

June 9, 2010

Via Electronic and U.S. Mail

Public Utility Commission of Oregon
550 Capitol Street NE, Suite 215
Salem, OR 97310
Attention: Carol Hulse

Re: Docket No. UE-215

Dear Ms. Hulse:

The International Dark Sky Association (“IDA”) respectfully submits the Original and five copies of the Opening Testimony and Exhibits of Leo Smith on behalf of the International Dark-Sky Association filed in the above-referenced matter.

Sincerely,



Leo Smith
Board of Directors,
International Dark-Sky Association
1060 Mapleton Avenue
Suffield, CT 06078
860 668 4000

Enclosure

cc: Service List

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

Docket No. UE-215

In the Matter of)
PORTLAND GENERAL ELECTRIC COMPANY,)
Request for a General Rate Revision)

Opening Direct Testimony of Leo Smith

on Behalf of the International Dark-Sky Association

1 **Q PLEASE STATE YOUR NAME AND ADDRESS**

2 A Leo Smith. My address is 1060 Mapleton Avenue, Suffield, Connecticut 06078

3 **Q WITH WHAT ORGANIZATION ARE YOU AFFILIATED AND IN WHAT CAPACITY?**

4 A The International Dark-Sky Association. I serve as a member of the Board of Directors
5 and as the Northeast Regional Director. My resume of experience related to outdoor
6 lighting is explained in detail in Attachment A.

7 **Q ON WHOSE BEHALF ARE YOU TESTIFYING?**

8 A I am testifying on behalf of the International Dark-Sky Association in support of its
9 proposal to require the adoption of midnight rates for streetlights and for the
10 inclusion of rates for 50 watt high pressure sodium lamps.

11 **Midnight Option Rate for Streetlights**

12 **Q. PLEASE EXPLAIN THE PROGRAMMABLE PHOTOCELL**

13 A. The standard photocell operates on a dusk-to-dawn basis. The programmable
14 photocell allows for turn on of the streetlight at dusk with a clock that can be set to
15 turn the light off at a set time, such as midnight. The same photocell also allows the
16 streetlight to turn back on at a selected hour

1 **Q. WHY IS IT IMPORTANT TO ALLOW STREETLIGHTS TO TURN BACK ON, AFTER**

2 **MIDNIGHT TURN OFF?**

3 A. During the winter months of short daylight hours, school bus schedules in the early
4 morning sometimes operate during darkness. Allowing streetlights to turn back on at
5 6AM would address concerns of parents regarding school children waiting for busses
6 in darkness.

7 **Q. PLEASE EXPLAIN PRICE DIFFERENCES FOR THE PROGRAMMABLE PHOTOCELL**

8 A. Using CL&P pricing for the example, a standard photocell will cost the utility \$3,
9 whereas the programmable photocell cost is \$11 based on volume.

10 **Q. PLEASE EXPLAIN THE BENEFITS TO MUNICIPALITIES IF MIDNIGHT OPTION RATES**
11 **FOR STREETLIGHTS WERE TO BECOME AVAILABLE.**

12 A. There are three primary benefits of the Midnight Option rate for Streetlights:
13 1) Reduction in energy cost, 2) lower maintenance costs and 3) reduction in CO2
14 emission that result from energy generation.

15 **Q. PLEASE EXPLAIN THE REDUCTION IN ENERGY USE BY IMPLEMENTING A MIDNIGHT**
16 **OPTION.**

17 A. A standard dusk-to-dawn photocell will operate a streetlight 4,100 hours per year.
18 A programmable photocell set to turn the streetlight off from Midnight to 6AM
19 would reduce the annual energy consumption by 1,825 hours or 44.5% .

20 **Q. PLEASE EXPLAIN HOW THE USE OF THE MIDNIGHT OPTION RESULTS IN LOWER**
21 **MAINTENANCE COSTS**

22 A. Maintenance costs are primarily related to re-lamping. A standard practice is to
23 establish a group re-lamping schedule. A typical High Pressure Sodium lamp has a 24,000
24 hour lamp life when it burns dusk to dawn. Based on the 4,200 hours of use per year, a

1 typical period for group relamping will be on a 4.5 year cycle. A streetlight controlled by
2 a programmable photocell where the light is off from Midnight to 5AM will have 2,375
3 hours of use per year. Based on the short cycles, the lamp life will be reduced to
4 approximately 18,000 hours. With 2,375 hours used annually, the lamp life under
5 the Midnight Option would be 7.5 years. Group relamping would likely be set for
6 every 7 years, resulting in a 36% reduction in maintenance cost.

7 **Q HOW WOULD PGE GROUP RELAMPING CREWS BE ABLE TO DISTINGUISH**
8 **PROGRAMMABLE PHOTOCELLS WHILE SERVICING IN THE FIELD?**

9 A Manufacturers of programmable photocells use color to distinguish the product from a
10 standard photocell. A work crew could be assigned group relamping for all standard
11 photocells in one year (usually 5 years since the previous relamping), in a specific
12 municipality. Then two years later another relamping would be done for streetlights
13 controlled by programmable photocells, distinguished by their color from a standard
14 photocell. (See Exhibits B-1 through B-4 for a sample of the color used to distinguish
15 programmable photocells from standard photocells)

16 **Q HOW AVAILABLE ARE PROGRAMMABLE PHOTOCELLS IN THE MARKET?**

17 A Programmable photocells are widely available in the commercial market. There are
18 many manufacturers. Precision Multiple Controls was selected by CL&P after testing
19 three manufacturers. Fischer Pierce, Dark To Night and Ripley are among other
20 manufacturers. See http://www.fpolc.com/pdf/Mid-Night_Tracker_Utility.pdf

21 http://www.AcuityBrandsLighting.com/library/Specification_Sheets/AEL/Specification%20Sheets/Dark%20to%20Light/Dark%20to%20Light/DTL-DP-1707.pdf
22 and <http://www.ripleylightingcontrols.com/twist-lock-photocontrols.html>

1 Q ARE PROGRAMMABLE PHOTOCELLS A NEW AND UNTESTED TECHNOLOGY?

2 A Programmable photocells are not new and they have been tested. Connecticut
3 Light & Power conducted tests on three manufacturers' programmable photocells
4 before choosing the manufacturer. A subsidiary of Acuity Brands, one of the largest
5 and well established manufacturers of lighting equipment, has sold to over 700 utility
6 companies and has sold over 7 million units since its founding in 1990. See Exhibit B-1.

7 Q Why is a Rate for Part Night Streetlights in the Public Interest.

8 A PGE's Municipal Streetlight Service (Schedule 91), is offered only for all night service. Sheet 91-1
9 (Exhibit C) states, under Character of Service that service is "From dusk to dawn...for
10 4,100 hours annually". Advances in photocell technology in today's market offer electronic
11 programmable photocells capable of regulating the streetlight's burn hours with an internal clock,
12 so that streetlights can be turned off at 11PM or midnight, and turned back on at 6AM during the
13 to be a winter. The use of programmable photocells for part night lighting has been tested and
14 proven stable and reliable technology through which municipalities can conserve energy and
15 reduce expenses for street lighting. Utility regulators in Connecticut required in a 2007 rate case
16 that Connecticut Light and Power to add a Midnight Option to their streetlight tariff. In 2009
17 New Hampshire enacted a law requiring the regulators to include a part night streetlight rate for
18 all streetlight tariffs. The conservation of energy, the reduction in CO2 emission and the lower
19 tariff rate associated with part-night streetlights are all in the public interest.

1 **Reasons to Include Lower Wattage Lamps in Schedule 91**

2 **Q PLEASE DESCRIBE THE LOWEST OFFERINGS UNDER SCHEDULE 91**

3 **FOR HIGH PRESSURE SODIUM (HPS)**

4 A Schedule 91, Sheet 91-8 (Exhibit D) shows the 9500 lumen (100 watt) HPS as the lowest
5 lighting level offered. PGE has stated in DR-002 that 70 watt HPS should be included
6 but had been omitted in error. 50 watt HPS lamps are not included in Schedule 91.

7 **Q WHAT LOWER WATTAGE LAMPS SHOULD BE ADDED TO THESE SCHEDULES?**

8 A For Schedule 91, the 50 watt HPS lamp should be added to Sheet 9-8 and all other.
9 places where 100 watt HPS lamps are offered.

10 **Q PLEASE EXPLAIN THE BASIS FOR THIS CONCLUSION.**

11 A The 50 watt HPS lamp has an initial lumen output of 4,000 lumens. 4,000 lumen was
13 deemed adequate for streetlight purposes when 100 watt mercury vapor lamps with
14 4,000 lumen were commonly used in the 1970s by most utility companies, prior to HPS.
15 4,000 lumen level Mercury Vapor were offered by PGE for streetlights (See Exhibit E).
16 PGE has even offered 1,000 and 2,500 lumen incandescent streetlights, with as little
17 as 25% of the lumen output of the 4,000 lumen 50 watt HPS.(See Exhibit F - Sheet 9-12)

18 **Q. CAN YOU OFFER A REASON WHY 4,000 LUMEN (50 watt) HPS LAMPS ARE NOT**

19 **ALSO OFFERED IN SCHEDULE 91- MUNICIPAL STREET LIGHTING?**

20 A. While the 50 watt HPS is much more energy efficient when compared to the incandescent
21 or mercury vapor lamps, use of the 50 watt HPS lamp will result in significant reduction in
22 energy sales. In my opinion, the potential loss of energy sales may be a significant reason why
23 the more energy efficient 50 watt HPS lamp has been excluded in past rate offerings.

1 The exclusion of the 50 watt HPS lamp from Schedule 91 forces municipalities and property
2 owners to purchase higher wattage lamps than may be necessary, thus wasting energy and
3 inflating cost for street lighting.

4 **Q WHAT TYPES OF STREETS MIGHT BE APPROPRIATE FOR 50-WATT HPS LAMPS?**

5 A Streets with low travel speeds or where pedestrian traffic is the primary purpose are
6 two examples. (The Roadway Lighting Committee established a Task Force that
7 determined that car headlights may be sufficient on low speed roads.)

8 **Q WHY WOULD ADDING 50 LAMPS TO SCHEDULE 91 BE IN
9 THE PUBLIC INTEREST?**

10 A 50 watt High Pressure Sodium streetlights consume significantly less energy than
11 higher wattage lamps currently offered in PGE's Schedule 91. The 4,000 lumen
12 output 50 watt HPS lamp is a standard offering in the streetlight tariffs of many other
13 utility companies. (See Exhibits G-1 through G-3) Including the 50 watt HPS streetlight
14 in PGE's Schedule 91 is in the public interest because:

15 1) 50 watt HPS lamp have a high energy efficiency and will provide adequate
16 illumination levels at many locations;

17 2) a 50 watt HPS lamp will significantly lower municipal street lighting costs
18 as compared to higher costs for higher wattage lamps (70 and 100 watt) ; and

18 3) CO 2 emission will be reduced with less energy consumed by the 50 watt HPS.

19 Providing municipalities with the option of designating the 50 watt HPS lamp for use
20 in a portion of their streetlight inventory is in the public interest.

21 **Q DOES THIS CONCLUDE YOUR TESTIMONY?**

22 A. Yes.

Leo Smith
1060 Mapleton Avenue
Suffield, CT 06078
860 668 4000

Area of Expertise: Streetlights - Levels of light - Warranting - Location and Time of Operation - Municipal Control of Light Pollution - Light Trespass - Glare

Credentials: Leo Smith is a member of the Illuminating Engineering Society of North America (IESNA) and the International Dark Sky Association (IDA). He is one of 9 members of the IDA/IESNA Joint Task Force working to develop the Outdoor Model Lighting Ordinance (MLO) for municipalities.

He also serves as a member of the following committees and boards:

Board of Directors, IDA (2004 through 2007 and May 2008 through Present)

Board of Directors, Sensible and Efficient Lighting to Enhance the Nighttime Environment (SELENE-NY)(2007 through Present)

Member, Illuminating Engineering Society of North America (IESNA)
Roadway Lighting Committee (IESNA)
Chair, Task Force on When Roadway Lighting May Not Be Necessary
Standard Practice Subcommittee

Residential Streetlights Subcommittee

Lighting for Exterior Environments Committee (IESNA)

Northeast Regional Director (IDA) (2007 through Present)

Connecticut Section Leader (IDA) (2002 through Present)

Legislation: Drafted language that was used for three Connecticut laws and one state building code amendment designed to control light pollution

CT Public Act 01-134 ***AN ACT REQUIRING ENERGY EFFICIENT ROADWAY LIGHTS.***

CT Public Act 03-210 ***AN ACT REQUIRING REDUCTION IN HAZARDOUS ROAD GLARE AND LIGHT POLLUTION FROM PRIVATE AREA FLOODLIGHTING LOCATED WITHIN THE STATE RIGHT-OF-WAY***

CT Public Act 06-86 ***AN ACT CONCERNING LUMINAIRES AT STATE AGENCIES***

Agency Regulation

2004 Amendment to Connecticut State Building Code. New Section 805.6.1 on Light Pollution Controls (2003 International Energy Conservation Code)

2007 Intervenor in CL&P electric utility rate case setting requirements for midnight service rates under streetlight tariffs.

Awards of Recognition on Outdoor Lighting Issues

In 2006, Leo Smith was presented with the **IESNA President's Award** for his contributions to the Model Outdoor Lighting Ordinance (MLO), in his capacity as a member of the IESNA/IDA Joint Task Force to develop the MLO. Nationwide, he is one of nine people selected to develop a model lighting ordinance that can be used by U.S. Municipalities. He has served on the MLO Task Force from 2004 through present.

Also in 2006 the International Dark Sky Association presented him with its Executive Director Award, also in recognition of his work in developing the Model Lighting Ordinance.

In 2003 the International Dark Sky Association presented him with the Hoag/Robinson Award, which "is given at the recommendation of the IDA board of directors to an individual who has been outstanding in educating governmental organizations, businesses, and the public about the merits of outdoor lighting control ordinances."

In 2001 the International Dark Sky Association presented him with the IDA Executive Director Award in recognition of his success in drafting legislative proposals that were enacted into law by the State of Connecticut. These proposals require municipal, state and utility-owned streetlights to be fully shielded. (Connecticut Public Act 01-134)

EXHIBIT B - 1 - Samples of Programmable Photocells Available

DPN Series *Part Night*[®] Electronic Twist Lock Photocontrol



ORDERING INFORMATION



Features:

- Control turns on at dusk and off halfway through the night. Automatically self-adjusts to seasonal time changes, reducing maintenance.
- Reduces light pollution and light trespass concerns.
- Filtered silicon photocell provides long-term, drift-free light sensing. The infrared blocking polymer filter gives human eye response.
- A 2-5 second off-only time delay is provided to avoid turn-off from extraneous light.
- Complies with ANSI C136.10-1996.
- Four-year warranty.
- Energy Savings.
- Star Friendly[™].
- Available in job packs of J12 or J50 only.
- Polypropylene cover, neoprene gasket, brass legs, acrylic window base rated for 120°C.
- Power consumption: 0.8 watts.
- Load rating: 1000 watts, 1800 VA ballast.
- Sealed relay rated for 5000 operations at full load.
- Turn OFF is at middle of the night.
- 3.6 ounces each.
- 40°C to +70°C ambient, up to 90°C interface per ANSI.
- Dielectric strength: 5000 V per ANSI.

Applications:

- Parking lots
- Area lights
- Park lights
- Media lighting
- Ball fields and courts
- Pedestrian lighting



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About Dark to Light - Lighting Controls

Dark to Light (DTL)[™] is the leader in high quality, cost-effective electronic outdoor photocontrols for electric utilities. DTL[™] was founded in 1986 as a development company. Since 1990, DTL[™] has shipped over seven million electronic photocontrols in North America, Central America, Australia, and Asia. More utilities use DTL[™] electronic controls than those of any other electronic control manufacturer.

DTL[™] controls are used in over 700 utility installations, ranging in size from under 500 to over 300,000 photocontrols.

TECHNOLOGY/TESTING:

DTL's patented photocontrol design meets and/or exceeds all existing or proposed ANSI photocontrol standards. DTL[™] photocontrols are exceptionally reliable and reduce utility maintenance costs. In addition, they are energy efficient. DTL[™] is a Manufacturing Ally in the U.S. EPA Green Lights Program, which promotes energy-efficient lighting to reduce energy usage. We can provide you with an analysis to estimate your streetlight energy savings and emission reductions. All DTL[™] controls satisfy the relevant certifications and/or specifications, including ANSI C136 and UL773.

MANUFACTURING:

Advanced flexible manufacturing allows DTL[™] to respond quickly to individual utility needs, including special requirements. DTL[™] manufactures a wide range of electronic photocontrols including:

- Twist-locks to button-type (wire-in) controls
- 120 to 480 volts (including 347 and multi-voltage controls)
- "Intelligent" controls - Part-night and anti-cycling
- UL and non-UL listed controls.

DTL[™] photocontrols are manufactured in Pembroke, Massachusetts.

ENGINEERING & TECHNICAL SUPPORT:

DTL[™] Engineering has led the industry in new product development for 10 years. DTL[™] offers customers the benefits of this engineering expertise. Engineers are available to support 1) customers' inquiries about standard products and specifications; and 2) to assist customers with custom applications.

DTL[™] also maintains a large database of utility operating cost data and product performance data. This information is available to assist customers in understanding DTL[™] product capabilities. In addition, the database allows utilities to quantify operating cost factors.

EXHIBIT B - 2 - Samples of Programmable Photocells Available

RIPLEY LIGHTING CONTROLS

DIVISION OF SOUTHCONN TECHNOLOGIES INC

Twist-Lock Electronic Photocontrol **PhotoClock** *Patented*



Exclusive Features

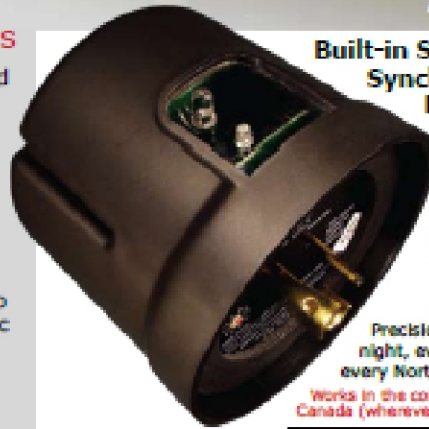
No Battery Backup Needed



Continuously monitors radio signals from the National Atomic Clock

Built-in Smart Clock synchronizes to National Atomic Clock signals

Provides unparalleled scheduling accuracy, and reliability



Built-in Smart Clock Synchronizes with National Atomic Clock for Ultra-Precise Lighting Curfew Scheduling

- Turns Lights On at Dusk
- Off at Selectable Time
- Back-On at Selectable Time if Desired
- Off at Dawn

Precision time control, every day, every night, every leap year, every time change, every North American time zone - every time.

Works in the continental United States and parts of Canada (wherever Atomic Clock signal can be received)

Eliminates the need for expensive, unreliable, hard-wired time clocks

Addresses current issues of:

- Lighting Curfews
- Dark Sky Initiative
- California Title 24
- Federal Energy Act 2005
- Canadian Industry Program for Energy Conservation (CIPEC)

User Selectable Turn-Off Time, Turn Back-On Time, Time Zone, Daylight Savings Time Observance

Meets or exceeds rigid quality requirements of SouthConn Technologies Inc. and applicable ANSI C136.10, and C136.24 Standards

WARRANTY: One year from date of manufacture

Phone: 803-939-4700
Fax: 803-939-4777
E-mail: Sales@RipleyLC.com

www.RipleyLC.com

RCB444	
Nominal Voltage 50/60 Hz	120/208/240/277
Voltage Range	105-305
Fall Mode	On
Load Rating	1000 Watt Tungsten / 1800 VA Ballast
Operating Temperature	-40C to +70C (-40F to +158F)
Photocell	Encapsulated Silicon Phototransistor
Dielectric Strength	5000 Volts between current carrying parts and metal surfaces
Surge Protection	320 Joule MOV / 10,000 amp surge current
Power Consumption	0.7 watts @ 120 V
Time Delay Off (Instant On)	5 seconds
Operating Light Levels (Standard Settings)	Turn On 2.8 FC ± .25 / Turn Off by 3.9 FC (Off-On Ratio = 1.5:1)
ANSI Color Coded Cover	Black
Receiver Frequency	60 KHz
Receiver Sensitivity	0.4 µV
Receiver Antenna	Built-in Ferrite
Programmable Off Time	7pm-3am in 1 hour increments, or Default
Programmable Back-on Time	4am-8am in 1/2 hour increments, or Default
Time Zone / Daylight Savings Selection	Atlantic, Eastern, Central, Mountain, Pacific, with or without Daylight Savings Time observance



Simple Setup utilizes selector switches conveniently located in the photocell base

Time Zone - Select appropriate time zone and whether or not to observe Daylight Savings Time shift. Uppercase selections include Daylight Savings Time shift, lowercase selections do not.

OFF - Select desired Turn-Off time from 7:00 pm to 3:00 am, or select DEFAULT to disable the Turn-Off Time feature.

BACK-ON - Select desired time to turn back-on in the early morning hours from 4:00 am to 8:00 am, or select DEFAULT to disable the Back-On feature.

PH 102 000
PhotoClock
02000
Rev 1

EXHIBIT B - 3 - Samples of Programmable Photocells Available

Http://www.precisionmulticontrols.com/Photocontrols/Energy-Saving-Photocell.html

PRECISION
MULTIPLE CONTROLS
INC.

- HOME
- CROSS REF. GUIDE
- LOW VOLTAGE
- LIGHTING CONTACTORS
- PHOTOCONTROLS
- ACCESSORIES
- TIME SWITCHES
- IN WALL TIMERS
- LITERATURE / BULLETINS
- TROUBLE SHOOTING
- WIRING DIAGRAMS
- REP DIRECTORY
- CONTACT SUPPORT
- ALSO VISIT OUR OTHER WEBSITES
- swimmingpooltimeswitch.com
- DEFROSTIMER.COM

MANUFACTURERS OF ENERGY SAVING PRODUCTS FOR OVER 50 YEARS!

FREE SHIPPING ON ALL ORDERS \$100 OR MORE!
* Free Shipping applies to UPS ground shipping.

Search by Precision model # for; photocells: select model relays: select model timers: select model

The Cost Effective Solution for Lights that Do Not Have to be On All Night!
YOU SAVE ENERGY THE VERY FIRST NIGHT YOU USE THIS PHOTOCELL TIMER!

ESC-124DS



Photocell / Timer

- Programmable photocell timer all in one!
- Plug for instant conversion from nighttime to "programmed off" generation.
- State-of-the-art technology measures length of night and let's you set "off" time.
- Continually adjusts - never needs resetting!
- Payback in as little as 2 months.

IDEAL APPLICATIONS FOR THIS PHOTOCELL TIMER

<input type="checkbox"/> Parking Lots	<input type="checkbox"/> Billboards	<input type="checkbox"/> Sports Lighting
<input type="checkbox"/> Electrical Signs	<input type="checkbox"/> Security Lighting	



Easy in field setting on base.



So Easy To Do!

- Remove old photocell
- Replace with Precision's Energy Saving Multi-Voltage Twistlock photocell timer- ESC-124DS
- ENERGY SAVINGS STARTS IMMEDIATELY!

EXHIBIT B - 4 - Samples of Programmable Photocells Available

http://www.fpolc.com/pdf/MidNight_Tracker_Utility.pdf

FP Outdoor Lighting Controls
Quality Products for Over 50 Years

54 Commercial Street
Raynham, MA 02767
PH: (508) 884-9732, FAX: (508) 822-0593, www.fisherpiersonolc.com

Mid-Night Tracker

Turns Light on at Sunset and off at Midnight



Saves 50% in Energy Costs
Addresses Light Trespass Issues

High performance electronic photocontrol that turns the light on at sunset and turns the light off at the mid point of the night. It tracks the mid point in the night on a daily basis and automatically adjusts for the seasonal changes in sunrise and sunset.

Ideal for all areas where lights do not need to be on all night:

- Shopping Malls
- Super Markets
- Retail Outlets
- Sports Facilities
- Municipal and State Parks
- Landscape Lighting
- Bill Boards
- Single Shift Companies

Specification: 105-305 VAC, 1,000 watt/1,800 VA, Non-drift silicon light sensor.

Mid-Night Tracker I (Model # MT-I): Turn on at Sunset, Turn off at Midnight

Mid-Night Tracker II (Model # MT-II): Turn on at Sunset, Turn off at Midnight,
Turn on Before 6:00 AM
Turn off at Sunrise

EXHIBIT C - Schedule 91, Sheet 91-1

Portland General Electric Company
P.U.C. Oregon No. E-18

First Revision of Sheet No. 91-1
Cancelling Original Sheet No. 91-1

SCHEDULE 91
STREET AND HIGHWAY LIGHTING
STANDARD SERVICE
(COST OF SERVICE)

AVAILABLE

In all territory served by the Company.

APPLICABLE

To municipalities or agencies of federal or state governments for lighting service utilizing Company approved streetlighting equipment for public streets and highways and public grounds where funds for payment of Electricity generally are provided through taxation or property assessment.

CHARACTER OF SERVICE

From dusk to dawn daily, controlled by a photoelectric control or time switch to be mutually agreeable to the Customer and Company for an average of 4,100 hours annually.

LUMINAIRE SERVICE OPTIONS - The Company offers the following Luminaire Service Options at the applicable rates specified herein.

The Customer will elect the Luminaire Service Option at the time of Initial luminaire Installation.

Option A - Luminaire

Option A provides electricity service to luminaires that are purchased, owned, and maintained by the Company with attachment to Company-owned poles at the monthly Option A rate applicable to the installed type of light.

Maintenance Service under Option A

Includes preventative group lamp replacement and glassware cleaning subject to the Company's operating schedule.

Emergency Lamp Replacement and Luminaire Repair

The Company will repair or replace Inoperable luminaires as soon as reasonably possible following notification of an Inoperable luminaire.

**Schedule 91
Sheet 91-1
permits
only dusk
to dawn
service**

(C)
(C)

(N)

(C)

(C)

(N)

(N)

Advice No. 09-07
Issued September 2, 2009
Maria M. Pope, Senior Vice President

Effective for service
on and after September 23, 2009

EXHIBIT D - Schedule 91, Sheet 91-8

Portland General Electric Company
P.U.C. Oregon No. E-18

Fourth Revision of Sheet No. 91-8
Cancelling Third Revision of Sheet No. 91-8

SCHEDULE 91 (Continued)

REPLACEMENT OF NON-REPAIRABLE LUMINAIRES INSTALLATION LABOR RATES

Installation Labor Rate ⁽¹⁾	Straight Time	Overtime
	\$117.00 per hour	\$165.00 per hour

(1) Per Article 20.2 of the Collective Bargaining Agreement Union No. 125 Contract, overtime is paid at the Overtime Rate for a minimum of one hour.

RATES FOR STANDARD LIGHTING

High-Pressure Sodium (HPS) Only – Service Rates

Type of Light	Watts	Nominal Lumens	Monthly kWh	Monthly Rates	
				Option A	Option B
Cobrahead Power Doors ^{**}	100	9,500	43	*	\$2.70
	150	16,000	62	*	2.71
	200	22,000	79	*	2.76
	250	29,000	102	*	2.73
	400	50,000	163	*	2.74
Cobrahead	100	9,500	43	\$5.28	2.80
	150	16,000	62	5.30	2.81
	200	22,000	79	5.72	2.86
	250	29,000	102	5.77	2.87
	400	50,000	163	5.79	2.89
Flood	250	29,000	102	6.04	2.90
	400	50,000	163	6.06	2.92

* Not offered.

** Service is only available to Customers with total power door luminaires in excess of 2,500.

(N)

(N)

(M)

9,500 lumen HPS (100 watts) is currently lowest offered in Schedule 91 Sheet 91-8

Expanded offering could include 4,000 lumen (50 watt) and 5,800 lumen (70 watt) lamps

Advice No. 09-07
Issued September 2, 2009
Maria M. Pope, Senior Vice President

Effective for service on and after September 23, 2009

EXHIBIT E - Schedule 91. Sheet 9- 11

Portland General Electric Company
P.U.C. Oregon No. E-18

First Revision of Sheet No. 91-11
Cancelling Original Sheet No. 91-11

SCHEDULE 91 (Continued)

RATES FOR CUSTOM POLES (Continued)

Type of Pole	Pole Length (feet)	Monthly Rates	
		Option A	Option B
Aluminum, HADCO, Fluted Victorian Ornamental	14	\$11.08	\$0.37
Aluminum, HADCO, Non-Fluted Techira Ornamental	18	19.81	0.65
Aluminum, HADCO, Fluted Ornamental	16	10.60	0.35
Aluminum, HADCO, Non-Fluted Ornamental Westbrooke	16	15.95	0.52
Aluminum, Painted Ornamental	35	27.35	0.90
Concrete, Ameron Post-Top	25	23.42	0.78
Fiberglass, HADCO, Fluted Ornamental Black	14	6.47	0.21
Fiberglass, Regular			
color may vary	22	3.17	0.11
color may vary	35	7.47	0.25
Fiberglass, Anchor Base, Gray	35	11.95	0.40
Fiberglass, Direct Bury with Shroud	18	6.20	0.21

SERVICE RATE FOR OBSOLETE LIGHTING

The following equipment is not available for new installations under Options A and B. To the extent feasible, maintenance will be provided. Obsolete Lighting will be replaced with the Customer's choice of Standard or Custom equipment. The Customer will then be billed at the appropriate Standard or Custom rate. If an existing Mercury Vapor luminaire requires the replacement of a ballast, the unit will be replaced with a corresponding HPS unit.

Type of Light	Watts	Nominal Lumens	Monthly kWh	Monthly Rates	
				Option A	Option B
Cobrahead, Mercury Vapor	100	4,000	39	-	-
	175	7,000	66	\$5.37	\$2.70
	250	10,000	94	6.31	2.94
	400	21,000	147	5.48	2.82
	1,000	55,000	374	6.28	3.13
Special Box Similar to GE "Space-Glo"					
HPS	70	6,300	30	8.68	2.80
Mercury Vapor	175	7,000	66	8.90	2.80

* Not offered.

Advice No. 09-07
Issued April 9, 2009
Maria M. Pope, Senior Vice President

Effective for service
on and after September 23, 2009

(M)

**4,000 lumen
Mercury Vapor
lamps
(100 watts)
are currently
included
in
Schedule 91
Page 11 as
"obsolete".**

**4,000 lumen
HPS (50 watt)
not offered in
standard offering
On Page 9-8**

EXHIBIT F - Schedule 91. Sheet 9-12

Portland General Electric Company
P.U.C. Oregon No. E-18

Original Sheet No. 91-12

SCHEDULE 91 (Continued)

SERVICE RATE FOR OBSOLETE LIGHTING (Continued)

Type of Light	Watts	Nominal Lumens	Monthly kWh	Monthly Rates	
				Option A	Option B
Special Box, Anodized Aluminum Similar to GardCo Hub					
HPS	Twin 70	6,300	60	*	*
	70	6,300	30	*	*
	100	9,500	43	\$8.52	\$3.17
	150	16,000	62	*	3.18
	250	29,000	102	*	*
	400	50,000	163	*	*
Metal Halide					
	250	20,500	99	*	3.36
	400	40,000	156	*	3.76
Cobrahead, Dual Wattage, HPS					
	70/100 Watt Ballast	100	9,500	43	*
	100/150 Watt Ballast	100	9,500	43	*
	100/150 Watt Ballast	150	16,000	62	*
Special Architectural Types					
	KIM SBC Shoebox, HPS	150	16,000	62	*
	Special Acom-Type, HPS	70	6,300	30	8.45
Special GardCo Bronze Alloy					
	HPS	70	5,000	30	*
	Mercury Vapor	175	7,000	66	*
Special Acrylic Sphere					
	Mercury Vapor	400	21,000	147	*
Early American Post-Top, HPS					
	Black	70	6,300	30	5.17
Rectangle Type					
	200	22,000	73	*	*
Incandescent					
	92	1,000	31	*	*
	182	2,500	62	*	*
Town and Country Post-Top					
	Mercury Vapor	175	7,000	66	5.50

* Not offered.

(M)

Although 50 watt
4,000 lumen
HPS not offered
in Sheet 91-8
past offerings
include a 1,000
and 2,500 lumen
incandescent lamp
for street lighting.

(M)

Advice No. 09-07
Issued April 9, 2009
Marla M. Pope, Senior Vice President

Effective for service
on and after September 23, 2009

EXHIBIT G - 1 - CL&P Rate 116 with 50 watt HPS

THE CONNECTICUT LIGHT AND POWER COMPANY

STREET AND SECURITY LIGHTING

RATE 116
Page 1 of 10

AVAILABLE for street, highway, off-street and security lighting. Excludes service off the public highway except where the fixture is mounted on a Company owned distribution pole.

MONTHLY RATE:

Overhead Service:

Includes street lights, flood lights, and spot lights served overhead and mounted on an existing distribution supply pole with existing secondary distribution.

Nominal Rating In Lumens	Wattage	Mercury Vapor*	H.P. Sodium	Incandescent**	Metal Halide
600	59	-	-	\$ 6.22	-
1,000	104	-	-	\$ 5.78	-
2,500	203	-	-	\$ 4.73	-
3,450	72	-	-	-	\$ 8.87
4,000	328	-	-	\$ 5.55	-
4,000	118	\$ 6.06	-	-	-
4,000	59	-	\$ 6.23	-	-
5,200	89	-	-	-	\$ 8.09
6,000	449	-	-	\$ 7.61	-
6,300	84	-	\$ 6.47	-	-
8,000	206	\$ 7.40	-	-	-
8,500	119	-	-	-	\$ 8.42
9,500	118	-	\$ 7.18	-	-
10,000	691	-	-	\$ 11.78	-
12,500	287	\$ 9.47	-	-	-
13,000*	190	-	\$ 8.35	-	-
14,400	207	-	-	-	\$ 10.33
16,000	172	-	\$ 8.17	-	-
22,000	289	-	-	-	\$ 12.38
22,500	455	\$ 12.46	-	-	-
27,500	311	-	\$ 11.39	-	-
36,000	451	-	-	-	\$ 15.32
50,000	472	-	\$ 14.14	-	-
60,000	1103	\$ 25.60	-	-	-
110,000	1080	-	-	-	\$ 30.61
140,000	1103	-	\$ 29.35	-	-

Connecticut Light and Power Streetlight Schedule (Rate 116) includes 4,000 lumen (50 watt) and 6,300 lumen (70 watt) lamps

Note: the 84 wattage represents 70 watts for the lamp and 14 watts to account for the electricity used to power the ballast and photocell. Same for the 50 watt lamp, plus 9 watts for ballast and photocell

*No additional luminaires or poles of these sizes or types will be installed. For replacement of an existing mercury vapor luminaire, municipalities may request in writing that a similar luminaire be installed where ambiance and atmosphere must be maintained and where safety and security will not be jeopardized.

Supersedes Rate 116
Effective July 1, 2009
by Letter Ruling dated June 19, 2009
Docket No. 09-05-07

Effective January 1, 2010
by Letter Ruling dated December 28, 2009
Docket No. 10-01-01

Rate 116.01-01-10.doc

EXHIBIT G - 2 - Public Service Electric and Gas Sheet No. 93 offering 50 watt HPS

Rates contained online at page 87 of the PDF file:
PUBLIC SERVICE ELECTRIC AND GAS COMPANY First Revised Sheet No. 93
 Superseding
 B.P.U.N.J. No. 13 ELECTRIC Original Sheet No. 93
RATE SCHEDULE BPL
BODY POLITIC LIGHTING SERVICE
APPLICABLE TO USE OF SERVICE FOR:
 Public street lighting and outdoor area lighting to a body politic.
CHARACTER OF SERVICE:
 Limited period from dusk to dawn.
RATE:
Monthly Charge Per Unit: Service From Company-Owned Facilities

<u>Lamp Type</u>	<u>Luminaire</u>	<u>Average Maintained Lumens</u>	<u>Wattage Including Ballast</u>	<u>Company Owned</u>	<u>Company Owned including SUT</u>
HIGH	50 Watt Cobra-Head	3,600	58	\$5.49	\$5.82
PRESSURE	70 Watt Cobra-Head	5,670	83	7.90	8.37
SODIUM	100 Watt Cobra-Head	8,550	117	10.04	10.64
VAPOR	150 Watt Cobra-Head	14,400	171	9.96	10.56
	200 Watt Cobra-Head	19,800	236	11.06	11.72
	250 Watt Cobra-Head	24,750	300	10.64	11.28
	400 Watt Cobra-Head	45,000	450	17.89	18.95
	50 Watt Cobra-Head Cut-off	3,600	60	7.02	7.44
	250 Watt Cobra-Head Cut-off	24,750	300	14.86	15.75
	400 Watt Cobra-Head Cut-off	45,000	470	17.36	18.40

Streetlight Schedule (Sheet 93) includes both 50 watt and 70 watt HPS lamps

Rate from Page 89 of PDF file

<u>Lamp Type</u>	<u>Luminaire</u>	<u>Average Maintained Lumens</u>	<u>Wattage Including Ballast</u>	<u>Publicly Owned</u>	<u>Publicly Owned including SUT</u>
HIGH	50 Watt Cobra-Head	3,600	58	\$2.67	\$2.83
PRESSURE	70 Watt Cobra-Head	5,670	83	3.17	3.36
SODIUM	100 Watt Cobra-Head	8,550	117	2.40	2.54
VAPOR	150 Watt Cobra-Head	14,400	171	2.37	2.51
	200 Watt Cobra-Head	19,800	236	2.25	2.39
	250 Watt Cobra-Head	24,750	300	1.61	1.71
	400 Watt Cobra-Head	45,000	450	.51	.54
	50 Watt Cobra-Head Cut-off	3,600	60	2.62	2.78
	250 Watt Cobra-Head Cut-off	24,750	300	1.61	1.71
	400 Watt Cobra-Head Cut-off	45,000	470	(0.03)	(0.03)

EXHIBIT G - 3 - Southern California Edison
Sheet No. 24448-E offering 50 watt HPS and Midnight Service



Southern California Edison
 Rosemead, California

Revised Cal. PUC Sheet No. 24448-E
 Cancelling Revised Cal. PUC Sheet No. 24086-E

Schedule LS-1
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM

Sheet 1

APPLICABILITY

Applicable to service for the lighting of streets, highways, and publicly-owned and publicly-operated automobile parking lots which are open to the general public where the Company owns and maintains the street lighting equipment and associated facilities included under this schedule.

TERRITORY

Within the entire territory served.

RATES

Nominal Lamp Rating		Per Lamp Per Month *	
Average		A	B
Lamp Wattage	Initial Lumens	All Night Service	Midnight Service
Incandescent Lamps **			
103	1,000	\$ 7.95	\$7.16
202	2,500	9.69	8.14
327	4,000	11.96	9.45
448	6,000	14.40	10.96
Mercury Vapor Lamps **			
100	4,000	\$ 7.88	\$ 6.87
175	7,900	9.39	7.73
250	12,000	11.26	8.95
400	21,000	14.58	10.94
700	41,000	21.10	14.94
1,000	55,000	26.63	17.92
High Pressure Sodium Vapor Lamps			
50	4,000	\$ 6.59	\$ 6.15
70	5,800	7.09	6.45
100	9,500	7.98	7.08
150	16,000	9.30	7.82
200	22,000	10.61	8.73
250	27,500	11.84	9.44
400	50,000	15.11	11.39

Streetlight Schedule (Sheet 24448-E) includes both 50 watt and 70 watt HPS lamps

Streetlight Schedule (Sheet 24448-E) also includes rates for Midnight Service

* Rates shown are for a single lamp. When an account has more than one lamp the total kWh will be the kWh per month lamp rating to three decimal places multiplied by the number of lamps.

** Closed to new installations.

(Continued)

(To be inserted by utility)
 Advice 1295-E
 Decision _____

Issued by
 John R. Fielder
 Senior Vice President

(To be inserted by Cal. PUC)
 Date Filed Mar 11, 1998
 Effective Apr 20, 1998

EXHIBIT G - 4 - CL&P Rate 116 Street lighting - offering 50 watt HPS and Midnight Service

Midnight Option Rate Included

Comparison Dusk-to-Dawn vs Midnight Option

IT CRG-11

The Connecticut Light & Power Company
 Docket No. 09-12-05
 Witness Responsible: C. R. Goodwin

RATE 116

Dated: January 8, 2010
 Page 1 of 2

Rate 116 - Full Service Streetlighting

	Type/Size	Wattage	Distribution Monthly Rate	Annual kWh		Dusk-to-Dawn	Midnight Option	Annual Bill \$		Difference	Percent Change
				Dusk-to-Dawn	Midnight Option			Midnight Option	Difference		
10	<u>Incandescent</u>										
11	600 lumen	59	\$5.58	242	129	\$97.67	\$83.33	\$83.33	-\$14.34	-14.7%	
12	1,000	104	\$4.65	427	228	\$109.85	\$84.57	\$84.57	-\$25.28	-23.0%	
13	2,500	203	\$2.52	834	444	\$135.81	\$66.46	\$66.46	-\$49.35	-36.3%	
14	4,000	328	\$1.98	1348	718	\$194.33	\$114.59	\$114.59	-\$79.74	-41.0%	
15	6,000	449	\$2.67	1845	982	\$265.59	\$156.43	\$156.43	-\$109.16	-41.1%	
16	10,000	691	\$4.18	2839	1512	\$409.50	\$241.52	\$241.52	-\$167.99	-41.0%	
17	<u>Mercury Vapor</u>										
18	4,000 lumen	118	\$4.77	485	258	\$118.66	\$89.98	\$89.98	-\$28.69	-24.2%	
19	8,000	206	\$5.16	846	451	\$168.99	\$118.91	\$118.91	-\$50.08	-29.6%	
20	12,500	287	\$6.34	1179	628	\$225.37	\$155.60	\$155.60	-\$69.77	-31.0%	
21	22,500	455	\$7.51	1869	995	\$326.70	\$216.08	\$216.08	-\$110.61	-33.9%	
22	60,000	1,103	\$13.58	4532	2413	\$736.63	\$468.48	\$468.48	-\$268.15	-36.4%	
23	<u>High Pressure Sodium</u>										
24	4,000 lumen	59	\$5.59	242	129	\$97.79	\$83.45	\$83.45	-\$14.34	-14.7%	
25	6,300	84	\$5.55	345	184	\$110.30	\$89.88	\$89.88	-\$20.42	-18.5%	
26	9,500	118	\$5.89	485	258	\$132.10	\$103.42	\$103.42	-\$28.69	-21.7%	
27	13,000	190	\$6.28	781	416	\$174.15	\$127.96	\$127.96	-\$46.19	-26.5%	
28	16,000	172	\$6.29	707	376	\$164.95	\$123.14	\$123.14	-\$41.81	-25.3%	
29	27,500	311	\$8.00	1278	680	\$257.69	\$182.09	\$182.09	-\$75.61	-29.3%	
30	50,000	472	\$9.00	1939	1033	\$353.42	\$238.68	\$238.68	-\$114.75	-32.5%	
31	140,000	1103	\$17.33	4532	2413	\$781.63	\$513.48	\$513.48	-\$268.15	-34.3%	
32	<u>Metal Halide</u>										
33	3,450 Lumen	72	\$8.08	296	158	\$134.45	\$116.94	\$116.94	-\$17.50	-13.0%	
34	5,200	89	\$7.13	366	195	\$131.80	\$110.17	\$110.17	-\$21.64	-16.4%	
35	8,500	119	\$7.12	489	260	\$147.31	\$118.38	\$118.38	-\$28.93	-19.6%	
36	14,400	207	\$8.07	850	453	\$204.48	\$154.16	\$154.16	-\$50.32	-24.6%	
37	22,000	289	\$9.23	1187	632	\$261.09	\$190.83	\$190.83	-\$70.26	-26.9%	
38	36,000	451	\$10.41	1853	987	\$359.43	\$249.78	\$249.78	-\$109.64	-30.5%	
39	110,000	1080	\$18.84	4437	2363	\$787.79	\$525.23	\$525.23	-\$262.56	-33.3%	

EXHIBIT H - New Hampshire State Law Requiring Streetlight Rates for Midnight Service

[Http://www.gencourt.state.nh.us/legislation/2009/hb0585.html](http://www.gencourt.state.nh.us/legislation/2009/hb0585.html)

CHAPTER 212 (Enacted into law in 2009)

HB 585-FN - FINAL VERSION

9-D:4 Part-Night Rate for Roadway and Area Lighting.

To encourage cost savings and energy conservation, the public utilities commission shall, subject to its ratemaking authority under RSA 378, develop a rate for part-night or midnight service for unmetered street or area lighting. Such a rate shall be revenue neutral with respect to utility distribution revenue.

Updated State-level Greenhouse Gas Emission Coefficients for Electricity Generation 1998-2000

Energy Information Administration
Office of Integrated Analysis and Forecasting
Energy Information Administration
U.S. Department of Energy

April 2002

<http://www.eia.doe.gov/oiaf/1605/pdf/EFactors1998-2000.pdf>

Table 1. 1998-2000 Average State-level Carbon Dioxide Emissions Coefficients for Electric Power
Page 5

	Carbon Dioxide
Region/State	lbs/kWh
West/Oregon	0.28

UE 215 – CERTIFICATE OF SERVICE

I hereby certify that on this 9th day of June 2010, I served the foregoing OPENING TESTIMONY OF THE INTERNATIONAL DARK-SKY ASSOCIATION in docket UE-215 upon each party listed in the UE-215 OPUC Service List by email, and where paper service is not waived, by US Mail First Class Postage Prepaid, and upon the Commission by email and by sending 1 original and 5 copies to the Commission's Salem office.

(W denotes waiver of paper service)

(C denotes service of Confidential material authorized)

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UE-215 - Certificate of Service OPENING TESTIMONY OF THE INTERNATIONAL DARK-SKY ASSOCIATION

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