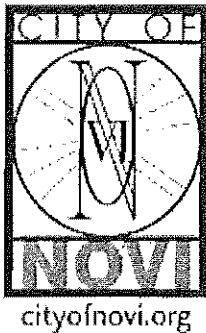


# MEMORANDUM



**TO:** MEMBERS OF THE PLANNING COMMISSION  
**FROM:** KRISTEN KAPELANSKI, AICP, PLANNER *Kapelan*  
**THRU:** BARBARA MCBETH, AICP, COMMUNITY DEVELOPMENT  
DEPUTY DIRECTOR  
**SUBJECT:** TEXT AMENDMENT 18.264 – RESIDENTIAL DEVELOPMENT  
ENTRANCE LIGHTING  
**DATE:** DECEMBER 6, 2012

---

The Community Development Department has reviewed the Zoning Ordinance provisions and suggested a possible amendment to require new residential developments to provide street lighting for road and driveway entrances at major thoroughfares. This amendment is being proposed in response to discussion by the City Council that street lighting is desired at main entrances to subdivisions. It is expected that the ordinance will complement the recently updated and adopted "Street Light Policy".

The Planning Commission previously considered the matter at the October 24, 2012 Planning Commission meeting. At that meeting, the Commission expressed some concerns. In particular, it was noted that a standard for the amount of light to be provided could be added and there was a question regarding the type of lighting that would be permitted (i.e., incandescent versus LED, etc.). Relevant meeting minutes are attached.

#### Revised Ordinance Amendment

The revised amendment would require developers to provide lighting at each residential entrance intersecting with a major thoroughfare to sufficiently illuminate the entrance of the development. Fixtures would be limited to a height of 25 feet so as to prevent glare and direct illumination away from adjacent properties.

Additionally, any fixtures would need to be in accordance with Section 2511 'Exterior Lighting' of the Zoning Ordinance. A provision requiring entrances to have a minimum illumination of 0.2 foot-candles (equivalent to the City's requirements for parking areas) has been added.

#### LED lighting

The ordinance currently does not restrict exterior lighting to any particular type of lamp, but encourages metal halide over high or low pressure sodium lights. The use of LED (Light Emitting Diode) lighting would be permitted in private developments under the current provisions of the ordinance, provided the lighting otherwise meets the standards of the ordinance for minimum levels of illumination, and the fixtures are adequately screened to prevent unnecessary glare, reduce spill-over onto adjacent properties and reduce unnecessary transmission of light into the night sky.

Staff found a few webpages describing the use of LED lights in parking lots and for other exterior lighting. Generally, it appears that the initial cost to install LED lighting is more expensive than other types of lighting, but that there can be an overall reduction in energy use and maintenance costs over the life of the fixture. Additionally, reports indicate that LEDs are capable of producing light that provides an accurate rendering of an object's natural color, which is one benefit of the recommended metal halide fixtures. Please see attached excerpts from selected webpages.

Planning staff contacted the Department of Public Services (DPS) department to determine if that department had any objections to the ordinance as proposed. DPS staff indicated that high pressure sodium lights are the current standard for public street lights, since they are considered to be more energy efficient than metal halide, and have a longer lamp life. The DPS Department is open to reviewing other types of fixtures and lighting as new fixtures or replacements are needed, and therefore had no objection to the ordinance as proposed.

Planning Commission Action

The Planning Commission is asked to hold the Public Hearing on the proposed ordinance amendment and forward a recommendation to the City Council, for reading and adoption.

If any Commissioner has any questions related to this request, do not hesitate to contact Kristen Kapelanski in the Community Development Department at 248-347-0586 or [kkapelanski@cityofnovi.org](mailto:kkapelanski@cityofnovi.org).

**PROPOSED ORDINANCE AMENDMENTS – STRIKE VERSION**

STATE OF MICHIGAN

COUNTY OF OAKLAND

CITY OF NOVI

ORDINANCE NO. 12- 18 – 264

AN ORDINANCE TO AMEND ORDINANCE NO. 97-18 AS AMENDED, THE CITY OF NOVI ZONING ORDINANCE AT ARTICLE 25, GENERAL PROVISIONS, SECTION 2511, EXTERIOR LIGHTING; IN ORDER TO MODIFY THE STANDARDS FOR LIGHTING AT RESIDENTIAL DEVELOPMENT ENTRANCES.

THE CITY OF NOVI ORDAINS:

Part I. That Ordinance No. 97-18, the City of Novi Zoning Ordinance, as amended, hereby amended to read as follows:

ARTICLE 25. GENERAL PROVISIONS

Section 2500. – Section 2510. [Unchanged.]

Section 2511. Exterior Lighting

[Unchanged.]

1. – 2. [Unchanged.]

3. Required conditions. When site plan approval is required for the installation or modification of exterior lighting, the following conditions shall apply:

a. – m. [Unchanged.]

n. All residential developments shall provide lighting at each entrance intersecting with a major thoroughfare sufficient to illuminate the entrance of the development. A major thoroughfare shall be defined as a major arterial, arterial or minor arterial road as designated in the City of Novi Master Plan's Thoroughfare Classification Map. Minimum illumination shall be 0.2 foot-candles. Fixtures shall not exceed 25 feet in height. Lighting shall be subject to the requirements of this Section of the Zoning Ordinance. If the proposed lighting is within the right-of-way, installation, maintenance and operating costs and responsibilities shall be in accordance with the amended Street Light Policy adopted by the City Council in 2012.

4. – 5. [Unchanged.]

Section 2512. – Section 2524. [Unchanged.]

**Part II**

**Severability.** Should any section, subdivision, clause, or phrase of this Ordinance be declared by the courts to be invalid, the validity of the Ordinance as a whole, or in part, shall not be affected other than the part invalidated.

**PART III.**

**Savings Clause.** The amendment of the Novi Code of Ordinances set forth in this Ordinance does not affect or impair any act done, offense committed, or right accruing, accrued, or acquired or liability, penalty, forfeiture or punishment, pending or incurred prior to the amendment of the Novi Code of Ordinances set forth in this Ordinance.

**PART IV.**

**Repealer.** All other Ordinance or parts of Ordinance in conflict herewith are hereby repealed only to the extent necessary to give this Ordinance full force and effect.

**PART V.**

**Effective Date: Publication.** Public hearing having been held hereon pursuant to the provisions of Section 103 of Act 110 of the Public Acts of 2006, as amended, the provisions of this Ordinance shall be published within fifteen (15) days of its adoption by publication of a brief notice in a newspaper circulated in the City of Novi stating the date of enactment and effective date, a brief statement as to its regulatory effect and that a complete copy of the Ordinance is available for public purchase, use and inspection at the office of the City Clerk during the hours of 8:00 A.M. to 5:00 P.M., Local Time. The provisions of this Ordinance shall become effective seven (7) days after its publication.

MADE, PASSED, AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF NOVI, OAKLAND COUNTY, MICHIGAN, ON THE \_\_\_\_ DAY OF \_\_\_\_\_, 2012.

\_\_\_\_\_  
ROBERT J. GATT, MAYOR

\_\_\_\_\_  
MARYANNE CORNELIUS, CITY CLERK

Ayes:  
Nays:  
Abstentions:  
Absent:

**PROPOSED ORDINANCE AMENDMENTS – CLEAN VERSION**

STATE OF MICHIGAN  
COUNTY OF OAKLAND  
CITY OF NOVI

ORDINANCE NO. 12- 18 – 264

**AN ORDINANCE TO AMEND ORDINANCE NO. 97-18 AS AMENDED, THE CITY OF NOVI ZONING ORDINANCE AT ARTICLE 25, GENERAL PROVISIONS, SECTION 2511, EXTERIOR LIGHTING; IN ORDER TO MODIFY THE STANDARDS FOR LIGHTING AT RESIDENTIAL DEVELOPMENT ENTRANCES.**

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4. – 5. [Unchanged.]

Section 2512. – Section 2524. [Unchanged.]

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MADE, PASSED, AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF NOVI, OAKLAND COUNTY, MICHIGAN, ON THE \_\_\_ DAY OF \_\_\_\_\_, 2012.

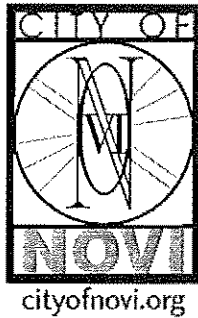
\_\_\_\_\_  
ROBERT J. GATT, MAYOR

\_\_\_\_\_  
MARYANNE CORNELIUS, CITY CLERK

Ayes:  
Nays:  
Abstentions:  
Absent:



PLANNING COMMISSION  
DRAFT MEETING MINUTES - EXCERPT  
OCTOBER 24, 2012



# PLANNING COMMISSION MINUTES

CITY OF NOVI

Regular Meeting

October 24, 2012 7:00 PM

Council Chambers | Novi Civic Center | 45175 W. Ten Mile  
(248) 347-0475

## CALL TO ORDER

The meeting was called to order at or about 7:00 PM.

## ROLL CALL

**Present:** Member Anthony, Member Lynch, Chair Pehrson, Member Zuchlewski

**Absent:** Member Greco (Excused), Member Gutman (Excused), Member Prince (Excused)

**Also Present:** Barbara McBeth, Deputy Director of Community Development, Gary Dovre, City Attorney; Kristen Kapelanski, Planner

## PLEDGE OF ALLEGIANCE

Member Anthony led the meeting attendees in the recitation of the Pledge of Allegiance.

## APPROVAL OF AGENDA

Moved by Member Lynch, seconded by Member Anthony:

**VOICE VOTE ON THE AGENDA APPROVAL MOTION MADE BY MEMBER LYNCH AND SECONDED BY MEMBER ANTHONY:**

*Motion to approve the October 24, 2012 Planning Commission Agenda. Motion carried 4-0.*

## PUBLIC HEARINGS

### 1. ZONING ORDINANCE TEXT AMENDMENT 18.264 TO PROVIDE LIGHTING AT RESIDENTIAL ENTRANCES ON MAJOR THOROUGHFARES

Recommendation to City Council for an Ordinance to amend Ordinance No. 97-18 as amended, the City of Novi Zoning Ordinance at Article 25, General Provisions, Section 2511, Exterior Lighting; in order to modify the standards for lighting at residential development entrances.

Planner Kapelanski said this is in response to the City Council expressing an interest in assuring residential development entrances are easily identifiable through proper lighting. Staff has suggested a possible amendment and this would require street lighting for proposed residential developments. It would only apply to newly proposed single and multiple-family developments with entrances on a major thoroughfare. Any existing residential developments that wish to install entranceway lighting could do so in accordance with the Street Lighting Policy adopted by the City Council on September 24, 2012. The Planning Commission is asked to hold the public hearing and forward a recommendation to the City Council.

No one wished to speak and there was no correspondence and Chair Pehrson closed the public hearing.

Chair Pehrson asked Planner Kapelanski if the ordinance itself allowed for different types of lighting, such as incandescent versus LED and does it specify the lumens required.

Planner Kapelanski answered in saying it does not specified the lumens required. As of now, it just reads sufficient to illuminate the entrance. Staff could add requirements that perhaps would be equal to what's required for parking lots or something similar. Any type of lighting would be permitted. The Street Lighting Policy that was recently approved by the City Council talks about the types of maintenance and cost that would be covered by the City. The standard cobra head fixture is the one that the City

would cover the parts and maintenance for. The City would maintain other types of fixtures provided the development stocked the parts.

Chair Pehrson said he thought it would be worthwhile to add in some of those considerations; maybe there is a range that could be considered for both the lumens themselves as well as the dispersion pattern. Staff should look at the differences between the incandescent and LED.

Member Zuchlewski suggested the City require either mercury vapor or high pressure sodium so that the lighting itself is all one color.

Member Lynch asked if the ordinance only allowed street lights that shine down.

Planner Kapelanski said that some subdivisions might elect to have a decorative fixture that doesn't necessarily have a full cut off. Some of the decorative ones are more of the pedestrian style lighting that tends to shine in all directions.

Member Lynch asked Planner Kapelanski if it was only in the main entrances.

Planner Kapelanski answered in saying it is only at a main entrance at a major thoroughfare.

Chair Pehrson stated asked if previously constructed developments would have to install lighting.

Planner Kapelanski answered developments that have already been constructed before the ordinance is in place would not be required to comply.

Deputy Director McBeth suggested that staff could re-work this ordinance and bring it back to the Planning Commission if Planning Commission wishes to do so.

Motion made by Member Zuchlewski and seconded by Member Lynch:

**ROLL CALL VOTE ON MOTION TO POSTPONE CONSIDERATION OF TEXT AMENDMENT 18.264 MADE BY MEMBER ZUCHEWSKI AND SECONDED BY MEMBER LYNCH:**

**Motion to postpone consideration of Text Amendment 18.264 in order to modify the standards for lighting of residential development entrances so that the staff may address the issues raised by the Planning Commission. Motion 4-0.**

## STREET LIGHTING POLICY

RESOLUTION FOR AMENDED STREET LIGHT POLICY  
CITY OF NOVI,  
September 24, 2012

City of Novi  
County of Oakland, Michigan

Minutes of a regular Meeting of the City Council of the City of Novi, County of Oakland, Michigan, held in the City Hall in said City on September 24, 2012, at 7:00 o'clock P.M. Prevailing Eastern Time.

PRESENT: Councilmembers: Gatt, Staudt, Casey, Fischer, Margolis, Mutch, Wrobel

ABSENT: Councilmembers: None

The following preamble and Resolution were offered by Councilmember Margolis and supported by Councilmember Fischer.

WHEREAS, on December 19, 1988, Novi City Council adopted a "Street Light Policy" to address requests for street light installation in the City of Novi; and,

WHEREAS, said 1988 Street Light Policy needs to be updated to address different types of street lighting requests and to encompass established and successful practices; and,

WHEREAS, alternatives to establishing a Special Assessment District (SAD) for street lighting shall exist to accommodate street light installation requests from individual petitioners; and,

WHEREAS, street lights provide a public safety benefit and serve as a valuable way-finding tool; and,

WHEREAS, street lights in the public rights-of-way are typically installed, owned and operated by DTE Energy (DTE) under agreements between DTE and the City of Novi; and,

WHEREAS, the City of Novi deems the facilitating of street lighting to be a proper public service.

NOW, THEREFORE, BE IT RESOLVED, that the City of Novi City Council hereby effectively amends the 1988 Street Light Policy by establishing the following policy for street light installations that are not associated with an SAD within the City of Novi:

For single standard street lights requested for installation in the public right-of-way at major road entrances of residential developments:

1. The City will contract directly with DTE for the installation and operation of a single standard entryway street light, defined as a steel pole with a single "cobra head" fixture fed by an underground electrical conduit.
2. The City will pay for the non-DTE share of the installation cost (DTE pays for a portion of the installation cost equal to the first three years of revenue DTE will receive for operation).
3. The City will pay for ongoing energy costs for perpetuity.
4. Installation will only be made in cases where electrical service for the street light is available within one hundred (100) feet of the proposed street light location. Otherwise, the petitioner would bear the additional installation cost.
5. If the request is for a decorative/non-standard street light, then the petitioner shall bear the non-DTE cost of the installation.

For all other street light requests from individual petitioners:

1. The City will contract directly with DTE for the installation and operation of the type and number of poles and fixtures requested by the petitioner.
2. The City will contract with the petitioner as a means to recoup installation costs immediately and operating costs over a renewable 20-year term.
3. The City will pay for the non-DTE share of the installation costs.
4. The City will be reimbursed by the petitioner for installation costs upon execution of the agreement.
5. The City will pay for energy costs; and bill annually and be reimbursed by the petitioner.
6. The City will be authorized to collect a 10% administrative fee added to annual energy costs.
7. Any increase in DTE's energy costs must be assumed by the street light petitioner.

AYES: Councilmembers: Gaff, Staudt, Casey, Fischer, Margolis, Mutch, Wrobel (7)

NAYES: Councilmembers: None (0)

RESOLUTION DECLARED ADOPTED.

  
MARYANNE CORNELIUS, City Clerk

CERTIFICATION

I hereby certify that the foregoing is a true and complete copy of a Resolution adopted by the City Council of the City of Novi at a regular meeting held this 24th day of September, 2012.

  
MARYANNE CORNELIUS, City Clerk

INFORMATION ON LED LIGHTING





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**Northeast Group research shows satisfaction with LED street lights**

30 Oct 2012

*Smart-energy-focused research firm says that 95% of the municipalities in the US that have installed SSL street lights are satisfied with the results.*

Northeast Group has published a study entitled "United States smart infrastructure: LED and smart street lighting" that is based on interviews with more than 100 municipalities that have installed LED-based street lights. The smart-energy-focused research firm found that 95% of the municipalities are pleased with the overall performance of the solid-state lighting (SSL), and that on average the municipalities are realizing a 60% savings in combined energy and maintenance costs.

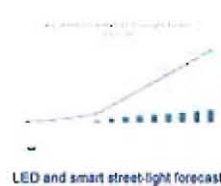
The satisfaction rating applies both to municipality officials and citizens and include both performance and the lighting quality. Moreover, the study notes that law-enforcement and public-safety officials were especially pleased with improved visibility.

Looking forward, the Northeast Group expects technology advancements to provide additional energy savings. Specifically, adaptive controls and dimming could reduce energy usage an additional 20-30%.

The bad news may be in the area of funding. The study reports that 45% of the municipalities surveyed used funding from the American Recovery and Reinvestment Act (ARRA) to pay for essentially the entire street-light project. An additional 36% used ARRA funding or other grants to finance a portion of their project.

For the most part ARRA funding is gone with the exception of a few projects currently underway. Fortunately, SSL prices are dropping, making the LED-based lighting more affordable and payback periods shorter.

Northeast Group also projected that "the LED and smart street lighting markets are expected to reach a cumulative \$4.7 billion in the US by 2025." Clearly there is still a lot of opportunity in the market segment. The study said that most municipalities that have installed LED lights have done so in a small percentage of their street light inventory. Cumulatively in the US, the study says that the penetration rate of LED street lights is still less than 1%. But there are a lot of companies chasing the market with the study identifying more than 25 active manufacturers.



**LINKS**

**Channels**

[Outdoor Illumination](#)

**Related Stories**

DOE Gateway report indicates LED post-top lighting performed efficiently in New York's Central Park (Oct 2012)

Toshiba installs 20,000 LED street lamps in San Antonio (Sept 2012)

**Author**

Maury Wright

**Go farther, faster!**

We have the right LED product for every application.

**OSRAM**  
 Opto Semiconductors

**About the Author**

Maury Wright is the Editor of LEDs Magazine.

**COMMENTS**

There are currently no comments.

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Invented by Nichia

**NICHIA**

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- Power Backup for Airfield
- Remote Controlled Lights
- Runway Lights
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- Solar RunWay Lights Edge
- Solar Powered Tower Lights
- Tower Obstruction Lights
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- Wind Cones
- Solar Powered Wind Cones

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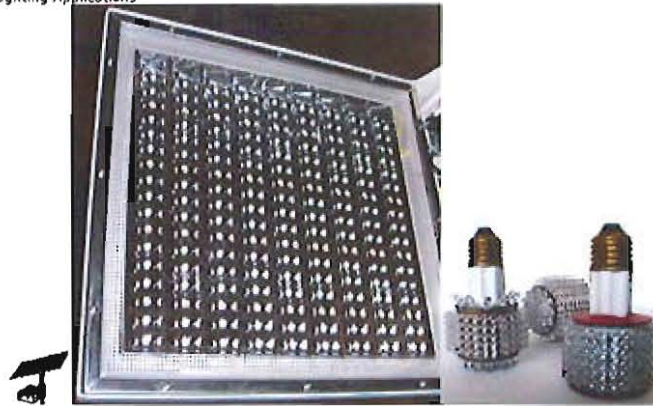
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- Hospital Signals

[Light Emitting Diodes \(LED\) for Street and Parking Lot Lighting Applications](#)

LED for Street and Parking Lot Lighting Applications



**Technical assessment of light emitting diodes (LED) lights for street and parking lot lighting applications.** Recently, there have been significant improvements in the cost, performance, and application of LEDs for a variety of lighting applications. The energy saving potential of LED lighting, as compared with conventional lighting, ranges from 50 to 90 percent. Additionally, LED lighting technology offers benefits of extended operating lifetime (up to 100,000 operating hours), small sizes to expand fixture design options, and improved optical quality and control.

**Low Power Requirements.** LEDs require low direct current voltage and low power to operate. This ultimately results in reduced energy use. In many applications where LEDs are used today the energy savings are at least 50 percent, and up to 90 percent for applications where they replace Incandescent lights. Energy and cost savings associated with the use of LEDs in traffic signals are approximately 90 percent.

**Long Lifetimes.** LED manufacturers claim lifetimes of up to 100,000 hours (with less than 40 percent lumen depreciation after 100,000 hours of operation). This is several times greater than the operating life of conventional lighting. Because LEDs may last more than 10 years, replacing lights that are difficult or costly to access are good candidate applications for LEDs, such as towers, aircraft, offshore buoys, tunnels, and bridges.

**Color Rendering.** LEDs are capable of producing light that provides an accurate rendering of object's natural color. LED products for street and parking lot applications have been designed to produce a warm, white, light that range from 85 to 90 (on a scale of 100) on the color rendering index (CRI). This is very good especially compared to other lights commonly used these application, such as high pressure sodium (CRI of 20 to 80), mercury vapor (CRI 20 to 60), metal halide (CRI of 60 to 80), and especially low pressure sodium (CRI 20 to 60) whose yellow color makes it difficult to discern color difference in objects.

**Small Size.** LEDs have been referred to as the ultimate light point source. This offers product designers and integrators flexibility in their form and design for a wide range of products. LEDs in the miniature lamp market, such as use in automotive panel display lighting and rear cluster (red) lighting, is well established and growing. The small LED size also allows mixing of different colors in small areas for meeting specific optical needs.

**Optical Control.** LEDs offer the benefit of greater optical control due to their small size and packaging options. When combined with a well-designed fixture, the light produced by LEDs can be directed to the intended location such as a roadway surface. Typical fixture losses are in the range from 40 to 60 percent, meaning that only about one-half of the source light is directed in the desired direction. LED fixture efficiencies can be in the 80 to 90 percent range. Thus, an LED light output does not have to be as high as a conventional light to achieve the same coverage. This makes LEDs advantageous for streetlight fixtures to minimize light trespass to adjacent areas not intended to be lit.

**Operating Characteristics.** LEDs have several favorable operating characteristics. The lights do not require any "strike" time – they instantly come on and off – and on/off cycling does not affect lifetimes. As LEDs fail, they dim rather than turn completely off or cycle on/off as with other lighting. LED are resistance to vibration, a key attributes in the automotive market. Also, LEDs are dimmable and operate without generating excessive heat.

**Lighting Guidelines for Streets and Parking Lots**

The Illuminating Engineering Society (IES) of North America provides recommended lighting levels for nearly every lighting application. Tables 2-1 and 2-2 provide IES recommended light level for parking lots and roadways. (IES 1989)

**Recommended Horizontal Illuminances for Open Parking Facilities.**

Level of Activity	Foot-candles (Minimum on Pavement)
High	0.9
Medium	0.6
Low	0.2

**Estimated Energy Savings**

Table shows the estimated annual energy savings for replacing a 100-W HPS light fixture with each of the three manufacturers LED products identified in Table

Watts	Replaces HPS	Equal to HPS Lumen Efficiency of
48W	75W	3,300
60W	125W	4,400
80W	150W	6,000
100W	175W	7,600
125W	200W	9,400
140W	250W	10,600
180W	320W	13,800

**Notes:**

- W watts
- Hrs/yr hours per year
- KWh/yr kilowatt hours per year

The electrical energy savings is estimated to range from 312 to 437 kWh per year per fixture, corresponding to an annual energy savings ranging from 58 to 81 percent. This estimate is based on a HPS fixture wattage of 160-W, which includes the 100-W lamp and a 30-W ballast load. The number of



Commercial Building Energy Alliances

# LED Site (Parking Lot) Lighting Technology Procurement Project

## Current Members of the LED Parking Lot Lighting Working Group

- Best Buy
- Food Lion
- The Home Depot
- Illuminating Engineering Society of North America
- JCPenney
- John Deere
- Kohl's
- McDonald's
- Target
- Walmart
- Whole Foods Market

The U.S. Department of Energy and its partners are working to support the market introduction of LED (light emitting diode) parking lot lighting. A Commercial Building Energy Alliance (CBEA) working group is focused on making reliable, energy-efficient, and competitively priced outdoor LED luminaires more widely available in the marketplace.

CBEAs can help commercial building owners and managers cut energy costs by working with appliance, heating, cooling, and lighting manufacturers to meet energy-efficiency needs. One area that offers immediate returns is lighting, because high-efficiency lighting systems using Solid-State Lighting (SSL) technology are rapidly improving in terms of performance, and are gaining market acceptance. In April 2008, a working group formed to investigate the use of LED parking lot lighting for retail buildings, and accelerate the market availability of LED parking lot lighting products that meet CBEA members' performance requirements. Initiated by the Retailer Energy Alliance, this working group has:

- Identified candidate luminaires and investigated their field and laboratory performance as well as life and reliability issues
- Developed product performance specifications and evaluation procedures based on group members' needs.

## DOE Support

This effort is sponsored by the U.S. Department of Energy (DOE) and implemented by the Pacific Northwest National Laboratory (PNNL) in coordination with CBEA members. Because LEDs have the potential for such significant energy savings, DOE has been actively supporting research and commercialization of LED lighting through its SSL program, which includes

research and development, product testing, technical information development, product demonstrations, and outreach to energy-efficiency program adminis-

trators. See [www.ssl.energy.gov](http://www.ssl.energy.gov) for more information on DOE's SSL portfolio.

Through its involvement in the CBEAs and its SSL program activities, DOE will provide technical assistance in support of this technology procurement project, including:

- Product performance testing
- Product demonstration technical support
- Analysis of energy cost savings
- Analysis/quantification of maintenance cost savings
- Investigations into life measurements and other performance indicators
- Development of a CBEA product performance specification
- Technology procurement technical assistance.

## CBEA Member Opportunities and Benefits

There are several ways CBEA members have been involved in LED parking lot lighting procurement: identifying candidate products, reviewing product laboratory testing, conducting field demonstrations, evaluating candidate products, and assisting with the development of LED parking lot lighting performance specifications.

Interested CBEA members can benefit from this project in a variety of ways, from simply being better informed of the potential of LED parking lot lighting (from DOE research and reports from other members), to being among the first to hear about new and promising technologies, to participating in demonstration projects and a collaborative RFP for LED parking lot lighting products.



The parking lot lighting demonstration comparing LED (left) and high-pressure sodium (right) shows the even light distribution and good color rendering of LED lighting.



## DOE Solid-State Lighting Program

Through its Commercially Available LED Product Evaluation and Reporting (CALIPER) program, DOE tests commercially available luminaires to determine actual performance. Summary reports are available at [www.ssl.energy.gov/caliper.html](http://www.ssl.energy.gov/caliper.html). DOE also supports GATEWAY demonstrations to showcase high-performance LED products for general illumination in a variety of commercial and residential applications. Reports showing a range of economic results for demonstrations of exterior solid-state lighting products are available on the DOE SSL Web site at [www.ssl.energy.gov/gateway-demos.html](http://www.ssl.energy.gov/gateway-demos.html).

## Why LED Parking Lot Lighting?

LED technology is advancing into new categories of white-light applications, including parking lot lighting, where early indications suggest a high-quality light and long life. At present, however, products are available from a limited number of suppliers, performance in the later years of the product's lifetime is still not completely explored, and LED luminaires are expensive on a first cost basis. Table 1 highlights the benefits of LED light in parking lots.

Table 1

Product Feature	LED
Overall Lighting System Efficiency	Very efficient because of LED directionality, meaning nearly 100% of light leaves the luminaire
Life	Expected long life (50,000+ hours) but actual end-of-life performance not completely understood
Maintenance	Very low maintenance expected due to long life and durability
Environmental (Mercury)	Contains NO mercury
Light Output Depreciation	Low lumen depreciation rate
Lighting Uniformity	Directionality and flexibility make uniformity ratios below 10:1 easily achievable
Dimmability	Fully dimmable
Durability	Solid-state technology is much less fragile and less susceptible to vandalism, breakage, or damage from high winds and vibration
Light Pollution	Easy to reduce light pollution effects due to inherent directionality of source

## Overview of the CBEA Specification

Typically, technology procurement specifications focus on a product, rather than an application. In order to maximize benefits of converting from the traditional HID technology to SSL technology, the CBEA team developed a performance specification that should be applied to a specific site. SSL area luminaire manufacturers will work with either DOE or commercial building organizations (i.e., large retailers or developers) to provide lighting solutions for different locations. The specification provides information about both the luminaire and how the site should be lighted. Key details of the specification:

- Luminaires should be compliant with "BUG" requirements in IESNA TM-15.
- Luminaires should carry a 5-year warranty covering the luminaire, finish, and power supply.
- Testing requirements are identified.
- Both power density and illuminance requirements are by Lighting Zone (LZ); different environments need more or less light (and thus use power differently).
- Different amounts of light (illuminance) are needed for different parts of the parking lot.
- Uniformity is treated differently than the standard maximum-to-minimum ratio and is instead represented by a weighted average of relevant illuminance measurements.

Table 2 provides information on the basic power density and illuminance requirements.

Table 2

Lighting Zone	Power Density	Minimum Illuminance (fc) requirements per LZ			
		Main Area	Perimeter	Front Aisle	Vertical
LZ1	0.04 W/sf	N/A	N/A	N/A	N/A
LZ2	0.05 W/sf	0.50 fc	0.20 fc	1.00 fc	0.25 fc
LZ3	0.06 W/sf	0.75 fc	0.40 fc	1.50 fc	0.50 fc
LZ4	0.08 W/sf	1.00 fc	0.50 fc	2.00 fc	0.50 fc

## Project Next Steps

- Updates to the performance specification are expected to occur in the future.
- Demonstration projects hosted by CBEA members will continue.
- Large coordinated CBEA purchases are anticipated in summer 2009.



Energy Efficiency & Renewable Energy

Commercial Building Energy Alliance

To learn more about this project, contact:

Linda Sandahl,  
Program Manager  
Pacific Northwest  
National Laboratory  
[linda.sandahl@pnl.gov](mailto:linda.sandahl@pnl.gov)  
[buildings.energy.gov/alliances.html](http://buildings.energy.gov/alliances.html)