Achieve Your Building's

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SUSTAINABILITY IS A JOURNEY, NOT A DESTINATION

By Tabitha H. Goodman, LEED AP BD+C, O+M Project Manager, Sustainable Solutions Group[™] SSRCx[®]

Companies that get serious about improving sustainability soon discover there is always something else to do to achieve greater efficiencies. They quickly learn that sustainability is a journey, not a destination. Spectrum Properties | Emery has taken this message to heart, leading the charge in the Southeast for ongoing



sustainable retrofits and operations. Though the North Carolina-based real estate company has been implementing best practices and pursuing LEED[®] certification on new construction projects for several years, the sustainability journey for 1.4 million square feet of their existing holdings in Franklin, Tennessee began in 2007 with a roofing retrofit. When the Carothers Building needed a new roof, the property management team chose to install a white roof, looking to lower cooling costs by reducing solar heat gain during the southern summer months.

Corporate Centre Campus

Category	Achieved Points	Points
Sustainable Sites	2	12
Water Efficiency	7	10
Energy & Atmosphere	20	30
Materials & Resources	6	14
Indoor Environmental Quality	10	19
Innovation in Operations	7	7



The Carothers Building

ategory	Achieved	Possible
ustainable Sites	3	12
Vater Efficiency	5	10
nergy & Atmosphere	19	30
Materials & Resources	5	14
ndoor Environmental Quality	8	19
nnovation in Operations	7	7
otal	47	02



Published on FMLink.com

As the staggering energyuse reduction from this simple retrofit became apparent, the property management team continued seeking other opportunities for improvement. In 2009, the team began looking at the LEED for Existing Buildings[™] (LEED-EB) rating system, and a consulting contract was opened to investigate the likelihood of certification for each of the company's seven buildings.

Following the results of a favorable feasibility study, the LEED process began in earnest in November 2009.

Located south of Nashville, these seven Class A office buildings house numerous tenants from several industries, including finance, insurance and medical, many of them Fortune 500 companies. The Carothers Building has just over 500,000 square feet of rentable office space and features a full-service café and gym. The six-building Corporate Centre campus offers over 850,000 square feet of rentable office space.

Identifying and implementing operational and minor equipment upgrades to

align with LEED requirements took the team approximately six months, with another six months spent tracking data and verifying compliance. In December 2010, two applications were submitted to GBCI for review.



It took several months to complete the application process for each project, which involves providing documentation, waiting for an initial review, and providing further documentation for audited credits. The Carothers Building achieved LEED Silver certification in May 2011, and the six-building Corporate Centre campus achieved LEED Gold certification in June 2011, four years after the journey began with a white roof.

- CONTINUED NEXT PAGE -

SUSTAINABILITY IS A JOURNEY, NOT A DESTINATION CONTINUED



Spectrum | Emery began implementing sustainable practices because the property management team considers sustainable business practices to be the "right thing to do" and wishes to position the company as a leader in the Southeast. Because of USGBC's recognition as the foremost green building certification provider, Spectrum chose to take its already sustainability-conscious operations to the next level using LEED as a framework. The discussion began, not with "How many points can we get?", but with "What makes sense for these buildings, at this time?" This gave the team the freedom to step back and make informed decisions regarding the impact of each potential credit on their tenants, the environment and their operating budget. If a credit was deemed inappropriate because of its potential impact on tenants, it was rejected. If a credit was desirable, but not feasible due to budget constraints, it was considered for future implementation. After tallying the points associated with each best-practice item that had been marked for pursuit, the team quickly realized that each property could achieve more than base certification. By fostering collaboration between the property management team, the consulting team and vendors, these buildings were able to deliver truly impressive results. At the time of certification, Corporate Centre is the largest LEED-EB Gold certified multi-tenant campus in the Mid-South. The Carothers Building is the first commercial office building in Tennessee to achieve LEED-EB Silver certification.

The highlights of this project were also its challenges; several unique hurdles were faced due to scope and size. Because of the multiple tenants, multiple buildings and massive size, calculations and documentation for a number of LEED credits were more daunting than for a typical owner-occupied office building. Additionally, a number of credits were rejected due to impact on tenants, shrinking the pool of potential credits early in the planning process. For example, materials-related credits are especially challenging for a multi-tenant building, because the property management team cannot control the types of consumable materials or furniture their tenants purchase and use. Furthermore, best practices like recycling cannot be mandated in a multi-tenant situation, they can merely be offered and suggested. Finally, because the team was dedicated to pursuing sustainable activities that made sense, rather than those that netted the most points, some credits required lengthy considerations regarding first cost versus payback to determine their viability.

This project tells a compelling story of continuous improvement. By making minor changes and upgrades over the course of several years, the team was able to reach the milestone of LEED certification while keeping first costs low and focusing on items with a reasonable pay-back period. Before LEED was brought to the table, a number of sustainable policies were written by the property management team, which helped soften the transition to LEED standards for a number of operational items, including green cleaning.

Spectrum Properties | Emery calculates cost savings since 2007, based on energy efficiency alone, to be more than \$800,000. Capital investments in the LEED process, including certification fees, consulting costs and equipment upgrades totaled approximately \$470,000.

Because the Carothers Building and the Corporate Centre campus are less than 15 years old and had the advantage of good design and construction practices, the buildings were already stand-out performers in energy efficiency, and few equipment upgrades were required. For many older buildings, major plumbing and/or HVAC system upgrades may be required to meet basic LEED requirements. Making each required upgrade within a few months may prove cost-prohibitive; however, by upgrading equipment as replacement becomes necessary, any building can embark on a sustainability journey of its own. An experienced LEED consultant is very helpful when



L-R: Pat Emery of Spectrum Properties | Emery; Brooke Nicholson - Spectrum LEED project manager; Mayor of Franklin, Ken Moore; Tabitha Goodman, Jamie Qualk and Eric Sheffer of SSRCx.

process, with the intention of pursuing recertification every five years. The property management team is also continually seeking ways to improve operations over and beyond LEED, including maintaining ENERGY STAR qualification on a yearly basis.

For more information, please contact Eric Sheffer, SSRCx Senior Project Manager, at 615-514-6132 or <u>esheffer@ssr-inc.com</u>. SSRCx is a division of Smith Seckman Reid, Inc. and a leading facilities commissioning provider and green building consultant.

determining whether or not your building is a good candidate for LEED certification and what types of upgrades may be required.

Because sustainability is a journey, these properties are continuing to follow the operating procedures and data tracking implemented during the LEED certification



Published in the October 2011 issue of <u>Sustainable Facility</u> By James Qualk, LEED AP BD+C; Tabitha Goodman, LEED AP BD+C, O+M; and Steven Harrell, LEED AP O+M, CEM

The Caterpillar Financial Services Corporation was a typical Class A office building located in an urban area in Nashville, Tennessee until 2008 arrived and brought with it new responsibilities for the onsite facilities management team. Faced with new tasks and challenges, the team was committed to upgrading the facility from an aesthetically pleasing, comfortable and safe building to an environmentally conscious building of superior quality.

Through a collaborative process that involved the facility operations staff in the development of a best practices building manual and the early formation of an employee sustainability committee, Caterpillar Financial Headquarters achieved its goal of LEED[®] Gold under LEED for Existing Buildings[™] version 2.0 in just over 12 months. A year later, it earned the U.S. Environmental Protection Agency's prestigious ENERGY STAR designation for building performance in the top 25 percent of similar facilities nationwide for energy efficiency. Most recently, in April 2011, Caterpillar Financial was awarded one of three annual Middle Tennessee Energy Awards by the Association of Energy Engineers.

Overview / Preparing for Success

The Caterpillar Financial Services Corporation Headquarters is an eleven-story, 312,000square-foot office building in a thriving area near downtown Nashville. Neighboring properties include the Loews Vanderbilt Hotel and Vanderbilt University. Completed in 1999, the facility is occupied and managed by Caterpillar Financial Products Division and houses office space, a full-service dining facility and a fitness center for building occupants.

Due to its urban setting, the property has a minimal amount of landscape and hardscape. The site design includes a water feature near the main entrance and a seven-level parking garage (six covered levels and five below grade). The base building HVAC system consists of two 500-ton water-cooled chillers with cooling towers and a dedicated constant speed pump per chiller.

In late 2007, the global facilities manager for Caterpillar Financial consulted SSRCx about the potential for LEED certification of the landmark building. Our team conducted a LEED feasibility study, offering a detailed analysis of the credits available based on current practices and potential future strategies. The study identified the potential for LEED Gold certification, pending several operational changes.

Occupant Education / Buy-In

From the beginning of sustainability efforts, Caterpillar Financial wanted to avoid a "top-down" approach. Although the global facilities manager acted as a champion for the LEED process, the organization also formed a sustainability committee of employee representatives from various departments to encourage employee involvement and facilitate communication. When decisions were made about certain LEED credits, they were often presented to the



BUILDING AT A GLANCE

Building name: Caterpillar Financial Headquarters

Location: Nashville, Tenn.

Size: 312,000 square feet

LEED-EB process started: 2008 (January)

LEED-EB Gold achieved: 2009 (March)

Building use: Commercial office space featuring a full-service dining center and fitness center for building occupants

Total building cost: \$60 million in 1999

Distinctions: LEED Gold-EB v2.0, ENERGY STAR, AEE Middle Tennessee Energy Award (Commercial Category)

COMMISSIONING

THE RETRO-COMMISSIONING PROCESS

A full retro-commissioning process was a required prerequisite under the rating system applied to this building, LEED[®] for Existing Buildings[™] version 2.0.

The required scope, which was implemented at Caterpillar Financial Services Corporation Headquarters, included the following:

- Develop a building operation plan (BOP)
- Prepare a commissioning plan
- Implement the commissioning plan
- Make repairs or upgrades of deficient items
- Retest items repaired

This retro-commissioning process is essentially a "return to plans and specs" and under the requirements of the version of LEED used for this project can be implemented through a "continuous improvement" program over a period of up to five

CATERPILLAR FINANCIAL - GOING FOR THE GOLD CONTINUED

sustainability committee for opinions. In addition to providing a feeling of ownership to those involved, this process often led to valuable input regarding likely reactions from the general employee base. The committee remains active and regularly hosts events for building occupants, including an annual Earth Day celebration.

Because education is a key element in every successful LEED project, the sustainability committee supports a number of educational programs for building occupants. Many of these programs are coordinated with the communications department, further encouraging employees from all areas of the organization to "own" the process. Examples of educational programs include: sustainability initiative sections on internal and external websites, sustainability-themed slides on the electronic signage in each elevator lobby, regular internal newsletter articles, reminders about corporate sustainability programs and tips for implementing sustainable practices at home.

Water Use

Although the team investigated using captured rainwater for irrigation needs, it was determined that the initial costs far outweighed the water savings, due to the limited amount of irrigation needed on the landscape-light site. The facility may investigate this further in the future, but it was not feasible within the LEED project timeline.

The team focused on options for interior water savings due to limited opportunities for savings related to irrigation. As an easy and cost-effective step, flow restrictors were installed on all public restroom faucets. These flow restrictors, combined with existing water-saving fixtures, resulted in a 23 percent reduction in potable water use for interior plumbing fixtures, as compared to the LEED baseline. The facility was fortunate in this regard, as a number of buildings that may be interested in LEED-EB certification would likely require more extensive plumbing retrofits, such as water closet and/or urinal upgrades.

In addition to minor plumbing fixture upgrades, Caterpillar Financial purchased and installed a non-chemical cooling tower water treatment system to further reduce potable water usage. This system treats process water using ozone and radio frequency (RF), instead of conventional biocide treatments. Software monitoring and scheduling are also used to monitor water use and identify any potential leaks. The system has allowed the building to reduce water use through increasing the cycles of concentration while simultaneously reducing chemical water treatments. Currently, the building is demonstrating a 40 percent reduction in potable water use, as compared to data from previous years.

Materials Out / Waste Reduction

The recycling and waste reduction program at Caterpillar Financial began as a challenge, but became a phenomenal success story. Initially, recycling was limited to office paper, but a mixed-stream (or "comingled") recycling service expanded the program to include paper, plastics, metals and cardboard. Using a comingled recycling service made the transition to recycling much easier for occupants, since recyclable items can be placed in any recycling bin, rather than having to sort before disposal.

With the recycling service for disposable products in place, the team tackled food waste from the full-service café. On-site composting was not feasible for the urban area, so Caterpillar Financial contracted with a third-party provider for off-site composting. A partnership with neighboring Vanderbilt University provided an innovative solution to cooking-oil waste; a student-run biodiesel program collects yellow grease for conversion to fuel.

To further strengthen the waste reduction program, Caterpillar Financial eliminated the purchase of disposable items that could not be recycled by their comingled recycling provider.

COMMISSIONING CONTINUED

years. Projects pursuing certification today are required to use the most recent rating system, LEED for Existing Buildings: Operations and Maintenance[™], which offers various options for commissioning which include a simplified prerequisite and three credits worth up to six points for implementing traditional retro-commissioning or an ASHRAE Level II Energy Audit and an ongoing commissioning program.

IMPLEMENTATION

LEED-EB defines many required items to be commissioned including validation of proper space temperature, space pressurization testing, building envelope inspection and HVAC testing. It also makes recommendations for implementation of supply temperature reset of chilled water, heating hot water and discharge air.

LEED-EB allows two methods for implementing the commissioning plan: visual inspection or observation with instantaneous measurements; or short-term or continuous measurements (data logging).

Both methods were employed at the Caterpillar Financial project. When data was available through the building automation system (BAS), trends were set up to collect data that was used to verify systems and equipment were operating as intended. Trended items included: chilled water supply/return temperature, chiller operating hours, building space temperatures, AHU supply air temperature, VFD speed, and outside air and exhaust air fan operating schedules. Visually inspected items included: AHU damper controls, fan-powered terminal boxes, chilled water bypass valve operation, and kitchen and dishwasher exhaust hood operation.



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Eliminated products include disposable glass and Styrofoam. Recognizing that recycling is only one piece of the waste reduction puzzle, the organization also encourages employees to "reduce" by using reusable products wherever possible.

Because these efforts required a significant cultural shift, occupant education dedicated to waste reduction was considered high priority. The facilities management team tracks recycling on a monthly basis and provides regular reports via internal publications. Comprehensive signage was installed to ensure that employees and guests are consistently educated on what can be recycled. Finally, each employee was given one desk-side recycling bin; and the conventional desk-side waste bins were replaced with small 6" diameter and 6" deep black desk-top waste bins, labeled, "This is All the Trash I Make." To verify recycling containers are being used properly and percentages are not artificially inflated, the building undergoes a thorough waste stream audit twice a year.

Through these efforts, building occupants recycled 85 percent of their total waste stream (by weight) during the LEED performance period from March to May of 2008. Total waste sent to the landfill was reduced by more than 68 percent in 2008, as compared to total waste produced in 2007. In 2009, this figure jumped to nearly 80 percent, and in 2010 the property achieved a waste reduction rate of nearly 90 percent.

Healthy Work Environment

Caterpillar Financial's facility management team is dedicated to providing a safe and secure workplace for employees. Beyond conventional security measures, the team recognized that exposing occupants to chemicals and pollutants is a safety risk that should not be overlooked. By limiting the pollutants brought into the building, or source reduction, Caterpillar Financial seeks to provide additional intangible protection to visitors and staff.

Two types of pollutants, mercury and VOCs (volatile organic compounds), were specifically targeted for reduction. The best way to protect occupants from exposure to potentially harmful chemicals is to prevent those chemicals from entering the building. Both mercury and VOCs are primarily brought into buildings by installed products (lighting and finishes, respectively).

To reduce the amount of mercury introduced into the building, the facilities management team reevaluated their lighting techniques. Over-lit areas were de-lamped to reduce the total amount of lamps purchased and installed; all remaining fixtures were switched to lower mercury content lamps where possible.

To reduce occupant exposure to VOCs, finishes installed in the building must be approved prior to use. Applicable finishes include paint and coatings, adhesives, sealants, composite wood products and carpet. In the event that any of these products are used in the building, whether in one room or an entire floor, the product must be evaluated and shown to meet strict VOC limits.

Energy Savings

Although energy use is just one aspect of the LEED process, Caterpillar Financial chose to place a large emphasis on energy savings, seeking to optimize their existing systems as much as possible. Achieving an ENERGY STAR label was identified as a next step (after LEED certification) early in the process.

Because the facility is all-electric, increasing the ENERGY STAR score was a particular challenge. ENERGY STAR recognizes the unique challenges of electricity generation and transmission, particularly in the Southeast, so an all-electric building with the same energy use per square foot as a neighboring building that uses natural gas for heating may actually have a lower ENERGY STAR score.

OPTIMIZATION CAN TAKE MORE TIME THAN ANTICIPATED.

Before beginning the LEED-EB process, the project team set a goal of achieving certification within a year. This made it difficult for the building to live up to its potential in several of the credit categories, especially energy performance. Because LEED-EB involves a number of stakeholders, coordination on retrofits and optimization can take more time than most project teams would initially anticipate. Due to the nature of energy performance, many of the enhancements made to the system during the retro-commissioning process did not deliver their full potential until the end of the project's LEED performance period.

Owner involvement is key. One aspect of this project that worked well was the high level of input and involvement from the Caterpillar Financial facility management team. Without strong support from the owner, this project could not have met many of its lofty LEED-EB and energy performance goals, and certainly not within such a limited timeframe. Owner involvement is even more important for existing building projects due to the level of coordination required between vendors and occupants to make sustainability goals a reality. If you are pursuing a LEED-EB or ongoing commissioning project, identify a champion among the organization as early as possible.

BUILDING TEAM

Owner: Caterpillar Financial Services Corporation LEED and commissioning consultants: SSRCx

CATERPILLAR FINANCIAL - GOING FOR THE GOLD CONTINUED

The project team worked hard to identify areas for energy improvement with these goals in mind. Most of the building's energy savings resulted from implementing the retro-commissioning (RCx) and ongoing commissioning processes. Energy savings were achieved by optimizing distribution of air and water throughout the building, effective scheduling of unoccupied areas, resolution of night setback problems with terminal boxes, and improvements in the building envelope integrity. Some energy savings, and other financial savings through water and solid waste management, were achieved with capital expenditure projects including some lighting retrofits, a non-chemical cooling tower water treatment system and a recycling program.

The facility's initial ENERGY STAR score at the beginning of the LEED pursuit and the initiation of the retro-commissioning process was 62. Through the retro-commissioning process and subsequent ongoing commissioning process the ENERGY STAR score has increased to 88.

Total unadjusted monetary savings achieved as of December 8, 2010 is 16 percent over the 2006-2007 baseline. Cumulative savings (adjusted) since the beginning of ongoing commissioning is \$276,414.

The cost versus savings of the combined retro-commissioning and ongoing commissioning processes has a simple payback of less than two years.

ABOUT THE AUTHORS

James Qualk, LEED[®] AP BD+C, is vice president of SSRCx and team leader for Sustainable Solutions Group. He lectures in the Civil Engineering department of Vanderbilt University regarding sustainability and construction and also at Lipscomb University in the Institute for Sustainable Practice regarding renewable energy.

Tabitha Goodman, LEED[®] AP BD+C, O+M, is an assistant project manager at SSRCx. Her consulting work at SSRCx includes both existing building and new construction projects.

Steven Harrell, LEED[®] AP O+M, CEM, is manager of Continuous Commissioning[®] for SSRCx. He is a regular speaker at conferences regarding energy use and efficiency in existing buildings.



The University of Iowa — SSRCx was recently awarded a commissioning services contract with the University of Iowa Hospitals and Clinics (UIHC) in Iowa City, Iowa. The initial focus of this contract covers LEED[®] fundamental and enhanced commissioning services for the construction of a new children's hospital and renovation of the John W. Colloton Pavilion. The new 371,000-square-foot University of Iowa Children's Hospital will include a 195-bed patient care tower adjacent to the existing UIHC complex with connecting links back to the main facility. The existing John W. Colloton Pavilion will undergo a related 56,000-square-foot renovation. The construction cost for these two facilities is estimated at \$182 million, and, upon completion, this project will apply to become LEED[®] Silver certified.

Orlando Regional Medical Center — Orlando Regional Medical Center is nearing completion of the design phase for its new North Tower expansion project. SSRCx has been selected to provide commissioning and energy modeling for this 255,000-square-foot addition to Orlando's premier hospital group. The facility, located in downtown Orlando, Fla., will be Orlando Health's first attempt to earn LEED[®] certification for one of its major patient facilities. Completion is slated for the second quarter of 2014.



Picture was taken from the Government Solicitation for this work.

project located in Building 1 Naval Air Station, Corpus Christi, Texas. The 35,000square-foot historic building was originally constructed during WWII. In addition to the enhanced commissioning services, SSRCx will assist NAVFAC with the development of the Owners Project Requirements document.

NAVFAC SE IDIQ -

SSRCx is providing LEED[®] EAp1 and EAc3; fundamental and enhanced commissioning services directly to Naval Facilities Engineering Command Southeast (NAVFAC SE) for the Chief of Naval Air Training Headquarters facility

SPOTLIGHT ON OUT PEOPLE



DAVE VAN TASSELL - We are pleased to announce the addition of David Van Tassell as business development manager in our Houston office. In his new role, Van Tassell will be responsible

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for customer relations and generating new business. David has more than 35 years of managerial experience, most recently as a project manager at Sebesta Blomberg in Houston. He has a Bachelor of Business Administration in organization behavior management from the University of Houston and is a member of the Association of Energy Engineers.



STEVEN YI - We welcome Steven Yi as an engineerin-training to work with the commissioning plan group in our Nashville office. Steven has almost four years of experience in inclusion inductor and expert a year working for a general contractor.

the commissioning industry and spent a year working for a general contractor. Steven holds a Bachelor of Science in mechanical engineering from The George Washington University in Washington, D.C. ■



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