

**LEED NC 2009
and Light Controls**

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April 1, 2011



This document summarizes the 2009 LEED Green Building Design and Construction requirements that light controls help achieve. It focuses on LEED 2009 rating system for the design, construction, or major renovation of commercial buildings (LEED NC 2009). It is for information purposes only. It is not meant to replace the LEED 2009 Reference Guide. Please refer to the reference guide for precise interpretation. The reference guide is available on the USGBC website at: <http://usgbc.org/>.

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I. What is LEED?

LEED—Leadership in Energy and Environmental Design—is a green building rating system started in 1998 and administered by the United States Green Building Council (USGBC). It provides an objective, national standard for what constitutes a “green” building. It offers a set of scientifically-based performance criteria for LEED building certification.

The LEED Green Building Rating Systems address seven topics:

- 1) **Sustainable Sites (SS)**—for responsible and environmentally-friendly site selection and design strategies.
- 2) **Water Efficiency (WE)**—for responsible water use and conservation.
- 3) **Energy and Atmosphere (EA)**—to optimize whole-building energy efficiency.
- 4) **Materials and Resources (MR)**—to promote responsible waste management and materials selection.
- 5) **Indoor Environmental Quality (IEQ)**—to minimize contaminants and optimize the indoor environment including the use of lighting controls and daylighting.
- 6) **Innovation in Design (ID)**—for exemplary performance above LEED requirements or for new green building innovations.
- 7) **Regional Priority (RP)**—to incentivize the achievement of LEED credits that are important to the local geography.

LEED version 3.0 is the newest version of LEED, which was launched on April 27, 2009.

LEED v3.0 is comprised of the following:

- New LEED 2009 rating system (point-based green building rating system) +
- New LEEP AP exams (exams for people to become LEED Accredited Professionals) +
- New LEED online (primary resource for managing the LEED documentation process)

As of **June 27, 2009** all LEED projects will have to register under the new LEED 2009 rating system.

II. 3 key changes in LEED 2009

1) Credit weighting:

- More emphasis on Energy and Atmosphere.
This means that Lutron® light controls are more significant toward achieving LEED certification as all Lutron solutions save energy.

2) Updated credits:

- Additional Innovation in Design point
- ASHRAE 90.1 2007 is now the baseline (or Title 24 2005 for CA projects) for the Energy and Atmosphere section
- 10% (5% for renovations) minimum energy performance improvement over the ASHRAE 90.1 2007 baseline

3) Regional Priority Credits (RPCs):

- Based on U.S. zip code, bonus points for LEED credits that are deemed to be a priority for a particular region. RPCs are not new LEED credits, but instead are existing credits that USGBC chapters and regional councils have designated as being particularly important for their areas. The incentive to achieve the credits is in the form of a bonus point. More info: <http://www.usgbc.org/News/USGBCInTheNewsDetails.aspx?ID=4099>

III. LEED NC 2009 vs. LEED NC 2.2

LEED NC 2009 has more weight on energy and atmosphere. And the point scale has also been simplified—100 base points and 10 bonus points.

LEED Point Structure Comparison

Description	LEED NC 2.2		LEED NC 2009		Difference in %
	Possible Pts	% of Total Pts	Possible Pts	% of Total Pts	
Sustainable Sites (SS)	14	20.29	26	23.64	3.35
Water Efficiency (WE)	5	7.25	10	9.09	1.84
Energy and Atmosphere (EA)	17	24.64	35	31.82	7.18
Material & Resources (MR)	13	18.84	14	12.73	-6.11
Indoor Environmental Quality (IEQ)	15	21.74	15	13.64	-8.10
Bonus Points					
Innovative Design (ID)	5	7.25	6	5.45	-1.79
Regional Priority (RP)	0	0	4	3.64	3.64
Totals	69	100	110	100	

Certification Point Requirements

Level	LEED NC 2.2		LEED NC 2009	
	Lower Limit	Upper Limit	Lower Limit	Upper Limit
Certification	26	32	40	49
Silver	33	38	50	59
Gold	39	51	60	79
Platinum	52	69	80	110

IV. How do Lutron® solutions contribute to LEED NC 2009 certification?

Lutron solutions can contribute to 40 out of 110 possible points (36%) in the new LEED 2009 NC rating system. The following is a summary of the credits that Lutron solutions help achieve.

LEED NC 2009 Summary of the Credits and Prerequisites that Lutron Solutions Help Achieve ¹			
Credit	Description	Points that Lutron Solutions Help Achieve	% of Total Possible Points
SS	Sustainable Sites	1 out of 26	4%
Credit 8	•Light Pollution Reduction	1	
EA	Energy and Atmosphere	24 out of 35	69%
Prereq. 1	•Fundamental Commissioning	--	
Prereq. 2	•Min. Energy Performance	--	
Credit 1	•Optimize Energy Performance ²	19	
Credit 3	•Enhanced Commissioning	2	
Credit 5	•Measurement & Verification	3	
MR	Material & Resources	2 out of 14	14%
Credit 4	•Recycled Content	2	
IEQ	Indoor Environmental Quality	3 out of 15	20%
Credit 6.1	•Controllability of Systems - Lighting	1	
Credit 8.1	•Daylight	1	
Credit 8.2	•Views	1	
ID	Innovative Design	6 out of 6	100%
Credit 1	•Innovative Design	5	
Credit 2	•LEED AP	1	
RP	Regional Priority	4 out of 4	100%
	•Various	4	
	Total Possible Points	40 out of 110	36%

¹ Note that use of any products will not guarantee any LEED points. Products may have to be combined with other solutions to meet the full requirements for each credit.

² Please refer to page 9 for more details.

IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

1) Sustainable Sites (Lutron solutions help achieve 1 point)

Credit 8 Light Pollution Reduction (1 pt)

Intent:

- Minimize light trespass from the building.

Key Requirements:

- Interior lighting—No light shining out windows OR all non-emergency interior lighting power reduced by at least 50% during non-business hours (11 pm to 5 am).

- Exterior lighting—Must comply with ASHRAE 90.1 2007 Lighting Power Densities (watts per square foot) and lighting zone requirements in IESNA RP 33.

Lutron Solution:

- Controllable window shades with the right fabrics prevent light from escaping on the windows of the building.

- Occupancy sensors turn lights off when spaces are vacant to not only save energy but also prevent light pollution from escaping the building.

- Timeclock scheduling can be used to provide a building lighting sweep at night so that lights are off or set to a low dimmed level at certain times, saving energy and preventing light pollution.

IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

2) Energy and Atmosphere (Lutron solutions help achieve 24 points)

Prerequisite 1 Fundamental Commissioning

Intent:

- Verify that the building's energy systems are installed, calibrated, and perform according to owner's requirements, basis of design, and construction docs.

Key Requirements:

- Develop a commissioning plan; verify the installation and performance of systems to be commissioned.

Lutron Solution:

- Lutron field service team will help the Commissioning Authority (CxA) verify the installation and performance of the Lutron systems.

Prerequisite 2 Minimum Energy Performance

Intent:

- Establish a minimum level of energy efficiency for the building.

Key Requirements:

- Demonstrate a 10% minimum energy reduction compared to an ASHRAE 90.1 2007 (or CA Title 24 2008) compliant building.
- Comply with mandatory lighting control requirements in Section 9.4 of ASHRAE 90.1 2007.

Lutron Solution:

- Occupancy sensors and timeclock scheduling can be used to meet the mandatory lighting control requirements in Section 9.4 of ASHRAE 90.1 2007.
- Using a combination of Quantum® or EcoSystem® energy saving light control strategies such as automated shading, daylight harvesting, high-end trim, light level tuning, dimming, scheduling, and occupancy sensing can reduce lighting loads by 60% or more. And these strategies can also reduce HVAC loads by 20% or more.

Lutron® is not liable for reliance on this document towards interpreting or complying with LEED 2009 requirements.

IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

2) Energy and Atmosphere (con't.)

Credit 1 Optimize Energy Performance (1-19 pts)

Intent:

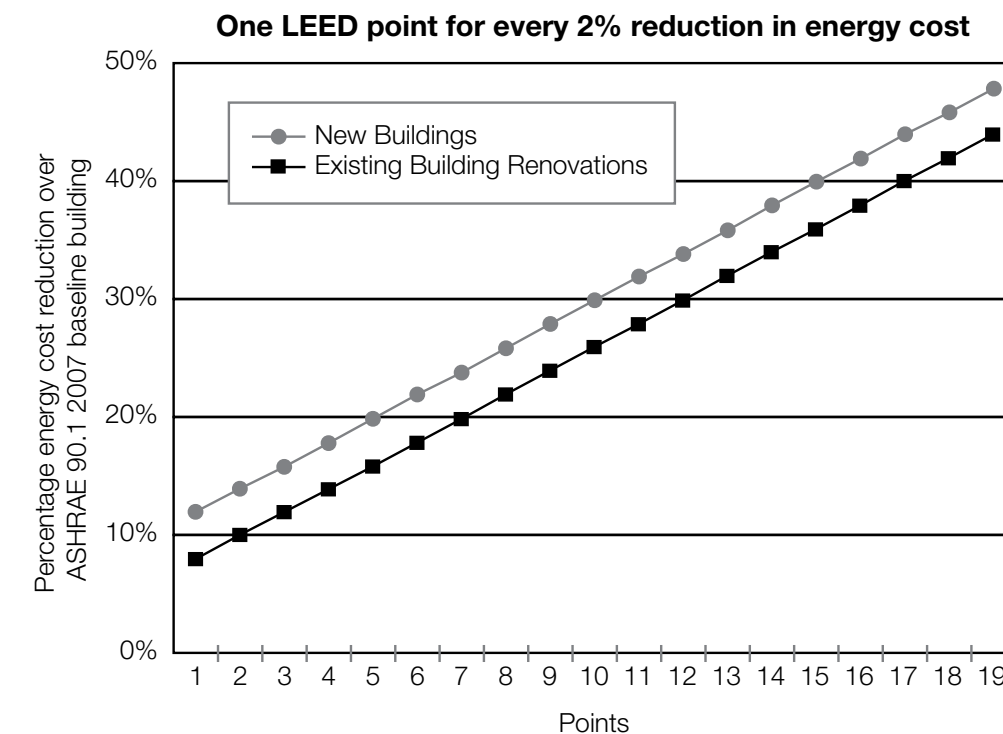
- Achieve energy performance beyond the prerequisite standard.

Key Requirements:

- Whole building energy simulation to show energy performance better than ASHRAE 90.1 2007 (or Title 24 2005 for CA projects) by at least 12% (8% for renovation). Note that automatic shades, not manual shades, may be used in the energy simulation.

Lutron Solution:

- Occupancy sensors and timeclock scheduling can be used to meet the mandatory lighting control requirements of ASHRAE 90.1 2007 chapter 9.
- Using a combination of Quantum® or EcoSystem® energy-saving light control strategies such as daylight harvesting, high-end trim, light level tuning, dimming, scheduling, automatic shading, and occupancy sensing reduces both lighting and HVAC loads.



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IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

2) Energy and Atmosphere (con't.)

Credit 3 Enhanced Commissioning (2 pts)

Intent:

- Begin commissioning early in the design process and execute additional activities after systems performance verification has been completed.

Key Requirements:

- Develop a systems manual.
- Verify that the requirements for training operating personnel are in place.
- Review building performance within 10 months of substantial completion.

Lutron Solution:

- Lutron field service can train and provide necessary manuals to operating personnel.

Credit 5 Measurement and Verification* (3 pts)

Intent:

- Provide ongoing accountability of building energy consumption over time.

Key Requirements:

- Develop and implement a measurement and verification (M&V) plan to monitor building electricity consumption.
- M&V must cover at least 1-year of post-construction occupancy.
- Provide a process for corrective action if the M&V results don't show energy savings.

Lutron Solution:

- Quantum® lighting power monitoring provides continuous lighting energy consumption and savings data for the M&V plan.
- Quantum light control strategies, such as light level tuning, can be easily implemented to provide necessary corrective action to achieve the desired energy savings.

* Note to increase the likelihood of achieving this point, HVAC loads should be monitored as well as the lighting loads. Furthermore, the USGBC now requires that new LEED buildings provide energy performance data annually in order to maintain LEED certifications.

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IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

3) Material and Resources (Lutron solutions help achieve 3 points)*

Credit 4 Recycled Content (1-2 pts)

Intent:

- Increase demand for building products that incorporate recycled materials.

Key Requirements:

- Use materials such that the sum of the recycled content constitutes at least 10% or 20%, based on cost, of the total value of the materials cost in the project.

Lutron Solution:

- 100% recycled fabrics for Lutron controllable window shades.

* Note that electrical components cannot be included in the calculation for this credit. Thus, the cost of the electronic drive must be excluded from the required calculations. Also, since shades are considered furniture as they are part of CSI Division 12, the cost of all Division 12 materials must be included in calculations for MR credits 3 through 7.

Lutron® is not liable for reliance on this document towards interpreting or complying with LEED 2009 requirements.

IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

4) Indoor Environmental Quality (Lutron solutions help achieve 3 points)

Credit 6.1 Controllability of Systems— Lighting (1 pt)

Intent:

- Provide a high-level of lighting system control for individual occupants or groups in multi-occupant spaces (i.e. classrooms, conference rooms) and promote their productivity, comfort, and well-being.

Key Requirements:

- Provide individual lighting controls for at least 90% of the occupants to suit individual task needs and preferences; and provide lighting controllability for all shared multi-occupant spaces to allow for adjustments to meet group needs and preferences.

Lutron Solution:

- All Lutron lighting controls help achieve this credit.

Credits 8.1 Daylight and 8.2 Views (1-2 pts)

Intent:

- Provide occupants a connection to outdoors through daylight and views into regularly occupied spaces.

Key Requirements:

- At least 75% of regularly occupied spaces must be daylight illuminated with a minimum of 25 footcandles.
- Achieve a direct line of sight to the outdoor environment via vision glazing btw 30” and 90” above floor for occupants in 90% of all regularly occupied areas.

- Provide glare control.

Lutron Solution:

- Lutron automated windows shades help control glare while still providing daylight and access to views.

IV. How do Lutron® solutions contribute to LEED NC 2009 certification? (con't.)

5) Innovation in Design (Lutron solutions help achieve 6 points)

Credit 1 Innovation in Design (1-5 pts)

Intent:

- Additional points for exceptional performance above LEED requirements and/or innovative performance in green building categories not addressed by LEED.

Key Requirements:

- Exemplary performance—Achieving double the credit requirements and/or achieving the next incremental threshold for the LEED requirement.
- Innovation in Design—Provide details on an innovative green building solution not addressed by LEED.

Lutron Solution:

- Using the Quantum® Green Glance® energy savings display in conjunction with a distributed case study or building tours helps achieve innovation point for Green Education.
- Using Quantum Hyperion solar-adaptive shading which automatically adjusts shades based on the position of the sun, may achieve an innovation point for the Daylight and Views.

Credit 2 LEED AP (1 pt)

Intent:

- Support and encourage design integration required by a LEED and streamline the application certification process.

Key Requirements:

- At least one principal participant on the project must be a LEED-AP.

Lutron Solution:

- Lutron has several LEED APs on staff that can assist the project team with the LEED rating system (see table on the next page).

V. Lutron® LEED APs and Green Associates as of 4/1/11

	Name	City	State	Country	Primary Area	Email	Phone	Certification
1	James Cheng	Chicago	IL	USA	Sales – Central	jcheng@lutron.com	312.420.4867	LEED AP
2	Lori Christopherson	Chicago	IL	USA	Sales – Central	lchristopherson@lutron.com	773.551.2084	LEED AP
3	Megan Donovan	Seattle	WA	USA	Sales – Northwest	mdonovan@lutron.com	206.331.2489	LEED AP
4	Manny Feris	Coopersburg	PA	USA	Residential Interiors	mferis@lutron.com	610.282.7613	LEED AP
5	Juan Figueroa	Cooper City	FL	USA	Window System Sales – Southeast	jfigueroa@lutron.com	954.647.6582	LEED AP
6	Michael Jouaneh	Coopersburg	PA	USA	Marketing	mjouaneh@lutron.com	610.282.5350	LEED AP
7	Maurice Karagiorgos	Kirkland	WA	USA	Sales – Northwest	mkaragiorgos@lutron.com	206.218.7140	LEED AP
8	Ashley Wickramaratne	Chicago	IL	USA	Sales	akwait@lutron.com	312.206.8088	LEED AP
9	Tom Myers	Coopersburg	PA	USA	Sales	tmyers@lutron.com	484.431.4133	LEED AP
10	Matthew Schulz	Belmont	CA	USA	Sales – Government/Military	mschulz@lutron.com	650.339.3263	LEED AP
11	Boon Liang Seng	Singapore	–	Singapore	Sales – Asia	blseng@lutron.com	011.65.6220.4666	LEED AP
12	JD Stephens	Freemont	CA	USA	Sales – Northwest	jdstephens@lutron.com	510.936.3371	LEED AP
13	Shaun H. Taylor	Washington, DC	–	USA	Sales – Mid-Atlantic	shtaylor@lutron.com	202.302.4126	LEED Green Associate
14	Amy Whiteluke	Coopersburg	PA	USA	Sales – NYC	awhiteluke@lutron.com	610.657.5610	LEED AP
15	Patrick Yam	Hong Kong	–	China	Specification Sales – Asia	pyam@lutron.com	011.852.9098.3540	LEED AP
16	Derek Yung	Hong Kong	–	China	Sales – Asia	dyung@lutron.com	011.852.9305.2607	LEED AP
17	Scott Ziegenfus	Coopersburg	PA	USA	Senior Applications Engineer	sziegenfus@lutron.com	610.282.6559	LEED AP

VI. Sample of Lutron® LEED projects

Project	Building Type	Rating System	Certification Level	Location	Other Details
Access Living	Office	NC 2.1	Gold	Chicago, IL	Case study (P/N 367-1687)
AIA HQ	Office	CI 2.0	Gold	San Francisco, CA	www.lutron.com/casestudies
Allsteel Showroom	Retail	CI 2.0	Silver	San Francisco, CA	www.lutron.com/casestudies
Bank of America	Office	CI 2.0	Silver	New York, NY	Uses EcoSystem®
Bently Reserve	Office	CS 2.0	Silver	San Francisco, CA	www.lutron.com/casestudies
eBay	Office	NC 2.1	Gold	San Jose, CA	Quantum with QED® shades
Exelon HQ	Office	CI 2.0	Platinum	Chicago, IL	Uses EcoSystem
Genzyme Center	Office	NC 2.0	Platinum	Cambridge, MA	Uses EcoSystem
Hotel Arista	Hotel	NC 2.2	Certified	Naperville, IL	Video case study www.lutron.com/stanza/arista
HSBC	Office	NC 2.1	Gold	Chicago, IL	Uses Quantum
ITC Gardenia	Hotel	India NC	Platinum	Bangalore, India	LCP 128
Montage Hotel Beverly Hills	Hotel	NC 2.2	Gold	Beverly Hills, CA	Uses a Lutron GRAFIK 5000™ system
Orchard Garden Hotel	Hotel	NC 2.1	Certified	San Francisco, CA	Uses Lutron GRAFIK® 4000
Salmon Creek Eco-Resource Building	Education	NC 2.2	Platinum	Occidental, CA	EcoSystem, GRAFIK QS, QS shades and LCP
Sidwell Friends School	Education	NC 2.1	Platinum	Washington DC	See case study (P/N 367-1336)
Starwood Element	Hotel	NC 2.2	Gold	Lexington, MA	Uses Lutron GRAFIK 4000
The Energy Foundation	Office	CI 2.0	Platinum	San Francisco, CA	Video and hardcopy case studies coming soon; uses Quantum system with some QED shades
The Plaza Center at PPL	Office	NC 2.0	Gold	Allentown, PA	See Lutron LEED CEU presentation for more details
Yale Sculpture Building	Education	NC 2.1	Platinum	New Haven, CT	Lutron occupancy and daylight sensors along with Lutron dimmer ballasts

Additional information:

Yale Sculpture Building is a 51,000 sqft LEED Platinum building completed in 2007 which houses student studios, a gallery, and faculty offices. Occupancy sensors are implemented throughout to switch lights off in unoccupied areas. Lutron Daylight Sensors and Dimming Ballasts work together to maximize natural light while maintaining a constant light level in all publicly occupied spaces.

The Genzyme Center completed in 2003, is a 344,000 square foot LEED Platinum office building located in Cambridge Massachusetts. Among the state of the art strategies for sustainable design, are Lutron Daylight and Occupancy Sensors along with individually dimmable ballasts which together, are expected to reduce lighting energy use by 45%.

LEED NC 2009 and Light Controls

For more information see:

- LEED Buildings Light Control Solutions brochure (P/N 367-679)
- AIA CEU—Lighting Controls for Sustainable Design and LEED Certification
- www.lutron.com/leed

Questions?

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OR

Contact: Michael Jouaneh, LEED AP

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