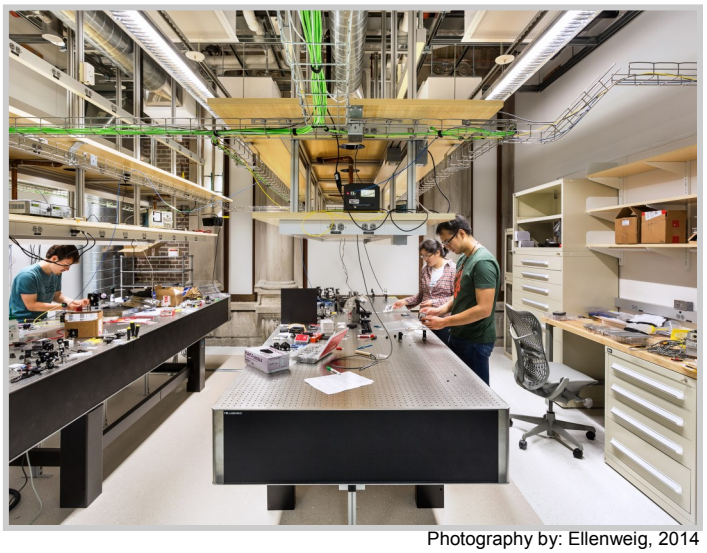
HARVARD
Faculty of Arts and Sciences

HARVARD UNIVERSITY | Sustainability

Ni Lab
12 Oxford Street, Cambridge, MA
Project Profile

LEED CI v3.0
LEED Gold
2014



Photography by: Ellenweig, 2014

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 Ni Lab is a great example of the successful implementation of these strategies.

The Ni Lab project consisted of the renovation of the existing Library and support spaces located on the first floor of the Converse Building Extension at Harvard University. The scope of work included a partial renovation of the existing Library for two new laser laboratories and associated support spaces including a preparatory room, a conference room, clean and dirty shop spaces, and offices. 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. The project achieved LEED-CI v3 Gold certification in March 2016.

LEED® Facts

Harvard University
Ni Lab

Location	Cambridge, MA
Rating System	LEED-CI v3
Certification Awarded	Gold
Total Points Awarded	70/110
Sustainable Sites	17/21
Water Efficiency	6/11
Energy and Atmosphere	24/37
Materials and Resources	4/14
Indoor Environmental Quality	11/17
Innovation and Design	5/6
Regional Priority	3/4

Project Metrics

35% reduction in water use below code maximum

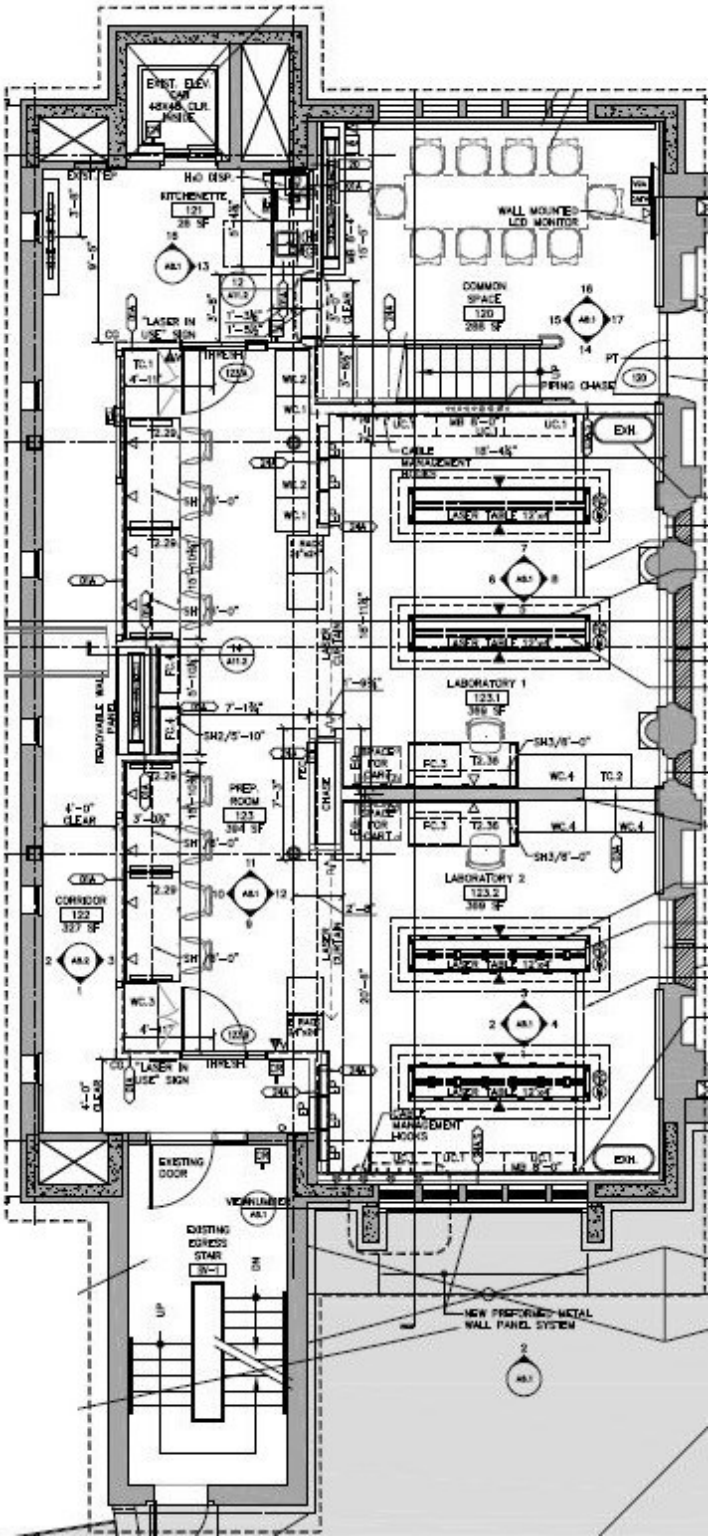
100% of the eligible equipment and appliances by rated power are ENERGY STAR certified

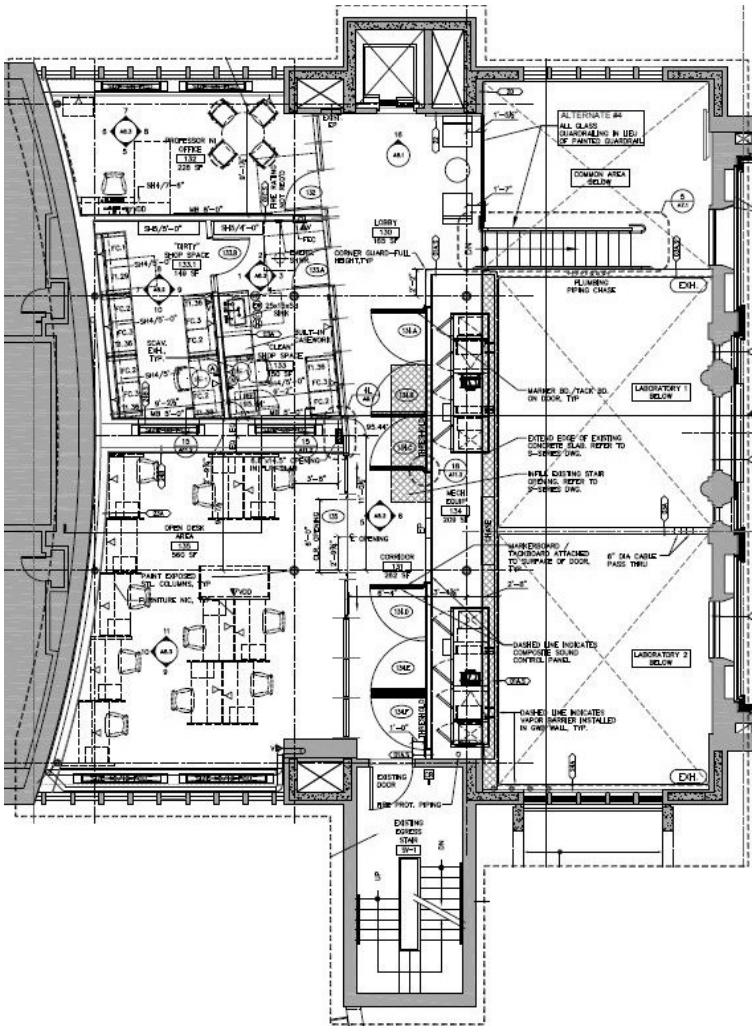
100% of individual and shared multi-occupant spaces have daylight responsive lighting controls

32% reduction in lighting power density

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

PROJECT HIGHLIGHTS





PROJECT TEAM

Owner	Harvard University
Project Manager	Harvard FAS Capital Project Management
Architect	Ellenzweig Associates
MEP Engineer	BR + A
Contractor	Consigli Construction
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: Variable Air Volume Boxes (VAV)

ECM 3: High Efficiency Fan Coil Units

ECM 4: Variable Frequency Drive Installation (VFD)

ECM 5: Thermostat Controls

ECM 6: Room Temperature Sensors

The overall strategy of the HVAC system design was to reduce energy use through the installation of high efficiency equipment and controls. The fans are controlled by electronically commutated motors and have variable air volume boxes downstream of the supply fans in order to provide ventilation. Room temperature sensors tied to the variable air volume (VAV) boxes were installed in the project space to sequence the hot water coil as required to heat the space and reduce HVAC system energy when applicable.

Photography by: Ellenweig, 2014

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Indoor Environmental Quality

The high indoor environmental quality of the Ni Lab renovation was a significant focus of the project. An indoor Quality Management Plan was enacted to ensure the protection of building systems, building occupants, construction related occupants, and interior building materials from air pollutants, excessive moisture exposure, and moisture damage during construction.

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, primers, and flooring systems. All wood and agrifiber products are also free of urea-formaldehyde.

All chemical use spaces have auto closing doors as well as compliant exhaust systems. To reduce contaminants brought in from the outdoors, all main entryways have permanent entryway systems that capture dirt and other foreign particulates.

Energy efficiency and indoor environmental quality

lighting and Electrical Systems

The Ni Lab space is expected to be occupied for extended periods through-out the year, therefore, it is crucial that 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 32.02% below the ASHRAE 90.1 baseline standard
- High performance T8 & 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

Decreasing the demand for potable water is the first step towards sustainable water management. Therefore, the plumbing system for the Ni 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 Clean Shop Space, 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 Ni 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 35%.

PRODUCTS AND MATERIALS

LIGHTING AND CONTROLS

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

M100
Selux
- ✓ Total fixture wattage = 25 watts
- ✓ Recessed linear fluorescent fixture which can be installed in hard lid ceiling or acoustical ceiling tiles

LED Surface Mounted Downlight
Peerless
- ✓ Total fixture wattage = 10 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).
- **35% 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

Countertop Hot/Cold Water Dispenser
Model #AWS300ct
Atlas
- ✓ ENERGY STAR®
- ✓ Significant cost savings when compared to bottled water, and a sustainable, green approach to providing clean drinking water

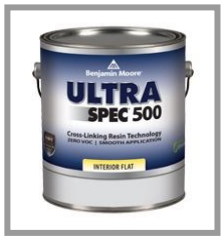
Kitchen Sink
Model #33986G
Grohe
- ✓ **0.5 gallons per minute (gpm)** vs. EPAct baseline of 2.2 gpm.

LOW-EMITTING MATERIALS

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

Rubber Flooring Adhesive
Model #C930
Forbo
- ✓ No VOCs

Carpeting
Model# Paved Freedom Tile
Bigelow
- ✓ CRI Green Label Plus Certified



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

Cambridge, MA

Ni Laboratory Renovation

LEED for Commercial Interiors (v2009)

Attempted: 74, Denied: 4, Pending: 0, Awarded: 70 of 109 points

Project ID: 1000039411
Status: Certified
Certification level: Gold
Certification date: 03/24/2016

SUSTAINABLE SITES	17 OF 21
SSc1 Site Selection	1 / 5
SSc2 Development Density and Community Connectivity	6 / 6
SSc3.1Alternative Transportation-Public Transportation Access	6 / 6
SSc3.2Alternative Transportation-Bicycle Storage and Changing Room	2 / 2
SSc3.3Alternative 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	24 OF 37
EAp1 Fundamental Commissioning of the Building Energy Systems	Y
EAp2 Minimum Energy Performance	Y
EAp3 Fundamental Refrigerant Mgmt	Y
EAc1.1Optimize Energy Performance-Lighting Power	4 / 5
EAc1.2Optimize Energy Performance-Lighting Controls	1 / 3
EAc1.3Optimize Energy Performance-HVAC	5 / 10
EAc1.4Optimize 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	4 OF 14
MRp1 Storage and Collection of Recyclables	Y
MRc1.1Tenant Space-Long-Term Commitment	1 / 1
MRc1.2Building Reuse	0 / 2
MRc2 Construction Waste Mgmt	2 / 2
MRc3.1Materials Reuse	0 / 2
MRc3.2Materials Reuse-Furniture and Furnishings	0 / 1
MRc4 Recycled Content	1 / 2
MRc5 Regional Materials	0 / 2
MRc6 Rapidly Renewable Materials	0 / 1
MRc7 Certified Wood	0 / 1

INDOOR ENVIRONMENTAL QUALITY	11 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
IEQc3.1Construction IAQ Mgmt Plan-During Construction	1 / 1
IEQc3.2Construction IAQ Mgmt Plan-Before Occupancy	1 / 1
IEQc4.1Low-Emitting Materials-Adhesives and Sealants	1 / 1
IEQc4.2Low-Emitting Materials-Paints and Coatings	1 / 1
IEQc4.3Low-Emitting Materials-Flooring Systems	1 / 1
IEQc4.4Low-Emitting Materials-Composite Wood and Agrifiber Products	1 / 1
IEQc4.5Low-Emitting Materials-Systems Furniture and Seating	1 / 1
IEQc5 Indoor Chemical and Pollutant Source Control	0 / 1
IEQc6.1Controllability of Systems-Lighting	0 / 1
IEQc6.2Controllability of Systems-Thermal Comfort	0 / 1
IEQc7.1Thermal Comfort-Design	1 / 1
IEQc7.2Thermal Comfort-Verification	1 / 1
IEQc8.1Daylight and Views-Daylight	0 / 2
IEQc8.2Daylight and Views-Views for Seated Spaces	0 / 1

INNOVATION IN DESIGN	5 OF 6
IDc1.1 Innovation in Design	0 / 1
IDc1.1 ID: Occupant Education	0 / 1
IDc1.2 IDc1.2: Low-Mercury Lighting	1 / 1
IDc1.2 Innovation in Design	0 / 1
IDc1.3 Innovation in Design - Exemplary Performance EAc1.4	1 / 1
IDc1.3 Innovation in Design	0 / 1
IDc1.4 Innovation in Design - Exemplary Performance SSc3.1	1 / 1
IDc1.4 Innovation in Design	0 / 1
IDc1.5 Innovation in Design	0 / 1
IDc1.5 Innovation in Design - Exemplary Performance EAc4	1 / 1
IDc2 LEED® Accredited Professional	1 / 1

REGIONAL PRIORITY CREDITS	3 OF 3
SSc3.2Alternative Transportation-Bicycle Storage and Changing Room	1 / 1
EAc1.1Optimize Energy Performance-Lighting Power	1 / 1
EAc1.3Optimize Energy Performance-HVAC	1 / 1

TOTAL	70 OF 109

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM

MORE INFORMATION

- Harvard Faculty of Arts and Sciences: http://www.fas.harvard.edu/home/
- Ni Lab: http://faculty.chemistry.harvard.edu/kni
- Harvard - Green Building Resource: http://green.harvard.edu/theresource
- Follow Harvard Sustainability: https://twitter.com/greenharvard and https://www.instagram.com/greenharvard/