PHILIPS

GARDCO

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Comments on July 1/2009 Proposed ENERGY STAR® Program Requirements for Solid State Lighting Luminaires – Proposed Category "A" Additions _ Outdoor Area and Parking Garage:

Philips Gardco offers the following comments on the proposal.

General Comments:

We see the Energy Star® program as a means to promote the use of the highest grade of energy efficient lighting products. If, however, SSL standards are approved, leading to the subsequent achievement of the Energy Star® rating by SSL luminaires, prior to the approval of program requirements for technologies that compete with SSL, we feel it would be a disservice to the public and to the goals of the program. Readily available white light technologies exist today, such as high performance electronic ceramic metal halide systems, that provide outdoor area lighting as efficiently as or more efficiently than SSL solutions provide in many applications.

There is a natural tendency in our environmentally concerned economy to look to the Energy Star ® rating as an absolute standard when determining if a lighting product or lighting solution is energy efficient and environmentally friendly. Additionally, the natural presumption is that products without the Energy Star® rating are not efficient. We understand that some state laws and local ordinances are either in place or under consideration that require the use of only Energy Star® rated lighting products. At this time, with no Energy Star® rating available for Outdoor Area and Parking Garage luminaires, all technologies are on an equal footing. If, however, it becomes possible for Energy Star® ratings to be achieved ***ONLY*** on SSL luminaires, but not on competing technologies, then SSL luminaires will enjoy a prohibitive market advantage, even if SSL luminaires are less efficient than competing technology luminaires. Customers who utilize Energy Star® products could be utilizing a less efficient product than what a competing technology could offer. This seems contrary to the goals of the program.

Consider the following example:

Outdoor Area Lighting Analysis
0.5 fc minimum, 25 foot pole, with 26.5 optic height, 120 foot by 120 foot pole spacing
Twin luminaires, 4 pole grid analysis, 15 to 1 or less maximum to minimum uniformity.

	LED Solution: 174 System Watts per Luminaire	High Performance Electronic CMH : 154 System Watts per Luminaire
Analysis Area (120 ft. x 120 ft.)	14,400 sq ft	14,400 sq ft
Total Watts (8 luminaires)	1, 392	1,232
Watts Covering Analysis Area (1/4 of total)	348	308
Watts per Square Foot	.0242	.0214
Efficiency Advantage		13% more energy efficient

In this example, the high performance electronic ceramic metal halide system solution is more efficient than the SSL solution. Even if the efficiency was equal between these solutions, why should the Energy Star® program only be available for the SSL solution?

Furthermore, if higher light levels are required, SSL solutions, to date, generally require more poles and luminaires than equally efficient solutions from competing technologies. SSL outdoor lighting products are to this point generally limited to 15,000 lumens per luminaire. High performance electronic ceramic metal halide systems, as an example, can provide up to 29,000 net lumens per luminaire, with only 338 system watts, or 85 luminaire lumens per watt. As a result, for equal light levels, an SSL solution may require up to twice as many luminaires, or installation of additional poles. More poles mean more environmental disruption with more trenching, wiring, and the like required.

If a goal of the Energy Star® program is to encourage the most energy efficient and environmentally friendly lighting solutions, it makes sense that standards for SSL and equally efficient competing technologies for Outdoor Area and Parking Garage lighting should be made available at the same time, adding strength and credibility to the Energy Star® rating.

Comments on the Standards:

As we understand it, the standards have been set to yield at least 20% energy savings over the dominant incumbent light source technology, by lighting application. Our analysis indicates that based on the Fitted-Target Efficacy metric (FTE) the standards as they currently stand require savings from 25% to 40%. At the same time, currently available LED technology, when combined with measures needed to assure proper light control; do not appear to support the standards as proposed. What are needed are further improvements in LED base lumens per watt. We believe these improvements are under development by LED manufacturers. Time is required to assure proven performance of these improvements, provide necessary testing, and incorporate improved LEDs (when they become available) into luminaire designs.

We propose that the lm/W standards be reduced for the first 2 year period by approximately 15%, and then increased every 2 years after adoption by 1/3 of the difference to the proposed standards, until the full proposed standards take effect. Our proposed initial standards have been inserted in Red box notes on a copy of the proposed standards attached to these comments as Attachment 1.

Use of Metrics:

We have great concern that the metric proposed by the Energy Star® program for Outdoor SSL (FTE), and the metrics under consideration for the Outdoor Lighting Bill under development in the US Congress (HR1732) do not agree. We would strongly urge that the same metric(s) be utilized. If differing metrics are approved, it may be possible for a luminaire to achieve an Energy Star® rating but not meet the minimum requirements under the Outdoor Lighting Bill, and thus not be available for sale. We believe this possibility can only be eliminated if the metrics are at least coordinated. The Outdoor Lighting Bill right now proposes metrics called Energy Effectiveness Factor (EEF) and Task LPW. Uncoordinated metrics could cause a great deal of confusion in the outdoor lighting market place, hurting the goals of both the Energy Star® program and the Outdoor Lighting Bill.

Controls:

The proposed standards do not address lighting controls in any way. We believe a great advantage of SSL technology is the ability to provide control of the light level and energy consumption, either by on / off control or stepped dimming. Energy savings can be substantially increased if luminaires operate at a low level of light and power when an area is unoccupied. For instance, a wall mounted LED luminaire that operates at 54 watts in full light output mode, can be tied to a motion sensor. When the area is vacant for a specified amount of time, the unit dims to 10% light output and 10% of energy use (5.4 watts.) If 80% of the time the area is vacant, the average watts consumed drops from 54 to approximately 15 watts. (80% at 5.4 watts = 4.32 watts plus 20% at 54 watts = 10.8 watts, for a total of 15.12 watts average.) The potential impact of such motion-sensed demand response control is an energy savings of 72% compared to a constant wattage luminaire, in this example. This is a much greater level of savings than is typically realized by the switch from incumbent technologies to SSL.

We suggest that the Energy Star® program should encourage this potential level of savings. It is not clear from the standards how multiple level luminaires, would be evaluated. Does each light level/ energy level possible from a luminaire need to meet the standard? The standards should make this point clear.

Additionally, we suggest that luminaires that meet all of the following standards qualify for the Energy Star® if they achieve 80% of the FTE lm/W standard:

1) Luminaire meets the minimum lumen requirements on the highest setting.
2) Luminaire includes a motion sensor, either integral or remote mounted, and a step dimming or multi-level system included with the luminaire with a factory default setting providing for a reduction in energy consumption of at least 50% when the area is vacant for a maximum of 30 minutes.
3) Luminaire and its integral or remote motion sensor provide detection of activity within 1 mounting height of the luminaire in the direction the luminaire is aimed, with a minimum 180° detection area for pole mounted luminaires and a minimum 110° detection area for wall mounted luminaires.

We believe this change would encourage the adoption of SSL technology by increasing savings and decreasing payback time dramatically.

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Attachment 1, ENERGY STAR® Program Requirements for Solid State Lighting Luminaires
Proposed Category “A” Additions – Outdoor Area & Parking Garage with changes to recommended values shown in red boxes is attached and part of this document.

Philips Gardco Comments - Attachment 1

Recommended changes to values shown in red below.

ENERGY STAR® Program Requirements for Solid State Lighting Luminaires

Proposed Category "A" Additions – Outdoor Area & Parking Garage

Category A: Near-term Applications

Outdoor pole-mounted area and roadway luminaires[1]

Application Requirements					
Minimum Light Output		Luminaire shall deliver a minimum of 1,000 lumens (initial).			
Minimum Fitted Target Efficacy (lm/W)		Fitted Target Efficacy (FTE) evaluates the efficacy with which a luminaire delivers uniform illumination to a rectangular uniform area of coverage (the target area). FTE is calculated using standard absolute luminaire photometry (LM-79-08 test results in LM-63-02 formatted .ies file). Minimum requirements are given in initial lumens per watt of luminaire input power (lm/W). For DOE FTE calculator (beta version) please see http://www.drintl.com/temp/FTE-Calculator.exe. For calculator instructions, please see http://www.drintl.com/htmlemail/FTE_ReadMe.pdf. For supporting materials, please see http://www.drintl.com/htmlemail/FTEoverview01Jul09.pdf and http://www.drintl.com/htmlemail/FTEalgorithm01Jul09.pdf.			
		Shielded (< 1.5 MH house-side)		Unshielded (≥ 1.5 MH house-side)	
		Low Output < 9,500 lumens	High Output ≥ 9,500 lumens	Low Output < 13,300 lumens	High Output ≥ 13,300 lumens
		37 31	48 41	53 43	70 60
Maximum Luminous Flux in Glare and Uplight Zones†	FH (60-80°)	48.0% and 12,000 lumens			
	BH (60-80°)	20.0% and 5,000 lumens		48.0% and 12,000 lumens	
	FVH (80-90°)	3.0% and 750 lumens			
	BVH (80-90°)	3.0% and 750 lumens			
	UL (90-100°)	4.0% and 1000 lumens			
	UH (100-180°)	4.0% and 1000 lumens			

† Both requirements must be met for each BUG secondary solid angle: maximum percent of luminaire lumens in zone, and maximum lumens in zone. Secondary solid angles (zones) are per IES TM-15-07. FH-forward high; BH-back high; FVH-forward very high; BVH-back very high; UL-up low; UH-up high.

[1] Including but not limited to luminaires intended for lighting streets, parking lots, walkways, and plazas. Includes decorative post-top luminaires. Excludes luminaires intended to be mounted below eye level, e.g. bollards and steplights.

Recommended changes to values shown in red below.

Outdoor wall-mounted area luminaires ("wall packs")

Application Requirements		
Minimum Light Output	Luminaire shall deliver a minimum of 300 lumens (initial).	
Maximum Luminous Flux in Glare and Uplight Zones*	FH (60-80°)	48.0% of total luminaire output
	FVH (80-90°)	3.0% of total luminaire output
	UL (90-100°)	2.0% of total luminaire output
	UH (100-180°)	2.0% of total luminaire output
Minimum Luminaire Efficacy	52 lm/W 41 lm/W	

*Secondary solid angles (zones) are per IES TM-15-07. FH-forward high; FVH-forward very high; UL-up low; UH-up high.

Parking garage/canopy luminaires

Application Requirements	
Minimum Light Output	Luminaire shall deliver a minimum of 2,000 lumens (initial).
Zonal Lumen Density Requirement	Luminaire shall deliver a minimum of 20% of total lumens in the 60°-70° zone.
Minimum Luminaire Efficacy	70 lm/W 60 lm/W

Attachment A -- Definitions

Average-to-minimum ratio	A requirement establishing the greatest allowable difference between the average illuminance and the minimum illuminance measured in a given area. For example, to meet a 6:1 average-to-minimum ratio, the average illuminance value (lumens per unit of area, such as footcandles [lm/sq. ft.], lux [lm/m^2], or lumens per mounting height squared [lm/MH^2]) measured in a given area must not be more than six times the lowest value measured in that area.
BUG	Backlight, Uplight, and Glare Ratings defined in Addendum A to IESNA TM-15-07, Luminaire Classification System for Outdoor Luminaires.
House-side	The hemisphere behind the luminaire containing all backlight, i.e., opposite of street-side. Some controlled luminous flux in this region can be beneficial for mast-arm-mounted luminaires, luminaires located between sidewalk and street, luminaires along curving roads, etc.
Maximum-to-minimum ratio	A requirement establishing the greatest allowable difference between the maximum illuminance and the minimum illuminance measured in a given area. For example, to meet a 30:1 maximum-to-minimum ratio, the highest illuminance value measured in a given area must not be more than thirty times the lowest value measured in that area.
Mounting height (MH)	The vertical distance between finished grade and the optical center of the luminaire.
Shielded luminaire	Luminaire with a uniform area of coverage extending less than 1.5 times the mounting height (MH) in the backward (house-side) direction.
Uniform area of coverage	For purposes of this document: the "pool" of horizontal illumination covered to ratios of 30:1 maximum-to-minimum and 6:1 average-to-minimum. Both requirements must be met, i.e., max:min cannot be more than 30:1 and avg:min cannot be more than 6:1.