

# Evaluating the Return on Investment for LEED in Existing Buildings

UCF *FAIRWINDS* Alumni Center Achieves LEED Gold® Certification



Prepared for:

University of Central Florida  
Case Study

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April 16, 2018

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Utilities & Energy Services, Facilities & Safety

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## 1.0 EXECUTIVE SUMMARY

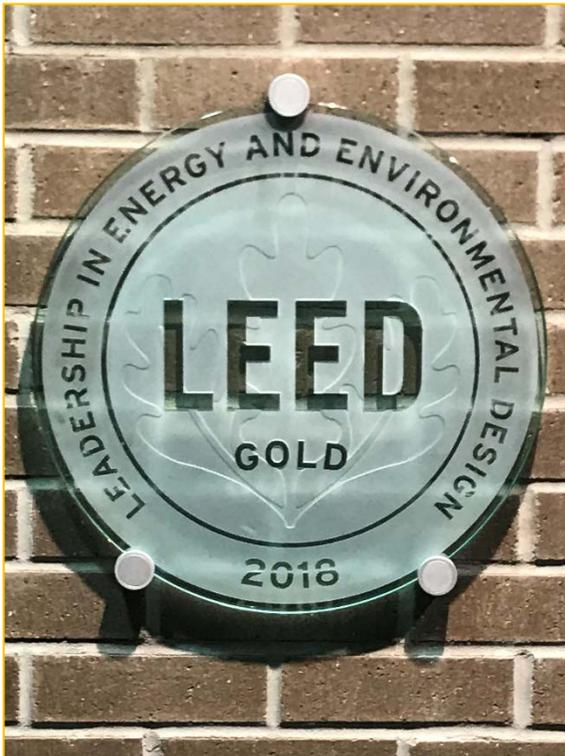
## 1.1 Background

Since 2007, UCF has pursued Leadership in Energy and Environmental Design (LEED) certification for all new construction, major renovations, and most recently, for existing buildings. To date, UCF has achieved twenty LEED certifications: fifteen LEED Gold- and five LEED Silver-rated buildings. UCF identified 28 credits that were mandated for all projects, with emphasis on energy, atmosphere, and water efficiency, and incorporated these into UCF's Green Building Construction and Renovation Requirements. As UCF continues to expand, high performance buildings will play an integral role in reducing the impact buildings have on the environment and on human health.

Utilities & Energy Services administers the LEED process to ensure the university's energy optimization and water conservation goals are achieved. The department is a unique stakeholder in the green building design and construction process, being involved from project inception through the building's life cycle, to include design and construction charrettes, data collection, commissioning, and building close-out. Throughout design, construction, and operations, UES serves as the university's principal advisor and approval authority to ensure that the project meets the requirements of UCF Energy Sustainability Policy, 3-111.1.

## 1.2 Why LEED?

High performance buildings play an integral part in supporting UCF's learning environment. Through LEED's high efficiency standards, UCF LEED buildings are consuming about 30% less



energy (based on ASHRAE 90.1 2010) and 40% less water than similar non-LEED buildings. LEED's energy, atmosphere, and water conservation strategies are integrated into UCF's Building Design and Construction Standards. In the design phase, Life Cycle Cost Analyses are conducted to evaluate the most feasible cutting edge and proven technologies.

As time has progressed, LEED has been integrated into UCF's culture, procedures have been streamlined; and stakeholders expect LEED certification for their building construction or restoration projects. The goal of achieving certification is recognized by all, throughout design and construction charrettes, data collection, commissioning, and building closeout.

## 1.3 New Certification Stringency

The LEED certification program was established by the U.S. Green Building Council (USGBC), and verified by the Green Building Certification Institute (GBCI). It has been revised over the years, with the newest version being version 4 (“v4”). LEED v4 offers a performance-based approach that calls for measurable results throughout a building’s life cycle.

**LEED v4 is the newest version of LEED**

It's designed to be flexible and improve the overall project experience.

Improvements:

 <p><b>Materials</b></p> <p>Focuses on materials to get a better understanding of what's in them and the effect those components have on human health and the environment</p>	 <p><b>Performance-based</b></p> <p>Uses a stronger, performance-based approach to indoor environmental quality for better occupant comfort</p>
 <p><b>Smart grid</b></p> <p>Brings the benefits of smart grid thinking to the forefront with a credit that rewards projects for participating in demand response programs</p>	 <p><b>Water efficiency</b></p> <p>Provides a clearer picture of water efficiency by evaluating total building water use</p>

## **2.0 UCF FAIRWINDS ALUMNI CENTER**

The UCF *FAIRWINDS* Alumni Center has achieved LEED® Gold certification under the LEED v4 O+M (Building Operation and Maintenance: Existing Buildings) rating system.

UCF *FAIRWINDS* Alumni Center is the 20th UCF project to achieve LEED certification, and the first UCF building to achieve certification under the new, more stringent standards of the O+M rating system. This certification for an existing building demonstrates a new caliber of performance, in that it challenges existing facilities to perform at the high standards of LEED for new construction. It not only captures how the building *plans* to perform, but also measures how it performs in practice.

## 2.1 Scorecard

The official LEED Gold scorecard of points achieved for the UCF *FAIRWINDS* Alumni Center is as follows:



### LEED Certification Review Report

This report contains the results of the technical review of an application for LEED® certification submitted for the specified project. LEED certification is an official recognition that a project complies with the requirements prescribed within the LEED rating systems as created and maintained by the U.S. Green Building Council® (USGBC®). The LEED certification program is administered by Green Business Certification Inc. (GBCI®).

## UCF Alumni Center

Project ID 1000074431  
 Rating system & version LEED v4 O+M: EB  
 Project registration date 07/22/2016



**Certified (Gold)**  
 CERTIFIED: 40-49, SILVER: 50-59, GOLD: 60-79,  
 PLATINUM: 80+

### LEED V4 O+M: EXISTING BUILDINGS

ATTEMPTED: 63, DENIED: 1, PENDING: 0, AWARDED: 61 OF 110 POINTS

	<b>LOCATION AND TRANSPORTATION</b>	<b>9 OF 15</b>			<b>MATERIALS AND RESOURCES</b>	<b>CONTINUED</b>
	Alternative Transportation	9 / 15				
	<b>SUSTAINABLE SITES</b>	<b>4 OF 10</b>			<b>INDOOR ENVIRONMENTAL QUALITY</b>	<b>9 OF 17</b>
	Site Mgmt Policy	Y			Minimum IAQ Performance	Y
	Site Development - Protect or Restore Habitat	0 / 2			Environmental Tobacco Smoke Control	Y
	Rainwater Mgmt	3 / 3			Green Cleaning Policy	Y
	Heat Island Reduction	1 / 2			IAQ Mgmt Program	2 / 2
	Light Pollution Reduction	0 / 1			Enhanced IAQ Strategies	2 / 2
	Site Mgmt	0 / 1			Thermal Comfort	0 / 1
	Site Improvement Plan	0 / 1			Interior Lighting	0 / 2
					Daylight and Quality Views	0 / 4
	<b>WATER EFFICIENCY</b>	<b>10 OF 12</b>			Green Cleaning - Custodial Effectiveness Assessment	1 / 1
	Indoor Water Use Reduction	Y			Green Cleaning - Products and Materials	1 / 1
	Indoor Water Use Reduction	5 / 5			Green Cleaning - Equipment	0 / 1
	Building-Level Water Metering	Y			Integrated Pest Mgmt	2 / 2
	Outdoor Water Use Reduction	2 / 2			Occupant Comfort Survey	1 / 1
	Cooling Tower Water Use	2 / 3			<b>INNOVATION</b>	<b>6 OF 6</b>
	Water Metering	1 / 2			Innovation	5 / 5
					LEED Accredited Professional	1 / 1
	<b>ENERGY AND ATMOSPHERE</b>	<b>15 OF 38</b>			<b>REGIONAL PRIORITY CREDITS</b>	<b>4 OF 4</b>
	Energy Efficiency Best Mgmt Practices	Y			Alternative Transportation	1 / 1
	Minimum Energy Performance	Y			Indoor Water Use Reduction	1 / 1
	Optimize Energy Performance	2 / 20			Outdoor Water Use Reduction	1 / 1
	Building-Level Energy Metering	Y			Renewable Energy and Carbon Offsets	1 / 1
	Fundamental Refrigerant Mgmt	Y				
	Existing Building Commissioning - Analysis	2 / 2			<b>TOTAL</b>	<b>61 OF 110</b>
	Existing Building Commissioning - Implementation	2 / 2				
	Ongoing Commissioning	3 / 3				
	Advanced Energy Metering	2 / 2				
	Demand Response	0 / 3				
	Renewable Energy and Carbon Offsets	3 / 5				
	Enhanced Refrigerant Mgmt	1 / 1				
	<b>MATERIALS AND RESOURCES</b>	<b>4 OF 8</b>				
	Ongoing Purchasing and Waste Policy	Y				
	Facility Maintenance and Renovation Policy	Y				
	Purchasing - Ongoing	1 / 1				
	Purchasing - Lamps	1 / 1				
	Purchasing - Facility Maintenance and Renovation	0 / 2				
	Solid Waste Mgmt - Ongoing	2 / 2				
	Solid Waste Mgmt - Facility Maintenance and Renovation	0 / 2				

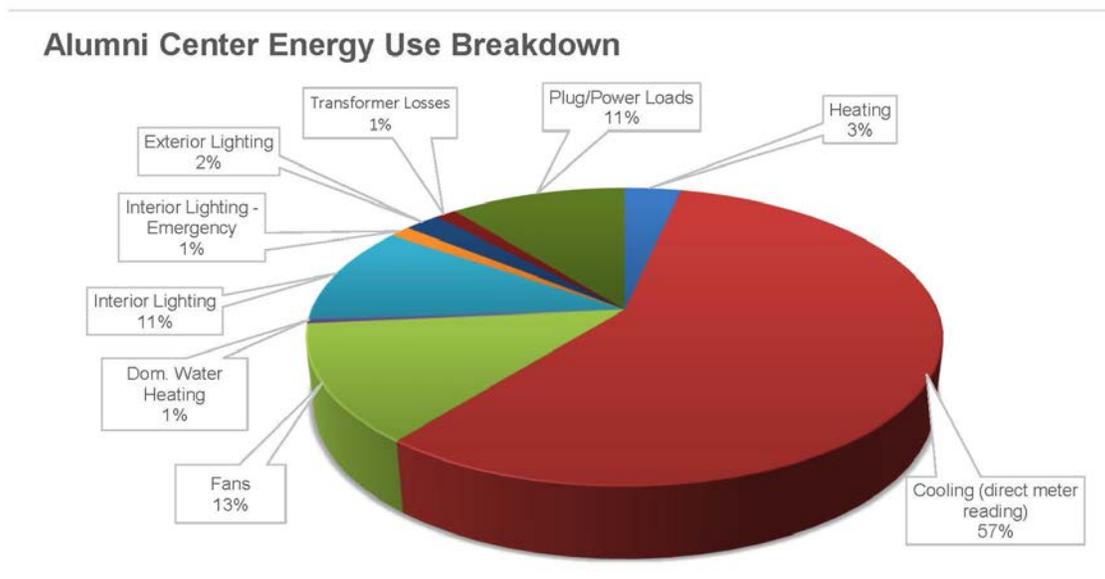
## 2.2 Project Cost

The project cost was \$40,050 in total, including \$1,200 for LEED v4 O+M registration and \$38,850 for professional commissioning and administrative services that were performed by exp U.S. Services Inc., a UCF continuing services contractor.

Public opinion dramatically overestimates the marginal costs associated with a green building versus a non-green building. Additional upfront costs associated with green buildings are balanced by long-term savings, assuming LEED processes are integrated in early stages. Studies show that the average marginal costs for LEED buildings are less than 2% higher, and that significant resiliency and value is added to each facility.

## 2.3 Savings Breakdown

The commissioning representative evaluated the energy use of the facility (see *Figure 1*) and developed a series of practical low- or no- cost facility improvement measures (FIM). UES implemented many of these measures, achieving a significant reduction in energy use. Implemented energy measures show a payback of 6 to 12 months, and result in cost savings of more than two times the initial investment within one year.



**Figure 1.** Energy use breakdown of the UCF FAIRWINDS Alumni Center, September 31, 2016 energy analysis. Based on the most current 12 months of utility bills, the total annual energy cost was \$64,228.04. The source energy use index (EUI) was 233.7 kBTU/sf, site EUI was 122.2 kBTU/sf, and source energy use was 6,299,399.4 kBTU.

### 2.3.1 Savings Breakdown - Complete

The LEED process required an ASHRAE Level I and Level II energy audit. The following FIMs were completed, and energy savings are predicted as follows:

Facility Improvement Measures (FIM)	Upfront Cost	Projected Savings (per year)	Payback Period (years)
Pressure wash reflective roof as heat island reduction measure	\$2,381 (Contract and Labor)	\$1,000	2.39
Change LED lights to lower color temperature in Banquet Room	\$4,848 (Supplies and Labor)	\$5,050	0.96
Update building schedules based on occupancy of operations, maintaining a set point of 74°F	\$500 (Labor)	\$1,540	0.32
Calibrate sensor for operation efficiency	\$1,500	\$1,705	0.88
<b>Totals</b>	<b>\$9,229</b>	<b>\$9,295 / year</b>	

In the last year, the *FAIRWINDS* Alumni Center has shown, on average, a 20% reduction in daily energy use due to these FIM upgrades (see *Figure 2*), resulting in greater cost avoidances (see *Figure 3*). The LEED commitment also extends to water conservation. The *FAIRWINDS* Alumni Center reduced indoor water use by 31.1% and outdoor water use by 50.85% from a baseline derived from the average water use during 2013-2015. These reductions are attributed to the installation of low flush appliances, water conserving aerators, and the use of reclaimed water for irrigation.

### Energy Use Avoidance

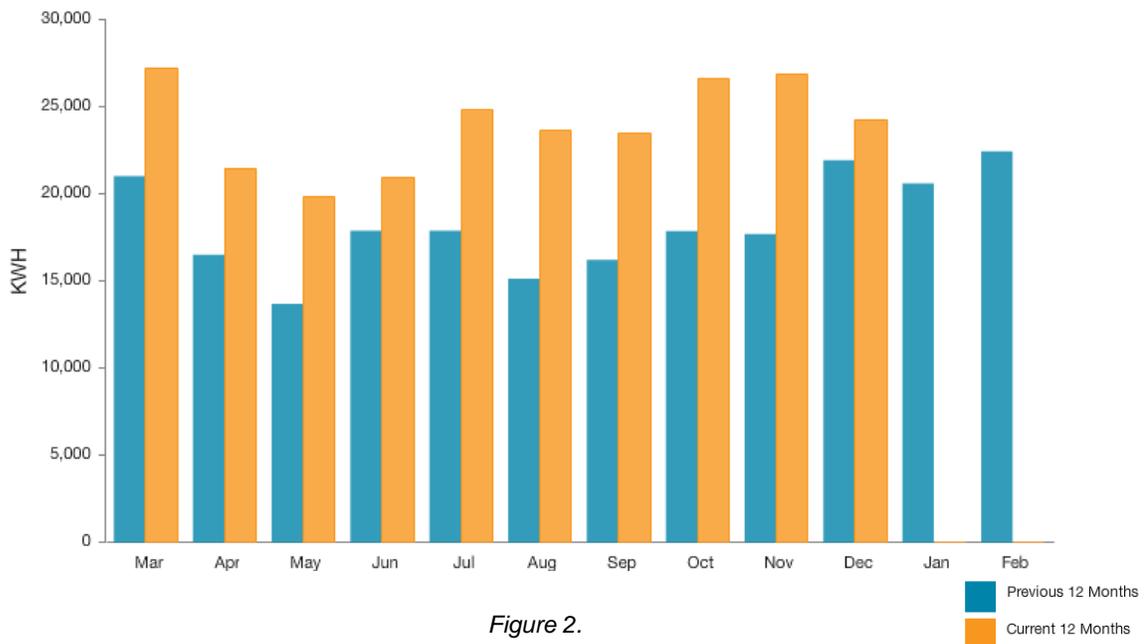


Figure 2.

### Cost Avoidance

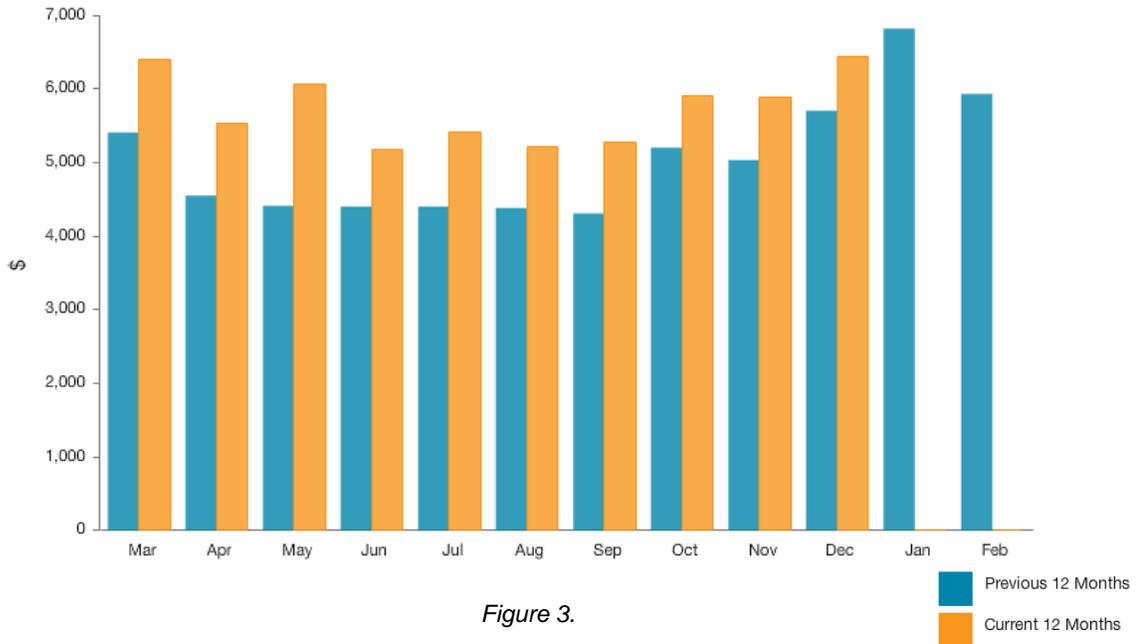


Figure 3.

### 2.3.2 Savings Breakdown – Future

The LEED energy auditing process also outlined a series of future capital improvement projects that will result in a projected 8.3% reduction in energy use index (EUI). These measures include test and balance of all airside equipment to ensure proper airflows are distributed per design; control sensor calibration for operation efficiency; static pressure and supply air temperature reset strategies for energy conservation; refined occupancy schedules to align operation of equipment; LED lighting retrofits for energy conservation and efficiency; daylight harvesting; and demand control ventilation strategies by managing the volume of outside air flow into the building to meet code and indoor air quality (IAQ).

Future FIM	Upfront Cost	Savings (per year)	Payback Period (years)
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Employ static pressure and supply air temperature reset strategies for energy conservation	\$1,000	\$1,395	0.72
Complete LED lighting retrofits for energy conservation and efficiency	\$87,448	\$9,275	9.4
Control building pump water operations	\$250	\$690	0.36
Implement demand control ventilation strategies by managing the volume of outside air flow into the building to meet code and IAQ	TBD	TBD	TBD
Test and balance all airside equipment to ensure proper airflows are distributed per design	TBD	TBD	TBD
<b>Totals</b>	<b>\$88,698</b>	<b>\$11,360 / year</b>	

### 3.0 Supporting UCF’s Collective Impact Strategic Plan

The LEED initiative supports the UCF Collective Impact Strategic Plan as it, “reflects the importance given to ensuring that the university strengthens its commitment to healthy environments and sustainable practices in everything it undertakes”. As UCF’s scale and excellence progress, so does its impact. LEED’s innovative nature reduces the negative impacts that can accompany expansion, such as the demand on energy or the impact on natural resources. In return, the university garners a diverse, high-performance building portfolio that bridges academic concepts like engineering and sustainability, and fosters a “living laboratory” in which all disciplines may learn while on the UCF campus.

LEED is also recognized in the Strategic Plan as an explicit strategy to achieve the university’s Health and Sustainability goals. An improved, healthy learning environment creates value, which is defined by the UCF Collective Impact as “a ratio of quality to cost”. This value can be accomplished by optimizing productivity and delivery of university services (quality), and reducing the operational costs of mixed building types while keeping tuition affordable (cost). LEED’s evolving stringent standards, paired with aggressive energy strategies, can ultimately transform UCF into a healthier campus and provide a favorable sustainability comparison to other analogous and desirable universities.

### 3.1 Emerging Campus Culture

LEED promotes the use of efficient and modern technologies, in support of the emerging campus culture. Outreach programs, such as the Green Office Certification Program implemented last year by the *FAIRWINDS* Alumni Center, are developed to educate building inhabitants about the building’s sustainable assets. Indoor environmental quality and occupant comfort are improved

through recommissioning HVAC systems, retrofitting interior lighting, and streamlining green housekeeping and pest management practices. These building system adjustments subsequently reduce hot-cold calls and improve the overall productivity of the indoor environment.

The University of Central Florida is committed to sustainable growth, and is continually striving to expand its portfolio of high-performance buildings. As outlined in the University of Central Florida Campus Master Plan 2015-2025 Update, the LEED initiative coincides with multiple long-term university growth objectives, including energy-efficient urban design elements (see Objective 1.5 and Policy 1.5.10 on page 32), future facility conservation planning, open space protection, and stormwater management.

UCF's commitment to LEED's high efficiency standards creates a catalyst for change, not only at UCF, but also throughout the Florida State University System. We celebrate the most recent, and certainly commendable, LEED Gold Certification for the UCF *FAIRWINDS* Alumni Center. UES and Facilities & Safety look forward to all future successes within this realm.

### 3.2 Recognition

On April 14th, 2018, this building was honored as the Most Outstanding LEED Project for Existing Buildings at the 5<sup>th</sup> annual USGBC Central Florida LEEDership Awards, held at the UCF Alumni Center. The annual awards dinner celebration recognizes and honors outstanding projects, inspirational businesses, dedicated volunteers and community stakeholders in the Central Florida community.

