environmental Protection Agency (EPA), Universal Waste Rule,
<http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm>

EP Prerequisite 1 continued

Mercury Reduction

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Develop a mercury management policy for proper management of mercury-containing devices until the facility is mercury-free. Maintain the policy and training even after the site is designated “mercury-free.”
- Conduct a community-wide thermometer exchange to encourage the public to return mercury-containing devices for proper recycling and disposal in return for a mercury-free thermometer.
- Purchase low-mercury fluorescent lamp assemblies. Advances in lighting and ballast technology have greatly reduced the per bulb mercury concentrations. Low-mercury, high intensity discharge lamps are increasingly available. Consider long-life bulbs to reduce costs associated with relamping, recycling and purchase.
- Consider piloting the use of mercury-free LED (light-emitting diode) lamps or very low mercury fluorescent induction lighting, with instant on–off control, offering reduced energy usage and long life.
- Avoid bulb crushers (even if legal in a certain state) as they can expose workers to mercury vapor and increase hazardous waste generation (crushed bulbs are not classified as universal waste).
- Develop a mercury spill response policy that meets the intent of the U.S. EPA Resource Conservation and Recovery Act (RCRA), including: spill cleanup supplies, and staffers trained in spill response, including removal by a licensed hazardous waste hauler. Ensure proper oversight of spill cleanup. Report the spill to Joint Commission and other applicable regulatory bodies and replenish spill supplies. (See GGHC CM Credit 1.1: Community Contaminant Prevention: Leaks & Spills.)
- Collect, store and dispose all mercury-containing devices as Universal Waste, per Universal Waste guidelines. (See GGHC CM Credit 2: Indoor Chemical Contaminant Prevention.)
- Review the Practice Greenhealth Making Medicine Mercury Free Award criteria for a review of mercury sources, <http://www.practicegreenhealth.org>.

EP Prerequisite 1 continued

Mercury Reduction

Resources

The American Hospital Association (AHA) and the United States Environmental Protection Agency (EPA) signed a Memorandum of Understanding identifying goals to reduce the impact of health care facilities on the environment. <http://www.practicegreenhealth.org>.

Health Care Guide to Pollution Prevention Implementation through Environmental Management Systems (U.S. EPA 2005 draft), <http://www.kppc.org/EMS/>

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group, <http://www.masco.org/mercury/>

Minnesota Technical Assistance Program Mercury Page, <http://mntap.umn.edu/health/mercury.htm>

NY Academy of Science "What You Should Know about the Health Risks of Mercury," The report discusses major sources of mercury and methylmercury to the Harbor (and health care's role). <http://www.nyas.org/about/newsDetails.asp?newsID=55&year=2002>

Practice Greenhealth, Making Medicine Mercury Free Award criteria, <http://www.practicegreenhealth.org>.

U.S. Environmental Protection Agency (EPA), Mercury page and Mercury Study Report to Congress, <http://www.epa.gov/mercury/report.htm>.

U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act, 1976 (RCRA), <http://www.epa.gov/rcraonline/>

Many states have enacted laws prohibiting some or all uses of mercury-containing medical devices and/or mercury switches. These include but are not limited to:

- Maine *State law (LD 1159)* prohibiting the sale of mercury in switches, measuring devices (including sphygmomanometers), instruments and thermostats.
- Washington *State law (House Bill 1002)* requiring the labeling of fluorescent lamps that contain mercury. Prohibits the sale of mercury-containing items in products such as thermometers and thermostats. Sphygmomanometers may not be sold with the exception of a hospital or health care facility with a mercury reduction plan in place.
- Michigan *State law (House Bill 4599)* bans the sale of mercury thermometers.
- Connecticut *State law (House Bill 5539)* bans the sale and distribution of mercury fever thermometers and places restrictions on the sale of other mercury-containing equipment and devices.
- Massachusetts *State law (House Bill 3772)* bans the sale of mercury fever thermometers.
- California *State law (SB 633)* restricts the use and distribution of mercury fever thermometers and other mercury-containing equipment and devices.
- Oregon *State law (HB 3007)* phases out mercury thermostats and prohibits the sale of mercury-containing fever thermometers and other mercury-containing equipment and devices.

Required

EP Prerequisite 2

Electronic Assets Environmental Management Plan**Intent:**

Reduce the environmental and health burdens associated with the manufacture, use and disposal of electronic products.

Health Issues

The electronics industry—nationally and internationally—is making strides to reduce toxic chemical use in their products, though there is still progress to be made regarding environmental considerations, recycling or end-of-life disposal. Computers and other electronic wastes can contain toxic chemicals. The average electronic product contains chemicals that are persistent, bioaccumulative toxicants, teratogens, carcinogens, reproductive toxicants, endocrine disruptors, and/or mutagens, including heavy metals such as lead and cadmium in Cathode Ray Tube (CRT) monitors, mercury in Liquid Crystal Display (LCD) and flat panel monitors, and halogenated flame retardants in circuit boards and plastic housings. Workers in manufacturing facilities may be exposed to these toxic substances, and users may be exposed to the toxic chemicals during the products' use.

The increased promotion of new IT equipment and design for short life spans, has made electronic waste one of the world's fastest growing waste streams. According to the U.S. EPA, fifteen to twenty percent of discarded electronics are currently recycled,¹ with the remainder stockpiled or improperly disposed of in landfills or incinerators. Many electronics are exported to developing countries for disassembly, sometimes under unsafe conditions. Additionally, through burning of halogenated plastics in cable wiring, melting of lead solder in circuit boards and leaching of persistent chemicals from waste stockpiles, toxic chemicals can be released into air, land, and water, directly exposing recycling workers and adjacent communities to these hazards, and threatening the global public and ecological health.

Credit Goals

- Develop an Electronic Assets Management Plan by either of the following methods:
 - Establish and maintain an Electronic Assets Management Team with staff from the Information Technology (IT) or electronics department, Biomedical Engineering, Environmental Services/Recycling, Procurement, Administration and Risk Officers; or,
 - Work directly with an existing “green” team (a group tasked with addressing sustainability issues) on Electronic Assets Management and include people from relevant departments associated with the lifecycle of these products.
- Develop and implement an Electronic Assets Environmental Management Plan that includes a total cost of ownership approach with strategies around Procurement, Reduction, Use-Phase Management, Responsible Reuse, and Responsible Recycling.
- At the point of purchase for equipment, require manufacturers' or vendors' written commitments to equipment end-of-life management through to final disposition, including: take-back, refurbishment, resale, responsible donation or recycling, and provision of asset tracking by serial number.
- Establish a process for tracking responsible end-of-life management for existing or inherited equipment.

¹ U.S. Environmental Protection Agency (EPA), General Information on E-Waste, <http://www.epa.gov/eCycling/faq.htm#recycled>

EP Prerequisite 2 continued

Electronic Assets Environmental Management Plan

- Establish and maintain a HIPAA (Health Insurance Portability and Accountability Act) compliance plan for all electronic products to safeguard the privacy of personal information.

Note: All of the above strategies should be pursued in accordance with applicable federal and state solid waste and hazardous waste disposal regulations, including Universal Waste Rules.

Suggested Documentation

- ☐ Compile and annually review documentation tracking implementation of the Electronic Assets Environmental Management Plan.
- ☐ Compile and annually review documentation demonstrating compliance with the Electronics Management Plan's Purchasing and End-of-Life Management requirements over a minimum 12-month period. Demonstrate continuous improvement over time.
- ☐ Compile and annually review documentation of the facility's HIPAA (Health Insurance Portability and Accountability Act) compliance plan for electronic products in accordance with regulations.

Reference Standards

HIPAA (Health Insurance Portability and Accountability Act), <http://www.hhs.gov/ocr/hipaa/>

U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act, 1976 (RCRA), <http://www.epa.gov/rcraonline/>

U.S. Environmental Protection Agency (EPA), Universal Waste Rule, <http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm>

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.
- Require suppliers to deliver all printers and copiers set for double-sided (duplex) copying/printing.
- Purchase Energy Star products for all relevant categories and require suppliers to deliver all applicable equipment with energy saving settings enabled.

EP Prerequisite 2 continued

Electronic Assets Environmental Management Plan

- Prefer products that are durable, long lasting, reusable or refillable, whenever feasible. Extend Information Technology (IT) products' life by upgrading memory, processor speed or other attributes instead of disposing of them.
- Purchase rechargeable batteries where applicable and return rechargeable batteries at the end of their useful life for recycling,
- Assess the appropriateness of multifunction devices that combine a printer, fax, scanner and/or copier into one package for your uses. These machines consume less energy by using one printer engine for multiple functions.
- Require vendors to eliminate packaging, take it back for reuse, or use the minimum amount necessary for product protection, to the greatest extent practicable. Packaging that is reusable, recyclable or compostable should be preferred, when suitable uses and programs exist.
- Give preference to equipment that is made with recycled content.
- For printers, copiers, fax machines and multifunction devices, establish procedures and policies that give priority to remanufacturing expended toner cartridges. Return used toner cartridges for remanufacturing and reuse. Purchase cartridges tested by a remanufacturer who will recycle the parts removed from spent cartridges, and whose replacement parts contain recycled content.

Resources

Basel Action Network (BAN) is a non-profit organization focused on confronting the global environmental injustice and economic inefficiency of toxic trade (toxic wastes, products and technologies) and its devastating impacts, while promoting green, toxic free and democratic design of consumer products. <http://www.ban.org/>

Electronics Take Back Coalition, General information about the environmental and human health problems associated with the lifecycle of electronic products, <http://www.computertakeback.com/>

Electronic Product Environmental Assessment Tool (EPEAT) is a system to help purchasers in the public and private sectors evaluate, compare and select desktop computers, notebooks and monitors based on their environmental attributes. EPEAT also provides a clear and consistent set of performance criteria for the design of products, and provides an opportunity for manufacturers to secure market recognition for efforts to reduce the environmental impact of its products, <http://www.epeat.net/>

Health Care Without Harm, (HCWH) is a non-profit international coalition dedicated to transform the global health care sector to be ecologically sustainable, and provides information on the purchase, management and disposal of environmentally preferable electronic equipment, visit <http://www.noharm.org/us/electronics/issue>.

U.S. Environmental Protection Agency (EPA) Electronics Environmentally Preferable Purchasing page (specifications, case studies), <http://www.epa.gov/epp/pubs/products/electronic.htm>.

1 point

EP Credit 1**Solid Waste Reduction in Purchasing****Intent**

Reduce generation of municipal solid waste through waste prevention at the point of purchase.

Health Issues

U.S. hospitals generate approximately 6,600 tons of waste per day, with non-hazardous solid waste representing up to 80% of the total. According to zero-waste policy experts, approximately 90% of solid waste can be recycled, composted, or otherwise diverted from landfill or incineration based on current technologies and infrastructure. Waste reduction conserves natural resources and reduces greenhouse gas emissions by reducing demand for virgin materials and the amount of waste sent to landfills and incinerators that can result in greenhouse gas emissions such as methane—a potent greenhouse gas. The 1998 Memorandum of Understanding between the American Hospital Association and the Environmental Protection Agency calls on hospitals to voluntarily reduce their waste generation by 50%. Waste prevention conserves natural resources, transport of waste materials to landfills and treatment facilities each with associated emissions. Purchasing departments have a key role to play in reducing a facility's waste generation through purchasing practices that avoid potential for future waste streams by eliminating waste at the source.

Credit Goals

- Develop and implement a process and establish policy language for investigating waste reduction opportunities in the supply chain purchasing process for products and services.
- Phase in waste reduction criteria into contracts and specifications for products and services at the point of development and renegotiation. Waste reduction criteria extend the life of a product through maintenance, reduced packaging, take back programs, leasing, switching from disposable to reusable or a change in process or preference to products for which markets exist and are readily recyclable or able to be reprocessed.
- Annually educate department heads, purchasing personnel and their group purchasing organization (where appropriate) on the value of and opportunities for waste reduction.
- Establish and maintain an EPP subcommittee (or equivalent decision-making body) reporting directly to the facility-wide environmental stewardship committee focused on reducing waste in the supply chain. Integrate the subcommittee's work into the Integrated Operations & Maintenance Process outlined in GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process.

EP Credit 1 continued

Solid Waste Reduction in Purchasing

Suggested Documentation

- ☐ Maintain and annually review an environmentally preferable product purchasing policy incorporating waste reduction language in accordance with Credit Goals.
- ☐ Track and annually review progress in adding waste reduction criteria to contracts as they are developed and renegotiated. Maintain and annually review documentation of trainings in accordance with Credit Goals including sign in sheets, educational information and length of training.
- ☐ Compile EPP subcommittee (or equivalent decision-making body) meeting minutes and other documentation identifying waste prevention opportunities over the previous 12-month period through purchasing decisions.

Reference Standards

There are no reference standards for this credit.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management; GGHC EP Credit 6: Office Supplies.*
- Collaborate with group purchasing organizations (GPO) and manufacturers to identify opportunities to reduce waste in their product or service offerings.
- Conduct a life cycle cost analysis when evaluating disposable versus reusable products to ensure that waste disposal fees, labor, storage and other criteria are addressed.
- Consider investing in reusable options for the following high use items to reduce waste:
 - Toters for material delivery from receiving/storeroom to user areas.
 - Linens including underpads (chux), pillows, isolation gowns, barrier protection, surgical drapes, stainless sterilization containers (versus blue wrap), lab coats and linen bags.
 - Mattresses—eliminate disposable “eggcrate” foam mattresses.
 - Food service ware in accordance with GGHC FS Credit 4: Reusable and Non-Reusable Products. (Note: Consider biodegradable disposable food service ware for take-out.)

EP Credit 1 continued**Solid Waste Reduction in Purchasing**

- Shipping containers for regulated medical waste removal.
- Sharps containers for sharps management.
- Medical devices, including instruments.
- Require take back of shipping crates and pallets in contract language with manufacturers and/or distributors.
- Require take back or leasing programs for televisions, copiers, computers, telephones and medical equipment in contract language with manufacturers and/or distributors.
- Institute a paper prevention initiative, including review of all printed reports and opportunities for distribution sharing and printing of departmental-specific pages only. Purchase or lease printers, scanners and copiers with automatic double-sided copying capabilities.
- Review purchasing policies and establish high-percentage post-consumer recycled content and increased recyclability in product or packaging if not in place. For example, request recycled paper packaging instead of foam plastic packaging and containers made from plastics #1 and #2, to increase potential for recycling when a reusable option is unavailable.
- Review packaging and shipping materials to identify materials used and reduction opportunities.
- Establish a program to divert furniture and supplies from the waste stream through donation, refurbish or recycling.
- Research regional recycling and reuse markets to maximize waste reduction opportunities.

Resources

Health Care Without Harm's Chemical Policy Page: <http://noharm.org/us/chemicalpolicy/issue>

Health Care Without Harm's Green Purchasing Page: <http://noharm.org/us/greenPurchasing/issue>

Practice Greenhealth, Environmentally Preferable Purchasing (EPP), <http://www.practicegreenhealth.org>

New York City Wasteless Program,

http://www.nyc.gov/html/nycwasteless/html/in_business/tips_business_office.shtml

U.S. Environmental Protection Agency (EPA) Waste Prevention,

http://www.epa.gov/epaoswer/osw/pubs/source_reduction.htm

U.S. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines,

<http://www.epa.gov/cpg/products.htm>.

U.S. Environmental Protection Agency (EPA) Green cafeteria program,

<http://www.epa.gov/oppt/epp/ppg/case/cafeteria.htm>.

Zero Waste Standards, <http://www.zwia.org/standards.html>

1-2 points

EP Credit 2.1-2.2**Toxic Chemical Reduction in Purchasing****Intent**

Promote the health of building occupants and reduce disposal costs and liability through toxic chemical reduction in purchasing.

Health Issues

Every person is exposed to a complex mixture of hundreds of chemicals daily. This chemical exposure impacts every human in the world, including developing babies in the womb.² Industrial societies are experiencing an increase in chronic diseases and conditions, including some cancers, birth defects, and infertility, asthma, and chemical sensitivities linked, in some instances, to environmental exposures. Toxic chemical exposure also jeopardizes the health of wildlife and ecosystems. Toxic chemicals, once in use, can disperse widely throughout the environment. Environmental monitoring shows that high hazard industrial chemicals and chemicals with unknown health effects are widely distributed in the environment and the food web and are measurable in humans at levels that, in some cases, are known to cause adverse health effects in humans, laboratory animals, and wildlife.

Credit Goals**EP Credit 2.1 (1 Point) – Policy/Structure Development**

- Develop, implement and annually evaluate a comprehensive chemicals purchasing policy as part of an environmentally preferable purchasing (EPP) program for all major purchasing decisions that sets goals for the elimination of target chemicals in products and that seeks disclosure on the extent of testing of chemical ingredients in products. Construction materials and furniture and furnishings are excluded from this credit. These topics are covered by GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions and GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings.
- At a minimum, the chemicals policy shall require:
 - The development of a position and a plan of action to address targeted classes of chemicals. A position is an organizational acknowledgement of the broad issue, with high level support, that communicates to the institution and to the public the general concern and the proposed organizational response to that issue. A plan of action is a written plan, indicating tasks that must be completed, and who is responsible for those tasks, with a timeline.

² Environmental Working Group/Centers for Disease Control and Prevention Study, <http://archive.ewg.org/reports/bodyburden2/execsumm.php>

EP Credit 2.1-2.2 continued**Toxic Chemical Reduction in Purchasing**

- Target a list of classes of chemicals for elimination from products purchased by the facility including, at a minimum the following list. A targeted-chemical strategy involves specifically identifying chemicals and materials the institution believes are a priority for elimination, communicating this priority to suppliers, and using purchasing power to support companies that are eliminating these chemicals or materials and replacing them either with substances known to be less hazardous, or with non-chemical alternatives such as changed design. For the purposes of this credit, targeted classes of chemicals are defined as:
 - Phthalates, specifically those listed under California Proposition 65 (Prop 65) plus Di-isononyl phthalate (DINP).
Listings in Prop 65 as of 12/16/2008 are:
 - Butyl benzyl phthalate (BBP or BzBP)
 - Di(2-ethylhexyl phthalate (DEHP)
 - Di-n-butyl phthalate (DBP)
 - Di-n-hexyl phthalate (DnHP)
 - Di-isodecyl phthalate (DIDP)

Note: DINP is included due to scientific evidence that it has similar and additive effects to the Proposition 65 phthalates.
 - Polyvinyl chloride (PVC)
 - Persistent bioaccumulative toxic chemicals (PBTs) listed in the U.S. EPA Toxics Release Inventory list of PBT Chemicals and Washington State PBT list
 - Bisphenol-A
 - Carcinogens, mutagens and reproductive toxicants listed under California Proposition 65
 - Halogenated flame retardants
- Annually review policy, progress and goal setting with the facility's group purchasing organization (GPO), purchasing department and other relevant staffers. Identify opportunities for the GPO to participate in market shifting and advocacy on behalf of membership organizations.

EP Credit 2.2 (1 point in addition to EP Credit 2.1) – Implementation

- Demonstrate active change in at least three of the six categories listed above, resulting in a transition to environmentally preferred products as a result of the chemical purchasing policy, including documentation in supply chain, purchasing and/or other committee. For example: An annual report could state, for example: "transitioned to DEHP- and PVC-free IV products, purchased halogenated flame retardant-free TV's, purchased only RoHS-compliant electronic equipment, and eliminated persistent bioaccumulative and toxic chemicals from cleaning products."

Note: An innovation point is available for product changes in all of the chemical categories as documented in supply chain or other appropriate committee setting.

EP Credit 2.1-2.2 continued**Toxic Chemical Reduction in Purchasing****Suggested Documentation****EP Credit 2.1**

- ☐ Compile and annually review documentation verifying implementation of the chemicals purchasing policy, position and plan of action and progress towards achieving the facility's stated goals in accordance with Credit Goals.
- ☐ Maintain a list of products containing the chemicals targeted by the policy in accordance with Credit Goals.
- ☐ Document annual training to appropriate departmental and purchasing staff on proper management of existing toxic chemicals and toxicity reduction activities.
- ☐ Document meetings with the facility's Group Purchasing Organization and/or product supplier and compile and annually review documentation of the environmentally purchasing program, product list and Supplier Environmental Disclosure forms.

EP Credit 2.2

- ☐ Establish metrics for each of the targeted chemicals and annually evaluate progress to meet them in accordance with Credit Goals.

Reference Standards

European Union, RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment") Directive, <http://www.rohs.eu/english/index.html>

Prop 65: State Of California Environmental Protection Agency, Office Of Environmental Health Hazard Assessment, Safe Drinking Water And Toxic Enforcement Act Of 1986, Chemicals Known To The State To Cause Cancer Or Reproductive Toxicity
http://www.oehha.ca.gov/prop65/CRNR_notices/list_changes/pdf/111403lsta.pdf

U.S. Environmental Protection Agency (EPA) Toxics Release Inventory list of PBT Chemicals,
<http://www.epa.gov/pbt/pubs/cheminfo.htm>

Washington State PBT list, <http://www.ecy.wa.gov/programs/eap/pbt/pbtfaq.html>

Potential Technologies and Strategies:

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management and Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management; GGHC EP Credit 6: Office Supplies.

EP Credit 2.1-2.2 continued**Toxic Chemical Reduction in Purchasing**

- Require suppliers to disclose all ingredients covered by the facility's chemicals purchasing policy and to address data gaps in testing for safety for chemicals in their products. The phrase "data gaps" refers to lack of information on the health and environmental impacts of chemicals, the chemical ingredients of many products, and the lack of monitoring for the presence of these chemicals in the environment and in people. A chemicals policy plan would require suppliers to provide data on product ingredients, and to quantify the extent of data gaps for the chemicals contained in their products. A first step would be identifying a short set of questions for suppliers, and requiring responses.
- Review Material Safety Data Sheets (MSDS) and contact the manufacturer directly to identify whether a product or material contains any of the classes of chemicals targeted by the chemical purchasing policy.
- Engage in advocacy to address the systemic problem of inadequately regulated chemicals. Health care professionals remain trusted opinion leaders in society. Health care has an important role to play in the larger public health arena with the goal to adequately regulate targeted chemicals, such as those listed in the Credit Goals. An advocacy strategy is a plan for your institution to influence policy beyond your institution in order to achieve your chemicals policy goals. A first step might be supporting legislation to phase out targeted chemicals in your state, or publicly supporting federal legislation that seeks to address the failures of the current chemical regulatory system.
- Conduct an annual audit of major clinical products to help identify target products.
- Consider developing a procedure for labeling product content.
- Develop a phase-out policy for products where an acceptable alternative exists.
- Ensure there is a program for safe handling and disposal of existing devices containing hazardous substances.
- Consider implementing this credit in coordination with CM Prerequisite 2 – Chemical Management Policy and Audit. Offer annual training to appropriate departmental staff regarding roles and responsibilities associated with the environmentally preferable purchasing program and procedures for segregation, safe handling, and proper disposal of hazardous substances until phase-out is complete.
- At a minimum, meet annually with the facility's Group Purchasing Organization or product supplier to review environmentally preferable purchasing alternatives and progress encouraging manufacturers to:
 - Label products containing the attributes listed above (i.e., chlorine-free, latex-free, non-toxic, etc.)
 - Package units in minimal packaging that is recyclable, non toxic or bio-based
 - Transport products with minimal packaging and move to bio-based packaging
 - Manufacture products that use less energy and water during normal use
 - Manufacture products that use less water and energy during manufacturing
- Give preference to products that are natural rubber latex-free.
- Give preference for products that have manufacture and/or distributor "Take Back" programs

EP Credit 2.1-2.2 continued**Toxic Chemical Reduction in Purchasing**

- Identify and track annual progress in toxicity reduction through purchasing practices through supply chain committee meeting minutes.
- Focus on high volume items like halogenated plastic IV bags or other medical apparatus to transition to halogen-free and DEHP free medical devices. Consider starting in neonatal intensive care unit and then expanding to other areas.

Resources

CAS Registry Numbers Associated with Phthalates Identified in Credit Goals, <http://www.cas.org/>

Butyl benzyl phthalate (BBP or BzBP): CAS #85-68-7

Di(2-ethylhexyl phthalate (DEHP): CAS# 117-81-7

Di-n-butyl phthalate (DBP): CAS# 84-74-2

Di-n-hexyl phthalate (DnHP): CAS# 84-75-3

Di-isodecyl phthalate (DIDP): CAS# 68515-49-1 and 26761-40-0

Di-isononyl phthalate (DINP): CAS# 68515-48-0 and 28553-12-0

Borch J, Ladefoged O, Hass U, Vinggaard A. "Steroidogenesis in fetal male rats is reduced by DEHP and DINP, but endocrine effects of DEHP are not modulated by DEHA in fetal, prepubertal and adult male rats". *Reprod Toxicol* 2004 18(1): 53-61 <http://cat.inist.fr/?aModele=afficheN&cpsid=15442821>.

Bornehag, Carl-Gustaf, et. al., "The Association between Asthma and Allergic Symptoms in Children and Phthalates in House Dust: A Nested Case-Control Study," *Environmental Health Perspectives*, Volume 112, Number 14, October 2004, <http://www.ehponline.org/docs/2004/7187/abstract.html>

Calafat, AM, et. al., "Exposure of the U.S. Population to Bisphenol A and 4-tertiary-octylphenol: 2003-2004, *Environmental Health Perspectives* 116:39-44, <http://www.environmentalhealthnews.org/newscience/2007/2007-1109calafatetal.html>

California Proposition 65, Safe Drinking Water and Toxic Enforcement Act of 1986, <http://www.oehha.org/prop65.html>

Environmental Working Group, Body Burden Study, <http://www.ewg.org/>

FDA Public Health Notification on PVC Devices containing the Plasticizer DEHP- <http://www.fda.gov/cdrh/safety/dehp.html>

Health Care Without Harm, Chlorinated Plastic and DEHP web page, including alternatives, <http://noharm.org/us/pvcDehp/issue>

Health Care Without Harm DEHP Free NICU Pledge, <http://www.noharm.org/details.cfm?ID=1101&type=document>

Health Care Without Harm, Guide to Choosing Safer Products and Chemicals: Implementing Chemicals Policy in Health Care, <http://www.noharm.org>

EP Credit 2.1-2.2 continued**Toxic Chemical Reduction in Purchasing**

Health Care Without Harm, Health Care Institutions Undertaking Efforts to Reduce Polyvinyl Chloride (PVC) and/or Di(2-Ethylhexyl) Phthalate (DEHP),
<http://www.noharm.org/details.cfm?ID=1332&type=document>

Masden, T., et. al., "Growing Threats: Toxic Flame Retardants and Children's Health," Environment California Research and Policy Center, March 2003, <http://www.mindfully.org/Plastic/Flame/Children-Flame-RetardantsMar03.htm>

Schüler, D, Jager, J, "Formation of chlorinated and brominated dioxins and other organohalogen compounds at the pilot incineration plant VERONA,
<http://www.cababstractsplus.org/google/abstract.asp?AcNo=20053109301>

Kaiser Permanente National Environmental Purchasing Policy,
<http://www.healthybuilding.net/healthcare/KaiserPermanente-EPP-Policy.pdf>

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group,
<http://www.masco.org/mercury/>

Rudel, Ruthann, et. al., "Phthalates, Alkylphenols, Pesticides, Polybrominated Diphenyl Ethers, and other Endocrine-Disrupting Compounds in Indoor Air and Dust," *Environmental Science and Technology* (online), 13 September 2003, <http://www.mindfully.org/Pesticide/2003/Phthalates-Indoor-Air-Dust13sep03.htm>

Swan, Shanna, "Prenatal Phthalate Exposure and Anogenital Distance in Male Infants, *Environmental Health Perspectives*, Volume 114, Number 2, February 2006,
<http://www.ehponline.org/docs/2006/8823/letter.html>

U.S. Centers for Disease Control and Prevention (CDC) Human Exposure to Environmental Chemicals
<http://www.cdc.gov/exposurereport/>

U.S. Environmental Protection Agency (EPA), Persistent Bioaccumulative and Toxic (PBT) Chemical Program, <http://www.epa.gov/pbt/>

U.S. Green Building Council, "Assessment of the Technical Basis for a PVC-Related Materials Credit for LEED," <https://www.usgbc.org/ShowFile.aspx?DocumentID=2372>

U.S. National Toxicology Program, Report on Carcinogens,
<http://ntp.niehs.nih.gov/index.cfm?objectid=03C9B512-ACF8-C1F3-ADBA53CAE848F635>

Vandenberg, Laura N., "Human Exposure to Bisphenol A (BPA),
<http://www.loe.org/images/070803/Vandenberg%20Exposure%20Rep%20Tox%20resubmission.pdf>

vom Saal, Frederick, et. al., "An Extensive New Literature Concerning Low-Dose Effects of Bisphenol A Shows the Need for a New Risk Assessment," *Environmental Health Perspectives*, Volume 113, Number 8, August 2005, <http://www.ehponline.org/members/2005/7713/7713.html>

1-5 points

EP Credit 3.1-3.5**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions****Intent**

Promote the health of building occupants and reduce disposal costs and liability through purchasing least toxic products.

Health Issues

Every person is exposed to a complex mixture of hundreds of chemicals daily. This chemical exposure impacts every human in the world, including developing babies in the womb.³ Industrial societies are experiencing an increase in chronic diseases and conditions, including some cancers, birth defects, and infertility, asthma, and chemical sensitivities linked, in some instances, to environmental exposures. Toxic chemical exposure also jeopardizes the health of wildlife and ecosystems. Toxic chemicals, once in use, can disperse widely throughout the environment. Environmental monitoring shows that high hazard industrial chemicals and chemicals with unknown health effects are widely distributed in the environment and the food web and are measurable in humans at levels that, in some cases, are known to cause adverse health effects in humans, laboratory animals, and wildlife.

Credit Goals

- Establish environmentally-preferable specification and purchasing policies for building materials and products used for building maintenance, fit-outs, renovations and additions, as described in the 10 product groups below.

Note: This credit applies only to base building elements permanently or semi-permanently attached to the building. Examples include, but are not limited to, building components and structures (wall studs, insulation, doors, windows); panels; attached finishes (drywall, trim, ceiling panels); carpet and other flooring materials; adhesives; sealants; paints and coatings. Furniture, fixtures and equipment (FF&E) are not considered base building elements and are excluded from this credit. See GGHC EP Credit 3.6 for FF&E Environmentally Preferable Purchasing. Mechanical, electrical and plumbing components and specialty items such as elevators are also excluded from this credit.

- One point (up to 5 total) will be awarded for each 10% of the total value of all applicable building materials and products (see Note, above), based on project cost, used in maintenance, fit-out, addition and renovation projects during the previous year that meet the product criteria listed below. If the facility undergoes outside contracted projects, the calculation shall either include all of these projects in the calculation, or exclude them.

Note: This calculation refers solely to material cost exclusive of labor and equipment costs.

Exterior & Structural Components:**Group 1) Roofing and accessories**

- Meets requirements of GGHC SSM c4.2: Heat Island Effect: Roof.
- Roofing materials must meet ASTM E-108, UL 790 and UBC Standard 15-2.
- Manufactured with no added halogenated compounds (such as brominated fire retardants) or lead.

³ Environmental Working Group/Centers for Disease Control and Prevention Study, <http://archive.ewg.org/reports/bodyburden2/execsumm.php>

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions**

- No use of hot-mopped asphalt installation techniques.
- Adhesives, sealants, coatings, roofing and waterproofing materials (defined as from the weatherproofing system out and applied on-site) shall not exceed volatile organic content (VOC) limits of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules effective July 1, 2008 as per the July 13, 2007 amendment, and Rule 1168, rules effective date January 1, 2007 as per the January 7, 2005 amendment.

Group 2) Siding or cladding and accessories

- Manufactured with no added halogenated compounds or lead.
- No use of hot-mopped asphalt installation techniques.
- Adhesives, sealants, coatings, roofing and waterproofing materials (defined as from the weatherproofing system out and applied on-site) shall not exceed volatile organic content (VOC) limits of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules effective July 1, 2008 as per the July 13, 2007 amendment, and Rule 1168, rules effective date January 1, 2007 as per the January 7, 2005 amendment.

Group 3) Concrete and pavement:

- Parking lots and other paved surfaces shall not use coal tar sealants

Electrical & Plumbing:**Group 4) Lamps**

- In addition to GGHC EP Prerequisite 1, specify and install low mercury fluorescent and high pressure sodium lamps according to the following specifications:

Fluorescent Lamp	Criteria
All T-12 lamps	Do not specify or install
Eight-foot T-8 (Standard and High Output)	18,000 rated hours on instant start ballasts OR 24,000 rated hours on program start ballasts
Four-foot T-8 (Standard and High Output)	18,000 rated hours on instant start ballasts OR 24,000 rated hours on program start ballasts
Three-foot T-8	18,000 rated hours on instant start ballasts OR 24,000 rated hours on program start ballasts
Two-foot T-8	18,000 rated hours on instant start ballasts OR 24,000 rated hours on program start ballasts
U-Bent T-8	18,000 rated hours on instant start ballasts OR 24,000 rated hours on program start ballasts
28-watt T-5	20,000 rated hours on program start ballasts
24-watt T5HO (High Output)	20,000 rated hours on program start ballasts
54-watt T5HO (High Output)	25,000 rated hours on program start ballasts
22-watt Circular T-5	Do not specify or install
Compact fluorescent lamps	Minimum 10,000 rated hours

EP Credit 3.1-3.5 continued

Toxic Chemical Reduction: **Facility Maintenance, Alterations & Additions**

Group 5) Piping & conduit

- Manufactured with no added halogenated compounds or lead

Group 6) Electrical cable and wire

- Manufactured with no added halogenated compounds, lead or phthalates, specifically those listed under California Proposition 65 (Prop 65) plus Di-isononyl phthalate (DINP).

Listings in Prop 65 as of 12/16/2008 are:

- Butyl benzyl phthalate (BBP or BzBP)
- Di(2-ethylhexyl phthalate (DEHP)
- Di-n-butyl phthalate (DBP)
- Di-n-hexyl phthalate (DnHP)
- Di-isodecyl phthalate (DIDP)

Note: DINP is included due to scientific evidence that it has similar and additive effects to the Proposition 65 phthalates.

Interior finishes

Group 7) Interior Adhesives & Sealants

- Adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the requirements of the following reference standards:
 - Adhesives, Sealants and Sealant Primers shall not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule #1168, rules effective January 1, 2007 as per the January 7, 2005 amendment.
 - Aerosol Adhesives shall not exceed the VOC content limits established in Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.
 - Adhesives and sealants shall contain no carcinogen or reproductive toxicant components present at more than 1% of total mass of the product as defined in the following lists:
 - California OEHHA, Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
 - California Air Resources Board (ARB), list of Toxic Air Contaminants (California Air Toxics).

Group 8) Wall & Ceiling Finishes

- Paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules effective July 1, 2008, as per the July 13, 2007 amendment.

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions**

- Ceiling tiles (including suspended acoustical tiles) and wall coverings shall meet or exceed the indoor air quality requirements of California's Special Environmental Requirements, Specifications Section 01350, as specified in California Department of Health Services Standard Practice CA/DHS/EHLB/R-174. Testing should be conducted by an independent laboratory and modeling should use the standard office building protocol parameters. The following programs currently utilize California 01350 requirements for compliance:
 - Scientific Certification Systems (SCS) Indoor Advantage Gold Environmental Certification Program.
 - GREENGUARD Product Emission Standard For Children & Schools.
 - Collaborative for High Performance Schools (CHPS) Low-Emitting Materials Table.
- Ceiling tiles (including suspended acoustical tiles) and wall coverings shall contain no added halogenated compounds or phthalates, specifically those listed under California Proposition 65 (Prop 65) plus Di-isononyl phthalate (DINP).

Listings in Prop 65 as of 12/16/2008 are:

- Butyl benzyl phthalate (BBP or BzBP)
- Di(2-ethylhexyl phthalate (DEHP)
- Di-n-butyl phthalate (DBP)
- Di-n-hexyl phthalate (DnHP)
- Di-isodecyl phthalate (DIDP)

Note: DINP is included due to scientific evidence that it has similar and additive effects to the Proposition 65 phthalates.

Group 9) Flooring Systems

- Carpet and resilient flooring systems installed in the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall meet the indoor air quality requirements of California's Special Environmental Requirements, Specifications Section 01350, as specified in California Department of Health Services (DHS) Standard Practice CA/DHS/EHLB/R-174. Testing shall be conducted by an independent laboratory, and modeling shall use the standard office building protocol parameters. Systems shall be tested including backer and adhesive. The following programs currently utilize California 01350 requirements for compliance:
 - Carpet and Rug Institute (CRI) Green Label Plus program for both carpet and adhesive.
 - GREENGUARD Product Emission Standard For Children & Schools.
 - Scientific Certification Systems (SCS) FloorScore.
 - Collaborative for High Performance Schools (CHPS) Low-Emitting Materials Table.
- Carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.
- Adhesives shall meet the requirements of Group 7 Interior Adhesives & Sealants.

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions**

- Flooring systems shall contain no added halogenated compounds or phthalates, specifically those listed under California Proposition 65 (Prop 65) plus Di-isononyl phthalate (DINP).

Listings in Prop 65 as of 12/16/2008 are:

- Butyl benzyl phthalate (BBP or BzBP)
- Di(2-ethylhexyl phthalate (DEHP)
- Di-n-butyl phthalate (DBP)
- Di-n-hexyl phthalate (DnHP)
- Di-isodecyl phthalate (DIDP)

Note: DINP is included due to scientific evidence that it has similar and additive effects to the Proposition 65 phthalates.

Note: Carpet stain treatments are exempted from this Credit Goal.

- Coatings, sealants and other finishes applied on wood, concrete or any other flooring materials and products shall meet the VOC requirements of Group 8 Wall & Ceiling Finishes.

Group 10) Composite Wood, Agrifiber Products and Fiberglass Batt Insulation Products

- Composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins.
- Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies installed on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), plywood, wheat board, strawboard, panel substrates and door cores. Materials considered furniture, fixtures and equipment (FF&E) are not considered base building elements and are not included.

- Fiberglass batt insulation products shall contain no added formaldehyde.

Note: One innovation point is available for LED lamps that represent a minimum of 10% of total annual lamp purchases (by cost) in maintenance, fit-out, addition and renovation projects.

EP Credit 3.1-3.5 continued

Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions

Reference Table VOC Requirements for Groups 1,2,7,8 and 9			
Architectural Adhesives (SCAQMD 1168)		Specialty Adhesives	
	VOC Limit [g/L less water]		VOC Limit [g/L less water]
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesives	100	ABS Welding	325
Rubber Floor Adhesives	60	Plastic Cement Welding	250
Subfloor Adhesives	50	Adhesive Primer for Plastic	550
Ceramic Tile Adhesives	65	Contact Adhesive	80
VCT & Asphalt Adhesives	50	Special Purpose Contact Adhesive	250
Drywall & Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Rubber Lining Operations	850
Multipurpose Construction Adhesives	70	Top & Trim Adhesive	250
Structural Glazing Adhesives	100		
Substrate Specific Applications		Sealants	
Metal to Metal	30	Architectural	250
Plastic Foams	50	Nonmembrane Roof	300
Porous Material (except wood)	50	Roadway	250
Wood	30	Single-Ply Roof Membrane	450
Fiberglass	80	Other	420
Sealant Primers		Aerosol Adhesives (GS-36)	
Architectural Non-Porous	250	General purpose mist spray	65% VOCs by weight
Architectural Porous	775	General purpose web spray	55% VOCs by weight
Other	750	Special purpose aerosol adhesives (all types)	70% VOCs by weight
Coating (SCAQMD 1113)		Coating (SCAQMD 1113)	
Paints (flat and non-flat, except anti-rust)	50	Rust preventative paints & coatings	100
Clear wood finishes: (varnish, lacquer or sanding sealers)	275	Sealers: Waterproofing & all other	100
Floor coatings	50	Shellacs: Clear (avoid)	730
Industrial Maintenance Coatings	100	Shellacs: Pigmented (avoid)	550
Low-Solids Coating	120	Stains	100
Primers and undercoaters	100	Waterproofing Concrete/Masonry Sealers	100
Swimming pool coatings (avoid)	340		

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions****Suggested Documentation**

- ❑ Document and annually review the sustainable purchasing program covering materials for building maintenance, fit-outs, renovations and additions. Compile documentation including cost for all qualifying materials purchases that meet one or more of the specified sustainability criteria for every building maintenance, fit-outs, renovation and addition project. Scoring

To calculate points associated with multiple projects completed in one year:

1. Add up the number of Product groups in the project that meet all the group criteria and divide by the total product groups in the project. (For example, if a renovation only involved floors, walls, ceilings, lamps and wiring, the total product groups would be 5. If only the floor, walls and ceiling met the criteria, the percentage would be 60%)
2. Multiply that percentage by the total material cost of the project for products covered by CSI (Construction Specifications Institute) Divisions 2-10 (excluding labor and equipment) to get the total toxic avoidance materials value to apply toward the annual total.
3. Total up all project toxic avoidance material values and divide by the total materials value.

Reference Standards

ASTM E-108-07a, "Standard Test Methods for Fire Tests of Roof Coverings,"
<http://www.astm.org/Standards/E108.htm>

California Air Resources Board (CARB), list of Toxic Air Contaminants (California Air Toxics),
<http://www.arb.ca.gov/toxics/tac/toctbl.htm>

California's Special Environmental Requirements, Specifications Section 01350, as specified in California Department of Health Services Standard Practice CA/DHS/EHLB/R-174,
<http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/>

Carpet and Rug Institute (CRI) Green Label and Green Label Plus programs, <http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/index.cfm>

Collaborative for High Performance Schools (CHPS) Low-Emitting Materials Table,
http://www.chps.net/manual/lem_table.htm

GREENGUARD Product Emission Standard For Children & Schools, <http://www.greenguard.org/>

Green Seal Standard for Commercial Adhesives GS-36, <http://www.greenseal.org/>

International Code Council, Uniform Building Code Standard 15-2, <http://www.iccsafe.org/>

Prop 65: State Of California Environmental Protection Agency, Office Of Environmental Health Hazard Assessment, Safe Drinking Water And Toxic Enforcement Act Of 1986, Chemicals Known To The State To Cause Cancer Or Reproductive Toxicity
http://www.oehha.ca.gov/prop65/CRNR_notices/list_changes/pdf/111403lsta.pdf

Scientific Certification Systems (SCS) FloorScore program, <http://www.scscertified.com/>

Scientific Certification Systems (SCS) Indoor Advantage Gold Environmental Certification Program,
<http://www.scscertified.com/>

EP Credit 3.1-3.5 continued

Toxic Chemical Reduction: **Facility Maintenance, Alterations & Additions**

South Coast Air Quality Management District (SCAQMD), <http://www.arb.ca.gov/drdb/sc/cur.htm>

Underwriters Laboratories, UL 790, "Standard Test Methods for Fire Tests of Roof Coverings," <http://ulstandardsinfont.net.ul.com/>

U.S. Environmental Protection Agency (EPA), Toxic Release Inventory (TRI), <http://www.epa.gov/tri/>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management and Disposal; GGHC WM Credit 1.4: Solid Waste and Material Management: Recycling and Reuse of Facility Alterations & Additions; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Coordinate environmentally preferable purchasing practices with performance criteria, including prioritizing installation of durable construction assemblies.
- Establish a project goal to eliminate use of exterior copper roofing, flashing and gutters at the project's inception if the run-off from the building site flows into a sensitive aquatic zone.
- When purchasing materials, supplies or equipment, specify that these must meet one or more of the specified sustainability criteria.
- Purchase electrical boxes with no added halogenated compounds or lead.
- Consider materials free of added chlorine or other halogens in all applications that meet or exceed performance requirements. PBT-free materials include, but are not limited to: TPO, EPDM, and FPO for roof membranes; natural linoleum, rubber, or alternate polymers for flooring and surfacing; natural fibers, polyethylene, polyester and paint for wall covering; polyethylene for wiring; and wood, fiberglass, HDPE, and aluminum with thermal breaks for windows and copper, steel, concrete, clay, polypropylene, HDPE and borosilicate glass for piping. Cast iron pipe should be avoided based on air quality concerns associated with manufacturing practices (see USGBC TSAC report, "Assessment of the Technical Basis for a PVC-Related Materials Credit for LEED," <https://www.usgbc.org/ShowFile.aspx?DocumentID=2372>). Consider specifying and procuring halogen-free minor parts when available.
- Establish a lead- and cadmium-free product purchasing goal, and identify products and suppliers to fulfill this goal. Consider products such as silver and other lead-free solder, solderless copper connectors and polyethylene piping, aluminum flashing and Green Seal compliant paints. Note that it is understood that there may be small allowable use of cadmium in equipment beyond the knowledge and access of the purchaser, such as relay contacts.
- Consider lead-free radiation shielding materials.
- Consider incorporating GS-11: Green Seal Environmental Standard for Paints and Coatings, 2nd Edition, into facility specification criteria in addition to the South Coast Air Quality Management District Rule 1113 referenced under Credit Goals.

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions**

- Consider roofing alternatives that avoid asphalt fumes and odors, such as use of cold-process adhesives, heat welding, self-adhesive or mechanically connected membranes.
- Encourage manufacturers and suppliers to develop halogen-free alternatives. EPA and industry have acknowledged the hazards of halogenated stain treatments and are working to develop alternatives that meet or exceed performance standards.

Resources

CAS Registry Numbers Associated with Phthalates Identified in Credit Goals, <http://www.cas.org/>

Butyl benzyl phthalate (BBP or BzBP): CAS #85-68-7

Di(2-ethylhexyl phthalate (DEHP): CAS# 117-81-7

Di-n-butyl phthalate (DBP): CAS# 84-74-2

Di-n-hexyl phthalate (DnHP): CAS# 84-75-3

Di-isodecyl phthalate (DIDP): CAS# 68515-49-1 and 26761-40-0

Di-isononyl phthalate (DINP): CAS# 68515-48-0 and 28553-12-0

The American Hospital Association (AHA) and the United States Environmental Protection Agency (U.S. EPA) signed a Memorandum of Understanding (MOU) identifying goals to reduce the impact of health care facilities on the environment. One goal of the MOU is to minimize the production of PBT pollutants, <http://www.practicegreenhealth.org>

California CRELS (Chronic Reference Exposure Levels),
http://www.oehha.ca.gov/air/chronic_rels/index.html

City of Palo Alto, "New Palo Alto Ordinance Prohibits Copper Roofing Materials,"
<http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=6936>

Dioxin formation and waste combustion continues to be studied by the U.S. EPA and others. For reference, please consult <http://www.practicegreenhealth.org> for recent U.S. EPA findings on the subject.

Healthy Building Network, PVC Alternatives Database,
<http://www.healthybuilding.net/pvc/alternatives.html>.

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group,
<http://www.masco.org/mercury/>

National Institute for Occupational Safety and Health (NIOSH), Asphalt Fumes,
<http://www.cdc.gov/niosh/npg/npgd0042.html>

U.S. Centers for Disease Control and Prevention (CDC) Human Exposure to Environmental Chemicals,
<http://www.cdc.gov/exposurereport/>

U.S. Environmental Protection Agency (EPA), Volatile Organic Compounds,
<http://www.epa.gov/iaq/voc.html>

EP Credit 3.1-3.5 continued**Toxic Chemical Reduction: Facility Maintenance, Alterations & Additions**

U.S. National Toxicology Program, Coal Tars and Coal Tar Pitches,
<http://ntp.niehs.nih.gov/ntp/roc/eleveth/profiles/s048coal.pdf>

PBT elimination is reflected in policies established by a broad range of local, state, federal and international governmental bodies as well as major health care systems and organizations:

The Stockholm Convention on Persistent Organic Pollutants, signed by EPA Administrator Christine Todd Whitman for the United States with officials from 90 other countries in May 2001, addresses dioxins and furans, PCBs and HCB and commits signatories "to reduce the total releases with the goal of their continuing minimization and, where feasible, ultimate elimination." United Nations Environment Programme on Persistent Organic Chemicals, <http://www.chem.unep.ch/pops/>. Stockholm Convention on Persistent Organic Pollutants <http://www.pops.int/>.

United Nations Environment Programme (UNEP) Mandate 22/4 on Mercury calls for national action to reduce or eliminate releases of mercury and its compounds.
<http://www.chem.unep.ch/mercury/mandate-2003.htm>.

The Canada – U.S. International Joint Commission (IJC) study of PBTs in the Great Lakes led to a "Canada -- United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes" signed in April of 1997 by both countries. The Strategy targets dioxins and furans, PCBs, HCB, HCBd, cadmium, lead and mercury, among other toxic substances, for elimination.
<http://www.epa.gov/glnpo/p2/bns.html>.

The U.S. Environmental Protection Agency (EPA), in response to the Stockholm Convention, UNEP and IJC, has established a list of target PBTs including dioxins, PCBs, HCB, OCS, lead, and mercury. U.S. EPA Strategy for Priority Persistent, Bioaccumulative and Toxic (PBT) Pollutants, <http://www.epa.gov/opptintr/pbt/pbtstrat.htm>.

U.S. Environmental Protection Agency (EPA) TRI PBT Chemical List,
http://www.epa.gov/triinter/chemical/pbt_chem_list.htm.

Washington State's Department of Ecology has established a list of 22 PBTs including dioxins, HCB, HCBd, cadmium, lead, and mercury that the Department has targeted to be virtually eliminated from Washington sources. Washington State PBT Strategy,
<http://www.ecy.wa.gov/programs/eap/pbt/pbtfaq.html>.

The cities of Seattle and San Francisco have both established plans to reduce PBT releases, including eliminating the use of PVC building materials. City of Seattle PBT Reduction Strategy, <http://www.cityofseattle.net/environment/Documents/PBTStrategy3-07-03.pdf>.

A wide range of health care related organizations have passed resolutions directly encouraging action by member organizations to reduce dioxin releases or to reduce or eliminate the use of PVC due to its association with PBTs, including the American Public Health Association, American Nurses Association, California Medical Association, Chicago Medical Society and the Maine Hospital Association. Several major health care systems, including Kaiser Permanente and Catholic Healthcare West are acting to reduce their use of PVC and other PBT related materials from health care products and building materials. PVC substitution strategies have been endorsed by more than 120 health care facilities and systems (<http://www.noharm.org/details.cfm?ID=1332&type=document>) reflecting the associated dioxin releases during manufacturing, accidental or intentional combustion, and at disposal.

Health Care Without Harm listing of resolutions on PVC, <http://www.noharm.org/pvcDehp/reducingPVC>.
 Environmental Working Group's Body Burden Study - <http://www.ewg.org/>

1 point

EP Credit 3.6**Toxic Chemical Reduction: Furniture & Medical Furnishings****Intent**

Promote the health of building occupants, reduce disposal costs and liability, and improve health for employees through purchasing least toxic products.

Health Issues

Every person is exposed to a complex mixture of hundreds of chemicals daily. This chemical exposure impacts every human in the world, including developing babies in the womb.⁴ Industrial societies are experiencing an increase in chronic diseases and conditions, including some cancers, birth defects, and infertility, asthma, and chemical sensitivities linked, in some instances, to environmental exposures. Toxic chemical exposure also jeopardizes the health of wildlife and ecosystems. Toxic chemicals, once in use, can disperse widely throughout the environment. Environmental monitoring shows that high hazard industrial chemicals and chemicals with unknown health effects are widely distributed in the environment and the food web and are measurable in humans at levels that, in some cases, are known to cause adverse health effects in humans, laboratory animals, and wildlife.

Credit Goals

Ensure that 40% of the annual volume of all freestanding furniture and medical furnishings purchases (including mattresses, foams, panel fabrics, cubicle curtains and other textiles) based on cost meet the following criteria in Options 1, or 2 or 3 below.

The dollar value of any individual product may be added towards the 40% total value if the product meets one of the following criteria:

Option 1

Furniture components, textiles, finishes or dyes: product does not contain more than one of the following chemicals or materials

- Added urea formaldehyde
- Heavy metals: lead, mercury, cadmium, and antimony, except as allowed under the EU RoHS (Restriction of the Use of Certain Hazardous Substances of the European Union) Directive,
- Hexavalent chromium in plated finishes, except as allowed under the EU RoHS (Restriction of the Use of Certain Hazardous Substances of the European Union) Directive.
- Stain and non-stick treatments utilizing perfluorinated compounds (PFCs), including PFOA,
- All other added halogenated compounds (chlorinated and fluorinated plastics and halogenated flame retardants as listed in EPP Credit 3), except PFCs.
- Added antimicrobial treatments containing halogenated compounds and/or silver nanoparticles.

Note: Components composed of or treated with the above substances which constitute less than five percent of the product by weight are exempt.

OR

⁴ Environmental Working Group/Centers for Disease Control and Prevention Study, <http://archive.ewg.org/reports/bodyburden2/execsumm.php>

EP Credit 3.6 continued**Toxic Chemical Reduction: Furniture & Medical Furnishings****Option 2**

The product contains no more than two of the six above-listed categories of materials AND meets or exceeds the indoor air quality requirements of California's Special Environmental Requirements, Specifications Section 01350 (CA 01350), updated with California DHS Standard Practice CA/DHS/EHLB/R-174 as determined by independent laboratory testing and using the standard office building protocol parameters. The following programs currently utilize CA 01350 requirements for compliance for furniture:

- Scientific Certification Systems (SCS) Indoor Advantage Gold Environmental Certification Program
- GREENGUARD Product Emission Standard for Children & Schools

OR

Option 3

Sustainably Sourced Materials criteria (salvaged, recycled, rapidly renewable, FSC certified wood, local manufacture) See GGHC EP Credit 4.1-4.5: Sustainably Sourced Materials: Facility Alterations & Additions for more details to achieve this portion of the credit.

Note: Furniture and Medical Furnishings do not contribute to GGHC EP Credit 4.1-4.5.

Note: An innovation point for exemplary performance is available to projects that achieve 80% or higher of the annual volume of all freestanding furniture and medical furnishings purchases in compliance with Option 1.

Suggested Documentation

- ☐ Prepare and maintain a matrix listing annual furniture purchases and indicating that the requisite amount of furniture complies with one of the three Credit Goals. Compile backup documentation such as invoices for a minimum one-year period.

Reference Standards

California's Special Environmental Requirements, Specifications Section 01350, as specified in California Department of Health Services Standard Practice CA/DHS/EHLB/R-174, <http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/>

GREENGUARD Product Emission Standard For Children & Schools, <http://www.greenguard.org/>

Scientific Certification Systems (SCS), <http://www.scs-certified.com/>

EP Credit 3.6 continued

Toxic Chemical Reduction: Furniture & Medical Furnishings

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management and Disposal; GGHC WM Credit 1.4: Solid Waste and Material Management: Recycling and Reuse of Facility Alterations & Additions; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations and Additions; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Purchase refurbished furniture and medical furnishings meeting the Option 1 Credit Goal criteria for Toxic Chemical Reduction. Consider leasing and/or buy-back programs.
- Coordinate environmentally preferable purchasing practices with performance criteria for furniture and furnishings.
- Clean and inspect recycled and salvaged mattresses prior to use to verify they are free of allergens and contaminants.
- Identify opportunities to salvage and reuse furniture from existing inventory and research potential used furniture suppliers.
- Salvage and reuse systems furniture and furnishings such as:
 - Case pieces
 - Seating
 - Filing systems
 - Medical furnishings such as exam tables, stools, carts, etc.
- Consider contracting with local and/or regional furniture dealers for reused furniture and furniture recycling programs. Taking advantage of local resources helps save energy and other resources by reducing reshipping impacts and creation of new products using virgin material.
- Encourage manufacturers and suppliers to develop halogen-free alternatives. EPA and industry have acknowledged the hazards of halogenated stain treatments and are working to develop alternatives that meet or exceed performance standards.

EP Credit 3.6 continued**Toxic Chemical Reduction: Furniture & Medical Furnishings****Resources**

Business and Institutional Furniture Manufacturer's Association (BIFMA), <http://www.bifma.org>

Dahlberg, Carrie Peyton, "Tiny Silver Particles in Clothing May Lead to Pollution, Research Suggests," Sacbee.com, <http://www.sacbee.com/101/story/841669.html>

Environmental Working Group's Body Burden Study, <http://www.ewg.org/>

European Union, RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment") Directive, <http://www.rohs.eu/english/index.html>

Julie Silas, Hansen, Jean, and Lent, Tom, "The Future of Fabric: Health Care," <http://www.noharm.org/details.cfm?type=document&ID=1712>

Kaiser Permanente, "Evaluation of Antimicrobial Property Claims in Finishes and Fabrics," http://www.healthybuilding.net/healthcare/KP_Antimicrobial_Position_Paper.pdf

Scientific Certification Systems (SCS) Indoor Advantage Gold, <http://www.scs-certified.com/ecoproducts/indoorairquality/indooradvgold.html>

U.S. Centers for Disease Control and Prevention (CDC), CDC Human Exposure to Environmental Chemicals, <http://www.cdc.gov/exposurereport/>

U.S. Centers for Disease Control and Prevention (CDC), Guidelines for Environmental Infection Control in Health Care Facilities, http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf

1-5 Points

EP Credit 4.1-4.5**Sustainably Sourced Materials & Products: Facility Alterations & Additions****Intent**

Reduce the environmental and health burdens of materials and products acquired for building maintenance, fit-outs, additions and renovations.

Health Issues

Resource reuse and recycling eliminates primary extraction of virgin resources and manufacturing, thus preventing associated ecosystem disruption, energy expenditure and toxic emissions, while diverting materials from disposal.

Recycled content materials have the potential to conserve non-renewable resources, lower embodied energy, reduce ecological disruption and air, land and water emissions associated with extracting, transporting, and processing raw materials and manufacturing, and lower global warming potential.

The use of regional building materials may avoid local and remote human health impacts that result from transportation activities and the resulting pollution associated with delivery of materials and products to the project site.

Rapidly renewable materials can yield more material from less acreage, with lower irrigation and pesticide requirements, and avoid significant biodiversity loss if grown at appropriate scale with sustainable agricultural or forestry practices that prevent pollution of water and land resources and help to maintain healthy ecosystems.

Human and environmental health is inextricably linked with forest health. Sustainable forestry protects water quality by reducing water and soil runoff and pesticide and herbicide use. Specifying and procuring certified sustainably harvested wood increases acreage using sustainable management practices. These practices also protect aquatic life, including threatened and endangered species, and maintain viable diverse plant life increasing air filtration and carbon dioxide sequestration. The balancing of carbon dioxide mitigates global climate change, and thereby reduces the spread and redistribution of disease that can be a consequence of climate change.

Sustainable sourcing of materials should not result in compromised indoor air quality, so screening for emissions is a linked attribute.

Credit Goals

Develop and implement purchasing policies for building materials and products that meet the criteria below.

- One point (up to 5 total) will be awarded for each 10% of the total value of all building materials and products (based on cost) used in maintenance, fit-out, addition and renovation projects during the previous year that meet the criteria below. If the facility undergoes outside contracted projects, the calculation shall either include all of these projects or exclude them all. If concrete or steel structural elements are applied toward this credit, the project must include at least two other materials or products from CSI MasterFormat divisions other than 03 and 05 to attain the first point.

EP Credit 4.1-4.5 continued

Sustainably Sourced Materials and Products: **Facility Alterations & Additions**

- The source value of any individual material or product may be added to the total for each of the following four sustainability criteria which the material or product meets:
 - **Salvaged, reused or recycled:** The source value is determined by multiplying the salvaged/reused and/or recycled content fraction of the assembly (based on weight) by the cost of the assembly. The recycled content fraction is the sum of all post-consumer recycled content plus one-half of the pre-consumer content. Salvaged materials are construction materials recovered from existing buildings or construction sites and reused in other buildings.
 - **Regionally sourced/manufactured materials:** Contains only materials and products that have been extracted, harvested or recovered, as well as manufactured within 500 miles of the project site. The source value is 100% of the cost.
 - **Rapidly renewable materials and products** (made from plants that are typically harvested within a ten-year cycle or shorter). The source value for rapidly renewable content is determined by multiplying the rapidly renewable content fraction of the assembly (based on weight) by the cost of the assembly.
 - **Certified wood.** In accordance with the Forest Stewardship Council's (FSC) Principles and Criteria. The source value for certified wood content is determined by multiplying the certified wood content fraction of the assembly (based on weight) by the cost of the assembly.
- Wall, ceiling and flooring systems & finishes, composite wood, agrifiber and fiberglass products, exterior and interior adhesives, sealants, coatings, roofing, and waterproofing products must also meet the relevant GGHC Version 2.2 EQ Credit 4 requirements to contribute toward the credit.
- This credit only applies to materials in CSI MasterFormat Divisions 2-10. Mechanical, electrical and plumbing components and specialty items such as elevators shall not be included in this calculation. Only include materials permanently installed in the project. Furniture is not included (see GGHC EP Credit 3.6).
- Recycled content shall be defined in accordance with the International Organization of Standards document, *ISO 14021-1999—Environmental labels and declarations—Self-declared environmental claims (Type II environmental labeling)*.
 - *Post-consumer material* is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.
 - *Pre-consumer material* is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Note: Fly ash generated as a coal combustion by-product and used as a substitute for Portland cement, may apply as recycled content toward this credit only if compliant with ASTM C618, and only with documentation that the fly ash has verified mercury content ≤ 5.5 ppb (0.0055 mg/L). Fly ash as a by-product from municipal solid waste incinerators does not qualify as a recycled content material for this credit.

EP Credit 4.1-4.5 continued

Sustainably Sourced Materials and Products: **Facility Alterations & Additions**

Suggested Documentation

- ❑ Compile documentation for all qualifying materials purchases that meet one or more of the specified sustainability criteria and the cost of these purchases for every maintenance, fit-out, renovation and addition project over the previous year.

Reference Standards

Forest Stewardship Council's Principles and Criteria, <http://www.fscus.org>.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management and Disposal; GGHC WM Credit 1.4: Solid Waste and Material Management: Recycling and Reuse of Facility Alterations & Additions; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations and Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Identify opportunities to incorporate salvaged materials into building design and research potential material suppliers.
- Consider salvaged materials such as:
 - Beams and posts
 - Flooring
 - Paneling
 - Doors and frames
 - Metal casework
 - Brick
 - Decorative items
- During construction, ensure that the specified recycled content materials are procured and installed and quantify the total percentage of recycled content materials installed. Third party certification can be useful to assure validity of recycling and other sustainable source claims. While mechanical and electrical components are not included in this calculation, specification of products with recycled content is encouraged where available for electrical equipment, such as light fixture housings, electrical raceways and mechanical products such as air ducts, diffusers and return grilles.
- Coordinate environmentally preferable purchasing practices with performance criteria, including prioritizing installation of durable construction assemblies.

EP Credit 4.1-4.5 continued**Sustainably Sourced Materials and Products: Facility Alterations & Additions**

- Seek to incorporate products into the building design that have recycled content and are recyclable, reusable or compostable at their end of life in the building.
- For rapidly renewable materials, seek materials from producers using low impact sustainable agricultural practices to avoid eutrophication, soil depletion, and use of toxic chemicals. Sustainable agriculture certifications for rapidly renewable materials include, but are not limited to:
 - Certified USDA Organic or equivalent state organic standard.
 - Grown using environmentally sustainable agriculture harvest methods certified through a program that meets the criteria of ISEAL Alliance full membership (e.g., IFOAM organically grown materials).
 - Offset through credits for the same crop type grown using environmentally sustainable agriculture harvest methods certified through a program that meets the criteria of ISEAL Alliance full membership (e.g., IATP Working Landscape Certificates).
- Consider rapidly renewable materials such as:
 - Bamboo flooring
 - Wool carpet and insulation
 - Straw and wheat board
 - Sunflower seed board
 - Cotton batt insulation and duct insulation
 - Soy-based insulation
 - Linoleum flooring
 - Cork flooring
 - Poplar OSB
 - Plastics produced from bio-based materials
- Consider also seeking FSC-certified wood for non-rented temporary construction applications such as bracing, concrete formwork and pedestrian barriers.
- Jointly pursue local/regional materials sourcing in concert with the other categories under the Credit Goal.

Resources

ASTM D4840-99 Standard Guide for Sampling Chain-of-Custody Procedures, <http://www.astm.org>.

ASTM E2129-01 Standard Practice for Data Collection for Sustainability Assessment of Building Products, <http://www.astm.org>.

Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e), Federal Trade Commission <http://www.ftc.gov/bcp/gnrule/guides980427.htm>.

International Standard ISO 14021-1999 – Environmental Labels and Declarations – Self-Declared Environmental Claims (Type II Environmental Labeling), <http://www.iso.org>.

ISEAL Member certifying organizations, <http://www.isealliance.org/membership>

1-3 points

EP Credit 5.1-5.3**Electronics Purchasing & End of Life Management****Intent**

Reduce the environmental and health burdens associated with manufacture, use and disposal of electronic products. Require take back and management services for end-of-life electronic products to safely manage hazardous compounds.

Health Issues

While the electronics industry—nationally and internationally—is making strides to reduce the use of toxic chemicals in their products, electronic equipment is not always designed with environmental considerations, recycling or end-of-life disposal in mind. Computers and other electronic wastes can contain toxic chemicals. The average electronic product contains chemicals that are persistent, bioaccumulative toxicants, teratogens, carcinogens, reproductive toxicants, endocrine disruptors, and/or mutagens, including heavy metals such as lead and cadmium in Cathode Ray Tube (CRT) monitors, mercury in Liquid Crystal Display (LCD) and flat panel monitors, and halogenated flame retardants in circuit boards and plastic housings. Workers in manufacturing facilities may be exposed to these toxic substances, and users may be exposed to the toxic chemicals during the products' use.

In addition, due to the increased promotion of new IT equipment and design for short life spans, electronic waste has become one of the world's fastest growing waste streams. According to the U.S. EPA, fifteen to twenty percent of discarded electronics are currently recycled,⁵ with the remainder stockpiled or improperly disposed of in landfills or incinerators. Many electronics are exported to developing countries for disassembly under unsafe conditions. Additionally, through burning of halogenated plastics in cable wiring, melting of lead solder in circuit boards and leaching of persistent chemicals from waste stockpiles, toxic chemicals can be released into air, ground, and water, directly exposing recycling workers and adjacent communities to these hazards, and threatening the global public and ecological health.

Credit Goals**EP Credit 5.1 (1 Point) – End of Life Management**

- Require manufacturers' or vendor's written commitments of equipment end-of-life management, either through take-back or recycling, in all electronics purchasing contracts.
- For all electronic equipment: Contract only with recyclers that have signed the Electronic Recycler's pledge of True Stewardship (E-Stewards), or that otherwise provide adequate documentation proving they recycle all useable materials and do not export hazardous waste, use prison labor or use incineration (including waste to energy). If using manufacturer or vendor take back programs, verify that they follow the same guidelines in their subcontracting of recyclers.
- Upon hire and annually, provide training on the Electronic Assets Management Plan and end-of-life management protocol to all relevant employees to ensure strict adherence to electronics purchasing and end-of-life management protocol. Ensure recycling protocols are included in GGHC WM Prerequisite 1 – Waste Management Plan.

⁵ U.S. Environmental Protection Agency (EPA), General Information on E-Waste, <http://www.epa.gov/eCycling/faq.htm#recycled>

EP Credit 5.1-5.3 continued**Electronics Purchasing & End of Life Management****EP Credit 5.2 (1 point in addition to EP Credit 5.1) – Office and Commercial Electronic Equipment Purchasing**

- Achieve EP Credit 5.1

AND

- Develop and implement purchasing standards requiring a minimum of 90% Energy Star labeled equipment for all Energy Star qualified office and commercial equipment. When Energy Star standards do not exist for a given product category, purchase energy-efficient products that are among the 25th percentile of lowest energy consumers for that class of equipment as designated by the Federal Energy Management Program.
- For computers: Develop and implement purchasing standards requiring that a minimum of 95% of electronic hardware meets or exceeds Silver level EPEAT-registration in all relevant product categories. *Note: In 2007, the EPEAT standard is only applicable to desktop computer and laptops but will expand to other categories of electronics in the future.*
- Include the criteria for the Health Care Without Harm/Hospitals for a Healthy Environment (H2E) Computer Takeback Campaign Purchase Guidelines for Environmentally Preferable Computers (Beyond EPEAT) and the Suggested Environmental Preference and Disclosures for General (non-computer) electronic devices in all RFPs for computers and monitors. Give preference to companies that meet the highest percentage of criteria. (See reference below.)

EP Credit 5.3 (1 point in addition to EP c5.1) – Medical Equipment Purchasing

- Achieve EP Credit 5.1

AND

- Develop and implement purchasing standards requiring a minimum of 50% of all diagnostic imaging equipment (e.g., x-rays, MRIs), sterilization, and physiological monitoring equipment (but excluding other types of medical equipment) to be among the 25th percentile of lowest energy consumers for that class of equipment. Equipment shall be compared based on their continuous (or “standby”) mode electrical energy consumption.

Note: Incorporate these standards in the Electronic Assets Environmental Management Plan outlined in GGHC EP Prerequisite 2.

EP Credit 5.1-5.3 continued

Electronics Purchasing & End of Life Management

Suggested Documentation

- ☐ Compile and annually update a listing of all office and commercial equipment purchased and calculations demonstrating that the credit goals have been achieved.
- ☐ Compile documentation such as correspondence, contract language or equivalent documentation verifying that electronic end-of-life vendors are required to comply with the contractual specifications for end-of-life disposition outlined in the Credit Goals.
- ☐ Compile documentation demonstrating continuous improvement for end-of-life management both internally and through contracting for asset disposition, in terms of the number of products purchased, number of products disposed of appropriately, etc.

Reference Standards

Basel Action Network (BAN), Electronic Recycler's pledge of True Stewardship (E-Stewards), <http://www.ban.org/>

Electronic Product Environmental Assessment Tool (EPEAT), <http://www.epeat.net/>

Health Care Without Harm/Hospitals for a Healthy Environment (H2E) Computer Takeback Campaign Purchase Guidelines for Environmentally Preferable Computers: Going Beyond EPEAT, http://www.computertakeback.com/docUploads/Beyond%20EPEAT%20Computer%20Purchasing%20Guidelines%20_R5.pdf

U.S. Environmental Protection Agency (EPA) Energy Star, <http://www.energystar.gov>

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Prerequisite 2: Minimum Building Energy Efficiency Performance; GGHC FM Credit 1: Optimize Energy Efficiency Performance; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Prerequisite 1: Waste Management Plan; GGHC WM Prerequisite 2: Waste Generation Profile and Measurement; GGHC WM Prerequisite 3: Solid Waste Land Disposal; GGHC WM Credit 1: Solid Waste and Material Management; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations & Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.*
- Reduce generation of electronic waste by leasing equipment, purchasing refurbished electronic equipment, upgrading equipment instead of taking it out of service and/or participating in a buy-back program.
- Give preference to products registered with programs such as EPEAT that require all registered products to offer take back and recycling options.
- Provide preference for products that are available with extended warranties and parts for five years.

EP Credit 5.1-5.3 continued**Electronics Purchasing & End of Life Management**

- Use the Electronics Environmental Benefits Calculator to determine the environmental benefits of purchasing EPEAT-registered products and publicize this information inside and outside of the institution.
- Where applicable, design data centers with highly efficient temperature management systems. Utilize power supplies that meet the recommended efficiency guidelines of the Server System Infrastructure (SSI) Initiative and that offer the best efficiency at their most frequent operating load level. Analyze the capacity for virtualization, which can significantly reduce the number of servers required and allow some portion of them to go into sleep or off mode during down periods.
- Include asset management and electronics recycling in the Waste Management Plan outlined in GGHC WM Prerequisite 1.
- Include electronics recycling data in GGHC WM Prerequisite 2: Waste Generation Profile as part of the waste profile.
- Demonstrate compliance with the universal waste recycling rules as outlined in U.S. EPA's Resource Conservation and Recovery Act (RCRA).
- Collect all electronics for responsible management, including but not limited to: cell phones, pagers, walkie talkies, hand helds, televisions, fax machines, copiers, monitoring equipment, medical equipment.
- If donating retired equipment, ensure that it is mercury free, works, and has all parts necessary to be of use in other locations where extra parts and servicing might not be available.
- Engage with your Group Purchasing Organization to support responsible purchasing and end-of-life management of electronics for all its members.
- Purchase Energy Star® certified office and commercial equipment that carry the Energy Star®. Examples of these include:
 - Computers and Monitors
 - Copiers, Scanners and Printers
 - DVD Products
 - Exit Signs
 - Vending machines
 - Lighting
 - TVs & VCRs
 - Water Coolers
 - Commercial Clothes Washers
 - Commercial Dish Washers
 - Commercial Solid Door Refrigerators and Freezers

EP Credit 5.1-5.3 continued**Electronics Purchasing & End of Life Management**

Resources

Health Care Without Harm, Electronics. Information on purchasing and end-of-life choices for electronic equipment, <http://www.noharm.org/us/electronics/issue>.

HCWH/H2E/CTBC, Supplemental Purchasing Criteria, <http://www.noharm.org/details.cfm?ID=1633&type=document>.

Electronics Environmental Benefits Calculator. Information on calculating the environmental benefits of EPEAT-registered products, <http://eerc.ra.utk.edu/ccpct/eebc/eebc.html>

1-2 points

EP Credit 6.1-6.2**Office Supplies****Intent**

Conserve natural resources and promote ecosystem health through purchase of environmentally preferable office supplies.

Health Issues

According to the Healthcare Environmental Resource Center (HERC), the U.S. health care industry generates two billion pounds of paper and cardboard each year.⁶ Conventional office practices such as purchasing virgin paper manufactured using chlorine bleach and printing single-sided documents needlessly generates demand for continued logging of forests that provide valuable carbon dioxide sinks and ecological stability in their regions. Using chlorine as the bleaching agent for paper generates persistent bioaccumulative toxic chemicals (PBTs) such as organochlorines and dioxins, known carcinogens which can lead to long term health concerns such as birth defects and cancer. Paper products with high recycled content reduce sulfur and greenhouse gas emissions during manufacture, conserve virgin forest resources and contribute to healthier forest ecosystems. Furthermore, the Health Insurance Portability and Accountability Act (HIPAA) privacy law offers guidelines for safeguarding privacy while recycling paper products.

Credit Goals**Credit 6.1** (1 point)

- Develop and implement an environmentally preferable office supply product purchasing policy (including in-house purchases and contracts with office supply contractors), such that 50% of all office products meet or exceed the following criteria:
 - Office paper products: Most current U.S. EPA Comprehensive Purchasing Guidelines AND meet either FSC Certified Paper requirements, Green Seal GS-07 for Printing and Writing Paper, or Green Seal GS-10 for Coated Printing Paper requirements.
 - Office non-paper products: Most current U.S. EPA Comprehensive Purchasing Guidelines for Office Non-Paper Products, excluding office furniture. See GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture and Medical Furnishings for environmentally preferable purchasing criteria for furniture and medical furnishings.
- Educate employees on the environmentally preferable office products purchasing initiative upon hire and annually.

Credit 6.2 (1 point in addition to Credit 6.1)

- Achieve EP Credit 6.1

AND

⁶ Healthcare Environmental Research Center, <http://www.hercenter.org/wastereduction/paper.cfm>

EP Credit 6.1-6.2 continued

Office Supplies

- Develop and implement an environmentally preferable office supply product purchasing policy (including in-house purchases and contracts with office supply contractors), such that 50% of all office paper products meet the following criteria:
 - 100% post-consumer recycled content.
 - Certified Processed Chlorine Free®.

Note: An innovation point is available for purchasing practices such that 100% of all office products meet EP Credit 6.1 and 6.2 criteria OR 50% of office paper products contain alternative fiber sources. Fiber sources produced overseas from the project site are not eligible.

Suggested Documentation

- ☐ Maintain and annually review the environmentally preferable office supply purchasing policy in both the facility's Purchasing Policies and in the Waste Plan (See GGHC WM Prerequisite 1).
- ☐ Demonstrate through purchasing records that the credit goals have been met over a minimum one-year period.
- ☐ Maintain documentation of employee orientation to the environmentally preferable office products purchasing initiative (including meeting agenda and educational information).

Reference Standards

Chlorine-Free Products Association, <http://www.chlorinefreeproducts.org>

Forest Stewardship Council, FSC Certified Paper, <http://www.fscus.org/paper/>

Green Seal: GS-07 for Printing and Writing Paper; GS-10 for Coated Printing Paper, <http://www.greenseal.org>

U.S. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines, <http://www.epa.gov/cpg/products.htm>.

Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this credit with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management and Disposal; GGHC WM Credit 1.4: Solid Waste and Material Management: Recycling and Reuse of Facility Alterations & Additions; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC FS Credit 4: Reusable & Non-Reusable Products; GGHC EP Prerequisite 2: Electronic Assets Environmental Management Plan; GGHC EP Credit 1: Solid Waste Prevention in Purchasing; GGHC EP Credit 2: Toxicity Prevention in Purchasing; GGHC EP Credit 3.1-3.5: Toxic Chemical Reduction: Facility Alterations and Additions; GGHC EP Credit 3.6: Toxic Chemical Reduction: Furniture & Medical Furnishings; GGHC EP Credit 5: Electronics Purchasing & End of Life Management.

EP Credit 6 continued**Office Supplies**

- Applicable paper products include, but are not limited to: photocopy paper, letterhead, business cards and printed documents such as annual reports, posters, brochures and other paper products.
- Reduce paper consumption through strategies such as digital data storage, double-sided copying, computer-generated reports and intranet communication. Set up copiers to print duplex as the default setting. Work with the facility Group Purchasing Organization when identifying green office products to make the green choice the default purchase for all office products.
- For ball-point pens and pencils, use only refillable pens and refillable mechanical pencils.
- Purchase copiers and scanners equipped with automatic duplex copying.
- Investigate the availability of additional environmental criteria for office supplies such as recycled content paper certified by the Forest Stewardship Council (FSC) and non-toxic toner.

Resources

California Integrated Waste Management Board's Recycled Content Products Directory – Click on Office Products to find various products with recycled content - <http://www.ciwmb.ca.gov/RCP/default.asp>

U.S. Environmental Protection Agency (EPA) Buy Recycled Fact Sheets:
<http://www.epa.gov/cpg/factshts.htm>

U.S. Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines supplier database,
<http://www.epa.gov/epaoswer/non-hw/procure/products/paper.htm>

U.S. Environmental Protection Agency (EPA) Green cafeteria program,
<http://www.epa.gov/oppt/epp/ppg/case/cafeteria.htm>

1 point

EP Credit 7**Low Emitting & Fuel Efficient Fleet Vehicles****Intent**

Protect human health and improve air quality by reducing emissions from fleet vehicles.

Health Issues

Health care facilities often utilize fleets of vehicles to maintain and operate their facilities. These vehicles range from ambulances to delivery vans to shuttle buses, which often operate continuously and relatively locally. Motor vehicles represent the largest single source of atmospheric pollution including nitrogen oxides (a precursor of smog); benzene (a carcinogen); other volatile organic compounds (some of which are hazardous and precursors of smog); particulate matter (a trigger of respiratory and cardiovascular illnesses and symptoms), carbon dioxide (a greenhouse gas and contributor to global climate change); and carbon monoxide (atmospheric carbon monoxide contributes to the development of atherosclerosis). By reducing emissions, alternative fuel fleets contribute to healthier air quality, benefiting the health of the building occupants and the surrounding community.

Credit Goals

- Evaluate the type, size and number of fleet vehicles required to meet the needs of facility occupants, including programs such as van service for patients with ambulatory impediments and programs aimed at reducing single-person automobile use (as outlined in GGHC TO Credit 1.1).
- Own, lease, or contract with a service that supplies a low-emitting and fuel-efficient or alternative fuel (e.g., biodiesel, compressed natural gas or liquid propane) vehicle fleet, defined as vehicles that are either classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board, having achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide, or utilizing ultra-low sulfur diesel fuel and equipped with EPA or California Air Resources Board verified emissions control technology.
- Low-emitting and fuel-efficient or alternative fuel vehicles shall comprise minimum 50% of total fleet mileage driven annually.
- Provide alternative fuel stations, either onsite or by contract, to meet 100% of the fuel needs of the alternative fuel fleet.

EP Credit 7 continued

Low Emitting & Fuel Efficient Fleet Vehicles

Suggested Documentation

- ☐ Demonstrate proof of ownership of, or 2-year lease or contract agreement, for low-emitting and fuel-efficient vehicle fleet and calculations indicating that the vehicles comprise a minimum of 50% of hospital operated vehicle fleet, in terms of miles driven annually.
- ☐ Prepare site drawings showing on-site fueling stations, or contract agreement, in accordance with the Credit Goals.

Reference Standards

California Air Resources Board (CARB) Zero Emission Vehicles (ZEV),
<http://www.arb.ca.gov/msprog/zevprog/zevprog.htm>.

American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide,
<http://www.aceee.org/>.

U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) verified emissions control technologies, <http://www.epa.gov/otaq/retrofit/nonroad-list.htm>.

Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this credit in coordination with GGHC SSM Credit 2.2: Reduced Site Disturbance: Structured Parking, GGHC SSM Credit 4.1: Heat Island Reduction, GGHC TO Credit 1.1-1.4: Alternative Transportation: Commuting; GGHC TO Credit 1.5: Alternative Transportation: Allowances, and GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting.*
- Retain existing preferred handicapped parking areas. Handicapped parking is inclusive of any patient population designated by the hospital as eligible to park in handicapped areas.
- Alternative fuel vehicle fleets can be used to provide intra-campus transportation or inter-campus transportation, transportation to remote parking and staff housing, ambulance and ambulette fleets, and carpool/vanpool programs.
- Coordinate the low emitting and fuel efficient vehicle fleet program with a policy establishing an alternative transportation commuting in accordance with GGHC TO Credit 1.
- Biodiesel is becoming available in many markets nationwide, particularly in regions designated as non-attainment areas or where there are high levels of ground level ozone. Low sulfur diesel fuels are required nationally and can be used in all diesel engines without modifications. Biodiesel is usable in most diesel engines as well, although in some older engines may require changing of rubber gaskets and more frequent changing of filters during initial use as it cleans the engine.

EP Credit 7 continued

Low Emitting & Fuel Efficient Fleet Vehicles

Resources

American Council for and Energy Efficient Economy (ACEEE), Green Book, <http://www.greenercars.org/>

California Energy Commission, Alternative Fuel Vehicles (AFVs) and High-Efficiency Vehicles, <http://www.energy.ca.gov/afvs/>

U.S. Department of Energy (DOE), State and Federal Incentives and Laws, http://www.eere.energy.gov/afdc/incentives_laws.html

U.S. Department of Energy (DOE), Clean Cities Program, <http://www1.eere.energy.gov/cleancities/>

U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA), Fuel Economy website, <http://www.fueleconomy.gov/>

U.S. Environmental Protection Agency (EPA) National Clean Diesel Campaign, <http://www.epa.gov/cleandiesel/>

U.S. Environmental Protection Agency (EPA), Transportation and Air Quality, <http://www.epa.gov/otaq/>

Innovation in Operations

1-4 points

IN Credit 1.1-1.4**Innovation in Operations**

Intent

Provide facilities' operations, management, and upgrade teams the opportunity to achieve points for achieving environmental and health benefits beyond those already addressed by the *Green Guide for Health Care Operations* section.

Health Issues

The health care industry's responses to environmental stewardship are continuously evolving. Priorities such as evidence-based design, carbon neutrality, and a toxic-free health care sector drive innovations toward the goal of a high performance, healing environments. The health care sector's mission to provide healing uniquely positions it to evolve ever more powerful and innovative strategies to enhance building performance. The Innovation credits reward exemplary performance of existing credits and encourage implementation of innovative facility operations strategies.

Credit Goals

Credit 1.1 (1 point)	Identify the intent of the proposed innovation credit, the proposed credit goals, the additional environmental benefits delivered and the performance metrics used to document the additional environmental benefits delivered over a minimum one-year period. Successful innovation credit proposals shall require and track continuous improvement.
Credit 1.2 (1 point)	Same as Credit 1.1.
Credit 1.3 (1 point)	Same as Credit 1.1.
Credit 1.4 (1 point)	Same as Credit 1.1.

Suggested Documentation

- ☐ Prepare the innovation credit proposal(s) (including intent, credit goals, thresholds and/or calculations, documentation, and operations approach) and relevant evidence of performance achieved.
- ☐ Document achievement in accordance with credit goals, and annually review progress.

IN Credit 1.1-1.4 continued**Innovation in Operations****Reference Standards**

There is no reference standard for this credit.

Potential Technologies & Strategies

- Substantially exceed a *Green Guide* credit threshold such as for energy performance or waste management. Several credits in the *Operations* section provide guidance on related innovation points.
- Apply strategies or measures that are not covered by the *Green Guide for Health Care*.
- Consider establishing a program phasing in linen products meeting the requirements of the U.S. Department of Agriculture's National Organic Program. (See Resources for more information.) Organic cotton is available for products such as: newborn onesies, receiving blankets, personal care items (tampons, cotton balls, q-tips, etc.), hospital scrubs, patient gowns, lab coats, bed linens, and towels. Institute a laundry program minimizing chemical and water use.
- Consider running an audit of the facility quantifying how many and what kind of spaces maximize the use of space to their workload. Integrate an improvement plan into the Integrated Operations and Maintenance program outlined in IO Prerequisite 1.

Resources

BetterBricks, Hospitals & Healthcare,

<http://www.betterbricks.com/subHomePage.aspx?ID=1&PID=detailpage>

Global Health and Safety Initiative, <http://www.noharm.org>

Pharos Project, <http://www.pharosproject.net/>

Practice Greenhealth, <http://www.practicegreenhealth.org>

Savings By Design, Awards, <http://www.savingsbydesign.com>

U.S. Department of Agriculture's National Organic Program, <http://www.ams.usda.gov/nop/Consumers/Consumerhome.html>.

U.S. Department of Energy (DOE), Federal Energy Management Program, <http://www1.eere.energy.gov/femp/>

U.S. Department of Energy (DOE), High Performance Building Database, <http://www.eere.energy.gov/buildings/highperformance/>

U.S. Green Building Council, Credit Interpretation Rulings: Innovation credits, <http://www.usgbc.org>

U.S. Green Building Council, Innovation & Design Credit Catalog, <http://www.usgbc.org/ShowFile.aspx?DocumentID=3569>

Whole Building Design Guide, <http://www.wbdg.org/>

1 point

IN Credit 2.1**Documenting Sustainable Operations Cost Impacts:
Overall Operating Costs****Intent**

Document sustainable building operations cost impacts to increase awareness of the benefits of green facilities operations.

Health Issues

Executives from early adopter health systems have identified environmental stewardship as a defining facet of leadership, excellence, and quality in the health care industry. Increasingly, they are also moving beyond the question of whether to incorporate green principles into facility design, construction, and operations to how best to leverage their positions as health care providers, major players in the U.S. economy, and organizations with significant purchasing power to accelerate market transformation. The benefits of greening operations may be quantified in terms such as monetary savings, avoided pollution, and improved patient and staff safety. Making the business case reinforces the economic viability of adoption and implementation of sustainable operations policies and programs.

Credit Goals

- Document overall building operating costs for the previous five years (or length of building occupancy, if shorter), and track changes in overall building operating costs over a minimum one-year period.
- Compile building operating cost and financial impacts for a minimum of five implemented *Green Guide* credits on an ongoing basis.

OR

- Annually conduct a triple bottom line sustainability report.

IN Credit 2.1 continued

Documenting Sustainable Operations Cost Impacts: Overall Operating Costs

Suggested Documentation

- ☐ Compile all building operating costs for the previous five years (or length of building occupancy, if shorter) and annually update.
- ☐ Track changes in overall costs for a minimum of five implemented credits over a minimum one-year period.
- ☐ Publish or otherwise publicly share performance data.

OR

- ☐ Annually document a triple bottom line sustainability report over a minimum one-year period.
- ☐ Publish or otherwise publicly share performance data.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- A triple bottom line sustainability report takes into consideration environmental and social considerations in addition to economic considerations.
- Track building operating costs to identify positive impacts relative to sustainable performance improvements to building and operations.
- Consider tracking the facility's ecological footprint.

Resources

Canadian Sustainability Reporting Toolkit, <http://www.sustainabilityreporting.ca/>

Global Health and Safety Initiative, <http://www.noharm.org>

Global Reporting Initiative, <http://www.globalreporting.org/>

The Sustainability Report, <http://www.sustreport.org/>

Sustainability Reports, <http://www.enviroreporting.com/service/>

1 point

IN Credit 2.2

Documenting Sustainable Operations Cost Impacts: **Absenteeism & Health Care Cost Impacts**

Intent

Document absenteeism, staff retention, health care costs and other impacts of sustainable building performance improvements.

Health Issues

Evidence-based design research indicates that access to daylight and views and healthy indoor air quality increases staff productivity and reduces patient stays. Many green operations strategies increase productivity by reducing exposure to hazardous substances and the associated regulations around their storage, use, and disposal. Health care is uniquely positioned to make use of the records gathered on staff retention, absenteeism, slips and falls, patient satisfaction, patient length of stay, etc., to correlate changes in trends over time to environmental improvements to facility operations.

Credit Goals

- Document the history of absenteeism, staff retention and health care costs for full-time equivalent (FTE) staff for the previous five years (or length of building occupancy with a minimum of 12 months).
- Track changes in absenteeism, staff retention and health care costs (claim costs and any reductions in premium costs should be provided if available) for full-time equivalent (FTE) staff relative to the pursuit of minimum five *Green Guide for Health Care* credits and set annual goals for improvement.

IN Credit 2.2 continued

Documenting Sustainable Operations Cost Impacts: Absenteeism & Health Care Cost Impacts

Suggested Documentation

- ☐ Document and annually update the history of absenteeism, staff turnover and health care costs for full-time equivalent (FTE) staff in accordance with the credit goals.
- ☐ Document and annually update changes over a minimum twelve-month period in absenteeism and health care costs for full-time equivalent (FTE) staff relative to sustainable building performance improvements in accordance with the credit goals.
- ☐ Publish or otherwise publicly share performance data.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- Study possible correlations between changes in absenteeism, staff turnover and health care costs for full-time equivalent staff and sustainable performance improvements associated with achievement of prerequisites and credits in the *Green Guide for Health Care Operations* section.
- Track the difference between “before” and “after” operational costs and environmental and safety metrics associated with implementation of *Green Guide for Health Care* credits. Examples of environmental and safety metrics include:
 - Medical errors
 - Chemical spills
 - Waste diversion rate
 - Waste removal fees
 - Incidents of exposure to chemicals and biologicals
 - Use of wax strippers on flooring
 - Air quality complaints
 - Air levels exceeding OSHA or NIOSH levels
 - Disruption of staff circadian rhythm
 - Success of acoustic control measures in reducing staff and patient stress level and distractions
 - Quality of the staff work environment
 - Quality of sleep
 - Slips and falls

Resources

Center for Health Design, <http://www.healthdesign.org>

The Joint Commission, <http://www.jointcommission.org/>

Practice Greenhealth, <http://www.practicegreenhealth.org>

1 point

IN Credit 3**Research Initiatives****Intent**

Expand the body of knowledge around the long-term impact of sustainable operations initiatives by participating in third party research projects.

Health Issues

Evidence-based research on the health and financial benefits related to sustainable buildings in health care has been spearheaded by organizations such as the Center for Health Design, Health Care Without Harm, and the Healthy Building Network. While additional research is needed, current data indicates a correlation between healthy, sustainable health care facilities operations and improved patient healing rates, reduced need for pain medication, increased patient satisfaction, reduced instances of medical errors, and increased staff retention.

Credit Goals

- Engage in public, third party research initiatives to help discover the impact that sustainable building performance improvements have on building occupants, the local community, and/or the global environment. Correlate research metrics with *Green Guide for Health Care* credits or equivalent green operations strategies.

IN Credit 3 continued

Research Initiatives

Suggested Documentation

- ☐ Demonstrate involvement in a third-party research initiative in accordance with the Credit Goals over a minimum one-year period.
- ☐ Publish or otherwise publicly share performance data and research results.

Reference Standards

There is no reference standard for this credit.

Potential Technologies & Strategies

- Parameters for research may include indicators such as: staff recruitment, satisfaction, retention or clinical performance measures (i.e., medical errors, staff satisfaction, or patient outcome) or efficacy or product substitutes (i.e. development of safe, sustainable and efficacious cleaners and disinfectants approved and registered by federal agencies such as the FDA, EPA. etc.).
- Engage in sustainable health care research initiatives, surveys, or white papers sponsored by institutions such as:
 - Professional associations
 - Universities
 - Leap Frog
 - Center for Health Design
 - Health Care Without Harm
 - Practice Greenhealth
 - Global Health and Safety Initiative
- Use process mapping and other process based methodologies to identify changes and improvements in performance measures such as medical errors and patient outcomes. Track results of the implemented improvements for a minimum one-year period.
- Research projects should begin with a search of peer-reviewed studies on their topic.

Resources

Center for Health Design, <http://www.healthdesign.org>

Global Health and Safety Initiative, <http://www.noharm.org>

Practice Greenhealth, <http://www.practicegreenhealth.org>