

6 BUILT ENVIRONMENT

BUILT ENVIRONMENT INDICATORS
Table 6. Built Environment Indicators for Carnegie Mellon, FY 2004

Report Section	Indicator	Reason	FY2004	Units
6.1	Number of CMU buildings	Background Information	67	#
6.1	Number of LEED certified CMU buildings	Indicates number of buildings that are inherently efficient	1	#
6.1	SqFt of CMU buildings	Background Information	4,406,153	# Ft
6.1	SqFt of LEED certified CMU buildings	Indicates square footage of buildings that are inherently efficient	72,000	# Ft
6.2.1	Do the design and construction guidelines include specifications for greener:			
6.2.1	Paint	Indicates commitment to use of low VOC paints	Some	y/n
6.2.1	Carpet	Indicates commitment to use low VOC carpets or carpets with recycled content	N	y/n
6.2.1	Recycling waste building materials	Indicates commitment to reducing construction material waste	N	y/n
6.2.1	Recycling demo materials	Indicates commitment to reducing demolition wastes	N	y/n
6.2.1	Lighting	Indicates commitment to energy efficiency through lighting design	Some	y/n
6.2.1	Plumbing fixtures	Indicates commitment to water conservation through plumbing design	Some	y/n
6.2.1	Windows and Glazing	Indicates commitment to energy conservation through window design	N	y/n
6.2.2	<i>Number of new renovation projects</i>	<i>Background Information</i>	<i>FWD</i>	<i># projects</i>
6.2.2	<i>Number of LEED based renovation projects</i>	<i>Indicates number of renovations that will be more efficient</i>	<i>FWD</i>	<i># projects</i>
6.2.2	<i>Is there an environmental renovation checklist for project managers to reference?</i>	<i>Indicates ease of utilizing environmental practices for project managers</i>	<i>FWD</i>	<i>y/n</i>
6.3	Number of renovations/new buildings that are tracked over time	Indicates real life performance of efficient buildings	1	#
6.3	<i>Number of renovation/new building tracking documents available to the campus community/public</i>	<i>Indicates availability of real life performance data</i>	<i>FWD</i>	<i>#</i>
6.3	<i>Number of times tracking documents are accessed by the campus community/public</i>	<i>Indicates use of performance data</i>	<i>FWD</i>	<i>hits/webpage</i>

BUILT ENVIRONMENT INDICATORS RATIONALE

Carnegie Mellon University is located in an urban area with boundaries restricted by the existing infrastructure. At the same time, Carnegie Mellon is under pressure to expand and improve its existing built environment in order to renew its infrastructure and meet new research and education objectives. In the Campus Master Plan, additional buildings and facilities on campus were identified as an institutional need.³⁶ In order to accomplish this there must be new construction and rehabilitation on campus.

For the purposes of this report, the built environment will refer to buildings on campus. Paved areas are discussed in the Outdoor Environment section.

6.1 New Construction

There is unwritten policy at Carnegie Mellon that all new construction is to be LEED (Leadership in Energy & Environmental Design) certified by the US Green Building Council³⁷ (USGBC)³⁸. Indicators to track new construction and its impacts on the University and environment include the total number of buildings and the total number of LEED certified buildings. Similarly, the total amount of square footage of Carnegie Mellon buildings and the total LEED certified square footage serve as valuable indicators for the built environment. For the fiscal year of 2004 New House Dormitory was the sole LEED certified building on campus and the first LEED certified dormitory in the United States (certified Silver, September 12, 2003)³⁹. Recently two new buildings have been constructed and have applied for LEED certification: these are Posner Gallery (still under review) and Henderson House (LEED Silver, December 2004⁴⁰). The Collaborative Innovation Center (under construction at the writing of this report) is also anticipated to achieve LEED certification.⁴¹ While it is understood that the LEED certification process can take additional time after construction, the date of LEED

³⁶ Carnegie Mellon University 2002 Master Campus Plan, p. 5.

³⁷ US Green Buildings Council. "Leadership in Energy and Environmental Design.:" http://www.usgbc.org/leed/leed_main.asp. Accessed 15 January 2005.

³⁸ Carnegie Mellon Green Practices, "The History of Green Practices at Carnegie Mellon." <http://www.cmu.edu/greenpractices/background/history.html> . Accessed 15 January, 2005.

³⁹ Carnegie Mellon Housing Services, "New House: First Green Building on Campus." <http://www.housing.cmu.edu/buildings/newhouse/>

⁴⁰ "Move Over New House, There's a New "Green" Dorm on Campus: Henderson House Earns LEED™ Silver Certification" http://www.cmu.edu/cmnews/extra/050107_henderson.html. Accessed 02 January 2005.

⁴¹ Carnegie Mellon University Collaboration <http://www.cmu.edu/co-lab/center.html#5>

certification determines the fiscal year in which the project is added to the total number of LEED certified buildings.

6.2 Design and Construction

6.2.1 Design and Construction Guidelines

As discussed in Chapter 5, the FMS Design and Construction guidelines have the potential to be used as an environmental purchasing guide. Currently the Design and Construction guidelines are very clear in specification of preferred products in order to have a high level of quality consistent over all projects.⁴² However, the design guidelines do not specify the most environmentally-protective option, nor do they state any alternative product options. Instead, by specifying so exactly what products are approved, the design guidelines implicitly disapprove of other alternatives. The campus master plan states that “buildings shall be constructed of materials that are efficient in their use of resources, and cause minimal harm to the environment in their manufacture, installation, or disposal. Building materials and their containers shall be recyclable.”⁴³

In light of the above, an indicator of environmentally-friendly construction and renovation at Carnegie Mellon is the presence of environmentally-friendly purchasing guidelines or product specifications in the Design and Construction guidelines. Some products specified in the Design and Construction Guidelines that can be tracked for environmentally-friendly alternatives include:

- Paint: Currently there are very specific requirements for paints used. These paint specifications call for PPG paints of various types. For painting on metals the specification is for PPG low-odor oil-based enamel paint, while for plaster or drywall the specification is for PPG Speedhide latex paint.⁴⁴ The Michigan State Department of Environmental Quality lists PPG Speedhide latex paint as a recommended low-VOC paint option⁴⁵, but PPG offers a no-VOC latex paint option (Pure Performance® Zero

⁴² Carnegie Mellon University Facility Management Services Design and Construction. <http://www.cmu.edu/fms/designcon.htm>. Accessed 25 November 2004.

⁴³ Carnegie Mellon University 2002 Master Campus Plan, p. 46

⁴⁴ Carnegie Mellon University Design Guidelines, Section 09900, p. 9-13.

⁴⁵ Michigan State Department of Environmental Quality, “Environmental Purchasing Bulletin: The Monthly News Bulletin for Purchasing Staff” Volume 3, 2001. p. 6. <http://www.deq.state.mi.us/documents/deq-ess-p2-epp-bulletin3.pdf> Accessed 15 January 2005.

VOC Interior Latex Primer 9-2).⁴⁶ Different paint options should be examined for best durability and environmental benefits and specified in the Design and Construction Guidelines.

- Carpet: There are many carpet manufacturers specified in the Design and Construction guidelines⁴⁷ for broadloom or tile. The Design and Construction guidelines do not specify a required recycled content for carpets and instead state the yarn system and face fiber should be “new-generation nylon.” Specifying a recycled content for carpets would foster the use of recycled materials in construction and minimize the use of virgin materials.
- Recycling waste building materials: There are currently no building materials recycling guidelines in the Design and Construction guidelines. The U.S. Department of Energy suggests that a minimum of 50% (by weight) of construction, demolition, and land clearing waste be recycled to avoid filling landfills.⁴⁸
- Recycling demolition wastes: The design guidelines state only that the University has first salvage rights and that the “Contractor shall remove promptly all demolition material and dispose of the material at an approved dumpsite.”⁴⁹ Many demolition wastes can be recycled, and requiring a contractor to do so will reduce the amount of construction wastes in landfills.
- Lighting: The Design and Construction guidelines state that all incandescent lamps should be energy saving⁵⁰ and the fluorescent lamps specified are considered “green” bulbs.⁵¹ While there are instructions for control of outdoor lights by photocells, no specifications are made for indoor lighting control.
- Plumbing fixtures: The toilets and showers currently specified⁵² are improved efficiency⁵³ and specified to be “water-saver.” The sinks do not have any water-saver requirements in the Design and Construction Guidelines.

⁴⁶ PPG, “High Performance Coatings Specifications Guide.”

<http://corporate.ppg.com/PPG/PAF/HPC/ComArch/Educ/default.htm#Mild>. Accessed 15 January 2005.

⁴⁷ Carnegie Mellon University Design Guidelines, Sections 09680 and 09690. p. 9.11.

⁴⁸ U.S. Department of Energy, “Energy and Environmental Guidelines for Construction.”

<http://www.eere.energy.gov/buildings/info/design/construction.html#waste>. Accessed 18 January 2005.

⁴⁹ Carnegie Mellon University Design Guidelines, Section 02050. p. 2-3.

⁵⁰ Carnegie Mellon University Design Guidelines, Section 16500 p. 16-10.

⁵¹ Pers. Comm., Leonard Libbon. 22 December 2004.

⁵² Carnegie Mellon University Design Guidelines, Section 15440. p. 15-18.

- Windows: While for glazing “thermal energy efficiency is a primary consideration”⁵⁴ and specifications are made for glazing that will “prevent excessive solar gain,” the design guidelines for aluminum windows call for a “thermal transmittance” (U-value) maximum of 0.69,⁵⁵ which is a window with average insulating properties. According to the U.S. Department of Energy, U values can range from 1.1 (least insulative) to 0.3 (most insulative), with some highly efficient exceptions (less than 0.3).⁵⁶ The design guidelines could specify a more efficient window. Also, it should be noted that window screens are required for all new windows⁵⁷, however this practice rarely occurs.⁵⁸

6.2.2 Renovation Projects

In October 2004 The USGBC approved LEED guidelines for renovation projects (LEED Existing Buildings, or EB⁵⁹). In order to track environmental construction and rehabilitation at Carnegie Mellon the number of new renovation projects and the number of LEED based renovation projects are tracked. The total area of LEED-certified floor space will also be tracked. In addition, an environmental renovation checklist for project managers would facilitate the selection of environmentally sound materials and methods. It should be noted that LEED-EB can be applied to existing buildings that do not have LEED certification. If this is pursued a new indicator for existing buildings gaining LEED certification should be considered. This checklist can be developed in conjunction with the LEED guidelines or with the Design Guidelines.

6.3 Use of Built Environment

LEED does not require the owner of a green building to track building performance over time. Carnegie Mellon is a research institution and performance tracking can be used for a number of purposes including to justify new LEED construction. Therefore, the number of new buildings and renovations with performance tracking is an environmental indicator of the built

⁵³ Washington State University Extension, “Drought Advisory: Home Water Saving Methods.” <http://cru.cahe.wsu.edu/CEPublications/eb0732/eb0732.pdf>. Accessed 10 January 2005.

⁵⁴ Carnegie Mellon University Design Guidelines, Section 08800. p. 8-13.

⁵⁵ Carnegie Mellon University Design Guidelines, Section 08520. p. 8-7.

⁵⁶ U.S. Department of Energy, “Energy-Efficient Windows Fact Sheet.” <http://www.eere.energy.gov/consumerinfo/factsheets/eewindows.html> Accessed 05 January 2005.

⁵⁷ Carnegie Mellon University Design Guidelines, Section 08520. p. 8-8.

⁵⁸ Pers. Comm., Curt Yeske, Department of Civil and Environmental Engineering Physical Manager. 09 October 2004.

⁵⁹ U.S. Green Buildings Council, “LEED Rating System for Existing Buildings.” http://www.usgbc.org/LEED/leed_existing.asp. Accessed 16 January 2005.

environment. Similar to the metering accessibility (discussed in Chapter 6), the number of buildings with performance tracking that is accessible to the community is another indicator.

