

FACILITY SERVICES GREEN BUILDING CRITERIA

TABLE OF CONTENTS

1	BACKGROUND:	2
2	THE RATING	2
2.1	Targets:.....	2
2.2	Credit equivalence:	2
2.3	Documentation:.....	2
3	THE CRITERIA	3
3.1	RATING SYSTEM PREREQUISITES	3
3.1.1	Asbestos	3
3.1.2	Building Commissioning	3
3.1.3	Energy Efficiency	3
3.1.4	Indoor Air Quality	3
3.1.5	Ozone Depletion / Cfcs	4
3.1.6	Storage And Collection Of Recyclables	4
3.1.7	Thermal Comfort	4
3.1.8	Water Conservation	4
3.1.9	Water Quality (Lead)	4
3.1.10	Erosion Control.....	4
3.2	RATING SYSTEM CREDITS	4
3.2.1	Building Materials.....	4
3.2.2	Construction Waste Management	5
3.2.3	Energy	6
3.2.4	Indoor Air Quality	7
3.2.5	Landscaping/Exterior Design	8
3.2.6	Occupant Recycling	8
3.2.7	Operations And Maintenance Facilities	9
3.2.8	Ozone Depletion/Cfcs	9
3.2.9	Transportation.....	9
3.2.10	Water Conservation.....	10
3.2.11	Water Quality.....	10
4	REFERENCED STANDARDS OR REGULATIONS	11
4.1	Asbestos	11
4.2	Building Materials.....	11
4.3	Building Commissioning	11
4.4	Energy Efficiency	11
4.5	Indoor Air Quality	11
4.6	Thermal Comfort	12
4.7	Water Conservation	12
4.8	Water Quality	12

FACILITY SERVICES GREEN BUILDING CRITERIA (adapted from US Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System Criteria)

1 BACKGROUND:

The **LEED™** Green Building Rating System, upon which the Facility Services' Green Building Criteria is based, is a priority program of the US Green Building Council. It is a voluntary, consensus-based, market-driven building rating system based on existing proven technology that evaluates environmental performance from a whole building perspective over a building's life cycle. **LEED™** is intended to be a definitive standard for what constitutes a green building.

The US Green Building Council's **LEED™** Green Building Rating System is based on accepted energy and environmental principles and strikes a reasonable balance between known effective practices and emerging concepts. Unlike other rating systems currently in existence, the development of the **LEED™** Green Building Rating System has been open to public scrutiny and has involved the participation of virtually all segments of the building industry including product manufacturers, environmental groups, building owners, utilities, state and local governments, research institutions, professional societies and colleges and universities.

The City of Fort Collins Facility Services Department has modified the LEED Green Building Rating System to make it more consistent with City codes, regulations and ordinances, more consistent with local climatic conditions, and more consistent with the local infrastructure. The resulting Green Building Criteria will be used to guide the design and construction of City facilities.

2 THE RATING

2.1 Targets:

The City's Green Building Criteria includes both "prerequisites" and "credits". Prerequisites must be met by all projects. Designers may choose which credits to earn, based on the total credit target specified for an individual project.

2.2 Credit equivalence:

Under certain circumstances an action will be taken that will comply with the spirit, though not necessarily the letter, of the compliance criteria. Under these circumstances, the design team must demonstrate that the actions taken are substantially similar in impact to the relevant criteria and request credit for those actions. Areas where substantial equivalence is being claimed must be clearly indicated and the appropriate documentation provided to support the claim. Credit equivalence may only be claimed on specific points and will be limited to a maximum of 3 credits per project.

2.3 Documentation:

Documentation must be submitted to support all compliance claims. Specific documentation requirements are described along with each prerequisite and credit.

3 THE CRITERIA

3.1 RATING SYSTEM PREREQUISITES

THE PROJECT MUST MEET ALL PREREQUISITES

3.1.1 ASBESTOS

The building owner's prime design professional of record (architect or engineer) must submit a signed and sealed statement certifying in their professional opinion that the building is either

(1) free of asbestos containing material pursuant to OSHA asbestos regulations governing building owners, 29 CFR Part 1926 including §1926 (communication of hazards and testing), or

(2) complies with the OSHA Part 1926 asbestos rule for protection from human exposure, training, hazard communication, and other applicable OSHA Part 1926 requirements for building owners

3.1.2 BUILDING COMMISSIONING

Building commissioning is required. Documentation is comprised of the commissioning plan and specifications developed for the project.

3.1.3 ENERGY EFFICIENCY

A 25% reduction in annual energy costs compared to a "base building" that meets the City of Fort Collins "Energy Code for Commercial, Industrial, and High-Rise Residential Buildings". The following information must be submitted to document compliance:

- Estimates of energy use, peak electrical demand, and energy cost for both the base building and the proposed design
- Description of the energy modeling approach
- Assumptions, including
 - Thermal characteristics of the building envelope
 - HVAC system description, including primary and secondary systems and controls
 - Operating conditions: design temperatures, operating hours, lighting schedules, etc.
 - Lighting and plug load power densities
 - Lighting control strategies
 - Domestic hot water use
 - Renewable/alternative energy contribution to the load (excluding daylighting)

Comply with the Department Of Energy's International Performance Measurement and Verification Protocol (IPMVP), dated 1997, for energy consumption. (www.ipmvp.org)

3.1.4 INDOOR AIR QUALITY

- Comply with ASHRAE Standard 62-1989 (minimum ventilation rates) with the proviso that the ambient air quality standard requirements shall be site specific and not region specific (i.e. ambient air quality at the proposed point of fresh air intake).
- Building fresh air intake shall be located away from loading areas, building exhaust fans, cooling towers and other point sources of contamination.

Documentation required: Calculation of ventilation rates attained with the project design, and fresh air intakes clearly labeled on the plans.

3.1.5 OZONE DEPLETION / CFCs

- For new buildings, CFC refrigerants and halon fire suppression systems are not permitted. Documentation required: Manufacturers' product literature indicating the material/ equipment is free of CFC's and Halon.

3.1.6 STORAGE AND COLLECTION OF RECYCLABLES

Provide a centralized ground-floor location for collection and storage of materials separated from each other for recycling, including office paper, newspapers, cardboard, glass, metals, and plastics. Documentation required: Show this area on the ground floor plan.

3.1.7 THERMAL COMFORT

Comply with ASHRAE Standard 55-1992. Documentation required: Show how the proposed design meets the standard.

3.1.8 WATER CONSERVATION

- Comply with the City of Fort Collins Water Conservation Standards for Landscaping and Irrigation. Documentation required: Show how the proposed design meets this standard.
- Comply with the Department Of Energy's International Performance Measurement and Verification Protocol (IPMVP), dated 1997, for water consumption. (www.ipmvp.org) Documentation required: Show how the calculations meet these standards.

3.1.9 WATER QUALITY (LEAD)

Meet the requirements of EPA Publication # 812-B-94-002: "Lead in Drinking Water in Schools and Non-Residential Buildings," April 1994. Documentation required: Show how the proposed design meets this standard.

3.1.10 EROSION CONTROL

Comply with the City of Fort Collins "Storm Drainage Design Criteria and Construction Standards for Storm Water Management and Erosion Control". Documentation required: Show how the proposed design meets this standard.

3.2 RATING SYSTEM CREDITS

A total of 40 Credits are available

3.2.1 BUILDING MATERIALS

There is a total of 7 CREDITS available for building materials measures.

1 OR 2 CREDITS FOR LOW VOC MATERIALS

--1 credit for complying with 1 or 2 measures;

--2 credits for doing all three

Documentation required: cut sheets or other data (such as MSDS sheets) from manufacturers indicating chemical composition of the products.

(a) Limit VOC content in adhesives. At a minimum all adhesives must meet the VOC limits of South Coast Rule #1168 by the South Coast Air Quality Management District.

(b) Limit the VOC content in architectural sealants (material with "adhesive" characteristics used as a filler; not material used as a "coating"). At a minimum, all sealants must meet the limits of Regulation 8, Rule 51 of the Bay Area Air Resources Board.

(c) Limit the VOC content in paints and coatings. At a minimum all paints and coatings must meet the requirements of New Jersey State Department of Environmental Protection, Title 7, Chapter 27, Subchapter 23.

1 CREDIT FOR USE OF LOCAL MATERIALS:

One credit is available for using a minimum of 20% of building materials as calculated by total materials cost (exclusive of costs for mechanical, electrical, plumbing systems, labor, overhead fees etc.) manufactured within 300-miles of the building site. Documentation required: list the materials and locations of manufacturers that meet this criterion. Show how these materials total 20% or more of the materials used in the project.

1 CREDIT FOR RESOURCE REUSE:

One credit is available for using salvaged or refurbished materials for 5% of total building materials as calculated by total materials cost (exclusive of costs for mechanical, electrical, plumbing systems, labor, overhead fees etc.). Documentation required: list the materials (with suppliers' names and addresses) that meet this criterion. Show how these materials total 5% or more of the materials used in the project.

1 CREDIT FOR ADVANCED RESOURCE REUSE

One additional credit is available for specifying salvaged or refurbished materials for 10% of total building materials as calculated by total materials cost (exclusive of costs for mechanical, electrical, plumbing systems, labor, overhead fees etc.). Documentation required: list materials (with suppliers' names and addresses) that meet this criterion. Show how these materials total 10% or more of the materials used in the project.

1 CREDIT FOR RECYCLED CONTENT:

One credit is available for buildings using a minimum of 20% of the materials as calculated by total materials cost (exclusive of costs for mechanical, electrical, plumbing systems, labor, overhead fees etc.) that contain at least 20% post-consumer recycled content OR a minimum of 40% post-industrial recycled content. Documentation required: list materials and provide cut sheets or other manufacturer data indicating percentages of recycled content. Show how these materials total 20% or more of the materials used in the project.

1 CREDIT FOR ADVANCED RECYCLED CONTENT:

One additional credit for buildings using a minimum of 30% of the materials as calculated by total materials cost (exclusive of costs for mechanical, electrical, plumbing systems and labor) that contain at least 20% post-consumer recycled content OR a minimum of 40% post-industrial recycled content. Documentation required: list materials and provide cut sheets or other manufacturer data indicating percentages of recycled content. Show how these materials total 30% or more of the materials used in the project.

3.2.2 CONSTRUCTION WASTE MANAGEMENT

There is a total of 2 CREDITS available for construction waste management measures.

1 CREDIT FOR MANAGEMENT PLAN

One credit is available for developing and implementing a construction and demolition waste management plan that identifies licensed haulers of recyclables and documents costs for recycling and frequency of pick-ups. At a minimum, the plan shall mandate recycling of cardboard, metals, concrete, brick, asphalt, land clearing debris (if applicable) and beverage

containers. Documentation required: the construction and demolition waste management plan for the project.

1 CREDIT FOR ADVANCED MANAGEMENT PLAN

One additional credit is available for meeting the requirements above and also recycling clean dimensional wood, plastic, glass, gypsum board, and carpet, and for evaluating the cost-effectiveness of recycling rigid foam insulation, engineered wood products and other materials. Documentation required: the construction and demolition waste management plan for the project, including the additional materials listed above.

3.2.3 ENERGY

There is a total of 10 CREDITS available for energy measures.

3.2.3.1 ENERGY EFFICIENCY (Up to 7 credits available.)

Five different levels of energy efficiency earn from 1 to 5 credits.

The table below summarizes the number of credits available for each level of energy efficiency. Each percentage reduction listed is intended to mean: An "X"% reduction in annual energy costs compared to a "base building" that meets the City of Fort Collins "Energy Code for Commercial, Industrial, and High-Rise Residential Buildings. The following information must be submitted to document compliance:

- Estimates of energy use, peak electrical demand, and energy cost for both the base building and the proposed design
- Description of the energy modeling approach
- Assumptions, including
 - Thermal characteristics of the building envelope
 - HVAC system description, including primary and secondary systems and controls
 - Operating conditions: design temperatures, operating hours, lighting schedules, etc.
 - Lighting and plug load power densities
 - Lighting control strategies
 - Domestic hot water use
 - Renewable/alternative energy contribution to the load (excluding daylighting)

% REDUCTION	CREDITS EARNED
30	1
35	2
40	3
45	4
50	5

1 CREDIT FOR NATURAL VENTILATION, HEATING AND COOLING

One additional credit is available for a building that uses natural ventilation and passive energy design to accomplish all heating and cooling requirements for a minimum of 8 months of the year. Documentation required: indicate the 8 months where this strategy is feasible; calculate the heating and cooling requirements needed for those 8 months; describe the

method(s) chosen to meet that need, with calculations to show that the need is met by those methods. Include manufacturers' product performance data where applicable.

1 CREDIT FOR WASTE-HEAT RECOVERY SYSTEM

One credit is available for installing a waste heat recovery system that recaptures at least 20% of total waste heat, and is used to pre-heat water or incoming air. To receive credit for this measure, the energy benefits from heat recovery must be in addition to whatever energy measures have been used to obtain other credits. Documentation required: Description of the system to be used for this credit, percentage of waste heat to be recovered, with calculations to support that claim, and manufacturer's product performance data.

3.2.3.2 RENEWABLE/ALTERNATIVE ENERGY (Up to 3 credits available.)

The table below summarizes the number of credits available for each level of renewable/alternative energy use. The percentages listed are intended to mean: "X" percent of the building's total energy load, not including day lighting, is supplied by building-integrated or directly connected renewable energy systems. Documentation required: description of the system(s) used, assumptions, and calculations to determine energy yield.

% RENEWABLE ENERGY	CREDITS EARNED
10	1
20	2
30	3

3.2.4 INDOOR AIR QUALITY

There is a total of 3 CREDITS available for indoor air quality (IAQ) measures.

1 CREDIT FOR CONSTRUCTION IAQ MANAGEMENT PLAN

One credit is available for the development and implementation of an IAQ management plan for the construction process, which is consistent with Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction." The management plan shall provide for:

- Protection of the ventilation system components (equipment & pathways) from contamination,

OR

- After completion of construction and prior to occupancy: provision of cleaning requirements for ventilation system components and pathways exposed to contamination during construction.

Documentation required: submittal of IAQ management plan for the construction process.

1 CREDIT FOR ADVANCED CONSTRUCTION IAQ MANAGEMENT PLAN

One additional credit is available for undertaking the management plan requirements above, and implementing the following additional measures:

- Reduction of construction contaminants in the building prior to occupancy (e.g. dust, particulates, water infiltration-related contamination, VOCs).

AND

- if the return air side of a system is used during construction, provide a minimum of 85% filtration, as determined by ASHRAE Standard 52.1-1992, on return-side system components during construction and replacement of all filtration media prior to occupancy. Documentation required: submittal of IAQ management plan for the construction process with a description of measures planned for implementation of additional requirements.

1 CREDIT FOR PERMANENT AIR MONITORING SYSTEM

One credit is available for the installation of a permanent air monitoring system.

- System should have the capability to monitor supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO₂), total volatile organic compounds (TVOCs) and particulates (including PM₁₀).

Documentation required: Description of system to be installed and cut sheets or other product data from manufacturer regarding capabilities of the system.

3.2.5 LANDSCAPING/EXTERIOR DESIGN

There is a total of 3 CREDITS available for landscaping measures:

UP TO 3 CREDITS FOR REDUCING HEAT ISLANDS

- 1 Credit for implementing one or two measures;
- 2 Credits for implementing three out of the five measures;
- 3 Credits for implementing four out of the five measures

Documentation required: Calculated ratio of trees per 1,000 square feet, calculation of percentage impermeable surfaces that are shaded, and manufacturers' data indicating albedo reflectance of materials used.

- (a) Planting at least one (1) tree on the site for every 1,000 square feet of impermeable surface on the building lot, including parking, walkways and plazas, etc.
- (b) Providing natural or artificial cover (e.g. trees or covered walks) to shade at least 60% of impermeable surfaces of the property.
- (c) Providing light-color (high-albedo, or reflectance) for 80% of the roofing materials of a building. Materials should have an albedo reflectance of at least 0.5.
- (d) Providing high-albedo materials on 80% of the property's non-parking impervious surfaces (e.g. sidewalks, plazas). Materials should have an albedo reflectance of at least 0.5.
- (e) Providing outdoor parking lots with light-colored aggregate or other light colored finish. Materials should possess an albedo of at least 0.4.

3.2.6 OCCUPANT RECYCLING

There is a total of 1 CREDIT available for occupant recycling measures. Documentation required: Description of system or equipment to be installed with cut sheets or other documentation from the manufacturer regarding efficiency, reliability, required maintenance, etc., of the equipment.

1 CREDIT FOR OCCUPANT RECYCLING EQUIPMENT

- One credit is available for multistory buildings of four or more stories in which a mechanical system (other than manual labor) is installed allowing for the floor to floor transportation and sorting of office paper, newspaper, magazines, corrugated cardboard, glass, metals, and plastics for recycling into separate containers on the ground floor of the building.

OR

- For buildings three stories or less, installing a compactor(s) and/or baler(s) as required to accommodate a recycling diversion rate of at least 75% of the building waste stream.

3.2.7 OPERATIONS AND MAINTENANCE FACILITIES

There is a total of 2 CREDITS available for Operation and Maintenance facility and design measures.

1 CREDIT FOR CHEMICAL STORAGE AREAS

One credit is available for designing all chemical storage and mixing areas for housekeeping products (central storage facilities AND janitors closets, where appropriate) to allow for adequate and secure product storage, with water in the space for mixing concentrated chemicals. Drains should be plumbed for the appropriate disposal of liquid waste products and should have separate outside venting. These areas should be operated under negative pressure.

1 CREDIT FOR ARCHITECTURAL ENTRYWAYS

One credit is available for permanent architectural entryway system(s) (e.g. grills, grates, etc.) designed to catch and hold particles to keep them from contaminating the building interior.

3.2.8 OZONE DEPLETION/CFCs

There is a total of 2 CREDITS available for CFC, HCFC and Halon elimination measures. Documentation required: Manufacturers' product literature indicating the material/ equipment is free of CFC's, HCFC's, and Halon.

1 CREDIT FOR ELIMINATING HCFC USE IN MECHANICAL EQUIPMENT

One credit is available for building-level HVAC and refrigeration equipment that does not contain HCFCs and a non-HCFC fire suppression system. (Elimination of CFC and Halon use is covered in the pre-requisites)

1 CREDIT FOR ELIMINATING CFC AND HCFC USE IN BUILDING MATERIALS

One credit is available for 100% use of building materials (e.g. insulation, carpet pad) that do not use CFCs or HCFCs as foaming agents or in other parts of the manufacturing process.

3.2.9 TRANSPORTATION

There is a total of 3 CREDITS available for transportation measures.

1 OR 2 CREDITS FOR ALTERNATIVE TRANSPORTATION FACILITIES

--1 credit for implementing 1 or 2 measures;
--2 credits for implementing 3 measures

- (a) Provide suitable means for securing bicycles for at least 5% of the building occupants.
- (b) Provide shower and changing facilities for cyclists.
- (c) Provide transit and pedestrian-friendly physical linkages to mass transit infrastructure, such as covered or internal access to bus or trolley stops or stations OR provide preferred parking for carpool participants.

1 CREDIT FOR ALTERNATIVE FUELING FACILITIES

One credit is available for installing refueling facilities for alternative-fuel vehicles using, for example, electricity, natural gas or methanol/ethanol. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

3.2.10 WATER CONSERVATION

There is a total of 5 CREDITS available for water conservation measures.

1 CREDIT FOR WATER-CONSERVING FIXTURES

One credit is available for installing fixtures other than toilets that use 20% less water than the water usage requirements in the Energy Policy Act of 1992. Documentation required: manufacturers' cut sheets or other product performance literature.

1 CREDIT FOR AUTOMATIC FAUCETS AND FLUSH VALVES

One credit is available for installing automatic sensors for lavatory faucets and toilet flush valves. Documentation required: manufacturers' cut sheets or other product performance literature

1 CREDIT FOR WATER RECOVERY SYSTEM

One credit is available for installing a system that collects roof or ground storm water, or recovers ground water from sump pumps, for use in landscape irrigation. Documentation required: manufacturers' cut sheets or other product performance literature, and a description of the proposed system.

1 CREDIT FOR WATER-CONSERVING COOLING TOWERS

One credit is available for installing cooling tower systems designed with delimiters to reduce drift and evaporation. Documentation required: manufacturers' cut sheets or other product performance literature.

1 CREDIT FOR WATER-EFFICIENT LANDSCAPING

One credit is available for 100 percent of exterior plantings that use plants tolerant of climate, soils, and natural water availability, and that do not receive watering from municipal potable water after a period of establishment is complete, except during long hot, dry periods. Documentation: list of proposed landscape plants with watering requirements, and description of supplemental water system to be used for establishment and for the long hot, dry periods.

3.2.11 WATER QUALITY

There is a total of 2 CREDITS available for water quality measures.

1 CREDIT FOR SURFACE RUNOFF FILTRATION

One credit is available for the installation of oil grit separators or water quality ponds for pre-treatment of runoff from surface parking areas. Documentation required: manufacturers' cut sheets or other product performance literature.

1 CREDIT FOR SURFACE RUNOFF REDUCTION

One credit is available for using pervious paving materials for a minimum of 50% of non-landscaped areas, exclusive of the building footprint (roadways, surface parking, plazas, pathways) on the site. Documentation required: manufacturers' cut sheets or other product performance literature, and area calculation of the proposed location of this material.

4 REFERENCED STANDARDS OR REGULATIONS

Key summaries of all of the standards referenced in the Rating System Criteria, as well as a list of design assistance resources can be found in the **LEED™** Building Design Assistance Manual, or are available in their entirety from the U.S. Green Building Council. Contact: US Green Building Council, 90 New Montgomery Street, Suite 1001, San Francisco, CA 94105. Phone: 415-543-3001
 Fax: 415-957-5890
 E-mail: info@usgbc.org
 Web site: www.usgbc.org

(Most standards are available over the internet.)

4.1 Asbestos

OSHA Asbestos Regulations in 29 CFR Part 1926 Safety and Health Regulations for Construction. (US Green Building Council has link to this from their web site)

4.2 Building Materials

South Coast Rule #1168-South Coast Air Quality Management District

Regulation 8, Rule 51, Bay Area Air Quality Management District
 BAAQMD: (415) 771-6000

Title 7, Chapter 27, Subchapter 23 -- New Jersey State Department of Environmental Protection

NJDEP - Arthur Diem, Rule Development: (609) 984-0490
 (US Green Building Council has links to these from their web site)

4.3 Building Commissioning

"Model Commissioning Plan and Guide Commissioning Specifications", USDOE/PECI, 1997. (available from: NTIS, document number DE97004564, or call 1-800-553-6847, or visit the Peci Web site at <http://www.peci.org>.)

4.4 Energy Efficiency

City of Fort Collins Energy Code for Commercial, Industrial and High-Rise Residential Buildings, 1996. Ordinance number 153-1995. Available from the City of Fort Collins Building Inspection and Zoning Department, 281 N. College Ave., Fort Collins, CO. 970-221-6760

DOE's International Performance Measurement and Verification Protocol (IPMVP). (www.ipmvp.org)

4.5 Indoor Air Quality

ASHRAE 62-1989'Ventilation for Acceptable Indoor Air Quality' (ANSI approved)

(800) 527-4723 (U.S. and Canada) or 404-636-8400 (worldwide)

Sheet Metal and Air Conditioning Contractors National Association (SMACNA)'IAQ Guidelines for Occupied Buildings Under Construction'
SMACNA: 4201 Lafayette Center Dr. Chantilly, VA 22021
(703) 803-2980 voice; (703) 803-3732 fax

Filters providing 85% filtration as tested according to ASHRAE Standard 52.1-1992: 'Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter'. (ANSI approved) 800 527-4723 (U.S. and Canada) or 404-636-8400 (worldwide)

4.6 Thermal Comfort

ASHRAE 55-1992 'Thermal Environmental Conditions for Human Occupancy' (ANSI approved)
(800) 527-4723 (U.S. and Canada) or 404-636-8400 (worldwide)

4.7 Water Conservation

Energy Policy Act of 1992-Plumbing Fixture requirements (42 USC Section 6295 (j)). (US Green Building Council has link to this from their web site)

4.8 Water Quality

EPA Publication # 812-B-94-002: "Lead in Drinking Water in Schools and Non-Residential Buildings," April 1994
EPA Safe Drinking Water Hotline: (800) 426-4791