POUND HALL 2ND FLOOR
1563 MASSACHUSETTS AVE
PROJECT PROFILE

LEED CI V2009
LEED GOLD
2016

Offices are used for a significant part of the day (a third if not more). Therefore, efficient lighting, heating, and cooling operation is essential in creating an energy efficient building. Automating these operations is one strategy to do this since someone may not remember to turn off the lights or setback the thermostat when they run to a meeting. Larger energy savings can be achieved through automation of these systems in conference rooms and classrooms due to their intermittent use. The Pound Hall 2nd Floor project took advantage of tying these systems into the building management system in all of these space types in order to maximize the project's energy savings.


Photo: copyright Perry and Radford Architects, 2015

Pound Hall is a five story office building consisting of 108,270 square feet of gross floor area. The HLS Pound Hall 2nd Floor renovation is being designed to provide office and classroom spaces for the Executive Education and PLP programs at Harvard Law School. The project scope includes renovations of approximately 9,900 square feet of space currently occupied by similar pre-renovation programs.

The project team was committed to sustainability from the onset and followed the Harvard Green Building Standards to make more informed decisions. These standards led to the inclusion of a number of progressive design strategies to meet aggressive energy targets and reduce water use without significant additional cost. The HLS Pound Hall 2nd Floor renovation achieved LEED-CI v3 Gold certification in April 2016.

LEED® Facts

Harvard University
Pound Hall 2nd Floor

Location……………………………………Cambridge, MA
Rating System…………………………LEED-CI v2009
Certification Achieved……………………………Gold
Total Points Achieved…………………………63/110

Sustainable Sites……………………………………15/21
Water Efficiency……………………………………11/11
Energy and Atmosphere…………………………19/37
Materials and Resources……………………………3/14
Indoor Environmental Quality……………………… 8/17
Innovation and Design……………………………………4/6
Regional Priority……………………………………………3/4

PROJECT METRICS

42% reduction in water use below code maximum

32% reduction in lighting power density

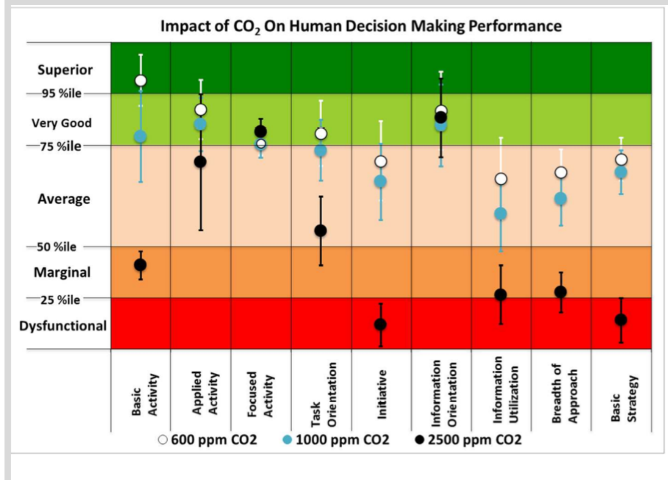
98% of lighting load is tied to occupancy sensors

99% of the eligible equipment and appliances by rated power are ENERGY STAR certified

100% Low-emitting adhesives, sealants, paints, coatings, flooring systems, composite wood, systems furniture and seating

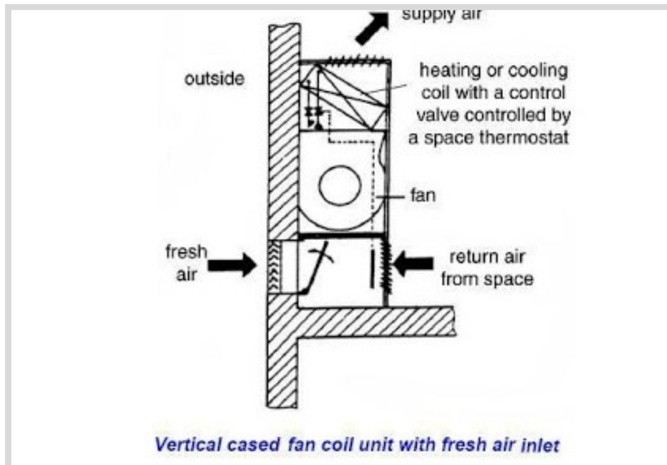
PROJECT HIGHLIGHTS - DEMAND CONTROL VENTILATION

Carbon dioxide is a byproduct of respiration. Build up of carbon dioxide in the built environment can severely impact human decision making. This is common in densely occupied spaces such as classrooms and conference rooms. Ideal CO2 levels are around 600 ppm. At these levels human decision making skills are exemplary-average (see graphic to the right for more details). However, as CO2 levels increase to 2,500 ppm , a number of decision making skills suffer. The ventilation system is designed to provide enough fresh air to dilute and exhaust CO2 byproduct out of the building. However, there's a more energy efficient way to create a healthy indoor environment.



Graphic: copyright Chao, http://newscenter.lbl.gov/, 2012

Demand control ventilation (DCV) is a ventilation strategy. The strategy utilizes a CO2 monitor and return air. The placement of the CO2 monitor is critical. It should be in the breathing zone (3-6' above the floor) in the room the unit serves in order to accurately measure the indoor environment. The fresh air damper and return air damper modulate in response to CO2 levels. If CO2 levels are below the threshold, then the fresh air damper closes and the return air damper opens. In this way, the system doesn't have to use energy to condition fresh air. The biggest energy savings with DCV are in spaces with varying occupancies such as classrooms and conference rooms.



Graphic: copyright http://www.electrical-knowhow.com/, 2015

Massachusetts code requires demand control ventilation for spaces larger than 500 ft2 with an average occupant load of 40 people per 1000 ft2 . The team went above and beyond the code requirements in the interest of making the project more energy efficient. Demand control ventilation is utilized in every office space and it's anticipated the fresh air damper will rarely open due to the low occupancy load. This will result in a significant reduction in energy that would have been used to condition fresh air.

Photo: copyright Perry and Radford Architects, 2015

PROJECT TEAM

Owner	Harvard Law School
Architect	Perry and Radford Architects
MEP Engineer	AHA Consulting Engineers
Contractor	Elaine Construction
Commissioning Authority	Harvard Green Building Services
Sustainability Consultant	Harvard Green Building Services

ENERGY EFFICIENCY AND INDOOR ENVIRONMENTAL QUALITY

ENERGY EFFICIENCY

EEM 1: Demand Control Ventilation

Demand control ventilation (DCV) is a strategy that modulates the amount of outside air provided to a space based on CO2 levels. This reduces the unnecessary heating and cooling of incoming outside air when outside air isn't required.

EEM 2: Fan Coils Units with Electronically Controlled Motors

Electronically controlled motors (EEM) are more efficient than traditional PSC motors, require less maintenance due to a soft start and stop, and the life of an EEM is more than twice that of a traditional PSC motor. The fan coil units in this project have EEMs.

EEM 3: Occupancy Sensors

Occupancy sensors are installed in common spaces to turn off the lights and setback room temperatures when spaces are unoccupied. This helps save lighting, heating, cooling, and ventilation energy.

EEM 4: Variable Frequency Drives

A variable frequency drive controls an AC motor speed and toque by varying the motor input frequency and voltage. As opposed to a constant speed drive, variable frequency drives slow down a motor when full load isn't required. In the built environment this could be a motor on a fan or a pump. The supply air fans in each of the new air handler units are controlled by variable speed drives.

EEM 5: LED Lighting

There are many benefits to using LED (light emitting dioxide) fixtures over fluorescent fixtures. First, the average lifetime of a LED fixture is 50,000 hours (as high as 100,000 hours) whereas the average lifetime of a fluorescent fixture is 16,000-25,000 hours. The lifetime of a LED is double that of the fluorescent. Also, LEDS are engineered to be directional meaning the light is efficiently focused where it's needed. Lastly, fluorescents contain mercury—this is a human and environmental hazard.

Photo: copyright Perry and Radford Architects, 2015

Photo: copyright Perry and Radford Architects, 2015

INDOOR ENVIRONMENTAL QUALITY

IAQ 1: Low Emitting Materials

The selection of low chemical-emitting construction and finish materials was an important driving force in the design phase. The project includes low VOC adhesives, sealants, paints, coatings, and primers. All wood and agrifiber products are also free of urea-formaldehyde.

PRODUCTS AND MATERIALS

LIGHTING AND CONTROLS

- **32% reduction** in lighting power density (watts/square foot)

Equation 2x4
Focal Point
- ✓ Total fixture wattage = 36watts
- ✓ DLC List
- ✓ Efficiency: 83 lm/W
- ✓ Average lifetime: 50,000 hours

eW Profile Powercore
Philips
- ✓ Total fixture wattage = 20watts
- ✓ Energy Star certified
- ✓ Efficiency: 42.3 lm/W
- ✓ Average lifetime: 50,000 hours

CM PDT 9
Sensor Switch
- ✓ Passive infrared and ultrasonic sensors
- ✓ Interface with BMS Relay

ENERGY EFFICIENT APPLIANCES & WATER EFFICIENCY

- **99%** of the equipment purchased for the project is **ENERGY STAR RATED** (by rated power).
- **42% reduction** in annual water use when compared to EPAct 1992 baseline standard.

48" Slim Direct-Lit LED
Samsung
- ✓ ENERGY STAR®

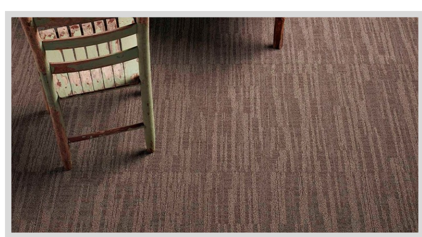
Flushometer
Model #111-1.28
Sloan
- ✓ **1.28 gallons per flush (gpf)** vs. EPAct baseline of 1.6 gpf
- ✓ Automatic flush

Lavatory Sink
Model EAF-275
Sloan
- ✓ **0.13 gallons per minute (gpm)** vs. EPAct baseline of 0.50 gpm
- ✓ Solar powered

LOW-EMITTING MATERIALS

- **100%** of the project's adhesives, sealants, paints, coatings, and flooring systems are **low-emitting.**

Sheetrock All Purpose
Joint Compound
USG
- ✓ No VOCs



Dry Lake
Carpet
Bentley
- ✓ CRI Green Label Plus Certified
- ✓ 14.8% recycled content

Interior Latex Primer
Model #Ultra Spec 500
Benjamin Moore
- ✓ No VOCs

Please note that while many products are described in this project profile, these are provided for informational purposes only, to show a representative sample of what was included in this project. Harvard University and its affiliates do not specifically endorse nor recommend any of the products listed in this project profile and this profile may not be used in commercial or political materials, advertisements, emails, products, promotions that in any way suggests approval or endorsement of Harvard University.

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If printing is required, please print double sided and recycle when finished. Thank you!

PROJECT SCORECARD

LEED FOR COMMERCIAL INTERIORS (V2009)

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

SUSTAINABLE SITES		15 OF 21
SSc1	Site Selection	1 / 5
SSc2	Development Density and Community Connectivity	6 / 6
SSc3.1	Alternative Transportation-Public Transportation Access	6 / 6
SSc3.2	Alternative Transportation-Bicycle Storage and Changing Room	0 / 2
SSc3.3	Alternative Transportation-Parking Availability	2 / 2

WATER EFFICIENCY		11 OF 11
WEp1	Water Use Reduction-20% Reduction	Y
WEc1	Water Use Reduction	11 / 11

ENERGY AND ATMOSPHERE		19 OF 37
EAp1	Fundamental Commissioning of the Building Energy Systems	Y
EAp2	Minimum Energy Performance	Y
EAp3	Fundamental Refrigerant Mgmt	Y
EAc1.1	Optimize Energy Performance-Lighting Power	4 / 5
EAc1.2	Optimize Energy Performance-Lighting Controls	1 / 3
EAc1.3	Optimize Energy Performance-HVAC	5 / 10
EAc1.4	Optimize Energy Performance-Equipment and Appliances	4 / 4
EAc2	Enhanced Commissioning	5 / 5
EAc3	Measurement and Verification	0 / 5
EAc4	Green Power	0 / 5

MATERIALS AND RESOURCES		3 OF 14
MRp1	Storage and Collection of Recyclables	Y
MRc1.1	Tenant Space-Long-Term Commitment	1 / 1
MRc1.2	Building Reuse	0 / 2
MRc2	Construction Waste Mgmt	2 / 2
MRc3.1	Materials Reuse	0 / 2
MRc3.2	Materials Reuse-Furniture and Furnishings	0 / 1
MRc4	Recycled Content	0 / 2
MRc5	Regional Materials	0 / 2
MRc6	Rapidly Renewable Materials	0 / 1
MRc7	Certified Wood	0 / 1

INDOOR ENVIRONMENTAL QUALITY		8 OF 17
IEQp1	Minimum IAQ Performance	Y
IEQp2	Environmental Tobacco Smoke (ETS) Control	Y
IEQc1	Outdoor Air Delivery Monitoring	0 / 1
IEQc2	Increased Ventilation	0 / 1
IEQc3.1	Construction IAQ Mgmt Plan-During Construction	1 / 1
IEQc3.2	Construction IAQ Mgmt Plan-Before Occupancy	0 / 1
IEQc4.1	Low-Emitting Materials-Adhesives and Sealants	1 / 1
IEQc4.2	Low-Emitting Materials-Paints and Coatings	1 / 1
IEQc4.3	Low-Emitting Materials-Flooring Systems	1 / 1
IEQc4.4	Low-Emitting Materials-Composite Wood and Agrifiber Products	1 / 1
IEQc4.5	Low-Emitting Materials-Systems Furniture and Seating	1 / 1
IEQc5	Indoor Chemical and Pollutant Source Control	0 / 1
IEQc6.1	Controllability of Systems-Lighting	1 / 1
IEQc6.2	Controllability of Systems-Thermal Comfort	0 / 1
IEQc7.1	Thermal Comfort-Design	1 / 1
IEQc7.2	Thermal Comfort-Verification	0 / 1
IEQc8.1	Daylight and Views-Daylight	0 / 2
IEQc8.2	Daylight and Views-Views for Seated Spaces	0 / 1

INNOVATION IN DESIGN		4 OF 6
IDc1.1	Innovation in Design	0 / 1
IDc1.1	Innovation in Design	0 / 1
IDc1.2	Innovation in Design	0 / 1
IDc1.2	Innovation in Design	0 / 1
IDc1.3	Exemplary Performance: Public Transportation Access	1 / 1
IDc1.3	Innovation in Design	0 / 1
IDc1.4	EAc1.2 Exemplary Performance	1 / 1
IDc1.4	Innovation in Design	0 / 1
IDc1.5	Exemplary Performance: Equipment and Appliances	1 / 1
IDc1.5	Innovation in Design	0 / 1
IDc2	LEED® Accredited Professional	1 / 1

REGIONAL PRIORITY CREDITS		3 OF 4
SSc3.2	Alternative Transportation-Bicycle Storage and Changing Room	0 / 1
WEc1	Water Use Reduction	1 / 1
EAc1.1	Optimize Energy Performance-Lighting Power	1 / 1
EAc1.3	Optimize Energy Performance-HVAC	1 / 1
MRc3.1	Materials Reuse	0 / 1
MRc5	Regional Materials	0 / 1

TOTAL	63 OF 110

MORE INFORMATION

- Harvard Law School Sustainability: http://hls.harvard.edu/dept/facilities/sustainability/
- Harvard—Green Building Resource: http://www.energyandfacilities.harvard.edu/green-building-resource
- Harvard—Green Building Services: http://www.energyandfacilities.harvard.edu/project-technical-support/capital-projects/sustainable-design-support-services