Outdoor Lighting Report

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by
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EXECUTIVE SUMMARY

House Bill 2628 §3 directs the Oregon Department of Energy to review provisions relevant to outdoor lighting fixtures contained within a model lighting ordinance (MLO) issued by the International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IESNA). As of September 30, 2008, the IDA and IESNA have not released this MLO.

The House Bill also directs the Department to examine current state statutes and state building code provisions concerning outdoor lighting as it impacts energy efficiency and night brightness. The purpose of this investigation is to report findings and make recommendations concerning the implementation of energy-efficient outdoor lighting fixtures. We provided a broad-based stakeholder group with a draft for review before making our final recommendations.

Excessive outdoor lighting can have a number of harmful consequences. Glare from high intensity light sources can be hazardous, light pollution can be disruptive to the night-time aesthetic, and unnecessary artificial light is a waste of natural resources. There are simple measures that can be implemented to mitigate these problems. One measure, shielding outdoor lighting fixtures, will result in reduced glare and light pollution. Additionally, by shielding the fixture and directing the light to where it is needed, you can decrease the energy used to obtain the desired level of illumination.

Our review of current state statutes and building code provisions regarding outdoor lighting has determined that there are few provisions currently in place to establish specific regulations on outdoor lighting. There are no provisions that regulate the lighting fixture type for general outdoor lighting. More can be done at the state level to promote energy efficient outdoor light use that mitigates light pollution, glare, and light trespass.

The IDA and the IESNA, have not yet issued their aforementioned MLO. In lieu of the directed review, the Oregon Department of Energy examined ordinances that have been adopted in other states as well as ordinances that have been developed at the city level within our state. The cities of interest include Eugene, Bend, and Wilsonville. The key distinguishing feature of the Wilsonville ordinance (No. 649) includes a five lighting zone classification scheme and specific lighting standards for each. The ordinance defines the boundaries of the various lighting zones and includes a series of tables with zone-specific regulations on lighting use. With the exception of specifying the boundaries of lighting zones, the Wilsonville ordinance provides a suitable example, or model lighting ordinance, for regulating outdoor lighting under the State Building Code. Because the Wilsonville ordinance was developed in cooperation with Jim Benya, the co-chair of the IDA and IESNA joint task force, administrative procedures were designed to comply with the forthcoming MLO.

The provisions contained in the Wilsonville lighting ordinance may well be adopted in chapter 13 §1313.5 of the Oregon Structural Specialty Code—*Exterior Lighting*. Geographic specific information that defines lighting zone boundaries should be specified at the local level. The Department, therefore, encourages local municipalities to incorporate these model lighting recommendations into their own code. Because the final MLO has yet to be released, any adopted ordinance at this time may have to undergo minor revisions in the future.

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INTRODUCTION

House Bill 2628 §3 directs the Oregon Department of Energy to review provisions relevant to outdoor lighting fixtures contained within a model lighting ordinance (MLO) to be issued by the International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IESNA). Additionally, the House Bill directs the Oregon Department of Energy to examine current state statutes and State Building Code provisions concerning outdoor lighting as it impacts energy efficiency and night brightness. The purpose of this investigation is to report findings and make recommendations concerning the implementation of energy-efficient outdoor lighting fixtures. The Department made final recommendations with input from a broad-based stakeholder group.

While this report does address relevant state statutes and building code provisions, the IDA and the IESNA, unfortunately, have not issued the aforementioned model lighting ordinance as of September 30, 2008. In lieu of the directed review, the Department examined ordinances that have been adopted in other states as well as ordinances that have been developed or are in development at the city level within our state. States that have adopted outdoor lighting ordinances include Arizona, Arkansas, Connecticut, Maine, Rhode Island, and Wyoming. Cities within Oregon that have adopted outdoor lighting ordinances include Eugene, Bend, and Wilsonville. The Wilsonville ordinance (No. 649) was developed in cooperation with Jim Benya, the co-chair of the IDA and ISNA joint task force, and was modeled after an early version of this group's MLO. As such, the Wilsonville ordinance is purported to be fully compliant with IESNA interests while still promoting the Dark Sky Initiative.

BACKGROUND

Excessive outdoor lighting can have a number of harmful consequences. Glare from high intensity light sources can be hazardous, light pollution can be disruptive to the night-time aesthetic, and unnecessary artificial light is a waste of natural resources. There are simple measures that can be implemented to mitigate these problems. Use of shielded outdoor lighting fixtures that direct light appropriately is a simple remediation of the adverse consequences of excessive outdoor lighting.

OREGON STATUTES AND PROVISIONS

We have identified current state statutes and State Building Code provisions concerning outdoor lighting as it impacts energy efficiency and night brightness. We investigated the Oregon Revised Statutes (ORSs), the Oregon Administrative Rules (OARs), and the Oregon Building Code for relevant provisions. We have cited those sections found to be the most pertinent.

Oregon Revised Statutes (ORSs)

Chapter 469—Energy; Conservation Programs; Energy Facilities

The only instances of the terms “outdoor lighting,” “exterior lighting,” or “external lighting” found are contained within the temporary provision that is identical to House Bill 2628.

Oregon Administrative Rules (OARs)

Chapter 330—DEPARTMENT OF ENERGY

330-066-0015

Commercial Energy Conservation Services Programs

(6) When a utility receives a request for a commercial energy audit, a commercial energy auditor shall perform an on-site audit to collect data and evaluate energy conservation measures including at least: operations and maintenance measures, simple automatic control systems, envelope weatherization, infiltration controls and lighting systems improvements.

(7) If the commercial building customer uses an average of more than 4,000 kWh of electricity per month, the utility shall provide an energy audit to evaluate more complex energy conservation measures such as sophisticated automatic control systems, furnace and boiler efficiency improvement, heat recovery devices, HVAC system modifications, infiltration controls, lighting system improvements and solar water heaters or water heating heat pumps unless it can substantiate that analysis of the systems in use does not require that level of expertise. The utility shall use a commercial energy specialist or engineer or architect to provide the energy audit described in this section.

Chapter 437—DEPARTMENT OF CONSUMER AND BUSINESS SERVICES, OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION

437-004-1140

Lighting

General lighting.

(1) Provide adequate general and local lighting in rooms, buildings and work areas.

(2) Methods for determining the adequacy and effectiveness of lighting include:

(a) Measure the quantity of light against requirements in the American National Standard ANSI A11.1-1965, "American Standard Practice for Industrial Lighting."

(b) The quality of light as to freedom from glare and correct direction, diffusion and distribution.

Chapter 660—LAND CONSERVATION AND DEVELOPMENT DEPARTMENT

660-013-0080

This section concerns lighting in the vicinity of airports and is reproduced below:

(d) Limit outdoor lighting for new industrial, commercial, or recreational uses or the expansion of such uses to prevent light from projecting directly onto an existing runway or taxiway or into existing airport approach corridors except where necessary for safe and convenient air travel;

Chapter 860—PUBLIC UTILITY COMMISSION

860-030-0045

The following definition is provided:

(18) "Lighting system improvements" means devices and actions which reduce overall indoor or outdoor lighting energy consumption while maintaining satisfactory lighting levels. Devices and actions include, but are not limited to: reducing light levels to acceptable minimum levels; installation of task lighting, local switching, time control, and sensing devices; and installation of more efficient lamps.

Chapter 918—DEPARTMENT OF CONSUMER AND BUSINESS SERVICES, BUILDING CODES DIVISION

918-251-0090
Definitions

Division 305
Electrical Codes and Standards

Oregon Building Code

Oregon Electrical Specialty Code
No instances of the term "outdoor lighting" were found in this document.

Oregon Structural Specialty Code

Chapter 13—Energy Conservation
Section 1313 addresses the lighting of non-residential buildings. Provisions are made to regulate the operation of exterior and canopy lighting using a controller. Incandescent and mercury vapor lighting is prohibited for exterior building lighting, except where specified. However, no provisions are made concerning lighting fixture type or maximum wattage standards. It appears that §1313.5 is well suited to incorporate any desirable provisions from the MLO.

LOCAL CITY-LEVEL CODE

Eugene
This ordinance requires shielding on certain outdoor lighting fixtures and prohibits certain types of lighting. It specifies exemptions to these provisions. The ordinance defines four outdoor lighting classification zones along with the lighting standard for each. In addition to these four zones, it provides additional lighting standards for five specific land uses. See Appendix A for the complete document.

Bend
This ordinance requires new outdoor lighting installations to be shielded. It prohibits the use of high intensity light sources, such as lasers and searchlights, for outdoor advertisement or entertainment purposes. The ordinance encourages outdoor lighting used for business and recreational events to be turned off at a specified time. It restricts the use of neon lighting. Exemptions include low wattage lighting, lighting for correctional and recreational facilities, as well as temporary lighting for carnivals and film productions. The ordinance establishes penalties for violation of these provisions. See Appendix B for the complete document.

Wilsonville
This ordinance applies to the installation of new lighting systems or the modification of existing systems in public, commercial, industrial, or multi-family housing facilities. It specifies exemptions. The ordinance establishes lighting zones with defined limitations on lighting systems based on maximum wattage, shielding type, curfew time, and lighting function. See Appendix C for the complete document.

The key distinguishing feature of the Wilsonville ordinance includes the five lighting zone classification scheme and specific lighting standards for each. It includes a map that defines the boundaries of the various lighting zones and a series of tables that provide zone-specific regulations on lighting use. This level of detail is not well suited to state-level ordinances. We would, therefore, encourage local outdoor lighting ordinances to further define a state ordinance.

ORDINANCES ADOPTED IN OTHER STATES

Arizona, Arkansas, Maine, Rhode Island, and Wyoming have adopted ordinances regarding outdoor lighting. Following is a summary of each state ordinance.

Arizona
This ordinance requires all outdoor lighting fixtures to be fully or partially shielded. Exemptions include emergency use, light for construction and maintenance work, and lighting at airports. Additional restrictions are made regarding the installation and use of mercury vapor light fixtures. This ordinance does not apply to incandescent fixtures of 150 watts or less and other sources of no more than 75 watts. See Appendix D for the complete document.

Arkansas
This ordinance restricts use of public funds for the installation and replacement of an unshielded outdoor lighting fixture unless it can be determined that a shielded outdoor lighting fixture will be more expensive given the cost of the fixtures and energy expenses. This ordinance prohibits the use of state funds to install mercury vapor outdoor lighting fixtures and restricts the disposal thereof. Each electric utility must offer its customers a shielded lighting service option and it must notify them of this service. This ordinance does not apply to incandescent fixtures of 150 watts or less and other sources of no more than 75 watts. Exemptions include use of navigational lighting systems such as at airports and outdoor lighting fixtures that are necessary for safe working operations. It establishes penalties and includes a provision for the enforcement of this ordinance. See Appendix E for the complete document.

Connecticut
Approved on July 9, 2003, this ordinance restricts the use of floodlights intended for private property illumination that are located on a state right-of-way. It gives provisions concerning allowable *illuminance* and shielding of a *luminaire*. It indicates the corrective action, including a time-table, if any *luminaire* is found to be in violation of these provisions. See Appendix F for the complete document.

Maine
This ordinance restricts the use of state funds for the purpose of installation or replacement of any *permanent outdoor luminaire*. Exceptions are permitted where federal laws, rules and regulations take precedence as well as when a compelling safety need arises. See Appendix G for the complete document.

Rhode Island
Adopted on July 1, 2002, this ordinance restricts the installation or replacement of permanent outdoor lighting. Exemptions include emergency use, lights for construction and maintenance work, other special purposes uses, instances where reasonable safety and security interests exist, and instances where federal rules take precedence. The ordinance directs the Department of Transportation to establish regulations for the implementation of these provisions. See Appendix H for the complete document.

Wyoming
This ordinance requires electric utilities to provide options for outdoor lighting and to provide tariffs thereof. The effective date is July 1, 2003. See Appendix I for the complete document.

CONCLUSIONS AND RECOMMENDATIONS

It is recommended that building owners use outdoor lighting fixtures that are shielded to reduce glare and light pollution. Additionally, owners who shield and direct light to where it is needed, will decrease the energy used to obtain the desired level of illumination.

The Oregon Department of Energy reviewed current state statutes and building code provisions regarding outdoor lighting. We determined that there are few provisions currently in place to establish specific regulations on outdoor lighting. There are no provisions that regulate the lighting fixture type for general outdoor lighting. More can be done at the state level to promote energy efficient outdoor light use that mitigates light pollution, glare, and light trespass.

We also examined ordinances adopted in Eugene, Bend, and Wilsonville. Additionally, we considered state-level ordinances in Arizona, Arkansas, Maine, Rhode Island, and Wyoming. With the exception of specifying the boundaries of lighting zones, the Wilsonville ordinance provides a suitable example, or model lighting ordinance, for regulating outdoor lighting under the State Building Code. Because the Wilsonville ordinance was developed in cooperation with Jim Benya, administrative procedures therein are designed to comply with the forthcoming MLO. The provisions contained in the Wilsonville lighting ordinance may well be adopted in chapter 13 §1313.5 of the Oregon Structural Specialty Code—*Exterior Lighting*. We recommend that geographic-specific information that defines lighting zone boundaries be specified at the local level. We, therefore, encourage local municipalities to incorporate these model lighting recommendations into their own code. Because the final MLO has yet to be released, any adopted ordinance may have to be revised in the future. It is expected, however, that any elements introduced to state and city code based on the Wilsonville ordinance will stand with insignificant alterations.