HARVARD
Faculty of Arts and Sciences

HARVARD UNIVERSITY | Sustainability

Cohen Lab
12 Oxford Street, Cambridge, MA
Project Profile

LEED CI v2009
LEED Gold
2015

Laboratories are typically regarded as an energy intensive building typology. Many of these buildings have extended occupancy periods, energy intensive equipment and machinery, and in some cases, strict air quality code requirements (high air changes per hour). These factors contribute to a high average energy use intensity value (National Average EUI of 370 kBtu/SF/year). Additionally, some laboratories consume significant amounts of water through process and HVAC equipment use. Nevertheless, there are many strategies that can be employed to make laboratories more energy and water efficient as well as healthy and productive spaces with minimal environmental impact. The Cohen Lab is a great example of the successful implementation of these strategies.

Photo: copyright Ellenzweig, 2015

The Cohen Lab project consisted of the renovation of the existing Cohen Laboratories and support spaces located on the first floor of the Edward Mallinckrodt Chemical Laboratory. The scope of work includes the total renovation of the first floor laboratories, including a new instrumentation facility, tissue culture room, biology lab, chemistry lab, optics labs and the renovation of the existing student write up spaces. Miscellaneous areas on the ground and basement levels are also included as part of this renovations in support of the main renovation on the first floor. The project's goals were to create high performance lab spaces that optimize the indoor environment, reduce resource consumption, and reduce the overall impact on the environment.

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. Cohen Lab achieved LEED-CI v2009 Gold certification in September 2015.

LEED® Facts

Harvard University
Cohen Lab

Location	Cambridge, MA
Rating System	LEED-CI v2009
Certification Achieved	Gold
Total Points Achieved	76/110
Sustainable Sites	18/21
Water Efficiency	6/11
Energy and Atmosphere	23/37
Materials and Resources	7/14
Indoor Environmental Quality	13/17
Innovation and Design	6/6
Regional Priority	3/4

Project Metrics

32% reduction in estimated indoor water use compared to an EPAct 1992 baseline

100% of the eligible equipment and appliances by rated power are ENERGY STAR certified

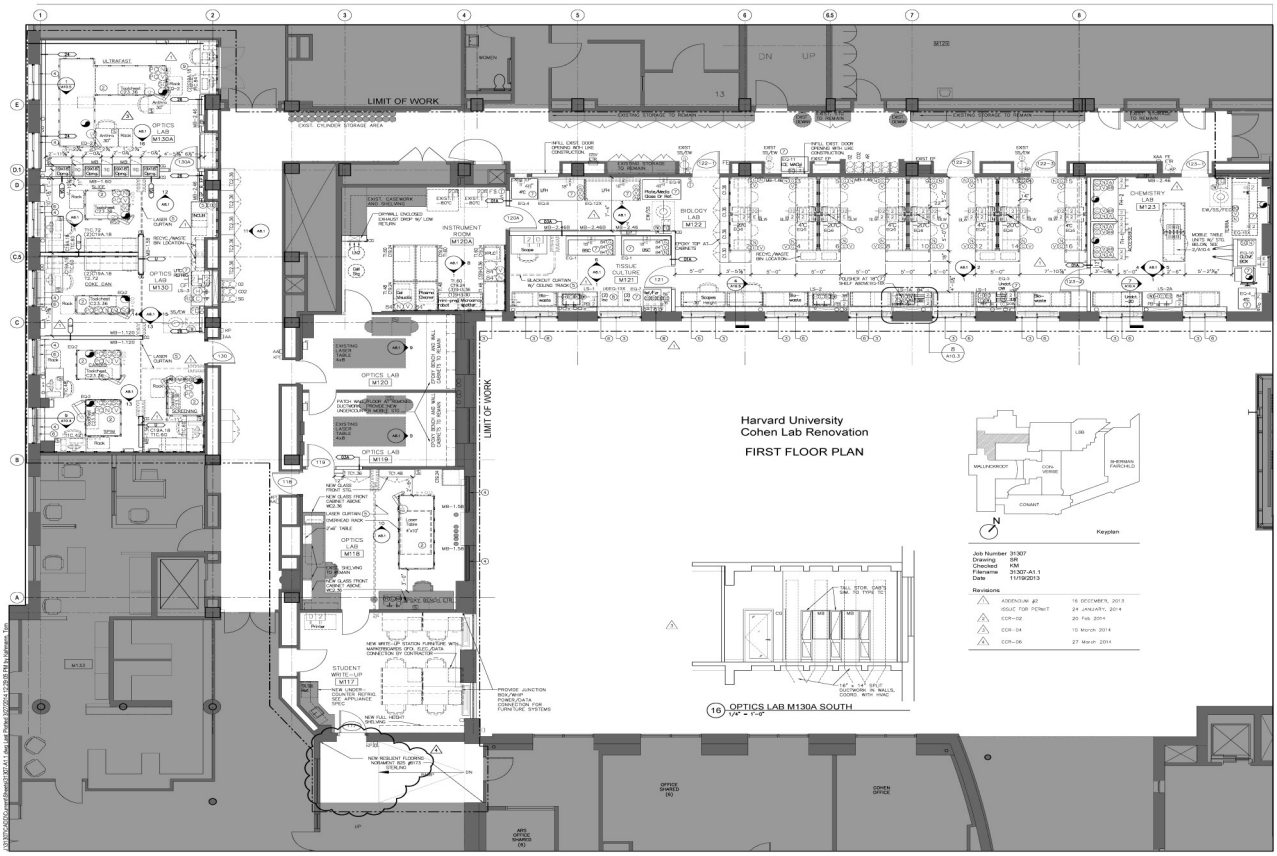
22% of newly installed materials have been manufactured within 500 miles of the project site

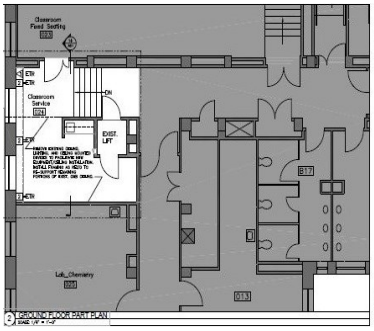
18% reduction in lighting power density compared to ASHRAE 90.1-2007

50% of individual workstations have thermal comfort controls

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

PROJECT HIGHLIGHTS





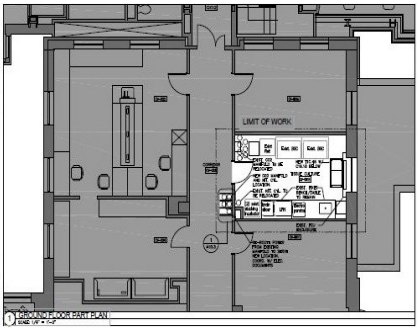


Photo: copyright Ellenzweig, 2015

Key Sustainability Features:

- Revitalizing an existing space
- Energy efficient HVAC systems
- Extensive energy efficient lighting and daylighting design strategy with occupancy sensors, efficient fixtures, and controls
- Healthy, productive, creative lab spaces

PROJECT TEAM

Owner	Harvard University
Project Manager	Harvard FAS Capital Project Management
Architect	Ellenzweig Associates
MEP Engineer	BR + A
Contractor	D.C. Beane and Associates
Commissioning Authority	Harvard Green Building Services
Sustainability Consultant	Harvard Green Building Services

Energy Efficiency and Indoor Environmental Quality

Mechanical Systems

ECM 1: High Efficiency Fans and Motors

ECM 2: Occupancy Sensors

ECM 3: High Efficiency Fan Coil Units

ECM 4: Variable Air Volume Control (VAV)

ECM 5: Thermostat Controls

ECM 6: Operable Windows

The overall strategy of the HVAC system design was to reduce energy use through the installation of high efficiency equipment and controls. The fan coil units are controlled by electronically commutated motors and variable air volume (VAV) boxes are located downstream of the supply fans in order to provide ventilation. Occupancy sensors are interlocked with the VAV boxes in the laboratory areas to control the ventilation air and reduce HVAC system energy when these spaces are unoccupied. Additionally, a new 2,000 cfm, HEPA filtered, humidified air handling unit was installed to recirculate HEPA filtered air throughout the new optics lab.

lighting and Electrical Systems

The Cohen Lab space is expected to be occupied for extended periods through-out the year. Therefore, it is crucial the energy reduction strategies also focus on reducing lighting energy. The lighting system was designed to not only reduce energy use, but also to improve in the indoor environmental quality of the space and provide optimal lighting. Some of the strategies employed include:

- Reduce lighting power density by 18.77% below the ASHRAE 90.1-2007 baseline standard
- High performance T8 fluorescents & LEDs for lab, work spaces, and support rooms.
- Ceiling mounted occupancy sensors capable of managing lighting setbacks for lab, work spaces, and support rooms.
- Lighting controls with multiple lighting levels to provide adequate illumination for a higher indoor environmental quality

Plumbing Systems and Potable Water Use Reduction

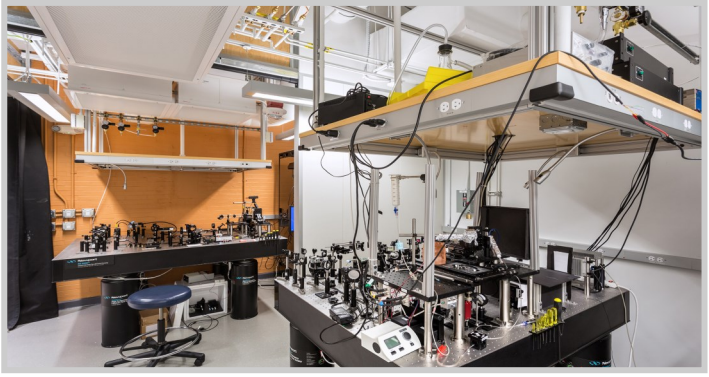


Photo: copyright Ellenzweig, 2015

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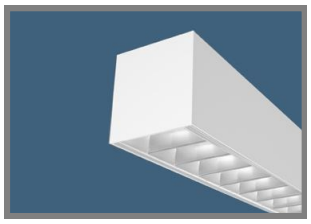
Decreasing the demand for potable water is the first step towards sustainable water management. Therefore, the plumbing system for the Cohen Lab was designed to reduce resource consumption, specifically potable water use. Potable water use was reduced by incorporating a low-flow fixture in the project space. In the Student Write-Up section, a 0.5 gpm kitchen sink was installed, reducing water use in the space by over 75% when compared to the baseline plumbing fixtures required by code.

Since there are no flush fixtures installed as part of the project scope and there are no flush fixtures located within the tenant space, tenants must utilize bathrooms in close proximity to the Cohen Lab. The bathroom which is used by the project tenants has installed a water closet with a GPF of 1.27 and a lavatory faucet metered at 0.1 GPM. Project tenants also have access to a shower which has a fixture GPM of 1.5. With the addition of these calculations, the overall percent reduction of water use in all fixtures is just over 32%.

PRODUCTS AND MATERIALS

LIGHTING AND CONTROLS

- **18% reduction** in lighting power density (watts/square foot)



Edge EX4P
Pinnacle
- ✓ Total fixture wattage = 25 watts
- ✓ Parabolic louver fixture which can be installed in hard lid ceiling or acoustical ceiling tiles

LED Pendant Fixture
Lightolier
- ✓ Total fixture wattage = 40 Watts
- ✓ LED Fixture

Dual Technology Ceiling Sensors DT-1000-R Series
Cooper
- ✓ Walk-through mode and BAS Relay options available through sensor.
- ✓ Passive infrared and ultrasonic sensors.
- ✓ Integrated daylight sensor

ENERGY EFFICIENT APPLIANCES & WATER EFFICIENCY

- **100%** of the equipment purchased for the project is **ENERGY STAR RATED** (by rated power).
- **32% reduction** in annual water use when compared to EPAct 1992 baseline standard.

Under Counter Refrigerator
Model #JUR24FLARS
Jenn-Air
- ✓ ENERGY STAR®
- ✓ Automatic Defrost technology is designed to maintain superior conditions within the refrigerator

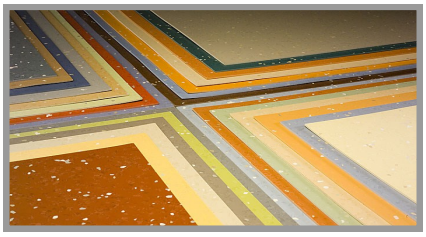
Self-contained Ice Maker
Model #F300BAF
Hoshizaki
- ✓ ENERGY STAR®
- ✓ Automatic system flush
- ✓ Gear motor protected from overload

Kitchen Sink
Model #33986G
Grohe
- ✓ **0.5 gallons per minute (gpm)** vs. EPAct 1992 baseline of 2.2 gpm.

LOW-EMITTING MATERIALS

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

Ceramic Tile Adhesive
Model #254 Platinum
Laticrete
- ✓ No VOCs
- ✓ UL GREEN-Guard Certified



Rubber Flooring
Model #Environcare
Noraplan
- ✓ Floorscore certified
- ✓ Low VOC 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.

PROJECT SCORECARD

LEED FOR COMMERCIAL INTERIORS (V2009)

ATTEMPTED: 79, DENIED: 2, PENDING: 0, AWARDED: 76 OF 110 POINTS

leed-ci

SUSTAINABLE SITES — 18 OF 21

SSc1	Site Selection	2 / 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	2 / 2
SSc3.3	Alternative Transportation-Parking Availability	2 / 2

WATER EFFICIENCY — 6 OF 11

WEp1	Water Use Reduction-20% Reduction	Y
WEc1	Water Use Reduction	6 / 11

ENERGY AND ATMOSPHERE — 23 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	1 / 5
EAc1.2	Optimize Energy Performance-Lighting Controls	3 / 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	5 / 5

MATERIALS AND RESOURCES — 7 OF 14

MRp1	Storage and Collection of Recyclables	Y
MRc1.1	Tenant Space-Long-Term Commitment	1 / 1
MRc1.2	Building Reuse	1 / 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	1 / 2
MRc5	Regional Materials	1 / 2
MRc6	Rapidly Renewable Materials	0 / 1
MRc7	Certified Wood	1 / 1

INDOOR ENVIRONMENTAL QUALITY — 13 OF 17

IEQp1	Minimum IAQ Performance	Y
IEQp2	Environmental Tobacco Smoke (ETS) Control	Y
IEQc1	Outdoor Air Delivery Monitoring	1 / 1
IEQc2	Increased Ventilation	1 / 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	1 / 1
IEQc6.1	Controllability of Systems-Lighting	0 / 1
IEQc6.2	Controllability of Systems-Thermal Comfort	1 / 1
IEQc7.1	Thermal Comfort-Design	1 / 1
IEQc7.2	Thermal Comfort-Verification	1 / 1
IEQc8.1	Daylight and Views-Daylight	0 / 2
IEQc8.2	Daylight and Views-Views for Seated Spaces	1 / 1

INNOVATION IN DESIGN — 6 OF 6

IDc1.1	Innovation in Design	0 / 1
IDc1.1	IDc1.1: Occupant Education w/ Case Study	1 / 1
IDc1.2	Innovation in Design: Low-mercury Lighting	1 / 1
IDc1.2	Innovation in Design	0 / 1
IDc1.3	Innovation in Design: Exemplary Performance SSc3.1	1 / 1
IDc1.3	Innovation in Design	0 / 1
IDc1.4	Innovation in Design - Exemplary Performance EAc1.4	1 / 1
IDc1.4	Innovation in Design	0 / 1
IDc1.5	Innovation in Design: Green Power	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	1 / 1
WEc1	Water Use Reduction	0 / 1
EAc1.1	Optimize Energy Performance-Lighting Power	0 / 1
EAc1.3	Optimize Energy Performance-HVAC	1 / 1
MRc3.1	Materials Reuse	0 / 1
MRc5	Regional Materials	1 / 1

TOTAL — 76 OF 110

MORE INFORMATION

- Harvard Faculty of Arts and Sciences: http://www.fas.harvard.edu/home/
- Cohen Lab: http://cohenweb.rc.fas.harvard.edu/
- 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
- Sustainability at Harvard: http://green.harvard.edu/