

COMBINING
ENERGY EFFICIENCY
AND QUALITY DESIGN

NEEP, INC.

A *knowhow*[™] CASE STUDY

demonstrating lighting

“Our new lighting has definitely caused a stir in the building. The landlord is considering converting the entire building to this softer, more upscale lighting scheme.”

Jane Stolzman,
NEEP Executive Assistant



Northeast Energy Efficiency Partnerships, Inc. (NEEP) is a non-profit regional organization founded in 1996 to increase and coordinate energy efficiency efforts in New England, New York and the mid-Atlantic region. NEEP's current projects involve electric, gas and water utility companies, environmental and consumer groups, state energy offices, federal agencies, regulatory staff, and trade and professional organizations. After a lighting re-design, the NEEP headquarters, located in Lexington Massachusetts, has become a showcase for energy-efficient lighting. The standard T12 acrylic-lens fixtures provided by the landlord were replaced with soft indirect lighting featuring energy-efficient T8 lamps, and advanced high-output T5s with electronic ballasts. Sophisticated lighting controls increase the versatility of the space and reduce energy costs. The new equipment provides higher-quality lighting for the office tasks performed by the NEEP staff, as well as a more comfortable, more attractive ambiance. Energy savings is the icing on the cake: about \$1,000 a year.

NEEP worked with lighting manufacturer's representatives at Boston Light Source and with the local utility Boston Edison Company to choose a lighting scheme intended to maximize both productivity and energy efficiency. Indirect-only pendants, direct-indirect pendants, and direct-indirect wall valences light the reception area, small offices, conference room, and break room. The result is much better color rendition and an overall warmer, more comfortable ambiance. Lighting controls save energy when spaces are unoccupied and make the lighting in the conference room suit the occasion.



PROBLEMS OVERCOME

When NEEP occupied this office space, numerous T12 acrylic-lens troffers generated a great deal of light—too much light, in fact. The atmosphere was harsh, stark and white when they were on. The bright lenses were almost always in the field of view of workers at their desks, as well as visitors in the reception area. Glare on computer screens was an annoyance and likely caused eyestrain, hindering productivity.

Energy costs also ran high for the outdated lighting. As a participant in the DesignLights[™] Consortium, NEEP believed it was important that its office showcase advanced and energy-efficient lighting technologies.

LIGHTING QUALITY

The *Office Lighting knowhow*[™] Series guide emphasizes that employee productivity and satisfaction are primary goals of an “energy effective” office lighting system. The smooth, clean lighting of the NEEP offices certainly conforms to this ideal. Indirect lighting creates a comfortable shadow-free ambiance. Lighting the walls and ceilings reduces contrasts and eliminates glare, enhancing visibility and long-term comfort.



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In addition to energy-efficient lamps, ballasts, and fixtures, lighting controls limit the quantity and duration of energy consumed. Occupancy sensors guarantee that the lighting in individual offices and areas will be off when spaces are unoccupied for longer than a few minutes.

Multiple light sources, along with dimming, in the conference room accommodate many types of meetings and presentations. The 4100K color temperature of the T8 and compact fluorescent light sources and 3500K color of the T5 lamps provide an upbeat atmosphere and CRI values in the 80s. Color rendering is considerably improved over the low 60s CRI of the original 'cool-white' T12 lamps.

QUALITY LIGHTING SOLUTION

Sleek wedge-shaped T5 indirect fixtures light the entryway and front offices areas. The slim,

bright T5 lamps are part of optically efficient luminaires that produce a wide distribution, spreading light uniformly across the 8-foot, 6-inch ceilings—despite a suspension length of only 14 inches in the front office.

Suspended about 6 feet apart in the private offices, two rows of suspended direct-indirect fixtures house two rows of T8 lamps. In the copy/break room wall-mounted direct-indirect valences with asymmetric reflectors supply soft, glare-free light. A white blade baffle on the downlight component provides shielding.

In the conference room a 90% indirect luminaire with a fluorescent dimming ballast is supplemented by six 26W recessed compact fluorescent downlights.

In private offices, ordinary light switches were retrofit with passive infrared occupancy sensors from The Watt Stopper. A ceiling sensor controls the conference room.

IMPRESSIONS

“We were looking to create a demonstration site,” said Susan Coakley, Executive Director of Northeast Energy Efficiency Partnerships. “In my office they put in the T8s with electronic ballasts in pendants. I like it much better. The color is better; there’s no glare, and there’s still plenty of light.” She described the quality of the indirect light, bouncing off the surfaces of the room, as similar to daylight.

“Controls are a big plus. In the conference room, we can adjust the amount of light when we’re

QUALITY INDICATORS	RATING		
	ACCEPTABLE	GOOD	EXCELLENT
Control of Direct and Reflected Glare			✓
Light on Walls and Ceilings		✓	
Fixture Location Related to People			✓
Light Patterns and Uniformity		✓	
Daylighting Integration		✓	
Color Rendering and Color Temperature			✓
Lighting Controls and Flexibility			✓
Quantity of Light on Horizontal Surfaces (fc)		✓	

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doing overhead projections or other types of presentations,” she added. “You can’t design the perfect lighting setup for every activity, but having options is very helpful. With the occupancy sensors, I’m confident that after the office staff leaves, lights will not be left on by the cleaning crew.”

Executive Assistant Jane Stolzman spends a great deal of time on computer tasks. She noticed immediately that the indirect T5s in the front office eliminated glare on her screen. Her central location, and tasks she performs in other offices, let her see that occupancy sensors do save energy by turning off lights. “Especially in the conference room and the copy room, which are used intermittently,” she said.

square foot down to only 1.2 watts per square foot. Further energy savings from occupancy sensing and dimming are estimated at an additional 20 percent annually.



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*Susan Coakley,
Executive Director*



AND NOW THE NUMBERS

Illumination levels in the space were reduced to levels more appropriate to an office space: 40 to 50 footcandles as opposed to 80 and 90 footcandles. These softer levels are in line with IESNA recommendations and appropriate to computer office tasks and meetings. Connected load fell drastically from almost 3 watts per



COSTS

Total fixtures and lamps	\$7,038
Total installation labor	\$4,462
Installed system cost	\$11,500
Materials per square foot	\$3.89
Installation labor per square foot	\$2.47
Total cost per square foot	\$6.35

SAVINGS

Demand reduction	3 KW
Watts saved per square foot	1.65 W/SF
Annual utility cost savings ¹	\$1,000

¹Based on 3,640 hours per year usage and local utility rate of \$0.075 per kilowatt-hour. Controls are assumed to contribute about 20% to savings.



PROJECT SUMMARY

Utility:	Boston Edison Company
Utility Representative:	Thomas Butler
Customer:	Northeast Energy Efficiency Partnerships, Inc.
Facility:	NEEP Headquarters
Location:	Lexington, Massachusetts
Space:	Offices and Conference Room
Area:	1,810 square feet
Ceiling Height:	8 feet 6 inches
Fixtures Used:	Peerless <i>Aero</i> indirect with one high-output (5000 lumen) T5 lamp per 4 foot section Litecontrol <i>Arcos Perf</i> direct-indirect with two Philips 2950 lumen T8 lamps per 4 foot section Lithonia recessed CFL downlights with 26W compact fluorescent lamps Controls and dimming ballasts by The Watt Stopper and Lutron
Mounting:	T8 suspended 8 inches from ceiling on 6-foot centers T5 suspended 14 inches from ceiling on 8-foot centers
Light Levels Achieved:	42 to 50 footcandles average
Lighting Power Density:	1.2 Watts per square foot
Lighting Specifier:	Boston Light Source
Installing Contractor:	Coastal Lighting, LLC



THE LIGHTING KNOWHOW™ SERIES

The DesignLights™ Consortium publishes the *knowhow™ Series* for office, small retail and classroom lighting. This *demonstrating lighting knowhow™ Case Study* highlights a specific installation of lighting that showcases quality, comfort and efficient use of energy. With members located throughout the Northeast, the DesignLights™ Consortium is “a regional collaboration seeking to influence naturally occurring lighting events towards quality, comfort and efficiency.” The DLC includes among its members many New England electric utilities as active participants, as well as several other interested stakeholders. The DLC created these case studies with the intention of helping contractors and lighting specialists sell and deliver the benefits of high quality, energy efficient lighting to their customers in the commercial building market.

National Grid

- Massachusetts Electric
- Narragansett Electric
- Granite State Electric
- Nantucket Electric

Northeast Energy Efficiency Partnerships, Inc.

New York State Energy Research and Development Authority

Northeast Utilities

- The Connecticut Light and Power Company
- Western Massachusetts Electric Company

NStar

- Boston Edison Company
- Commonwealth Electric Company
- Cambridge Electric Light Company

United Illuminating

Unitil

- Fitchburg Gas and Electric Light Company



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