GMO-2801

Exhibit No.:
Issue: Rate Design
Witness: Robert Wagner
Sponsoring Party: Robert Wagner
Type of Exhibit: Direct Testimony
Case No.: ER-2010-0355
ER-2010-0356
Date Testimony Prepared: November 9, 2010

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2010-0355

CASE NO. ER-2010-0356

DIRECT TESTIMONY

OF

ROBERT WAGNER

ON BEHALF OF

ROBERT WAGNER

Kansas City, Missouri
November 2010

Wagner Exhibit No GMO 2801
Date 2/4/11 Reporter LMB
File No ER-2010-0355 & 0356

Q: PLEASE STATE YOUR NAME AND ADDRESS

A: My name is Robert Wagner and my address is 9005 N Chatham Avenue, Kansas City, MO 64154.

Q: WITH WHAT ORGANIZATION ARE YOU AFFILIATED WITH AND IN WHAT CAPACITY?

A: The International Dark-Sky Association. I serve as the President of the Board of Directors. See RAW2010-1

Q: ON WHOSE BEHALF ARE YOU TESTIFYING?

A: I am testifying on behalf of myself, Robert Wagner, Pro Se Intervener

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS CASE?

A: I am presenting testimony in support of four requests of public benefit related to outdoor lighting. These include requests: for the addition of voluntary part-night rates for outdoor lighting; for the inclusion of rates for lower wattage high pressure sodium outdoor lamps; for the conversion of outdoor rates from listing lumens and wattages to listing expected illumination on the ground; and finally to prohibit the marketing of outdoor lights as safety, security or crime prevention lights without a guarantee to back up this claim.

Voluntary Part-Night Rates for Outdoor Lighting

Q: PLEASE EXPLAIN THE PROGRAMMABLE PHOTOCELL

A: Historically, photocells have been used with outdoor lighting to turn them on at dusk and off at dawn. A programmable photocell includes a clock that allows the light to be switched off at a designated time such as midnight and back on at a selected time such as 6am. A couple of examples are provided in Schedule RAW2010-2. The utility or customer may also choose a similar time such as 11pm until 5am.

Q: ARE ANY OTHER JURISDICTIONS ALLOWING VOLUNTARY PART-NIGHT RATES?

A: Yes, In California, Southern California Edison and in New Hampshire, the Public Service Company of New Hampshire have existing rates for both "All Night" and "Midnight" (aka part-night) street lighting see Schedule RAW2010-3 and RAW2010-4. In Connecticut, Connecticut Light & Power has been required to file a voluntary partial night streetlight rate by the Connecticut Department of Public Utility Control in rate case Docket No. 09-12-05 final decision dated 6/30/10 see Schedule RAW2010-5. In New Hampshire, the state of New Hampshire signed into law bill HB585 in 2009 that requires the public utilities commission to establish requirements for an electric utility rate for partial night use of outdoor lighting systems – see Schedule RAW2010-6.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE BENEFIT THE CONSUMER AND MUNICIPALITIES?

A: Establishing a voluntary part-night rate for outdoor lighting would provide consumers and municipalities with lower cost alternatives for lighting that still provides illumination during common busy times such as morning and evening rush-hour. Second, this would offer the public a considerable savings on electricity. Third, this would reduce maintenance costs. Fourth, this would reduce the CO2 associated with electricity generation. Fifth, this would assist anyone with an individual or community ethos to protect the night sky, environment or neighbor from light pollution.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE PROVIDE LOWER COSTS?

A: In looking at the Southern California Edison, Schedule LS-1, Sheet 3, Lighting – Street and Highway, the Energy Charge for "Midnight" service is 47.5% less than the "All Night" charge (Schedule RAW2010-3), a consumer would be able to afford the Energy Charge on almost two "Midnight" lights for the Energy Charge of one. For municipalities facing budget restrictions this would provide a significant savings where the only other choice is to remove the light under the existing rate plan.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE PROVIDE A REDUCTION OF ELECTRICTY USE?

A: The typical annual burning hours is 4100 hours per year mentioned by KCP&L. In reviewing the Southern California Edison rates, they advertise 4,140 hours of service for all night and 2,170 hours of service for "Midnight" service. In Missouri this 2,170 hours of part-night service would result in a savings of 47%.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE REDUCE MAINTENANCE COSTS?

A: Maintenance costs are primarily related to replacing lamps or ballasts. All high intensity discharge bulbs reduce their output over time and have an average life-span rated in hours. A standard practice is to establish a group re-lamping schedule based on an anticipated burned out bulb. Based on the 4,100 hours of use per year, a typical period for group relamping will be on a 4.5 year cycle. Reducing the annual "on" time for a bulb will increase its life, thus extending the time before it burns out. Maintenance will occur less often using part-night lighting. With 2,170 hours of use annually, the lamp life under the

part-night option would increase significantly. A streetlight controlled by a part-night photocell would have a longer group relamping schedule, resulting in a significant reduction in maintenance costs.

Q: WHAT IF KCP&L DOES NOT DO GROUP RELAMPING?

A: KCP&L should do group relamping due to the significant savings in costs and improvement in luminaire performance. This is also a time to wash and clean the reflective surfaces and lenses which may reduce lumen output of a fixture even more than lumen depreciation see Schedule RAW2010-7.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE REDUCE CO2 EMISSIONS?

A: Reduced consumption of electricity would reduce the CO2 associated with electricity generation.

Q: HOW WOULD A VOLUNTARY PART-NIGHT RATE BENEFIT A PERSONAL OR COMMUNITY CONCERN TO REDUCE LIGHT POLLUTION?

A: Communities, businesses, and individuals are becoming increasingly concerned about the negative effects of all-night outdoor lighting. Kansas City, MO for instance recently adopted an outdoor lighting ordinance to reduce light trespass – light shining across the property line – and uplight – light shining into the sky. Providing a period of darkness will help where there is an interest or concern for reducing light pollution.

Q: HOW AVAILABLE ARE PART-NIGHT PHOTOCELLS IN THE MARKET?

A: Part-night photocells are widely available in the commercial marketplace. There are many manufacturers. Precision Multiple Controls was selected by Connecticut Light & Power

after testing. Fischer Pierce, Dark To Light (DTL) and Ripley are among other manufacturers.

Q: ARE PROGRAMMABLE PHOTOCELLS A NEW AND UNTESTED TECHNOLOGY?

A: DTL, a subsidiary of Acuity Brands, one of the largest and well established manufacturers of lighting equipment, mentions on their website that since 1990 they have shipped over seven million electronic photocontrols and their controls are used in over 700 utility installations see Schedule RAW2010-8.

Q: WHAT IS THE COST FOR PROGRAMMABLE PHOTOCELLS?

A: The Connecticut Light and Power Company was able to negotiate a consumer cost of $12.73 for the cost of the new photocell if replacement was done at relamping (see Schedule RAW2010-9). I see no reason that KCP&L could not purchase these photocells and offer a similar rate.

Q: OTHER THAN REQUIRING A VOLUNTARY PART-NIGHT RATE, IS THERE ANYTHING ELSE THE COMMISSION NEEDS TO DECIDE RELATED TO PART-NIGHT LIGHTING?

A: The Public Service Commission should establish a state standard for the minimum duration of the "off" period. I would recommend 6 hours per night and leave it up to the utility to decide if this is from midnight to 6am, 11pm to 5am or other similar period.

Inclusion of rates for lower wattage high pressure sodium outdoor lamps

Q: PLEASE DECRIBE THE LOWEST OFFERINGS UNDER KCP&L AND GMO SCHEDULES?

A. KCP&L in Case ER-2010-0355,

Schedule AL, Sheet 33 the 5800 lumen HPS unit (70 watts) is the lowest.

Schedule 1-ML, Sheet 35 the 9500 lumen HPS unit (100 watts) is the lowest.

Schedule 3-ML, Sheet 36A the 9500 lumen HPS unit (100 watts) is the lowest

KCP&L GMO in Case ER-2010-0356, Municipal Street Lighting,

Sheet 41 the 150 Watt HPS unit (estimated 14,400 lumens) is the lowest.

Sheet 43, the 100 Watt HPS unit (8,550 lumen) is the lowest.

Sheet 47, the 150 Watt HPS unit (14,400 lumen) is the lowest.

Sheet 89, the 70 Watt HPS unit (5000 lumen) is the lowest.

Sheet 92, the 70 Watt HPS unit (5000 lumen) is the lowest.

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

A: For all schedules related to street and area lighting a 50 Watt (4000 lumen) High Pressure Sodium lamp should be added. For KCP&L Sheets 35 and 36A, and GMO Sheets 41, 43, and 47 a 70 Watt HPS lamp should be added.

Q: PLEASE EXPLAIN THE BASIS FOR YOUR CONCLUSION

A: I base this conclusion on the fact that other utilities offer this rate and KCP&L used to offer 4000 lumen and lower lights in its Schedule 73 filed with the State Corporation Commission of Kansas. Additionally, it used to offer a 3300 lumen Mercury Vapor Street Light on GMO Sheet 88.

Q: WHAT OTHER UTILITIES OFFER 50W OR LOWER HPS LIGHTS?

A: I am aware of at least 16 in 9 different states including:

Southern California Edison, CA (see Schedule RAW2010-3)

The United Illuminating Company, CT (see Schedule RAW2010-10)

Avista Utilities – Idaho (see Schedule RAW2010-11)

Western Massachusetts Electric, MA (see Schedule RAW2010-12)

Nstar Electric, Boston Edison Company, MA (see Schedule RAW2010-13)

Fitchburg Gas and Electric Light Company, MA (see Schedule RAW2010-14)

Massachusetts Electric Company, MA (see Schedule RAW2010-15)

Interstate Power and Light Company, MN (see Schedule RAW2010-16)

Public Service Company of New Hampshire, NH (see Schedule RAW2010-17)

Unitil Energy Systems, Inc., NH (see Schedule RAW2010-18)

New Hampshire Electric Cooperative, NH (see Schedule RAW2010-19)

Tri-County Electric Cooperative, OK (see Schedule RAW2010-20)

Nantucket Electric Company, RI (see Schedule RAW2010-21)

The Narragansett Electric Company, RI (see Schedule RAW2010-22)

Puget Sound Energy, WA (see Schedule RAW2010-23)

Avista Utilities – Washington (see Schedule RAW2010-24)

Q: HOW WOULD LOWER WATTAGE HPS LIGHTS BENEFIT THE CONSUMER?

A: The consumer would not be restricted to using more light than is necessary to illuminate an area, thus wasting energy and overlighting – possibly creating light pollution issues with neighbors in high density areas.

Q: WHY WOULD LOWER WATTAGE HPS LIGHTS BE IN THE PUBLIC INTEREST?

A: These lower wattage lights consume significantly less energy than higher wattage lamps currently offered. Adopting these lights will lower outdoor lighting costs and reduce energy and CO2 emissions. In addition, this would provide an opportunity for municipalities to reduce their streetlight costs without removing lights.

Conversion of outdoor lighting rates from listing lumens and wattages to listing expected illumination on the ground

Q: CAN YOU EXPLAIN THE REASON BEHIND MOVING TOWARD ILLUMINATION ON THE GROUND?

A: The proposed outdoor lighting rate sheets identify a light based on its wattage and/or lumen output. There are a wide variety of lighting designs and shielding standards. How much of the light is emitted toward the ground and results in useful illumination is at the discretion of the utility. An inexpensive and poorly designed light may produce significantly less useful illumination than a well-focused light. The current rate design favors the utility using an unshielded light if a well-focused light is slightly more expensive and other aspects such as lifespan are considered equal. Schedule RAW2010-19 shows one utility company that is using well-focused lights.

Q: SHOULD THE COMMISSION SIMPLY MANDATE SHIELDING?

A: That is one easy option to consider, but I believe moving toward illuminance based rates is a better solution.

Q: WHY IS CONVERTING THESE RATES TO ILLUMINATION ON THE GROUND BETTER THAN REQUIRING SHIELDING?

A: If KCP&L converted to ground illuminance, they should be able to discontinue listing wattage and lumen output on the rates. They should be able to use lower wattage fixtures

with better shielding as long as they provide the same level of illumination. For example, a shielded 70 Watt shielded light may produce the same ground illumination as a 100 Watt unshielded light. If KCP&L is rewarded through energy savings for adopting better shielded lights that provide the same level of illumination, then the utility, consumer and the public all benefit. Additionally, the utility would not need to file new rates as lighting technologies change and improve efficiency, as long as the useful light remains the same or better.

Q: HOW DOES THE CONSUMER BENEFIT FROM GROUND BASED ILLUMINATION RATES?

A: The consumer is provided a light that puts the same or more light on the target. Less light is emitted as glare and uplight into the sky. They will get a better focused light without paying more.

Q: HOW DOES GROUND BASED ILLUMINATION RATES BENEFIT THE PUBLIC?

A: Over time KCP&L will invest in lights with good efficiencies and shielding. The public will have roadways with less glare and improved nighttime visibility. Less light will be emitted into the sky and skyglow will be reduced. Better control of light will provide less stray light onto neighboring properties. If the entire electric utility industry switched over to ground based illuminance rates, I believe we would be years ahead of where we are now in relation to lighting efficiency and shielding controls.

Q: ARE THERE ANY CONCERNS THE COMMISSION SHOULD BE AWARE OF?

A: Yes. Some lights are used for their ability to properly render color. Many outdoor display lots such as automotive dealers would have problems changing from a warm, white light

to a monochromatic amber light such as low-pressure sodium. This is a small matter and could be easily solved through simple standards or regulations. A workgroup could be established to look into this concept and provide some recommendations on how it can be adopted.

Prohibit the marketing of outdoor lights as safety, security or crime prevention lights without a guarantee to back up this claim

Q: HOW LONG HAS KCP&L BEEN MARKETING ITS PRODUCTS AS CRIME PREVENTORS?

A: In March 2000 KCP&L approved its outdoor lighting brochure that used the statement: "TURN LIGHTS ON, TURN CRIME OFF" see Schedule RAW2010-25. It appears this has been ongoing since then.

Q: WHAT IS THE CONCERN WITH THE STATEMENT, "TURN LIGHTS ON, TURN CRIME OFF"?

A: This statement insinuates KCP&L's outdoor lighting products eliminate crime. It makes an unreasonable, misleading and unlawful statement about the products that have been approved for use by the commission. Customers that rely on this message may not take prudent security measures such as locking their doors, enrolling in a security monitoring service or hiding the valuables in their vehicle. There is no mechanism in lighting that guarantees it will be used only for good, safe purposes.

Q: WHAT ARE THE CONCERNS WITH PUBLIC SAFETY?

A: The assumption with safety is the ability of lights to improve visibility for the driver or pedestrian. Many people believe that brighter is better. But, the human eye must adapt to the brightest object in the field of vision. Bright, glaring lights cause the pupil to constrict

and reduce your night vision. When the bright object is removed, the eye takes some time to readjust to dark conditions – as much as several minutes. This is like going from a bright sunny day into a dark movie theater where the movie has already started. It may take some time before your night vision returns to allow you to see to find a seat. Many of KCP&L lights are unshielded or have a high glare rating, thus leading to safety concerns such as those mentioned by the American Medical Association, see Schedule RAW2010-26.

Q: WHAT IS YOUR RECOMMENDATION?

A: I recommend that utilities providing outdoor lighting limit their marketing to only stating the technical details of the lights they provide such as: wattage, bulb lumens, ground illuminance, and glare, backlight and uplight ratings in accordance with the Illumination Engineering Society TM-15. Implying they are suitable for safety, security or crime prevention should be prohibited unless the claim is accompanied with a guarantee like KCP&L's Surge Protection Program and approved for such use by the commission. Additionally, the term "PROTECTIVE" should be removed from the KCP&L rate Schedule AL, Sheet 33. This rate should be labeled "Private Unmetered Area Lighting" similar to GMO Sheet 47.

Q: WHY SHOULD THE COMMISSION MANAGE OUTDOOR LIGHTS APPROVED FOR SAFETY, SECURITY OR CRIME PREVENTION?

A: It is a common practice to manage, regulate and inspect these types of devices where human life may be at risk or dependant upon the correct operation of a device. Other devices used for this purpose such as fire extinguishers, emergency lighting, fire doors, fire sprinklers, fire fighting equipment, athletic safety equipment and safes have specific

standards they are required to meet. This may include regular inspections, battery backups and lab testing to show acceptability to standards. Due to an increased level of service, care, and liability a separate, higher rate would probably need to be established to account for these costs and insurance.

Q: DOES THIS CONCLUDE YOUR TESTIMONY TODAY?

A: Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Kansas City Power & Light Company to Modify Its Tariffs to Continue the Implementation of Its Regulatory Plan	)))	**Case No. ER-2010-0355**
In the Matter of the Application of KCP&L Greater Missouri Operations Company to Modify Its Electric Tariffs to Effectuate a Rate Increase	)))	**Case No. ER-2010-0356**

AFFIDAVIT OF ROBERT WAGNER

STATE OF MISSOURI)
) ss
COUNTY OF PLATTE)

Robert Wagner, being first duly sworn on his oath, states:

1. My name is Robert Wagner, I live at 9005 N Chatham Ave, Kansas City, MO, and I am the President of the Board of Directors for the International Dark-Sky Association.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Robert Wagner consisting of Twelve (12) pages, having been prepared in written form for introduction into evidence in the above captioned dockets.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.

Robert Wagner

Subscribed and sworn before me this 9 day of November, 2010.

Judith A Wagner
Notary Public

My commission expires: March 27, 2011

JUDITH A. WAGNER
MY COMMISSION EXPIRES
March 27, 2011
NOTARY SEAL
#07023015
PLATTE COUNTY
NOTARY PUBLIC, STATE OF MISSOURI

Index of Schedules

Nantucket Electric Company, 50W HPS rates	RAW2010-21
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Puget Sound Energy, 50W HPS rates	RAW2010-23
Avista Utilities – Washington, 50W HPS rates	RAW2010-24
KCP&L Outdoor Lighting Brochures	RAW2010-25
American Medical Association Policy on Light Pollution	RAW2010-26

Robert Wagner
9005 N Chatham Avenue
Kansas City, MO 64154
913-244-7608
rwagner@eruces.com

EDUCATION

University of Missouri - Rolla
B.S. Engineering Management **1991**
Preference: Electrical Engineering

WEBSITES

Midwest Citizens for Responsible Outdoor Lighting	http://mcrol.trianglealumni.org/
Boy Scout's Dark-Sky Camping	http://darkskycamping.googlepages.com/
Missouri Night Sky Protection Act	http://missourinspa.googlepages.com/
Kansas Night Sky Protection Act	http://ksnspa.googlepages.com/

LIGHT POLLUTION ACTIVITES

Kansas City, MO - Exterior Lighting Section Included in Current Drafts of City Ordinance Overhaul **2007-2008**
Worked with various groups to ensure inclusion.

Missouri Night Sky Protection Act **2007-Present**
Developed initial concept and found legislators to get the Act filed. Working with various state agencies to develop light pollution policy for the state.

Kansas Night Sky Protection Act **2008-Present**
Working with various state agencies to develop light pollution policy for the state. Gathering organizations and individuals to support the Act.

US National **2006-Present**
Working to establish coalition of organizations for congressional push. Efforts within the EPA to get light pollution identified as an visibility impairment in Federal Class 1 Areas. Pushing for the release of human health impact studies.

Various Regional **2006-Present**
Provided light pollution education to various localities.

PUBLICATIONS AND PAPERS

- "Dark-Sky Camping Best Practices in Illumination for the Boy Scouts"
  Co-author with Chad Moore and Leo Smith 2007
- "Light Pollution Impact on United States Class 1 Federal Areas"
  Used Google Earth overlay to show the impact of light pollution on EPA protected areas. 2007

OCCUPATION

ERUCES, Inc. 11142 Thompson Avenue, Lenexa, KS 66219
IT Manager responsible for company infrastructure. Providing training and support for encryption products used by various customers.

MEMBERSHIPS

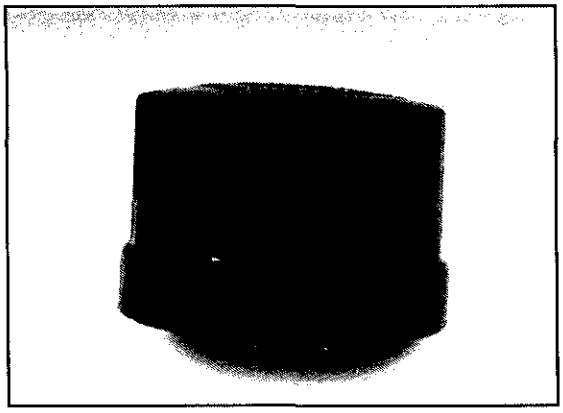
- International Dark-Sky Association – President, Board of Directors
- Sierra Club, The National Audubon Society, Missouri Parks Association
- Eagle Scout; Assistant Scoutmaster, Troop 1495; Den Leader, Pack 4348
- Philmont Staff Association, Charles L. Sommers Alumni Association, Sea Base Alumni and Friends Association, National Eagle Scout Association – Boy Scouts of America

Schedule RAW2010-1

DPN Series *Part Night*

Electronic Locking Type 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-time delay is provided to avoid turn-off from extraneous light.

Complies with ANSI C136.10-1996

Six-year warranty

Energy Savings

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 to +70°C ambient, Up to 90° interface per ANSI

Dielectric strength: 5000 V per ANSI

Applications:

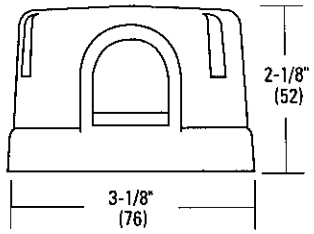
Parking lots
Area lights
Park lights
Media lighting
Ball fields and courts
Pedestrian lighting

Ordering Information

Example: D P N 1 2 4 - 2 . 6 - T J G N J 5 0

Voltage	Turn-on Level (ftc)[1]	Time Delay (seconds)	Surge Protector	Cover Color[1]	Job Packs
DPN124 120/240/277 Volts (105-305)	**2.6** Standard	**T** 2-5 Second Turn-off Delay (standard)	**J** 320 J/10,000 Amp MOV	**GN** Green (only)	**J12** 12 Units **J50** 50 Units

DIMENSIONS



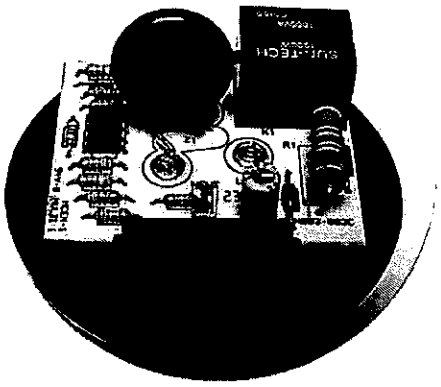
Notes:
1 Other options available, please contact your local American Electric Lighting representative

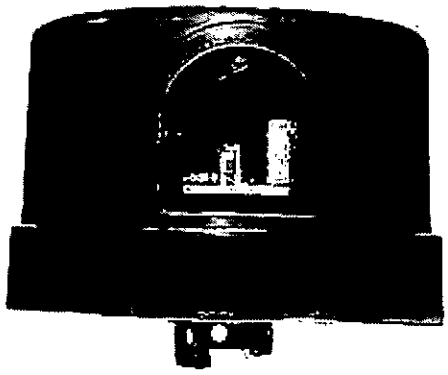
FISHER PIERCE OLC
Outdoor Lighting Controls

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

Schedule RAW2010-2

Schedule OL-1 — Sheet 1

OUTDOOR AREA LIGHTING SERVICE

APPLICABILITY

Applicable to outdoor area lighting service, other than street and highway lighting service, supplied from overhead lines where SCE owns and maintains the area lighting equipment. Service will be furnished only where the installation is considered by SCE to be of a permanent and established character.

TERRITORY

Within the entire territory served.

RATES

	Delivery Service								Generation[9]	
	Trans[1]	Distrbtn[2]	NSGC[3]	NDC[4]	PPPC[5]	DWRBC[6]	PUCRF[7]	Total[8]	URG**	DWR
Energy Charge* - $/kWh/Lamp/Month										
All Night Service	0.00359 (R)	0.01385	0.00069	0.00064	0.00773	0.00515	0.00024	0.03189 (R)	0.05041	0.03763
Midnight Service	0.00359 (R)	0.01385	0.00069	0.00064	0.00773	0.00515	0.00024	0.03189 (R)	0.05041	0.03763
All Night/Midnight Service Charge										
Mercury Vapor Lamps** - $/Lamp/Month										
175 Watt		6.86						6.86		
400 Watt		7.56						7.56		
High Pressure Sodium Vapor Lamps - $/Lamp/Month										
50 Watt		6.77						6.77		
70 Watt		6.86						6.86		
100 Watt		6.86						6.86		
150 Watt		6.86						6.86		
200 Watt		7.56						7.56		
250 Watt		7.67						7.67		
400 Watt		8.14						8.14		
Low Pressure Sodium Vapor Lamps - $/Lamp/Month										
35 Watt		8.89						8.89		
55 Watt		8.89						8.89		
90 Watt		10.60						10.60		
135 Watt		10.28						10.28		
180 Watt		10.43						10.43		
Metal Halide Lamps - $/Lamp/Month										
75 Watt		7.44						7.44		
100 Watt		8.15						8.15		
175 Watt		7.13						7.13		
250 Watt		7.30						7.30		
400 Watt		7.68						7.68		
1,000 Watt		9.45						9.45		
1,500 Watt		10.84						10.84		
Pole Charge - $/pole/Month		5.28						5.28		

* The kilowatt hours used to determine the Energy Charge for the lamp types and sizes served under this Schedule are shown in the Special Conditions section, below.

** Closed to new installations as of February 1, 1980.

*** The ongoing Competition Transition Charge (CTC) of $0.00010 per kWh is recovered in the URG component of Generation.

1 Trans = Transmission and the Transmission Owners Tariff Charge Adjustments (TOTCA) which are FERC approved. The TOTCA represents the Transmission Revenue Balancing Account Adjustment (TRBAA) of $(0.00055) per kWh, Reliability Services Balancing Account Adjustment (RSBAA) of $(0.00002) per kWh, and Transmission Access Charge Balancing Account Adjustment (TACBAA) of $0.00036 per kWh. (R)

2 Distrbtn = Distribution

3 NSGC = New System Generation Charge

4 NDC = Nuclear Decommissioning Charge

5 PPPC = Public Purpose Programs Charge (includes California Alternate Rates for Energy Surcharge where applicable.)

6 DWRBC = Department of Water Resources (DWR) Bond Charge. The DWR Bond Charge is not applicable to exempt Bundled Service and Direct Access Customers, as defined in and pursuant to D.02-10-063, D.02-02-051, and D.02-12-082.

7 PUCRF = The PUC Reimbursement Fee is described in Schedule RF-E.

8 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.

9 Gen = Generation – The Gen rates are applicable only to Bundled Service Customers. When calculating the Energy Charge, the Gen portion is calculated as described in the Billing Calculation Special Condition of this Schedule.

(Continued)

Schedule OL-1 Sheet 2
OUTDOOR AREA LIGHTING SERVICE

(Continued)

SPECIAL CONDITIONS

1. Kilowatthours for lamp Type and Size: The kilowatthours for the lamp types and sizes served under this Schedule used to determine the Energy Charge are shown below:

Nominal Lamp Rating		kWh Per Lamp Per Month*	
	Average	A	B
Lamp Wattage	Initial Lumens	All Night Service	Midnight Service
Mercury Vapor Lamps **			
175	7,900	74.520	39.074
400	21,000	168.460	85.747
High Pressure Sodium Vapor Lamps			
50	4,000	20.010	10.492
70	5,800	28.635	15.015
100	9,500	40.365	21.165
150	16,000	66.585	34.914
200	22,000	84.870	44.501
250	27,500	107.985	56.622
400	50,000	167.325	87.737
Low Pressure Sodium Vapor Lamps			
35	4,800	21.735	11.397
55	8,000	28.980	15.196
90	13,500	45.195	23.698
135	22,500	62.790	32.924
180	33,000	79.005	41.426
Metal Halide Lamps			
70	5,500	32.430	16.998 (T)
100	8.500	44.505	23.328
175	12,000	74.175	38.879
250	19,500	101.775	53.346
400	32,000	158.010	82.822
1000	100,000	372.600	195.300
1500	150,000	553.725	290.238

* 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 as of February 1, 1980.

(Continued)

Schedule OL-1 Sheet 3
OUTDOOR AREA LIGHTING SERVICE

(Continued)

SPECIAL CONDITIONS (Continued) (D) (L)

2. Service and Facilities Furnished: Service under this Schedule will be in accordance with SCE's specifications as to equipment, installation, maintenance, and operation. Facilities furnished will be SCE-owned luminaires mounted on existing SCE-owned wood poles as standard equipment. Not more than one new wood pole will be installed, and no more than one span of conductor per luminaire will be installed. For each additional new wood pole installed, the customer is billed the amounts shown in the Rates section, above. No new transformer capacity or primary distribution will be installed in order to provide this service. Service will be supplied from SCE's existing 120/240 volt overhead lines. (T) | (T) (L) (T) (L) (T) (T)

3. Hours of Service: Area all night lighting service will be furnished from dusk to dawn, approximately 4,140 hours per year. Midnight Service will be approximately 2,170 hours of service per year. (T)

4. Replacement of Lamps: SCE will replace its lamps as soon as practicable after notification by the customer of lamp outage. (T)

5. Contract: A written contract for a term of one year will be required by SCE when service is first established under this Schedule. (L) (T) | (T)

6. Restrictions:

   a. Installations will not be made at locations where, in the opinion of SCE, there is an unreasonable exposure to accidental or malicious damage. | (T)

   b. Installation will not be made at locations where, in the opinion of SCE, the lighting service may be objectionable to others. SCE reserves the right to discontinue service if, in its opinion, any installed equipment becomes objectionable to others. | (T) | (T)

7. Removal or Modification of Equipment: Where area lighting service and facilities were ordered removed or modified by a customer and such service and facilities, or their equivalent, are ordered reinstalled within 36 months from the date of the order to remove or to modify, the customer shall pay to SCE in advance of reinstallation a nonrefundable amount equal to the cost of removal or modifications of the prior facilities and the estimated cost of such reinstallation. Facilities removed or installed remain the sole property of SCE. | (T) | (T)

8. Other Than All Night Service: Where the customer requests the installation and/or removal of equipment in order to obtain Midnight Service, and such request is acceptable to SCE, SCE will comply with such request provided the customer first agrees to advance the estimated cost installed of any additional equipment required and/or the removal cost of any equipment currently installed. Such advances will not be refunded. Facilities installed in connection with such requests become and remain the sole property of SCE. | (T) | (T) (L) (T)

(Continued)

Schedule OL-1 Sheet 4
OUTDOOR AREA LIGHTING SERVICE

(Continued)

SPECIAL CONDITIONS (Continued)

9. Billing Calculation: A customer's bill is calculated according to the rates and conditions above.

Except for the Energy Charge, the charges listed in the Rates section are calculated by multiplying the Total Delivery Service rates and the Generation rates, when applicable, by the billing determinants (e.g., per kilowatt [kW], kilowatthour [kWh], etc.), (T)

The Energy Charge, however, is determined by multiplying the total kWhs by the Total Delivery Service per kWh rates to calculate the Delivery Service amount of the Charge. To calculate the Generation amount, SCE determines what portion of the total kWhs is supplied by the Utility Retained Generation (URG) and the Department of Water Resources (DWR). The kWhs supplied by the URG are multiplied by the URG per kWh rates and the kWhs supplied by the DWR are multiplied by the DWR per kWh rate and the two products are summed to arrive at the Generation amount. The Energy Charge is the sum of the Delivery Service amount and the Generation amount.

For each billing period, SCE determines the portion of total kWhs supplied by SCE's URG and by the DWR. This determination is made by averaging the daily percentages of energy supplied to SCE's Bundled Service Customers by SCE's URG and by the DWR.

a. Bundled Service Customers receive Delivery Service from SCE and receive supply (Gen) service from both SCE's URG and the DWR. The customer's bill is the sum of the charges for Delivery Service and Gen determined, as described in this Special Condition, and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

b. Direct Access Customers receive Delivery Service from SCE and purchase energy from an Energy Service Provider. The customer's bill is the sum of the charges for Delivery Service determined as described in this Special Condition except that the DWRBC rate component is subtracted from the Total Delivery Service rates before the billing determinants are multiplied by such resulting Total rates; plus the applicable charges as shown in Schedule DA-CRS and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

c. CCA Service Customers receive Delivery Service from SCE and purchase energy from their Community Choice Aggregator (CCA). SCE will read the meters and present the bill for both Delivery and Generation Services to the CCA Service Customer. The customer's bill is the sum of the charges for Delivery Service as displayed in this Rate Schedule and Generation charges determined by the CCA plus the applicable charges as shown in Schedule CCA-CRS, and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

10. Direct Access Credit: Pursuant to the Settlement Agreement in Application 02-04-2005, Direct Access Customers served under this Schedule shall receive a credit to their Delivery Service Charges of $____per kWh.

Schedule LS-1 — Sheet 1

LIGHTING - STREET AND HIGHWAY COMPANY-OWNED SYSTEM

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 SCE owns and maintains the street lighting equipment and associated facilities included under this Schedule.

TERRITORY

Within the entire territory served.

RATES

	Delivery Service								Generation[9]	
	Trans[1]	Distrbtn[2]	NSGC[3]	NDC[4]	PPPC[5]	DWRBC[6]	PUCRF[7]	Total[8]	URG***	DWR
Energy Charge* - $/kWh/Lamp/Month										
All Night Service	0.00359 (R)	0.01385	0.00069	0.00064	0.00773	0.00515	0.00024	0.03189 (R)	0.05041	0.03763
Midnight Service	0.00359 (R)	0.01385	0.00069	0.00064	0.00773	0.00515	0.00024	0.03189 (R)	0.05041	0.03763
All Night/Midnight Service Charge										
Incandescent Lamps** - $/Lamp/Month										
103 Watt		9.56						9.56		
202 Watt		9.61						9.61		
327 Watt		9.75						9.75		
448 Watt		10.27						10.27		
Mercury Vapor Lamps** - $/Lamp/Month										
100 Watt		8.70						8.70		
175 Watt		8.75						8.75		
250 Watt		9.35						9.35		
400 Watt		9.85						9.85		
700 Watt		11.10						11.10		
1,000 Watt		10.70						10.70		
High Pressure Sodium Vapor Lamps - $/Lamp/Month										
50 Watt		8.67						8.67		
70 Watt		8.77						8.77		
100 Watt		9.24						9.24		
150 Watt		9.24						9.24		
200 Watt		9.85						9.85		
250 Watt		9.94						9.94		
400 Watt		10.36						10.36		

(Continued)

Schedule LS-1
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

RATES (Continued)

	Delivery Service							Generation[9]	
	Trans[1]	Distrbtn[2]	NSGC[3]	NDC[4]	PPPC[5]	DWRBC[6]	PUCRF[7]	Total[8]	URG***	DWR
Low Pressure Sodium Vapor Lamps - $/Lamp/Month										
35 Watt		11.35						11.35		
55 Watt		11.04						11.04		
90 Watt		13.77						13.77		
135 Watt		14.14						14.14		
180 Watt		14.18						14.18		
Metal Halide Lamps - $/Lamp/Month										
70 Watt		17.65						17.65		
100 Watt		15.53						15.53		
175 Watt		14.23						14.23		
250 Watt		11.51						11.51		
400 Watt		10.98						10.98		
1,000 Watt		14.87						14.87		
1,500 Watt		21.76						21.76		
Tap Device Annual Charge - $/Device		21.86						21.86		

* The kilowatthours used to determine the Energy Charge for the lamp types and sizes served under this Schedule are shown in the Special Conditions section, below.

** Closed to new installations.

*** The ongoing Competition Transition Charge (CTC) of $0.00010 per kWh is recovered in the URG component of Generation.

1 Trans = Transmission and the Transmission Owners Tariff Charge Adjustments (TOTCA) which are FERC approved. The TOTCA represents the Transmission Revenue Balancing Account Adjustment (TRBAA) of $(0.00055) per kWh, Reliability Services Balancing Account Adjustment (RSBAA) of $(0.00002) per kWh, and Transmission Access Charge Balancing Account Adjustment (TACBAA) of $0.00036 per kWh. (R)

2 Distrbtn = Distribution

3 NSGC = New System Generation Charge

4 NDC = Nuclear Decommissioning Charge

5 PPPC = Public Purpose Programs Charge (includes California Alternate Rates for Energy Surcharge where applicable.)

6 DWRBC = Department of Water Resources (DWR) Bond Charge. The DWR Bond Charge is not applicable to exempt Bundled Service and Direct Access Customers, as defined in and pursuant to D.02-10-063, D.02-02-051, and D.02-12-082.

7 PUCRF = The PUC Reimbursement Fee is described in Schedule RF-E.

8 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.

9 Gen = Generation – The Gen rates are applicable only to Bundled Service Customers. When calculating the Energy Charge, the Gen portion is calculated as described in the Billing Calculation Special Condition of this Schedule.

(Continued)

Schedule LS-1 Sheet 3
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS

1. Kilowatthours for Lamp Type and Size: The kilowatthours for the lamp types and sizes served under this Schedule used to determine the Energy Charge are shown below:

Nominal Lamp Rating		kWh Per Lamp Per Month*	
		A	B
Lamp Wattage	Average Initial Lumens	All Night Service	Midnight Service
Incandescent Lamps**			
103	1,000	35.535	18.633
202	2,500	69.690	36.542
327	4,000	112.815	59.154
448	6,000	154.560	81.043
Mercury Vapor Lamps**			
100	4,000	45.195	23.698
175	7,900	74.520	39.074
250	12,000	103.845	54.451
400	21,000	163.530	85.747
700	41,000	277.035	145.263
1,000	55,000	391.575	205.322
High Pressure Sodium Vapor Lamps			
50	4,000	20.010	10.492
70	5,800	28.635	15.015
100	9,500	40.365	21.165
150	16,000	66.585	34.914
200	22,000	84.870	44.501
250	27,500	107.985	56.622
400	50,000	167.325	87.737
Low Pressure Sodium Vapor Lamps			
35	4,800	21.735	11.397
55	8,000	28.980	15.196
90	13,500	45.195	23.698
135	22,500	62.790	32.924
180	33,000	79.005	41.426
Metal Halide Lamps			
70	5,500	32.430	16.998 (T)
100	8,500	44.505	23.328
175	12,000	74.175	38.879
250	19,500	101.775	53.346
400	32,000	158.010	82.822
1,000	100,000	372.600	195.300
1,500	150,000	553.725	290.238

* 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)

Schedule LS-1 Sheet 4
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

2. Standard Installation: A standard installation includes an overhead multiple service installation where SCE furnishes bracket or mast arm construction and standard luminaire attached to a wood pole. (T) (T)

3. Other Than Standard Installation: (T)

   a. Where the applicant requests the installation of other than a standard installation and his request is acceptable to SCE, SCE will install the requested equipment provided the applicant agrees to advance the estimated difference in cost installed between such equipment and a standard installation. If, in the opinion of SCE, an existing wood pole could be utilized for said installation, the difference in cost installed shall include no allowance for a wood pole. For an underground service installation, cost installed shall include, but is not limited to, the cost of any necessary conduit, excavating, backfilling and restoring of the pavement in accordance with SCE's specifications. (T) (T) (T)

   b. The installed cost of the standard installation is established by Commission Decision in SCE's General Rate Case proceeding. (T)

   c. Advances made for other than a standard installation will not be refunded.

   d. All facilities installed shall become and remain the sole property of SCE. (T)

4. Hours of Service: Under SCE's standard all night operating schedule approximately 4,140 hours of service per year will be furnished. Under SCE's midnight service operating schedule approximately 2,170 hours of service per year will be furnished. (T) (T)

(Continued)

Schedule LS-1 Sheet 5
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

5. Other Than All Night Service:

a. Where the customer requests the installation and/or removal of equipment in order to obtain Midnight Service and such request is acceptable to SCE, SCE will comply with such request provided the customer first agrees to pay to SCE the estimated cost installed of any additional equipment required and/or the removal cost of equipment currently installed. Such payments will not be refunded and shall be paid in advance or in installments acceptable to SCE over a period not to exceed three years. Facilities installed in connection with such requests become and remain the sole property of SCE.

b. Total non-energy charge(s) shown under the Rates section shall be applicable under this Schedule when SCE has been requested to discontinue the existing service by the customer and the customer has stipulated, in writing, that the facilities are to be left in place for future use.

6. Removal, Relocation or Modification of Facilities:

a. Where street lighting service and facilities are ordered removed by a customer and such facilities, or any part thereof, were in service for a period of less than 10 years (120 consecutive months), the customer shall pay to SCE a nonrefundable amount equal to the total estimated cost installed less any customer contribution, plus the estimated cost of removal less the estimated net salvage value of the facilities. (T) (T)

b. Where street lighting service and facilities were ordered removed or modified by a customer and such service and facilities, or their equivalent, are ordered reinstalled within 36 months from the date of the order to remove or to modify, the customer shall pay to SCE, in advance of the reinstallation, a nonrefundable amount equal to the cost of removal or modification of the prior facilities and the estimated cost of such reinstallation.

(Continued)

Schedule LS-1 Sheet 6
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

6. Removal, Relocation or Modification of Facilities: (Continued) (T)

c. Where street lighting facilities are ordered modified and/or relocated by a customer, the customer shall pay to SCE, in advance of such modification and/or relocation, a nonrefundable amount equal to the estimated cost of such modification and/or relocation. This includes facilities that now serve street light load only, but that may have been installed originally to serve other than street light load. (T)

d. Facilities removed or installed remain the sole property of SCE. (T)

7. Requirements and Restrictions: (T)

a. The applicant for street light service shall specify the type of service, lamp size, and location of street lights.

b. Service shall not be furnished under this Schedule where location, mounting height, and/or other considerations are unacceptable to SCE. (T) (T)

c. The installation of street lighting equipment and facilities hereunder is contingent upon SCE obtaining easements, rights of way, and highway permits satisfactory to SCE for the required poles, lines, equipment, and facilities. (T)

d. In accordance with Rule 4, a written contract for a term of not less than one year and not more than five years is required in order to receive street light service under the provisions of this Schedule. (T)

e. Should the applicant not commence using the street lighting in a bona fide manner within ninety (90) days after date of completion and installation of a street light or street lighting system requested by the applicant, SCE will bill, and the applicant shall pay, the applicable non-energy (other charges) portion of the lamp charge(s). (T)

(Continued)

Schedule LS-1 Sheet 7
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

8. Timed Auxiliary Power Device Adaptor (TAP):

a. This service is available under the terms and conditions stated below. An annual charge per device, found in the Rates section of this Schedule, plus a one-time set up administrative fee and a per modification administrative fee of $65.00 per account plus Energy Charges billed at the LS-1 Midnight Service rate. (T) (L)(T)

b. A Standard Installation shall consist of an individual TAP installed on SCE-owned ornamental street lighting pole.

c. This rate option is only available to governmental agencies who are the customer of record for ornamental street lighting service. A written Application and Agreement is required for service in conjunction with SCE-owned ornamental street lighting poles.

d. SCE will install the requested TAP and the installed TAP shall remain the sole property of SCE.

e. The installation of the applicant's holiday lighting decorations and hanger assemblies shall be in accordance with SCE's specifications.

f. The applicant shall specify the number of TAPs required. Billing will be based on the manufacturers' 300 watt rating for each device and the hours of operation.

g. At the time of installation of the TAP and annually thereafter until such TAP has been removed, the customer will be required to pay the annual charge.

h. In no case shall the granting of permission to install lighted holiday decorations for use with a TAP device on SCE's ornamental poles give the applicant any additional rights.

(Continued)

Schedule LS-1 Sheet 8
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

9. Maintenance: SCE shall exercise reasonable care and diligence in maintaining its street light facilities or SCE-owned attachments thereto. Where SCE experiences, or expects to experience, maintenance costs exceeding its normal maintenance expense resulting from, but not limited to, vandalism, SCE may require the customer to pay the excess maintenance expense. (T) (T) (T)

10. Liability of SCE: SCE shall not, by taking action pursuant to its tariffs, be liable for any loss, damage, or injury, established or alleged, which may result, or be claimed to result, therefrom. (T)

11. Differential Facilities Rate: Where a governmental agency (applicant) requests and SCE agrees to install facilities which are in addition to the Standard Installation (differential facilities), the differential facilities installed costs shall be borne by the applicant. (T)

    In addition, where an applicant requests and SCE agrees to acquire the applicant's series street light system, the difference between the cost of the facilities to convert the series system to multiple service and the cost of the Standard Installation, shall be borne by the applicant. (T)

    At the option of SCE, the applicant may pay the differential facilities installed costs as a monthly charge in lieu of a one-time payment. The monthly charge is equal to 1.2 percent times the differential facilities total installed costs. (T)

    A Schedule LS-1 Differential Facilities Rate Agreement is required for service under this Special Condition.

12. Parking Lot Lighting Service: An "Agreement For Parking Lot Lighting Service SCE-Owned System Schedule LS-1" (Form 14-685) shall be required for parking lot lighting service under this Schedule. (T) (T) (T)

(Continued)

Schedule LS-1 Sheet 9
LIGHTING - STREET AND HIGHWAY
COMPANY-OWNED SYSTEM
(Continued)

SPECIAL CONDITIONS (Continued)

13. Billing Calculation: A customer's bill is calculated according to the rates and conditions above.

Except for the Energy Charge, the charges listed in the Rates section are calculated by multiplying the Total Delivery Service rates and the Generation rates, when applicable, by the billing determinants (e.g., per kilowatt [kW], kilowatthour [kWh], etc.), (T)

The Energy Charge, however, is determined by multiplying the total kWhs by the Total Delivery Service per kWh rates to calculate the Delivery Service amount of the Charge. To calculate the Generation amount, SCE determines what portion of the total kWhs is supplied by the Utility Retained Generation (URG) and the Department of Water Resources (DWR). The kWhs supplied by the URG are multiplied by the URG per kWh rates and the kWhs supplied by the DWR are multiplied by the DWR per kWh rate and the two products are summed to arrive at the Generation amount. The Energy Charge is the sum of the Delivery Service amount and the Generation amount.

For each billing period, SCE determines the portion of total kWhs supplied by SCE's URG and by the DWR. This determination is made by averaging the daily percentages of energy supplied to SCE's Bundled Service Customers by SCE's URG and by the DWR.

a. Bundled Service Customers receive Delivery Service from SCE and receive supply (Gen) service from both SCE's URG and the DWR. The customer's bill is the sum of the charges for Delivery Service and Gen determined, as described in this Special Condition, and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

b. Direct Access Customers receive Delivery Service from SCE and purchase energy from an Energy Service Provider. The customer's bill is the sum of the charges for Delivery Service determined as described in this Special Condition except that the DWRBC rate component is subtracted from the Total Delivery Service rates before the billing determinants are multiplied by such resulting Total rates; plus the applicable charges as shown in Schedule DA-CRS and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

c. CCA Service Customers receive Delivery Service from SCE and purchase energy from their Community Choice Aggregator (CCA). SCE will read the meters and present the bill for both Delivery and Generation Services to the CCA Service Customer. The customer's bill is the sum of the charges for Delivery Service as displayed in this Rate Schedule and Generation charges determined by the CCA plus the applicable charges as shown in Schedule CCA-CRS, and subject to applicable discounts or adjustments provided under SCE's tariff schedules.

OUTDOOR LIGHTING DELIVERY SERVICE RATE OL

AVAILABILITY

Subject to the Terms and Conditions of the Tariff of which it is a part, this rate is for the following applications:

(a) unmetered street and highway lighting provided to municipalities, state highway departments, and other governmental bodies;

(b) unmetered outdoor area lighting for private yards, parking lots, private roads, and other off-street applications.

All-night outdoor lighting service on an annual basis totaling approximately 4,345 hours of operation per year and midnight outdoor lighting service on an annual basis totaling approximately 2,005 hours of operation per year shall be provided for under this rate.

RATE PER MONTH

Energy Charge:

	Per Kilowatt-Hour
Transmission Charge	1.111¢
Stranded Cost Recovery	1.217¢

In addition to the energy charges above, Customers shall be assessed a monthly Distribution Rate per luminaire. The Distribution Rate includes, among other costs, the cost of the fixture and bracket. The energy charge shall be applied to the monthly kilowatt-hours specified below for the applicable fixture and service option. For outdoor lighting charges which are billed in conjunction with service rendered under a metered Rate Schedule, the kilowatt-hours used for billing purposes shall be the amount specified for the calendar month in which the meter read date occurred for service rendered under the metered Rate Schedule.

All-Night Service Option:
The monthly kilowatt-hours and distribution rates for each luminaire served under the all-night service option are shown below.

For New and Existing Installations:

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
High Pressure Sodium:														
4,000	50	27	23	22	19	16	16	16	18	21	23	24	27	$14.44
5,800	70	40	34	32	29	24	23	24	27	31	35	37	40	14.44
9,500	100	59	50	47	42	35	34	35	39	46	51	53	59	19.19
16,000	150	88	74	70	62	53	51	53	59	68	76	79	88	27.14
30,000	250	142	120	113	101	85	82	85	95	110	123	128	142	27.81
50,000	400	217	183	173	154	130	126	130	144	168	188	196	217	28.12
130,000	1,000	510	430	408	362	306	296	306	340	395	442	460	510	45.14
Metal Halide:														
5,000	70	41	35	33	29	25	24	25	28	32	36	37	41	$15.07
8,000	100	56	47	45	40	34	33	34	38	44	49	51	56	20.60
13,000	150	88	74	71	63	53	51	53	59	68	77	80	88	28.28
13,500	175	96	81	77	68	57	56	57	64	74	83	87	96	28.88
20,000	250	134	113	107	95	80	78	80	89	104	116	121	134	28.88
36,000	400	209	176	167	149	126	122	126	140	162	181	189	209	29.14
100,000	1,000	502	423	402	356	301	292	301	335	389	435	454	502	43.67

For Existing Installations Only:

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
Incandescent:														
600	105	49	41	39	35	29	28	29	33	38	42	44	49	$8.32
1,000	105	49	41	39	35	29	28	29	33	38	42	44	49	9.28
2,500	205	95	80	76	68	57	55	57	64	74	83	86	95	11.91
6,000	448	208	176	167	148	125	121	125	139	161	181	188	208	20.44
Mercury:														
3,500	100	54	46	44	39	33	32	33	36	42	47	49	54	$12.74
7,000	175	95	80	76	68	57	55	57	64	74	83	86	95	15.31
11,000	250	136	114	109	96	81	79	81	91	105	118	123	136	18.94
15,000	400	211	178	169	149	126	122	126	140	163	183	190	211	21.67
20,000	400	211	178	169	149	126	122	126	140	163	183	190	211	23.38
56,000	1,000	503	424	403	357	302	292	302	335	390	436	454	503	37.16

Issued: July 2, 2010

Issued by: Gary A. Long

Effective: July 1, 2010

Title: President and Chief Operating Officer

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
Fluorescent:														
20,000	330	153	129	123	109	92	89	92	102	119	133	139	153	$31.70
High Pressure Sodium in Existing Mercury Luminaires:														
12,000	150	84	71	67	59	50	49	50	56	65	73	76	84	19.84
34,200	360	192	162	154	136	115	112	115	128	149	166	173	192	25.39

The 15,000 Lumen Mercury fixture is fitted with a 20,000 lumen lamp. The 600 Lumen Incandescent fixture is fitted with a 1,000 lumen lamp.

Midnight Service Option:
The monthly kilowatt-hours and distribution rates for each luminaire served under the midnight service option are shown below.

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
High Pressure Sodium:														
4,000	50	14	11	9	10	7	6	6	7	9	11	13	14	$14.44
5,800	70	20	16	13	15	11	9	9	11	13	16	20	21	14.44
9,500	100	30	23	20	21	16	13	14	16	19	24	28	31	19.19
16,000	150	44	34	29	31	24	20	21	24	28	35	42	47	27.14
30,000	250	71	56	47	51	38	32	33	38	46	57	69	76	27.81
50,000	400	109	85	72	77	58	49	51	58	70	87	105	116	28.12
130,000	1,000	255	200	170	181	136	115	119	136	165	204	246	272	45.14
Metal Halide:														
5,000	70	20	16	14	15	11	9	10	11	13	17	20	22	$15.07
8,000	100	28	22	19	20	15	13	13	15	18	23	27	30	20.60
13,000	150	44	34	30	31	24	20	21	24	28	36	43	47	28.28
13,500	175	48	38	32	34	25	22	22	26	31	38	47	51	28.88
20,000	250	67	52	45	48	36	30	31	36	43	54	65	71	28.88
36,000	400	104	82	70	74	56	47	49	56	68	84	101	111	29.14
100,000	1,000	251	196	167	178	134	114	117	134	162	201	243	268	43.67

MODIFICATION OF SERVICE OPTION

Municipal and state roadway lighting Customers may request a modification of service from the all-night service option to the midnight service option during the calendar months of January and February of each year, otherwise known as the open enrollment period. Requests received from municipal and state roadway lighting Customers after the open enrollment period shall be implemented during the subsequent open enrollment period, unless the Company determines that it is feasible and practicable to implement the request prior to the subsequent enrollment period. All other Customers may request a modification of service from the all-night service option to the midnight service option at any time. Customers requesting a modification of service from the all-night service option to the midnight service option are responsible to pay to the Company the installed cost of any additional equipment required to provide service under the midnight service option. The installed cost includes the cost of the additional equipment, labor, vehicles and overheads. The Customer is responsible to pay such costs prior to the installation of the equipment. If such a request is made concurrent with the Company's existing schedule for lamp replacement and maintenance, the Customer is responsible to pay to the Company the cost of any additional equipment required, including overheads. The Customer is responsible to pay such costs prior to the installation of the equipment.

Customers requesting a modification of service from the midnight service option to the all-night service option are responsible to pay to the Company the installation cost of the equipment required to provide service under the all-night service option. The installation cost includes the cost of labor, vehicles and overheads. The Customer is responsible to pay such costs prior to the installation of the equipment. If such a request is made concurrent with the Company's existing schedule for lamp replacement and maintenance, no additional costs are required to modify service from the midnight service option to the all-night service option.

The Company will utilize fixed price estimates per luminaire for the installed cost, the additional equipment cost and the equipment installation cost and will update the fixed price estimates per luminaire each year based upon current costs. In the event traffic control is required during a modification of service option or for equipment repair, the Customer is responsible to coordinate and to provide traffic control and to pay all costs associated with traffic control. In the event the Customer is a residential or General Delivery Service Rate G Customer, the Company may coordinate and provide traffic control on the Customer's behalf and the Customer shall reimburse the Company for all costs associated with the traffic control provided by the Company. The scheduling of work associated with the modification of a service option will be made at the Company's discretion with consideration given to minimizing travel and set-up time.

LEAP YEAR ADJUSTMENT TO ENERGY

During any leap year, the energy (kilowatt-hour) usage during the month of February for all fixtures shall be increased by 3.6 percent for the purpose of determining total energy charges under this rate.

CONTRACT TERM

The contract term for outdoor area lighting shall be for not less than one year.

MAINTENANCE

The Company shall exercise reasonable diligence to insure that all street and highway lamps are burning and shall make replacements promptly when notified of outages. Lamp replacement, maintenance and cleaning of street and highway lighting fixtures will normally be performed on a periodic basis in accordance with generally accepted utility practices and consistent with any manufacturer's recommendations. Lamp replacement and maintenance of outdoor area lighting will be performed as soon as possible following notification by the Customer of the need for such service, but the Company shall not be required to perform any such replacement or maintenance except during regular working hours.

NEW INSTALLATIONS, EXTENSIONS AND REPLACEMENTS

New installations, extensions and replacements using overhead wiring, a standard fixture, an all-night service option photocell and located upon existing poles of the Company, shall be made at the expense of the Company.

Except for the excess costs of underground facilities to be apportioned as set forth in the provisions for underground electric distribution facilities specified in the Company's "Requirements for Electric Service Connections", any costs incurred in connection with new installations, extensions and replacements which exceed the costs of a standard outdoor lighting fixture equipped with an all-night service option photocell located on existing poles with overhead wiring shall be borne by the Customer. Such excess costs shall be paid as a lump sum prior to the installation of the equipment.

In the case of new installations, extensions and replacements which make use of underground conductors for supply and distribution and/or of standards or poles employed exclusively for lighting purposes, the Company reserves the right to require the Customer to furnish, own, and maintain such underground supply and distribution facilities and/or the standards or poles.

If the Company's right under the preceding paragraph is exercised and the Company thereby is relieved of the cost of installing the customary overhead wires and appurtenances and the customary dual purpose poles, the Company shall:

1. pay to the Customer the sum of the following:

    a. the estimated saving in investment to the Company represented by the estimated cost of the customary overhead wires and appurtenances;

    b. such portion, if any, of the estimated cost to the Company of the customary dual purpose poles as would normally be allocated to lighting purposes;

2. have the right, without payment of any charge, to attach its wires, fixtures, brackets, luminaires, transformers, and other equipment to the standards or poles owned by the Customer.

Should the standards or poles furnished, owned, and maintained by the Customer be located in a public highway, the Customer shall procure and furnish to the Company a license under the Public Laws of New Hampshire (R.S.A. Chapter 231) covering such interest as the Company may have in the standards or poles, including their wires, fixtures, brackets, luminaires, transformers, and other equipment.

For outdoor area lighting installations, the Customer shall provide without expense or cost to the Company, all permits, consents, or easements necessary for the erection, maintenance, and operation of the Company's facilities, including the right to cut and trim trees and bushes wherever necessary; and the Company shall not be required to move its facilities to another location on the Customer's premises unless the Customer shall bear the cost thereof. The Company reserves the right to restrict such installations under this rate to those which will yield a reasonable return to the Company and to areas which are easily accessible by service truck. Installations of 4,000 lumen (50 watt) high pressure sodium luminaires will not be allowed as replacements of existing 3,500 lumen (100 watt) mercury luminaires unless the Customer agrees to pay for the remaining unexpired life of the retired equipment, including the unexpired portion of the cost of installation and the cost of removal less any salvage value of the equipment removed.

The total number of new installations, extensions, and replacements for outdoor lighting equipment may be limited by the Company in any calendar year to three (3) percent of the total number of units billed to the particular Customers at the beginning of such calendar year.

In cases where the Customer requests a change in or removal of existing outdoor lighting equipment which has not reached the end of its normal useful life, the Company may require the Customer to pay for the remaining unexpired life of the retired equipment, including the unexpired portion of the cost of installation and the cost of removal less any salvage value of the equipment removed.

All poles, wires, fixtures, brackets, luminaires, transformers, and other equipment furnished by the Company shall be maintained by it and title to such shall in all cases remain vested in the Company.

annual distribution revenue recovery relative to current, negative levels under the bundled structure by approximately $1.6 million. However, when this increased distribution revenue is combined with the reduction in CTA rates effective January 1, 2011, total annual Rate 39 charges will decrease by approximately $0.1 million. Id., p. 33.

The impact to individual Rate 39 customer bills resulting from full, cost-based rate unbundling will vary. Customers with a large volume of kWh usage and high load factor can expect to experience an overall bill decrease, while those served at transmission voltage can expect an overall bill increase. Id. There are nine customers served by this rate class and the difference in the overall bills for these customers ranges from an increase of 29.8% for one to a decrease 4.2% for another. The difference in overall rates for this entire class is a decrease of 0.4%. Goodwin PFT, Exhibit CRG-13.

In compliance with Order No. 1 in the 2008 CL&P Decision, the Company and CIEC worked to develop a rate plan for interruptible customers that would maintain the rates and eliminate all rate subsidies. In order to address these allocation issues, the Company proposes to fully unbundle Rate 39 pricing structures by replacing existing charges with separate, cost-based rates for each component of service contained within the bundled structure. CIEC Brief, p. 14.

The Company's proposal will maintain interruptible rates in the Company's service territory and the inherent value such rates provide. Because the interruptible load under Rate 39 may be curtailed at the discretion of CL&P, it may be used to assist the specific needs of Connecticut. The importance and advantages of customer participation in interruptible rates have been acknowledged by both the Department and ISO-NE. Id., p.15.

The Department understands the system benefits provided by interruptible customers. The Department has further recognized that if curtailments of Rate 39 customers are properly targeted during ISO-NE annual system peaks, CL&P's capacity obligations would be further reduced. Moreover, the past has demonstrated that the existence of Rate 39 and the associated Mandatory Reduction Rider have reduced the FMCCs paid by all customers. Id., p.16.

For all the foregoing reasons, the Company's proposal to unbundle Rate 39 with each component cost based will maintain the value of interruptible service under a cost-based rate design. Accordingly, the Company's proposal is approved. Id., p. 17.

iv) Midnight Streetlight Option

a) General

Pursuant to the 2008 CL&P Decision, the Department directed CL&P to develop the costs and rates for a voluntary partial night streetlight rate and to propose such a rate in its next general rate case proceeding. 2008 CL&P Decision, p. 133; Order No. 2.

As a result of that directive CL&P developed an option within its current streetlighting tariffs, Rates 116 and 117, for customers to receive partial streetlighting service.

b) CL&P's Proposal

CL&P proposed that the streetlights for customers selecting this partial night option will still turn on at dusk, but will then turn off at midnight, and the kWh-based charges for this service will be reduced accordingly (Midnight Option).[19] The Company stated that it investigated the available technologies and operational requirements of various equipment, and analyzed the costs and changes to rates required to provide the Midnight Option. CL&P researched, selected and tested three programmable photocells (Programmable Photocells) that could be used to provide this option. Goodwin PFT, pp. 24-27; Bowes PFT, p. 25; Tr. 3/15/10, pp. 205-245.

CL&P proposed that customers choosing this option will be required to pay the incremental cost of the Programmable Photocell necessary to provide this service. CL&P proposed that Rate 116 customers will be charged an upfront cost of $12.73, the incremental cost of a Programmable Photocell installed during group re-lamping. However, when the Programmable Photocell is not installed during group re-lamping, the upfront charge will be $133.86, which includes the labor-related costs associated with the retrofit.[20]

The Company stated that its proposed Midnight Option fits readily into the Company's overall streetlighting unbundling proposal, and is actually a better fit than if streetlighting rates remaining bundled. By unbundling Distribution rates on a fixed, per month basis, and setting rates for all other components of service on a per kWh basis, the Midnight Option can be readily implemented in billing by modifying the monthly streetlight burn hour schedule. Id.

The Company indicated that it also reviewed its current rate structure and the billing process associated with service under its streetlighting Rates 116 and 117, and found that relatively simple modifications could be made to implement a standardized option under both tariffs (i.e., turn off any streetlight controlled by a Programmable Photocell at midnight). From a rates perspective, the Distribution charges for each light size/type will be the same for both existing dusk-to-dawn service and the new proposed Midnight Option. This is appropriate since the same streetlight equipment costs exist, and the same facilities on the Company's distribution system are utilized in providing either dusk-to-dawn, or partial night streetlighting service. However, all per kWh charges will be reduced in accordance with the shortened burn hour schedule associated with this partial service. The Company proposed to amend the availability and applicability clauses of these tariffs, and to incorporate a new section that includes a reduced burn hour schedule associated with lights turning off at midnight, and a

[19] The option is modeled after a similar proposal that is currently under review for another NU subsidiary, Public Service of New Hampshire. Tr. 3/15/10, p. 214.

[20] Additional installation costs, such as traffic control, are not included in these costs, and would apply as per standard Company practice. Goodwin PFT, p. 27.

provision for payment of the cost of a Programmable Photocell. Id.; Goodwin, Exhibit CRG-25.

The Midnight Option will be offered to all customers receiving streetlighting service under the Company's Rate 116 and 117 tariffs. However, because Rate 117 customers own their streetlight equipment these customers will be responsible for purchasing and installing their own photocells, in accordance with Company standards. Rate 117 customers must notify CL&P that a Programmable Photocell has been installed. CL&P indicated that customers taking service under Rate 116 would realize savings of approximately 18% to 25%, while customers taking service under Rate 117 would realize savings of approximately 40%.[21] Savings would vary depending on the wattage of the streetlight. Id.; Exhibit CRG-11.

Regarding the billing system, CL&P stated that it need only adjust the number of hours used to calculate any energy-related charges on customer bills and that its C2 system can accommodate this change. Further, there is little or no cost to do so. Tr. 3/15/10, p. 210 and 216,

CL&P stated that it is likely that some municipalities or the State of Connecticut's Department of Transportation may request large quantities of lights for conversion as a cost savings measure. Based on the volume of conversion requests, some restrictions may be required to allow adequate time to honor the requests without adversely re-directing line crews from their regular duties. CL&P continued, noting that to date only the cities of Stamford and West Hartford have expressed interest in this service. However, CL&P anticipates that interest among municipalities will increase as towns become aware of the service. CL&P notes that ISDA's proposal to have streetlights turn on again will reduce the lamp life for these fixtures. Bowes PFT, p. 27; CL&P Written Exceptions, p. 28.

c) Position of IDSA

The International Dark Sky Association (IDSA) stated that CL&P's proposed Midnight Option limits a municipality to a single choice; having a streetlight turn off at midnight and back on again the next evening. ISDA noted however that during the months of November, December, January and February, dawn arrives as late at 6:48 am. As a result, during these months streetlights would be off during times when students are waiting for their school bus. Therefore, ISDA requested that CL&P be required to offer municipalities the option to have lights go off at midnight and then turn on at 5:30 am (or other time matched to school bus schedules) (On-Again Option) to illuminate school bus stops. Without this flexibility, municipalities will be forced to choose between energy conservation and public safety. IDSA Brief, p. 2.

IDSA continued, stating that CL&P's proposed charge for installation of a photocell during non group relamping periods, $133.86, is unreasonable. For example, CL&P did not use third party labor costs to develop the charge, nor did CL&P consider

[21] These percentage differences reflect the fact that Rate 117 customers own their streetlight equipment and therefore only pay energy charges to CL&P.

the economies of scale that would result from the installation of multiple photocells within a geographic area during a defined period. To further control this cost, IDSA believes that municipalities should have the option to directly solicit bids from and award contracts to CL&P-approved contractors. ISDA argued that it is also unreasonable to assess this charge to towns that are not currently scheduled for group relamping, requiring some towns to wait up to six years to only pay the incremental cost of the Programmable Photocell. Id., p. 4.

Finally, ISDA stated that the Midnight Option will extend the lamp life of streetlights. However, CL&P did not capture this benefit when it developed it overall streetlight rates. Therefore, ISDA requested that CL&P be required to revise its streetlight rates to incorporate this cost reduction. Id., p. 7.

d) Department Analysis

The Midnight Option is a new, voluntary service that will provide streetlight and floodlight customers the opportunity to reduce the number of hours that this equipment operates providing a way to reduce the cost for street and security lighting. Under CL&P's proposal, upon request, the Company would replace a standard dusk-to-dawn photocell currently installed on all streetlight and floodlight fixtures with a Programmable Photocell that allows the light to be shut off at any time prior to dawn. CL&P has selected midnight as the shut off time. Tr. 3/15/10, pp. 205-245.

To implement this option, CL&P proposed to reduce the number of hours used to calculate traditional dusk-to-dawn streetlight charges (Burn Hours), reducing them to reflect the time that a light shuts off. CL&P provided a schedule of the reduced hours that would be used to calculate bills for the Midnight Option and would assess all energy based charges using the reduced hours. Goodwin Exhibit CRG-25, Rate 116, p. 8 of 11 and Rate 117, p. 3 of 5. The Department finds that reducing the number of Burn Hours and applying these reduced hours to all energy based charges to calculate bills under the Midnight Option is reasonable.

Under CL&P's proposal customers choosing the Midnight Option will be charged $12.73 per fixture for the installation of a Programmable Photocell completed during group relamping or $133.86 per fixture when the photocell is installed outside of the group relamping schedule. CL&P's proposed rate of $133.86 assumes the replacement of 12 photocells at individual, isolated locations, in an eight hour day. Further, CL&P used a blended labor cost for its line worker positions and the allocated costs for standard line vehicles to develop this charge. CL&P stated that photocell replacement is straightforward, (unplug and replace) and that this work can be performed by its Streetlight Mechanics, (a lower pay grade than line workers) using a Streetlight Van, (a lower equipment cost than standard line vehicles). The use of these costs to develop the charge results in an overall lower charge. CL&P indicated that this cost could be further reduced if replacements were coordinated and grouped by geographic location, thereby increasing the number of units being replaced per day. Bowes PFT, p. 26; Interrogatory Response IDA-3; Tr. 3/15/10, pp. 216-218, 228-231.

CL&P shared that it relies on its Streetlight Mechanics using Streetlight Vans to perform routine streetlight maintenance. Therefore it is reasonable to use the costs associated with these personnel and equipment to establish the installation cost for a Programmable Photocell. In addition, the Company can coordinate this activity within larger towns or groups of towns so that multiple replacements can be addressed within a geographic location in a single day. As a result, it is reasonable to expect that CL&P can replace 16 photocells in one day. At the Department's request, CL&P submitted revised costs to reflect these standards which calculate a cost per unit of $102.31, which the Department finds reasonable and therefore approves. Late Filed Exhibit No. 8.

The Department concludes that it is reasonable to assess this cost for installations that are performed outside of group relamping. It is also reasonable to assess only the then current incremental cost of a Programmable Photocell when the replacement is performed during group relamping.

At the Department's request, the Company submitted information regarding the potential to offer an incentive for the installation of Programmable Photocells through the Energy Efficiency Fund. CL&P stated that this measure would be eligible under the Energy Efficiency Fund's Energy Opportunities Program, and based on current program rules, would be limited to an incentive of approximately $41. This incentive assumes an installed cost of $102.31[22] and would provide a benefit to cost ratio of 2.6. Tr. 3/15/10, pp. 236-238; Late Filed Exhibit No. 9.

Streetlight customers have contributed to the Energy Efficiency Fund since its inception in 2000. However, since that time there have been no programs available that directly target energy efficiency for streetlights or floodlights. The Midnight Option provides an opportunity to offer an energy efficiency incentive targeted to these end use devices. Based on the relatively robust benefit to cost potential, and lack of past program offers, the Department believes that this incentive need not operate within the current guidelines of the Energy Opportunities program and should support at least 50% of the installed cost. To allow towns the opportunity to participate, this incentive should be available for three years. Based on the foregoing, the Department will require CL&P to offer an incentive of 50% for the installation of Programmable Photocells through the Energy Efficiency Fund. This program must operate within the requirements discussed below. Photocells installed during group relamping are not eligible for this incentive.

CL&P proposed to offer only one Midnight Option; lights off at midnight. CL&P cautioned that providing multiple on/off scenarios would create unwieldy administrative complexity. Tr. 3/15/10, p. 219. The Department understands CL&P's concerns regarding this matter and seeks to avoid this situation. However, during late fall and early winter dawn arrives after 6:30 a.m., creating a situation whereby Midnight Option streetlights that previously illuminated school bus stops would not do so during these times. For these lights, towns would need to choose between energy conservation and the public safety of students.

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[22] Incentives would vary by fixture, and would be capped based on total energy savings. Late Filed Exhibit No. 9.

The Department could require CL&P to offer the On Again Option proposed by ISDA and require towns to select only one option (i.e., Midnight or On Again) within each town's geographic area. However, under that scenario, towns choosing the On Again Option for selected streetlights (i.e., school bus stops) would achieve significantly lower savings when compared to those available under the Midnight Option. This matter was not explored during this proceeding. Therefore, to address concerns raised by ISDA, while limiting CL&P's administrative burden for this rate, the Department will require CL&P to gather data from all towns that choose to participate in the Midnight Option regarding the town's potential use of the On Again Option and to work with ISDA on this matter. CL&P will be directed to submit a report to the Department summarizing the participation in the Midnight Option, the potential to implement the On Again Option and other information or experience it gains regarding this matter, including lamp life discussed below. If CL&P determines that the potential exists to offer the Midnight Option *and* the On Again Option within the geographic area of each town, the report should address the steps necessary to do so. The report shall also include information concerning the Public Service of New Hampshire streetlight program.

The Midnight Option provides the potential to extend the life of streetlight lamps while the On Again Option could shorten lamp life. Tr. 3/15/10, p. 220; CL&P Written Exceptions, p. 28. However, because this is a new program this information is uncertain and, therefore, difficult to quantify. In addition, because group relamping occurs on a six-year cycle it will take time to gather this information. As a result, the Department will not attempt to embed these factors in streetlight rates at this time. Regarding the On Again Option, similar to the steps CL&P took to research Programmable Photocells, the Company should test this operating strategy to determine its effect on lamp life. CL&P must track this information which will be addressed at the time of CL&P's next general rate setting proceeding. Regarding the use of third-party contractors, the Department believes it is best to control this activity by relying on CL&P's personnel to conduct this work. Finally, it is reasonable to require that customers choosing the Midnight Option remain on the rate for one year and bear the cost to remove Programmable Photocells if they revert to dusk-to-dawn service. The cost of removal equals the installation cost, $102.31.

Based on the foregoing, CL&P must apply the following standards to customers who request the Midnight Option:

- Customers must pay the incremental cost of the installation of a Programmable Photocell;
- Customers must remain on the Midnight Option for one year;
- The Energy Efficiency Fund shall offer an incentive of 50% for the installation of Programmable Photocells;
- Programmable Photocells installed during group relamping are ineligible for the Energy Efficiency Fund incentive;
- The cost to remove a Programmable Photocell will be borne by the customer and can be collected in advance;
- CL&P should seek to coordinate the installation of Programmable Photocells to lower the cost of installation; and,
- CL&P shall study the potential to implement the On Again Option.

This is a new service. As such, it is difficult to predict the potential number of customers that will opt for it. Therefore, the Department will revisit this matter at the time of CL&P's next general rate case proceeding, or earlier if appropriate, to determine if any modifications to the Midnight Option rates are warranted.

Order No. 2 in the 2008 CL&P Decision required CL&P to submit a partial streetlighting tariff. The Department's review of this matter finds that CL&P has complied with the directives contained in Order No. 2.

v) Unbundling Streetlight Rates 116 and 117

CL&P proposed to unbundle its currently bundled streetlighting Rate 116 (where CL&P owns the streetlighting equipment) and Rate 117 (where municipalities own the equipment via purchase from CL&P). CL&P stated that a structural change to these tariffs will more easily accommodate the development of the Midnight Option as well as provide greater price transparency within streetlighting rates. Goodwin PFT, p. 22-24.

CL&P continued, stating that the current streetlighting rates charge a fixed monthly fee that differs by type of fixture and collects charges for distribution, transmission, CTA, SBC, C&LM, and renewable energy components on a combined basis within the fixed charge. Within the current rates, the number of streetlighting burn hours each month is identified for the standard dusk-to-dawn period that corresponds with the seasons throughout the year. Each month the non-distribution portion of the fixed monthly charge is determined by multiplying the monthly burn hours by the fixture-specific wattage by the kWh charges identified in the tariffs for the various non-distribution components. The residual monthly revenue becomes the distribution service charges within current rates. As a result, although the monthly distribution cost of service is fixed and does not change by month, this current process results in varying distribution revenues by month. The GSC and NBFMCC are billed on a kWh basis. Id.

CL&P proposed that the charges for transmission, CTA, SBC, C&LM, and renewable energy will be removed from the fixture-specific fixed rate on a per kWh basis. The balance will be the distribution component of streetlighting rates. This unbundling process will mean that the current streetlighting rate that has a fixed monthly charge that includes all components of service will now have a fixed monthly distribution-only charge, with the balance of the unbundled rates billed on a per kWh basis. These per kWh unbundled components will be billed as separate line items on a per kWh basis similar to how traditional tariff service is billed. The determination of monthly volumes will not change under this restructured rate proposal; that is, multiplying the fixture-specific wattage by the standard monthly burn hours. Id.

CL&P indicated that the monthly bills for Rates 116 and 117 under the Company's unbundling proposal will fluctuate somewhat from the bills under current rates because the existing bundled rate process results in fixed total monthly charges, while unbundling will result in only fixed monthly Distribution charges. However, because CL&P has unbundled all existing Rate 116 and 117 fixture-specific charges on a revenue neutral basis, annual bills for Rate 116 and 117 customers will be unchanged. Exhibit CRG-10 demonstrates that the approach used to unbundle existing

Streetlighting rates results in revenue-neutral unbundled rates. This exhibit presents a comparison of the existing bundled Rate 116 charges for a common Streetlighting fixture [i.e., 84 watt 6300 Lumen High Pressure Sodium (HPS)] and the resulting unbundled charges as proposed. As shown on line 31 of the exhibit, the resulting charges vary slightly by month, but the total annual unbundled charges are equivalent to the current bundled charges. Id.

At present, CL&P's streetlighting rates assess a fixed monthly charge that recovers all costs, except generation-related costs which are billed on a kWh basis. For example, CL&P current assesses $6.47/month for an 84 watt, 6300 Lumen High Pressure Sodium fixture which recovers Distribution, Transmission, CTA, SBC, C&LM and Renewable Energy costs. CL&P then allocates these revenues to the various bill components using the monthly burn hours, with the residual amount being assigned to distribution. Generation costs are billed on a kWh basis and are calculated using the monthly burn hours. Under its proposal, CL&P would unbundle the current fixed streetlight charges allowing for kWh billing of all components except distribution, which would remain a fixed monthly charge.

The following table demonstrates CL&P's proposal for an 84 watt 6300 Lumen HPS fixture.[23]

Proposed Streetlight Unbundling (HPS 6300 Lumen 84 watt fixture)	
Current Bundled Rates	
Fixed Charge	
Monthly Rate	$6.47
kWh Charges	
NBFMCC	$0.00225
GSC[1]	$0.09251
TOTAL	$0.09476
Proposed Unbundled Rates	
Fixed Charge	
Monthly Rate	$5.55
kWh Charges	
Transmission	$0.01127
CTA	$0.01526
SBC	$0.00129
C&LM	$0.00300
Renewable	$0.00100
NBFMCC	$0.00225
GSC[1]	$0.09251
	$0.12658
[1] GSC rate includes the Bypassable Federally Mandated Congestion Charge	
Source of data: Exhibit CRG-10	

It is reasonable to break out the streetlight-related transmission, CTA, SBC, C&LM and renewable charges and to recover these costs on a kWh basis. It is also reasonable to recover streetlight-related Distribution costs through a fixed monthly charge. Further, the manner in which CL&P proposed to unbundle its streetlight rates is reasonable. Therefore, CL&P's proposal to unbundle streetlight rates is approved.

The Department notes that the Midnight Option will provide streetlight customers the opportunity to reduce their cost of this service by reducing the number of hours that a streetlight operates. However, under the current rate structure, the potential savings would be limited to avoid GSC and NBFMCC costs, the components that are currently billed on a kWh basis. Unbundling will allow CL&P to bill additional charges on a kWh basis thereby providing customers choosing the Midnight Option, to increase their savings.

[23] The 84 watt 6300 Lumen HPS fixture represents approximately 42% of all CL&P streetlights. Exhibit CRG-17, p. 67.

New Hampshire General Court - Bill Status System

HB585

Bill Title: *relative to outdoor lighting efficiency.*

General Status:

LSR#: **61** *Body:* **H** *Local Govt:* **N** *Chapter#:* **0212** *Gen Status:* **SIGNED BY GOVERNOR**

House Status

Status	CONCURRED
Status Date	5/20/2009
Current Committee	SCIENCE, TECHNOLOGY AND ENERGY
Committee of Referral	SCIENCE, TECHNOLOGY AND ENERGY
Date Introduced	1/8/2009
Due out of Committee	3/19/2009
Floor Date	3/24/2009

Senate Status

Status	PASSED / ADOPTED WITH AMENDMENT
Status Date	5/6/2009
Current Committee	ENERGY, ENVIRONMENT AND ECONOMIC DEVELOPMENT
Committee of Referral	ENERGY, ENVIRONMENT AND ECONOMIC DEVELOPMENT
Date Introduced	4/8/2009
Due out of Committee	
Floor Date	5/6/2009

Sponsors

(P) Robert Bridgham (d)	Sally Kelly (d)	Norman Major (r)
C. Pennington Brown (d)	Gilman Shattuck (d)	

Next/Last Hearing: SENATE ENERGY, ENVIRONMENT AND ECONOMIC DEVELOPMENT

Date:	*Time:*	*Place:*	*Majority Report:*	*Minority Report:*
04-30-2009	09:50 AM	LOB 102	Ought to Pass Amended	None

Schedule RAW2010-6

CHAPTER 212

HB 585-FN - FINAL VERSION

24Mar2009... 0895h

05/06/09 1464s

19May2009... 1963eba

2009 SESSION

09-0061

05/09

HOUSE BILL ***585-FN***

AN ACT relative to outdoor lighting efficiency.

SPONSORS: Rep. Bridgham, Carr 2; Rep. C. Pennington Brown, Rock 9; Rep. S. Kelly, Merr 7; Rep. Shattuck, Hills 1; Rep. Major, Rock 8

COMMITTEE: Science, Technology and Energy

AMENDED ANALYSIS

This bill:

I. Establishes requirements for the state and municipal purchase of outdoor lighting systems.

II. Establishes the "New Hampshire dark skies" policy to encourage outdoor lighting efficiency at the municipal level.

III. Requires the public utilities commission to establish requirements for an electric utility rate for partial night use of outdoor lighting systems.

IV. Requires the department of transportation to review criteria for roadway lighting to maximize efficiency and cost savings.

Explanation: Matter added to current law appears in ***bold italics.***

Matter removed from current law appears [~~in brackets and struckthrough.~~]

Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

24Mar2009... 0895h

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19May2009... 1963eba

09-0061

05/09

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Nine

AN ACT relative to outdoor lighting efficiency.

Be it Enacted by the Senate and House of Representatives in General Court convened:

212:1 New Chapter; Outdoor Lighting Efficiency. Amend RSA by inserting after chapter 9-C the following new chapter:

CHAPTER 9-D

OUTDOOR LIGHTING EFFICIENCY

9-D:1 Definitions. In this chapter:

I. "Fixture" means the assembly that holds a lamp and may include an assembly housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and a refractor or lens.

II. "Fully shielded luminaire" means a luminaire that allows no direct light emissions above a horizontal plane through the luminaire's lowest light-emitting part.

III. "Glare" means direct light emitting from a luminaire that is significantly greater than luminance to which the eyes are adapted which causes reduced vision or momentary blindness.

IV. "Illuminance" means the unit measure of light at a surface.

V. "Light trespass" means light emitted by a luminaire that shines beyond the boundaries of the property on which the luminaire is located.

VI. "Lumen" means a unit of measure of luminous flux.

VII. "Luminaire" means the complete lighting system, including the lamp and the fixture.

VIII. "Lamp" means the component of a luminaire that produces the specific form of radiant energy that is observed as light.

IX. "Permanent outdoor luminaire" means any luminaire or system of luminaires that is outdoors and intended to be used for 21 days or longer.

X. "State highway" means any of the highways of the state classified in RSA 229:5.

9-D:2 State Purchase of Permanent Outdoor Lighting Design.

I. No state funds shall be used to install or replace any permanent outdoor luminaire unless:

(a) The luminaire is a fully shielded luminaire when the rated output of the luminaire is greater than 1,800 lumens.

(b) The maximum illuminance at the designated surface does not exceed the minimum illuminance level recommended for that purpose by the Illuminating Engineering Society of North America or the Federal Highway Administration.

(c) The director of the agency responsible for the funding of such luminaire or having authority over the illuminated infrastructure ensures that consideration is given to minimizing glare and light trespass.

II. The requirements of paragraph I shall not apply if:

(a) Compliance would create a conflict with federal laws or regulations;

(b) The director of the agency responsible for funding the installation of such luminaire or having authority over the illuminated infrastructure determines that there is a compelling safety interest that cannot be addressed by any other method;

(c) With respect to roadway lighting on state highways, when in specific instances the commissioner of transportation determines that use of a fully shielded luminaire would compromise the safety of the public utilizing the highway, increase the cost of the lighting plan or lighting replacement for the highway, or violate any provision of federal law; or

(d) The luminaire shall be used to illuminate designated public and historic structures, monuments, and flags of the United States of America and the state of New Hampshire.

III. No public utility company may install or replace a permanent outdoor luminaire for roadway lighting if the cost of operating such luminaire is paid for by municipal funds, unless:

(a) The luminaire is a fully shielded luminaire when the rated output of the luminaire is greater than 1,800 lumens.

(b) The maximum illuminance at the designated surface does not exceed the minimum illuminance recommended for that purpose by the Illuminating Engineering Society of North America or the Federal Highway Administration.

(c) The governing body of a municipality may waive the provisions of subparagraphs (a) and (b) when, after written notice from the public utility company 30 days prior to the installation

or replacement of the luminaire, the governing body determines that a waiver is necessary for the lighting application. Such notice shall be in such form as the governing body shall prescribe and may include a description of the lighting plan and a description of the efforts that have been made to comply with the provisions of RSA 9-D:3. The governing body may consider design safety, costs, and other factors deemed appropriate by the governing body.

9-D:3 New Hampshire Dark Sky Policy. It shall be the policy of the state of New Hampshire to encourage municipalities to enact such local ordinances and regulations as they deem appropriate to conserve energy consumed by outdoor lighting; to minimize light pollution and glare; and to preserve dark skies as a feature of rural character wherever practicable.

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.

9-D:5 Report by Department of Transportation. The department of transportation shall:

I. Review and update its criteria for roadway lighting to ensure that its current standards and procedures conform to commonly accepted best practices.

II. Explore how energy and maintenance costs can be reduced by replacing existing luminaries with lower-wattage, fully shielded luminaries or by eliminating roadway lighting altogether where appropriate.

III. Beginning November 1, 2009 and each November 1 thereafter, submit an annual report of its activities and findings to the office of energy and planning.

212:2 Contingency. If HB 464-FN of the 2009 legislative session becomes law, RSA 9-D as inserted by section 1 of this act shall be renumbered as RSA 9-E and the reference to RSA 9-D:3 in RSA 9-D:2 as inserted by section 1 of this act shall be renumbered RSA 9-E:3.

212:3 Effective Date. This act shall take effect 60 days after its passage.

Approved: July 15, 2009

Effective Date: September 13, 2009

United States
Environmental Protection
Agency

Air and Radiation
6202J

EPA 430-B-95-009
January 1995

LIGHTING MAINTENANCE

Proper lighting system maintenance is essential to high quality, efficient lighting. Systematic lighting management methods and services from lighting specialists can help organize the process and assure continued high performance of any lighting system.

ACTION CHECKLIST

- ✓ Group relamp to reduce lumen depreciation and maintenance costs.
- ✓ Clean fixtures at the time of relamping, more often in dirty locations.
- ✓ Write a lighting maintenance policy.
- ✓ Design your lighting upgrade projects to incorporate effective maintenance.
- ✓ Get help when needed from the following resources:
  - ★ lighting management companies
  - ★ consultants
  - ★ distributors
  - ★ manufacturers

INTRODUCTION

Lighting maintenance is more than simply replacing lamps and ballasts when they fail. Facility managers today must manage their lighting resources (i.e., fixtures, lamp/ballast inventory, labor, energy) to sustain the quality of a lighting system.

The light output of a luminaire decreases with age and use, yet the energy input remains unchanged. (See Exhibit 1 on the next page.) Because the human eye is extremely adaptive to gradually changing lighting conditions, most occupants do not notice the gradual decline in light levels. Eventually, however, the reduction will affect the appearance of the space and the productivity and safety of the occupants.
In the past, lighting designers have dealt with this problem by increasing the number of fixtures or lamps to compensate for the future light loss. While this simplifies maintenance, it is not an acceptable solution due to the added initial equipment cost, energy cost, and energy-related pollution.

CONTENTS

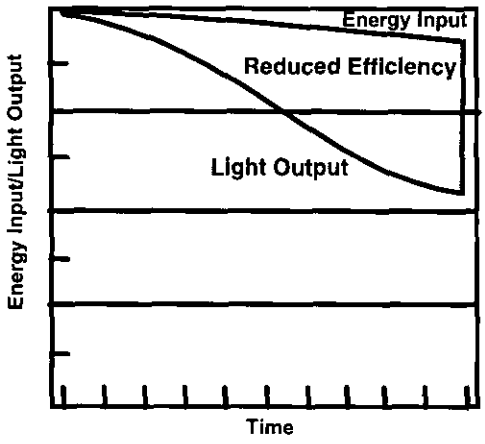
LIGHT LOSS FACTORS

Three factors cause light loss.

- ☛ lamp and ballast failure
- ☛ lamp lumen depreciation
- ☛ luminaire dirt depreciation

Light loss gradually decreases system efficiency over time. In combination, these factors commonly reduce light output by 20-60%. No corresponding energy reduction is associated with light loss, except with lamp and ballast failure.

EXHIBIT 1
LOST EFFICIENCY OVER TIME



Lamp and Ballast Failures

When lamps and ballasts fail, they no longer provide light for the space. Often, failed lamps and ballasts remain in fixtures for months.

Lamp Failures

Lamp manufacturers list the "average rated life" for their products. The average rated life is the number of operating hours after which one-half of the lamps can be expected to have failed. A few lamps may fail soon after installation, and the rate of failure will increase as the time in use increases (see Exhibit 2). Several factors affect lamp life.

- average operating time between starts
- type of ballast circuit
- improper installation

Based on the type of lamps in use and the operating conditions, it is possible to predict lamp failure rate accurately. Such predictions enable you to schedule the replacement of all the lamps just before substantial failures begin. This group replacement of lamps at 70% of rated life will reduce the light loss caused by lamp failure and will reduce the time, effort, and complaints associated with spot replacement of lamps. In addition, expired lamps left in the luminaire can cause ballasts to fail prematurely. The few lamps that fail between group replacements can be tolerated or spot-replaced as needed.

Typical Lamp Life	
Incandescent	1-2,000 hrs
Halogen	2-3,000 hrs
Fluorescent	12-20,000 hrs
Sodium	12-24,000+ hrs
Metal Halide	8-20,000 hrs
Mercury	20-24,000+ hrs

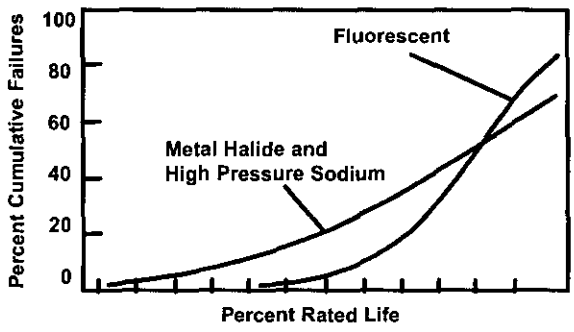
Ballast Failures

Ballasts last much longer than lamps. The operating temperature of the ballast primarily determines ballast life. But operating temperature varies with the type of ballast, the heat retention characteristics of the luminaire enclosure, and the fixture mounting method. This variation makes ballast life more difficult to predict than lamp life. Electronic ballasts can be expected to operate longer than magnetic ballasts because electronic ballasts produce less heat. While there are no reliable long-term test data available, ballast life is generally described by ballast manufacturers as shown in the box below.

Similar to lamps, the ballast failure rate can be expected to be small in the first 70% of average life and increase beyond that point. By monitoring ballast failures in a facility, it may be possible to predict the value of the potential maintenance savings achievable by replacing ballasts before failure.

Typical Ballast Life	
Magnetic	10 -14 yrs
Efficient Magnetic	12 -15 yrs
Cathode Cutout	15 -17 yrs
Electronic	15 - 20 yrs

EXHIBIT 2
LAMP FAILURE RATES



Schedule RAW2010-7

EXHIBIT 3
LAMP LUMEN DEPRECIATION

Source: US Department of Energy

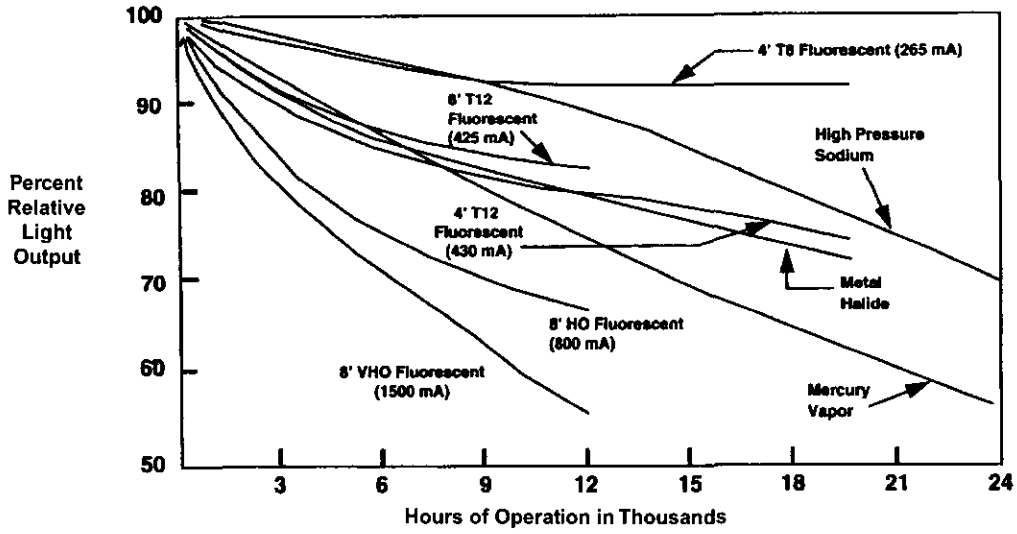


EXHIBIT 4
PROCEDURES FOR DETERMINING LUMINAIRE MAINTENANCE CATEGORIES

Source: IESNA

Maint. Category	Top Enclosure	Bottom Enclosure
I	• None	• None
II	• None • Transparent with 15% or more uplight through apertures • Opaque with 15% or more uplight through apertures	• None • Louvers or baffles
III	• Transparent with less than 15% upward light through apertures • Translucent with less than 15% upward light through apertures • Opaque with less than 15% uplight through apertures	• None • Louvers or baffles
IV	• Transparent unapertured • Translucent unapertured • Opaque unapertured	• None • Louvers
V	• Transparent unapertured • Translucent unapertured • Opaque unapertured	• Transparent unapertured • Translucent unapertured
VI	• None • Transparent unapertured • Translucent unapertured • Opaque unapertured	• Transparent unapertured • Translucent unapertured • Opaque unapertured

Lamp Lumen Depreciation (LLD)

As a lamp ages (through use), the amount of light it produces declines. This change is called lamp lumen depreciation (LLD) and is expressed as a percentage of initial lamp light output. Several factors can cause LLD, such as carbon deposits inside the bulb wall or deterioration of the phosphor coating inside the bulb. Incandescent and high pressure sodium lamps have minimal LLD (i.e., they maintain a high percentage of their initial output throughout their useful life). Fluorescent, mercury and metal halide lamps, however, exhibit significant lumen depreciation (See Exhibit 3).

To calculate average light levels, a lighting designer considers the light output of a lamp at the average age the lamp is expected to reach in use. By replacing lamps earlier, it is possible to achieve the same light levels with fewer lamps and less energy.

Luminaire Dirt Depreciation (LDD)

Dust, smoke film, oil and dirt accumulate on the reflective surfaces of fixtures, lenses and lamps. As a result, less of the light produced by the lamps is delivered into the room. This depreciation can be very minor in closed fixtures located in clean rooms, but it can be very severe in open fixtures in dirty environments. Estimating the effect of dirt depreciation is important for determining fixture cleaning schedules.

The following Illuminating Engineering Society of North America (IESNA) tables and graphs are used for determining LDD.

- Use Exhibit 4 to identify the luminaire category.
- Use Exhibit 5 to identify the dirt condition for the space.
- Use Exhibit 6 to estimate the luminaire dirt depreciation factor once the luminaire category, dirt conditions, and cleaning cycle have been established.

MAINTENANCE PLANNING

Many maintenance managers are hesitant to replace lamps that are still operating. But group relamping and cleaning can be less expensive than sporadic spot maintenance. Through strategic planning and performance management of the overall lighting system, costs can be reduced and lighting quality improved.

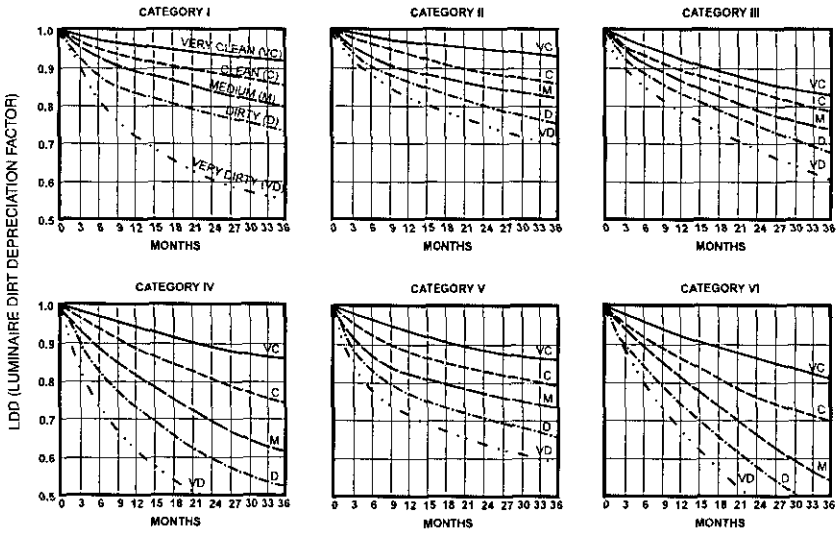
Group relamping is analogous to changing the spark plugs in your car. All of the spark plugs are changed at the same maintenance interval. This saves time and money and improves the overall efficiency of your car. As the spark plugs age, gas mileage of the car declines. Similarly with lighting, the efficiency and output of the system will decrease as lamps age. This change could decrease worker productivity. The most efficient maintenance method is to group-replace your lamps, just as you would group-replace the spark plugs in your car.

EXHIBIT 5
FIVE DEGREES OF DIRT CONDITIONS
Source: IESNA

	Very Clean	Clean	Medium	Dirty	Very Dirty
Generated Dirt	None	Very little	Noticeable but not heavy	Accumulates rapidly	Constant accumulation
Ambient Dirt	None (or none enters area)	Some (almost none enters)	Some enters area	Large amount enters area	Almost none excluded
Removal or Filtration	Excellent	Better than average	Poorer than average	Only fans or blowers if any	None
Adhesion	None	Slight	Enough to be visible after some months	High — probably due to oil, humidity, or static	High
Examples	High grade offices (not near production), laboratories, clean rooms	Offices in older buildings or near production, light assembly, inspection	Mill offices, paper processing, light machining	Heat treating, high speed printing, rubber processing	Similar to Dirty but luminaires within immediate area of contamination

EXHIBIT 6
DIRT DEPRECIATION GRAPHS

Source: IESNA



Advantages of Group Relamping and Cleaning

- ★ Saves money, time, and energy
- ★ Improves overall system efficiency
- ★ Reduces maintenance time and costs
- ★ Technician does not have to wait for service requests
- ★ Technician does not have to 'search' for a lamp and ladder
- ★ Technician does not have to travel to two or more remote sites to replace only a few lamps
- ★ Technician does not have to return the ladder and dispose of the lamps, one-by-one
- ★ Efficiently utilizes maintenance personnel
- ★ Reduces lamp and ballast inventory
- ★ Reduces material costs through bulk purchasing practices
- ★ Provides higher maintained light levels
- ★ Prevents unnecessary ballast degradation caused by ballasts trying to start expired lamps

Step 1: Define Existing Condition

The first step in planning a lighting maintenance strategy is to define the existing condition of the lighting systems. You must evaluate the following.

- ↖ type of lamps and ballasts in use
- ↖ average age of the lamps/ballasts
- ↖ total annual hours of lighting operation
- ↖ product costs
- ↖ spot replacement labor costs
- ↖ group replacement labor costs
- ↖ energy costs
- ↖ the rate of dirt accumulation

Step 2: Establish a Relamping Interval

You can identify an appropriate time to group relamp the lighting system. First, you must determine an acceptable level of light loss and an acceptable number of lamp failures (or spot replacements). Exhibit 2 shows that after 70 percent of rated life, the mortality rate of fluorescent lamps sharply increases. Therefore, group relamping traditionally occurs at 70 percent of the lamps' rated life. For example, suppose a lamp is rated at 20,000 hours and is operated 4,000 hrs per year. Then relamping should take place at 14,000 hours of lamp life, or at approximately three-year intervals.

EXHIBIT 7
CALCULATING MAINTAINED LIGHT LEVEL

$$fc = \frac{\text{rated lumens} \times CU \times BF \times LSD \times RSDD \times \mathbf{LLD} \times \mathbf{LDD} \times \mathbf{LBO}}{\text{area of room } (ft^2)}$$

CU	=	coefficient of utilization
BF	=	ballast factor
LSD	=	luminaire surface depreciation
RSDD	=	room surface dirt depreciation
LLD	**=**	**lamp luminaire depreciation**
LDD	**=**	**luminaire dirt depreciation**
LBO	**=**	**lamp burnouts (%)**

Step 3: Predict Light Loss Factor

Armed with the above information, it is possible to evaluate existing and future light loss. The mortality, lumen depreciation, and dirt depreciation curves are used to determine the maintained illumination, which is the average illumination expected over time. An overall light loss factor is applied to initial illumination value to obtain the maintained illumination value. The formula for light loss factor (LLF) follows.

LLF = LLD x LDD x LBO

Where,
LLD = Lamp lumen depreciation
LDD = Luminaire dirt depreciation
LBO = Lamp burnout, or lamp mortality rate

These are three of the *recoverable* components of light loss that a good maintenance program can minimize. The equation for maintained illuminance on horizontal surfaces, shows the significant impact these factors have on light levels (see Exhibit 7). These factors are *multiplied*, typically resulting in lumen output reductions of over 40% in poorly maintained systems.

Although room surface dirt depreciation (RSDD) is a recoverable factor, it is often ignored in lighting calculations and maintenance programs. Since most offices today are smoke-free, the RSDD is minimal relative to the other light loss factors. However, in manufacturing and other dirty environments, RSDD can have a significant effect and should not be ignored. Refer to the 8th edition of the *IES Lighting Handbook* for more information on calculating RSDD.

Step 4: Develop a Maintenance Method

There are several factors to consider when planning a lighting maintenance strategy.

- Use existing staff, hire new staff, or use a contractor.
- Complete during regular hours, nights, weekends.
- Manage quality control.
- Dispose of lamps and ballasts responsibly.
- Re-lamp building-wide or in stages.
- Establish product types.
- Establish testing procedures for exit and emergency lighting.

Step 5: Budget for Maintenance

Budgeting is the most difficult part of planning a maintenance program. Spot maintenance of a lighting system can be sporadic on a daily basis, but the annual cost will be constant after the first few years. Strategic maintenance, on the other hand, is easier to manage on a daily basis and may cost less overall, but the cost fluctuates each year.

Suppose you want to maintain the fluorescent lighting on a spot basis in a facility that operates 4,000 hours per year. This approach would require replacing about 20% of the lamps every year. To maintain the same facility on a group basis would require minimal replacement for two years, and then 100% replacement every third year.

Because budgets are often established a year in advance, it is necessary to predict relamp timing and budget accordingly. As an alternative, lighting maintenance budgets can be leveled by completing an equal portion of the group maintenance each year. In the example above, for instance, completing a group relamp of 33% of the facility each year will level the annual cost.

Step 6: Write a Lighting Maintenance Policy

For a lighting maintenance program to be most effective, it needs to be carried out regularly over the life of the lighting system. You can write a lighting maintenance policy once you have completed a lighting management analysis, developed a method, and established a budget. This will help in getting the program approved and will enable the plan to be carried out by other personnel in the future or in other facilities. Include justification for the maintenance plan, so that future managers can understand the importance of effective maintenance. Most important, it will assure a systematic continuation of the program.

Step 7: Implement the Strategy

A well-planned strategy can be easy to implement. Many companies use outside contractors to complete major tasks and then use inside staff to provide spot maintenance. Others contract with an outside lighting or electrical company to completely manage the lighting. Similarly, an outside company can designate and train a lighting management team within the company.

Whichever method you select, strategic lighting will also make lighting maintenance a predictable task and reduce unscheduled maintenance requirements.

GETTING HELP

As the demand for planned lighting maintenance has increased, so have the services offered by the lighting industry. The following are some resources available to help analyze, plan and implement efficient lighting maintenance.

Lamp Manufacturers

Although strategic lighting management can save energy and labor costs, group maintenance will usually require the use of more lamps. As a result, lamp manufacturers have an interest in providing assistance in analyzing lighting management strategies. Most of this assistance is valuable and reliable and offered free (or at low cost). Contact your lamp supplier or manufacturer for information. Many manufacturers are also Green Lights Manufacturer Allies. Assistance from lamp manufacturers is available from several sources.

- local factory representatives
- distributors
- software tools
- training programs

Lighting Management Companies

Lighting management companies (LMCs) are maintenance or electrical contractors that specialize in lighting installation, upgrade, management, and maintenance. Many offer a free or low cost service to identify optimum lighting maintenance programs. Some LMCs may offer consulting services to help develop in-house lighting management programs, but most are interested in providing upgrade installation and maintenance contract services. Many of these are Green Lights Lighting Management Company Allies.

EXAMPLE

The following example shows how strategically planned lighting maintenance can reduce energy consumption, prevent pollution, and control costs. The assumptions for this example are as follows.

- old office building
- 25,000 square feet
- 250 luminaires (category V, CU = 0.70)
- 4 F40T12/CW lamps per luminaire
- no luminaire cleaning for the existing system
- 20,000 hr lamp life
- 4,000 hr/yr operation

Step 1: Calculating Relamping Frequency

The first step is to determine the average number of lamps replaced per year. This will depend on the type of relamping practice chosen.

Average Annual Relamps for Spot Relamping

The average annual relamps for spot relamping is calculated as follows.

- 20,000 hrs life/4,000 hrs per yr = 5 year life
- 1,000 lamps/5 years = ***200 average annual relamps***

Average Annual Relamps for Group Relamping

The average annual relamps for group relamping is calculated as follows.

- (20,000 hrs life)x(0.70 group relamping factor) /4,000 hrs per yr = 3.5 years
- use 3 year relamping interval
- 1,000 lamps/3 years = 333 relamps per year
- (1,000 lamps)x(0.07 premature spot failures) /3 year interval = 23 spot failures per year
- 333 + 23 = ***356 average annual relamps***

Step 2: Determining Light Loss Factors

The next step is determining the light loss factors — LLD and LDD. A value of 1.0 will be used for LBO, which assumes that lamps that burn out will be spot-replaced without a long delay. Exhibit 8 summarizes the light loss factors used in this example. Following is the rationale for the use of the various factors. Note that group versus spot relamping practices will affect these factors significantly.

LLD

Spot Relamping

LLD for spot relamping is the average value of the lumen depreciation. The value for this example is chosen from the graph in Exhibit 3 at 40% rated life (or 8,000 hours). The T12 graph indicates that the LLD value is 0.82 at 8,000 hours.

Group Relamping

LLD for group relamping is the lumen depreciation at the time of the group relamp. This is at 14,000 (20,000 x 0.70) hours life for both the T8 and the T12 lamps. Referring to Exhibit 3, the lamp lumen depreciation at 14,000 hours for the T8 is 0.93, and for the T12 is 0.78.

LBO

Spot Relamping

After 20,000 hours, half of the lamps will have failed. The LBO for spot relamping can vary significantly depending on the promptness of the maintenance staff. For this example the LBO is 1.0 which assumes prompt replacement of failed lamps.

Group Relamping

According to Exhibit 2, approximately seven percent of the lamps will fail at 70 percent of their rated life. However, again an LBO factor of 1.0 is used. Note the spot replacement costs of the 7% premature failures is accounted for in the financial analysis of Exhibit 9.

LDD

Spot Relamping

Fixture cleaning is not typically included in spot relamping practices. This example assumes that the fixtures will be cleaned at least once during their 20 year expected life. Therefore, a ten year cleaning cycle is used. To find the LDD for this extended period, the luminaire dirt depreciation equation is used. For simplicity reasons, the equation is not presented in this text but can be found in the 1993 *IES Lighting Handbook*. For this example a value of 0.65 was calculated.

Group Relamping

Refer to the graphs in Exhibit 6 to determine the LDD, based on the following assumptions.

- a three-year cleaning cycle
- luminaire type V
- a clean environment

The LDD is 0.80 for both the T12 and T8 systems.

Step 3: Calculating Light Levels

The following light level calculations are based on the equation in Exhibit 7 and the factors for LLD, LDD, and LBO are tabulated in Exhibit 8. These factors were determined in the previous step.

T12 Spot Relamping

✍ 3,050 lumens per lamp x 250 luminaires x 4 lamps per luminaire x 0.70 CU x 0.53 LLF/25,000 SF = 45 fc

T12 Group Relamping

✍ 3,050 lumens per lamp x 250 luminaires x 4 lamps per luminaire x 0.70 CU x 0.62 LLF/25,000 SF = 53 fc

T8 Group Relamping

✍ 2,900 lumens per lamp x 250 luminaires x 4 lamps per luminaire x 0.70 CU x 0.74 LLF/25,000 SF = 60 fc

EXHIBIT 8
LIGHT LOSS FACTORS

	T12 Spot	T12 Group	T8 Group
LLD	0.82	0.78	0.93
LBO	1.00	1.00	1.00
LDD	0.65	0.80	0.80
Total LLF*	0.53	0.62	0.74

* LLF = LLD x LDD x LBO

Results

Group relamping and fixture cleaning can reduce maintenance and energy costs (see Exhibit 9). The T8 system has increased light levels while reducing energy consumption and pollution.

A further measure to reduce energy consumption would be to delamp the T8 option from four to three lamps per fixture. This would produce approximately 44 maintained footcandles, and decrease energy costs by an additional 10 percent. There would also be additional material and labor savings due to the fewer number of lamps.

- ★ A T8 and T12 system with group relamping and cleaning provides **18 to 33 percent more light** than the T12 base case of spot relamping only.
- ★ The T8 system **reduces energy consumption by 35 percent** as compared to both T12 systems.
- ★ The T8 system **reduces O&M costs by 31 percent** as compared to the T12 group relamping case.
- ★ Group relamping and fixture cleaning **save $811 annually** in labor costs.

EXHIBIT 9
AVERAGE ANNUAL O&M COSTS

	T12 Spot Relamping	T12 Group Relamping	T8 Group Relamping
Lamp Costs			
T12 Lamps (spot) 200 @ $1.50/lamp	$300	----	----
T12 Lamps (group) 356 lamps @ $1.50/lamp	----	$534	----
+ spot relamping of premature failures, 23 @$1.50		$34	
T8 Lamp (group) 356 lamps @ $2.00/lamp	----	----	$712
+ spot relamping of premature failures, 23 @$2.00			$46
Labor Costs			
T12 Relamp Labor (spot) 200 @ $7.50/lamp	$1500	----	----
T12 Relamp Labor (group) 356 lamps @ $0.75/lamp	----	$267	----
+ spot relamping of premature failures, 23 @$7.50		$172	
T8 Relamp Labor (group) 356 lamps @ $0.75/lamp	----	----	$267
+ spot relamping of premature failures, 23 @$7.50			$172
Fixture Cleaning Costs			
Fixture Cleaning (group) 333 @ $0.75/fix.	----	$250	$250
Energy Costs			
T12 Energy, 192W/fix. @$.07/kWh (assumes LBO=1)	$13,440	$13,440	----
T8 Energy, 124W/fix. @$.07/kWh (assumes LBO=1)	----	----	$8,680
TOTAL ANNUAL O&M COST	**$15,240**	**$14,697**	**$10,127**
ANNUAL O&M SAVINGS	**BASE**	**$543**	**$5,113**

NOTES:

GREEN LIGHTS

A Bright Investment in the Environment

Green Lights is an exciting and innovative program sponsored by the US Environmental Protection Agency (EPA) that encourages major US corporations and other organizations to install energy-efficient lighting technologies.

Organizations that make the commitment to Green Lights will profit by lowering their electricity bills, improving lighting quality, and increasing worker productivity. They will also reduce the air pollution caused by electricity generation.

For more information contact the Green Lights program office.

Green Lights Program
US EPA
401 M Street, SW (6202J)
Washington, DC 20460

Green Lights Information Hotline

(202) 775-6650
Fax: (202) 775-6680

Lighting Maintenance is one of a series of documents known collectively as the *Lighting Upgrade Manual*. Other documents in the Manual are Listed below.

Lighting Upgrade Manual

PLANNING

- *Green Lights Program*
- *Implementation Planning Guidebook*
- *Financial Considerations*
- *Lighting Waste Disposal*
- *Progress Reporting*
- *Communicating Green Lights Success*

TECHNICAL

- *Lighting Fundamentals*
- *Lighting Upgrade Technologies*
- *Lighting Maintenance*
- *Lighting Evaluations*
- *The Lighting Survey*

To order other documents or appendices in this series, contact the Green Lights Hotline at (202) 775-6650. Look in the monthly Green Lights *Update* newsletter for announcements of new publications.

EPA Green Lights

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.

Northeast Utilities System

September 1, 2010

Ms. Kimberley J. Santopietro
Executive Secretary
Department of Public Utility Control
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 09-12-05, Application of The Connecticut Light and Power Company to Amend Its Rate Schedules – Compliance with Order No. 16 – Programmable Photocell Guidelines

Dear Ms. Santopietro:

The Connecticut Light and Power Company ("CL&P" or "Company") herein submits compliance with Order No. 16 in the above referenced docket, which states:

> On or before September 1, 2010, CL&P shall submit the program guidelines and incentives for the installation of Programmable Photocells as discussed in Section F-5-iv, herein.

CL&P will notify all street light customers of the programmable photocell offering though a letter which will be mailed no later than November 30, 2010. The letter will outline the customer's installation options for programmable photocells. Included with the notification letter will be a 5-year group relamp schedule and a sample programmable photocell contract. Both the notification letter and the sample contract will highlight the liability risk assumed by the customer when adding programmable photocells.

Programmable Photocells Installed During Group Relamping

Rate 116 customers can elect to have the programmable photocells installed during group relamping. This will be the most cost effective method for the customer. Installations made under this election will occur according to the Company's current relamp cycle. If feasible, the Company may revise the cycle to accommodate customers who are requesting programmable photocells but will not be required to do so. As indicated above, to better help customers understand where they fall in the group relamp cycle, they will receive a copy of the 5-year group relamping schedule with the notification letter. Customers that choose to install programmable photocells during the group relamping process will not be eligible for an energy savings incentive. Prior to installation, the

customer will pay $12.73 for the cost of the new photocell, which reflects the difference between the cost of an existing dawn to dusk photocell and the programmable photocell. Once the relamp has been completed, the Street Light Account Executive will meet with municipal customers to review the relamp changes. Private customers will receive a letter from Street Light Billing & Accounting confirming the change. Every effort will be made to accommodate customers that request installations through group relamping.

Programmable Photocells Installed Outside of the Group Relamping Cycle
Customers who do not want to wait for group relamping will have the option to request that the photocells be installed outside the group relamp cycle at a cost of $122.62 per photocell, which includes the cost of equipment and Company labor. Once the Company receives the signed contract and the payment for the photocell installations, the customer will be placed in the queue for the next available installation date. When the photocells have been installed, the customer will be eligible for an energy saving incentive equal to 50% of the initial cost, or $61.31 per programmable photocell. When all billing changes have been verified, customers will receive a letter from Street Light Billing & Accounting confirming the changes.

Municipalities who own their street lights and are billed on Rate 117 will be eligible for a prescriptive energy savings incentive that is equal to the cost paid by Rate 116 customers, which is $61.31 per photocell. The customer will install the Company-approved programmable photocells using their own contractor. The customer must submit a signed programmable photocell contract before any billing changes will be made. Once billing changes are verified, the customer will receive a letter from Street Light Billing & Accounting confirming the changes.

Please contact Brian Roth at (860) 665-3630 if you have any questions with respect to this filing.

Very truly yours,

Janet Palmer
Manager – Regulatory Policy, CT
Northeast Utilities Service Company
as Agent for CL&P

c: Service List

The United Illuminating Company

Street and Security Lighting Rate M

Applies throughout the Company's Service Area.

Availability:

Service under this rate is available for any town, city or municipal subdivision, or to any other Customer, except that no new installations of mercury vapor lighting will be made for offstreet lighting.

Installation:

The Company will furnish and maintain its standard equipment necessary for supplying this service.

Where one or more wood poles must be installed in order to effect service, the Customer will make a one-time payment of $ 568.68 per pole and is responsible thereafter for the cost of any subsequent replacement poles. Alternatively, the Customer may pay a monthly charge of $ 13.04 per pole.

Where an overhead service pole is installed at a location more than one span distant from the Company's overhead distribution facilities, or an underground service ornamental pole is installed at a location more than 150 feet distant from the Company's underground distribution facilities, or an underground service low post fixture is installed at a location more than 50 feet distant from the Company's underground distribution facilities, the Customer will be required to reimburse the Company for the installation cost attributable to such excess distance.

Where underground service to low post fixtures is not installed concurrently with the installation of underground distribution facilities, the Customer is responsible for reimbursing the Company for all trenching, back-filling and resurfacing costs.

The Customer is responsible for reimbursing the Company for any other excess installation costs created by unusual conditions.

The following components are to be added to the proposed standard offer rate for Street and Security Lighting Rate M:

Generation Charges
January - December
Standard Service Generation 11.2307¢/kWhr

Delivery Services

Systems Benefits Charge**	0.3375¢/kWhr
Conservation Charge**	0.3000¢/kWhr
Renewable Energy Charge**	0.1000¢/kWhr

Non-Bypassable FMCC*

Summer	0.0000¢/kWhr
Winter	0.0000¢/kWhr

* Federally Mandated Congestion Costs
** On bills these items are combined and labeled "Combined Public Benefits Charge".

Competitive Transition Assessment 0.0000¢/kWhr

Transmission Charge

Seasonal		
Winter:	Jan. – May	1.6829¢/kWhr
	Oct. – Dec.	1.6829¢/kWhr
Summer	June – September	2.1036¢/kWhr

Payment: These unbundled components as well as any adjustments or charges based on kWh will be based on monthly burn hours.

Annual Rates per Light:

Overhead Service from Overhead Circuits to Standard Lights on Standard Wooden Poles

Lumen Rating	Sodium
4,000	$ 82.13
5,800	94.00
9,500	125.04
16,000	155.20
27,500	201.18
50,000	261.66

Floodlighting	
27,500	196.36
50,000	255.13

Underground Service from Underground Circuits to Standard Lights on Standard Wooden Poles will be charged an additional $ 115.56 per year for facilities installed on or after August 29, 1983.

Standard Ornamental Poles will be charged an additional $ 536.76 per year for facilities installed on or after August 29, 1983.

Underground Service from Underground Circuits to Lights on Low Posts

Lumen Rating	Colonial Fixtures On Wood Poles	Modern or Contemporary Fixtures on Non-Wood Posts
High Pressure Sodium 9,500	$ 184.86	$ 209.28
		Acorn Fixture On Non-Wood Post
High Pressure Sodium 9,500		$ 256.96

Payment:

One twelfth of the above annual rates will be billed monthly.

Hours of Operation:

Lights supplied under this rate will be operated each night approximately from one-half hour after sunset until one-half hour before sunrise, approximately 4150 hours each year. The Customer shall be responsible for notifying the Company of any outage, and lamp replacements will normally be made on the first working day after notification.

If a timing device is placed into operation to effectively reduce the annual burn hours of a fixture or fixtures, the customer's monthly billing will be reduced accordingly to reflect the reduced kilowatt hours of consumption.

Purchased Power Adjustment Clause:

The above ***Annual Rates per Light*** will be increased or decreased, as appropriate, by an amount determined in accordance with the Company's Purchased Power Adjustment Clause.

Transmission Adjustment Clause:

The above transmission charge will be increased or decreased every six months by an amount determined by state and federal regulations.

Estimated Kilowatt-hours:

The amount of the Purchased Power Adjustment for each Light will be determined each month by multiplying the Company's Purchased Power Adjustment by the Estimated Monthly Kilowatt Hours (wattage divided by 1,000 times monthly burn hours).

Lumen Rating	Fixture Wattage
4,000	64
5,800	81
9,500	116
16,000	173
27,500	307
50,000	471

The following are the burn hours of each month:

January	433	July	269
February*	365	August	301
March	364	September	334
April	310	October	388
May	280	November	413
June	251	December	442
		Total	4150
* Leap Year	377		

Minimum Term of Service:

If Company owned lighting facilities are removed at the request of the Customer, the Customer shall reimburse the Company for the original cost, less accumulated provisions for depreciation and net salvage, of the facilities removed.

There is no minimum term of service for generation service.

Terms and Conditions:

The Company's Terms and Conditions in effect from time to time where not inconsistent with any specific provisions hereof are a part of this rate.

Effective: January 1, 2010

Effective January 1, 2010
Decision dated December 30, 2009
Docket No.10-01-02

Supersedes C.P.U.C.A. No. 540
Effective July 1, 2009
Decision dated June 18, 2009
Docket No.09-06-01

AVISTA CORPORATION
d/b/a Avista Utilities

SCHEDULE 42

COMPANY OWNED STREET LIGHT SERVICE - IDAHO
HIGH-PRESSURE SODIUM VAPOR
(Single phase and available voltage)

AVAILABLE:

To agencies of local, state, or federal governments in all Idaho territory served by Company.

APPLICABLE:

To annual operation of dusk-to-dawn lighting for public streets and thoroughfares upon receipt of an authorized application.

MONTHLY RATE:

Fixture & Size	No Pole		Pole Facility: Wood Pole		Metal Standard: Pedestal Base		Metal Standard: Direct Burial		Metal Standard: Developer Contributed	
	Code	Rate	Code	Rate	Code	Rate	Code	Rate	Code	Rate
Single High-Pressure Sodium Vapor										
(Nominal Rating in Watts)										
~~50W~~	~~235~~	~~$9.84~~					~~234#~~	~~$12.27~~		
100W	935	10.29					434#	12.89		
100W	435	11.95	431	$ 12.54	432	$22.58	433	22.58	436	$12.54
200W	535	19.85	531	20.43	532	30.43	533	30.43	536	20.43
250W	635	23.28	631	23.88	632	33.89	633	33.89	636	23.88
400W	835	34.93	831	35.52	832	45.56	833	45.56	836	35.52
150W									936	18.67
Double High-Pressure Sodium Vapor										
(Nominal Rating in Watts)										
100W			441	$ 25.16	442	$ 35.87			446	$ 25.16
200W	545	$39.66			542	51.55			546	40.25
Decorative Sodium Vapor										
100W Granville	475	$17.96					474*	23.36		
100W Post Top							484*	22.41		
100W Kim Light							438**	12.90		

#Decorative Curb

*16' fiberglass pole
**25' fiberglass pole

Issued September 23, 2010 Effective October 1, 2010

Issued by Avista Utilities
By Kelly O. Norwood, VP, State & Federal Regulation

Schedule RAW2010-11

WESTERN MASSACHUSETTS ELECTRIC COMPANY

M.D.P.U. No. 1009X
Cancels M.D.P.U. No. 1009W

STREET AND SECURITY LIGHTING
SCHEDULE S-1

APPLICABILITY:

This rate is applicable to street, highway, and off-street lighting.

RATE - Per month:

The RATE-Per month is the sum of 1) LAMP CHARGE, 2) LUMINAIRE CHARGE, 3) POLE CHARGE, and 4) ACCESSORY CHARGE. Included in these rates are unbundled charges per kilowatt-hour as described below.

1) LAMP CHARGE:

Nominal Rating in Lumens	Lamp & Ballast Wattage	Mercury Vapor*	HP Sodium	Incandescent*	Metal Halide
1,000	104	-	-	$ 6.81	-
2,500	203	-	-	7.52	-
4,000	328	-	-	8.39	-
4,000	118	$6.88	-	-	-
(4,000)	(59)	(-)	($ 6.44)	(-)	(-)
5,200	89	-	-	-	$ 8.34
6,300	84	-	6.71	-	-
8,000	206	10.71	-	-	-
8,500	119	-	-	-	11.83
9,500	118	-	10.33	-	-
10,000	691	-	-	14.41	-
12,500	287	12.60	-	-	-
14,400	207	-	-	-	14.95
16,000	172	-	12.08	-	-
22,000	289	-	-	-	15.66
22,500	455	16.44	-	-	-
27,500	311	-	15.76	-	-
36,000	451	-	-	-	25.39
40,000*	781	26.87	-	-	-
50,000	472	-	25.77	-	-
60,000	1,103	29.17	-	-	-
110,000	1,080	-	-	-	45.65
140,000	1,103	-	45.85	-	-

*No additional lights of these sizes or types will be installed. For replacement of an existing mercury vapor light, municipalities may request in writing that a similar light be

STREETLIGHTING

RATE S-1

AVAILABILITY

Service under this rate is available for Street and Fire-Alarm Lighting Service in the Public Way for approximately 4,200 hours of operation per year. For lighting service on private property refer to Rate S-3. Service under this rate is subject to the Company's printed requirements and the Company's Terms and Conditions – Distribution Service, each as in effect from time to time.

STREET LIGHTING SERVICE
Delivery Services:

Class I

Size of Lamp Lumens	Watts	Luminaire Type	Basic Monthly Charges Distribution	Transmission
Incandescent				
(1,000)	(87)	(Open)	($6.78)	($0.37)
(2,500)	(176)	(Open)	($7.65)	($0.75)
(2,500)	(176)	(Enclosed)	($7.65)	($0.75)
(4,000)	(274)	(Enclosed)	($8.66)	($1.17)
6,000	376	Enclosed	$9.69	$1.60
10,000	577	Enclosed	$11.57	$2.45
15,000	855	Enclosed	$14.23	$3.64
2-2,500	352	Enclosed,Twin	$15.36	$1.50
2-4,000	548	Enclosed,Twin	$17.30	$2.33
2-6,000	752	Enclosed,Twin	$19.35	$3.20
2-10,000	1,154	Enclosed,Twin	$23.15	$4.91
2-15,000	1,710	Enclosed,Twin	$28.46	$7.27
Mercury Vapor				
(3,500)	(131)	(Enclosed)	($7.33)	($0.56)
7,000	213	Enclosed	$8.17	$0.91
11,000	296	Enclosed	$9.03	$1.26
20,000	460	Enclosed	$10.88	$1.96
35,000	780	Enclosed	$15.61	$3.32
2-3,500	262	Enclosed,Twin	$14.63	$1.11
2-7,000	426	Enclosed,Twin	$16.35	$1.81
2-11,000	592	Enclosed,Twin	$18.05	$2.52
2-20,000	920	Enclosed,Twin	$21.75	$3.91
2-35,000	1,560	Enclosed,Twin	$31.21	$6.63
High Pressure Sodium				
(2,150)	(41)	(Open)	($6.34)	($0.17)
(4,000)	(58)	(Open)	($6.57)	($0.25)
9,500	117	Enclosed	$7.17	$0.50
16,000	175	Enclosed	$7.73	$0.74
25,000	295	Enclosed	$9.36	$1.25
45,000	470	Enclosed	$11.37	$2.00
2-2,150	82	Enclosed	$12.67	$0.35
2-4,000	116	Enclosed,Twin	$13.11	$0.49
2-9,500	234	Enclosed,Twin	$14.34	$1.00
2-16,000	350	Enclosed,Twin	$15.49	$1.49
2-25,000	590	Enclosed,Twin	$18.72	$2.51
2-45,000	940	Enclosed,Twin	$22.71	$4.00

STREETLIGHTING

RATE S-1

Delivery Services: (continued)

Class II

Size of Lamp Lumens Incandescent Lamps	Watts	Luminaire Type	Basic Monthly Charges Distribution	Transmission
1,000	87	Open	$11.28	$0.37
2,500	176	Open	$12.15	$0.75
2,500	176	Enclosed	$12.15	$0.75
4,000	274	Enclosed	$13.16	$1.17
6,000	376	Enclosed	$14.18	$1.60
10,000	577	Enclosed	$16.07	$2.45
15,000	855	Enclosed	$18.73	$3.64
2-2,500	352	Enclosed,Twin	$19.85	$1.50
2-4,000	548	Enclosed,Twin	$21.80	$2.33
2-6,000	752	Enclosed,Twin	$23.85	$3.20
2-10,000	1,154	Enclosed,Twin	$27.65	$4.91
2-15,000	1,710	Enclosed,Twin	$32.96	$7.27
Mercury Vapor Lamps				
3,500	131	Enclosed	$11.83	$0.56
7,000	213	Enclosed	$12.67	$0.91
11,000	296	Enclosed	$13.53	$1.26
20,000	460	Enclosed	$15.38	$1.96
35,000	780	Enclosed	$20.11	$3.32
2-3,500	262	Enclosed,Twin	$19.13	$1.11
2-7,000	426	Enclosed,Twin	$20.85	$1.81
2-11,000	592	Enclosed,Twin	$22.55	$2.52
2-20,000	920	Enclosed,Twin	$26.25	$3.91
2-35,000	1,560	Enclosed,Twin	$35.71	$6.63
High Pressure Sodium Vapor Lamps				
2,150	41	Open	$10.84	$0.17
4,000	58	Open	$11.07	$0.25
9,500	117	Enclosed	$11.67	$0.50
16,000	175	Enclosed	$12.23	$0.74
25,000	295	Enclosed	$13.86	$1.25
45,000	470	Enclosed	$15.87	$2.00
2-2,150	82	Enclosed	$17.17	$0.35
2-4,000	116	Enclosed,Twin	$17.61	$0.49
2-9,500	234	Enclosed,Twin	$18.83	$1.00
2-16,000	350	Enclosed,Twin	$19.99	$1.49
2-25,000	590	Enclosed,Twin	$23.22	$2.51
2-45,000	940	Enclosed,Twin	$27.21	$4.00

STREETLIGHTING

RATE S-1

Delivery Services: (continued)

Class III

Size of Lamp Lumens Incandescent Lamps	Watts	Luminaire Type	Basic Monthly Distribution	Charges Transmission
1,000	87	Open	$13.08	$0.37
2,500	176	Open	$13.95	$0.75
2,500	176	Enclosed	$13.95	$0.75
4,000	274	Enclosed	$14.96	$1.17
6,000	376	Enclosed	$15.98	$1.60
10,000	577	Enclosed	$17.87	$2.45
15,000	855	Enclosed	$20.53	$3.64
2-2,500	352	Enclosed,Twin	$21.65	$1.50
2-4,000	548	Enclosed,Twin	$23.60	$2.33
2-6,000	752	Enclosed,Twin	$25.65	$3.20
2-10,000	1,154	Enclosed,Twin	$29.45	$4.91
2-15,000	1,710	Enclosed,Twin	$34.76	$7.27
Mercury Vapor Lamps				
3,500	131	Enclosed	$13.63	$0.56
7,000	213	Enclosed	$14.47	$0.91
11,000	296	Enclosed	$15.33	$1.26
20,000	460	Enclosed	$17.18	$1.96
35,000	780	Enclosed	$21.91	$3.32
2-3,500	262	Enclosed,Twin	$20.92	$1.11
2-7,000	426	Enclosed,Twin	$22.65	$1.81
2-11,000	592	Enclosed,Twin	$24.35	$2.52
2-20,000	920	Enclosed,Twin	$28.05	$3.91
2-35,000	1,560	Enclosed,Twin	$37.51	$6.63
High Pressure Sodium Vapor Lamps				
2,150	41	Open	$12.64	$0.17
4,000	58	Open	$12.87	$0.25
9,500	117	Enclosed	$13.47	$0.50
16,000	175	Enclosed	$14.03	$0.74
25,000	295	Enclosed	$15.66	$1.25
45,000	470	Enclosed	$17.67	$2.00
2-2,150	82	Enclosed	$18.97	$0.35
2-4,000	116	Enclosed,Twin	$19.41	$0.49
2-9,500	234	Enclosed,Twin	$20.63	$1.00
2-16,000	350	Enclosed,Twin	$21.79	$1.49
2-25,000	590	Enclosed,Twin	$25.02	$2.51
2-45,000	940	Enclosed,Twin	$29.01	$4.00

STREETLIGHTING

RATE S-1

Delivery Services: (continued)

Class V

Size of Lamp Lumens	Watts	Luminaire Type	Basic Monthly Distribution	Charges Transmission
Incandescent Lamps				
(1,000)	(87)	(Open)	($22.08)	($0.37)
(2,500)	(176)	(Open)	($22.95)	($0.75)
(2,500)	(176)	(Enclosed)	($22.95)	($0.75)
(4,000)	(274)	(Enclosed)	($23.95)	($1.17)
6,000	376	Enclosed	$24.98	$1.60
10,000	577	Enclosed	$26.86	$2.45
15,000	855	Enclosed	$29.53	$3.64
2-2,500	352	Enclosed,Twin	$30.65	$1.50
2-4,000	548	Enclosed,Twin	$32.50	$2.33
2-6,000	752	Enclosed,Twin	$34.66	$3.20
2-10,000	1,154	Enclosed,Twin	$38.45	$4.91
2-15,000	1,710	Enclosed,Twin	$43.76	$7.27
Mercury Vapor Lamps				
(3,500)	(131)	(Enclosed)	($22.62)	($0.56)
7,000	213	Enclosed	$23.48	$0.91
11,000	296	Enclosed	$24.33	$1.26
20,000	460	Enclosed	$26.18	$1.96
35,000	780	Enclosed	$30.90	$3.32
2-3,500	262	Enclosed,Twin	$29.92	$1.11
2-7,000	426	Enclosed,Twin	$31.65	$1.81
2-11,000	592	Enclosed,Twin	$33.35	$2.52
2-20,000	920	Enclosed,Twin	$37.05	$3.91
2-35,000	1,560	Enclosed,Twin	$46.51	$6.63
High Pressure Sodium Vapor Lamps				
(2,150)	(41)	(Open)	($21.64)	($0.17)
(4,000)	(58)	(Open)	($21.87)	($0.25)
9,500	117	Enclosed	$22.47	$0.50
16,000	175	Enclosed	$23.03	$0.74
25,000	295	Enclosed	$24.66	$1.25
45,000	470	Enclosed	$26.67	$2.00
2-2,150	82	Enclosed	$27.97	$0.35
2-4,000	116	Enclosed,Twin	$28.41	$0.49
2-9,500	234	Enclosed,Twin	$29.63	$1.00
2-16,000	350	Enclosed,Twin	$30.79	$1.49
2-25,000	590	Enclosed,Twin	$34.02	$2.51
2-45,000	940	Enclosed,Twin	$38.00	$4.00

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

OUTDOOR LIGHTING DELIVERY SERVICE

SCHEDULE SD (Continued)

(A) Mercury Vapor Lighting Equipment*

Lamp Size Nominal Lumens (Approx.)	Type of Luminaire	Price Per Luminaire Per Month Internal Transmission Distribution Transition Charge
3,500	(MV) Residential and Commercial Type	As per Schedule SR as in effect from time to time
7,000	(MV) Residential and Commercial Type	As per Schedule SR as in effect from time to time
3,500	(MV) Street and Highway Type	As per Schedule SR as in effect from time to time
7,000	(MV) Street and Highway Type	As per Schedule SR as in effect from time to time
20,000	(MV) Street and Highway Type	As per Schedule SR as in effect from time to time
60,000	(MV) Street and Highway Type	As per Schedule SR as in effect from time to time
20,000	(MV) Flood Light Type	As per Schedule SR as in effect from time to time
3,500	(MV) Power Bracket Included	As per Schedule SR as in effect from time to time
7,000	(MV) Power Bracket Included	As per Schedule SR as in effect from time to time

* Mercury Vapor Lighting is not available for new lighting installations, effective January 1, 1991.

(B) High Pressure Sodium Lighting Equipment

Lamp Size Nominal Lumens (Approx.)	Type of Luminaire	Price Per Luminaire Per Month Internal Transmission Distribution Transition Charge
3,300	(HPS) Residential and Commercial Type	As per Schedule SR as in effect from time to time
9,500	(HPS) Residential and Commercial Type	As per Schedule SR as in effect from time to time
3,300	(HPS) Street and Highway Type	As per Schedule SR as in effect from time to time
9,500	(HPS) Street and Highway Type	As per Schedule SR as in effect from time to time
20,000	(HPS) Street and Highway Type	As per Schedule SR as in effect from time to time
50,000	(HPS) Street and Highway Type	As per Schedule SR as in effect from time to time
140,000	(HPS) Street and Highway Type	As per Schedule SR as in effect from time to time
50,000	(HPS) Flood Light Type	As per Schedule SR as in effect from time to time

Issued: March 11, 2008

Effective: March 1, 2008

MASSACHUSETTS ELECTRIC COMPANY

STREET AND AREA LIGHTING – COMPANY OWNED EQUIPMENT S-1
RETAIL DELIVERY SERVICE

Lamp Type / Luminaire Type	Lumen Rating	Nominal Wattage	Description	Annual kWh	Annual Luminaire Charge per Unit
Mercury Vapor (Continued)*					
Post Top					
	4,400*	100	LUM MV POST 100W	543	$62.49
	8,500*	175	LUM MV POST 175W	881	83.63
Floodlight					
	23,000*	400	LUM MV FLD 400W	1,991	116.68
	63,000*	1,000	LUM MV FLD 1000W	4,572	212.37
High Pressure Sodium Vapor					
Roadway					
	4,000	50	LUM HPS RWY 50W	255	60.71
	6,300	70	LUM HPS RWY 70W	359	73.44
	9,600	100	LUM HPS RWY 100W	493	77.48
	13,000 (Ret)*	150	LUM HPS RWY 150W	758	80.27
	16,000	150	LUM HPS RWY 150W	722	82.43
	27,500	250	LUM HPS RWY 250W	1,269	102.31
	50,000	400	LUM HPS RWY400W	1,962	142.11
	140,000*	1,000	LUM HPS RWY 1000W	4,618	190.54
Floodlight					
	6,300*	70	LUM HPS FLD 70W	359	156.45
	27,500	250	LUM HPS FLD 250W	1,269	156.45
	50,000	400	LUM HPS FLD 400W	1,962	178.19
	140,000*	1,000	LUM HPS FLD 1000W	4,618	239.77
Post Top					
	4,000**	50	LUM HPS POST 50W	255	144.48
	9,600**	100	LUM HPS POST 100W	493	145.78
Wallighter					
	27,500 (12 Hr.)*	250	WALL HPS 250W 12 HR	1,332	123.68
	27,500 (24 Hr.)	250	WALL HPS 250W 24 HR	2,663	111.83

INTERSTATE POWER and LIGHT COMPANY — INTERIM
ELECTRIC TARIFF
FILED WITH M.P.U.C. — ORIGINAL VOLUME NO. 8
TWENTY-NINTH REVISED SHEET NO. 17
Canceling SUBSTITUTE TWENTY-EIGHTH REVISED SHEET NO. 17

RATE DESIGNATION: 330 and 340
CLASS OF SERVICE: AREA LIGHTING (Page 1 of 2)
SERVICE AREA: ALL MINNESOTA SERVICE AREA

Availability: Applicable for lighting of outdoor areas from dusk to dawn upon execution of a one-year contract, except a three-year contract shall apply when additional facilities are required. After the initial period, all contracts will continue in effect until cancelled by thirty days written notice from either party. Not applicable for lighting of public thoroughfares in urban areas. Service must be available from existing overhead or underground secondary distribution facilities. Additional distribution facilities for service hereunder will only be provided subject to an additional facilities charge. For underground distribution extensions, customer provides trenching and backfilling.

Character of Service: Company shall furnish and install on a Company-owned wood distribution system pole a photo-electric controlled (unmetered) lighting fixture of a type as follows and Company shall furnish all electric energy to operate such fixture. All facilities provided shall be owned, operated and maintained by the Company. All lamp replacement and other maintenance shall be done during regularly scheduled working hours with a reasonable period of elapsed time allowed for such work.

FIXTURE TYPE AND MONTHLY RATE:

SECURITY LIGHTS

Mercury Vapor Units

Fixture	Rate Code	Monthly kWh
175 Watt, 8,600 Lumens*	330	69
250 Watt, 12,100 Lumens*	330	98
400 Watt, 22,500 Lumens*	330	151

High Pressure Sodium Vapor Units

Fixture	Rate Code	Monthly kWh	Fixture Rate
(50 Watt, 4,000 Lumens)	(340)	(22)	($7.29)
100 Watt, 9,500 Lumens	340	45	$9.74
150 Watt, 16,000 Lumens	340	67	$11.46
250 Watt, 27,500 Lumens	340	104	$17.17

SECURITY FLOODS

Mercury Vapor Units

Fixture	Rate Code	Monthly kWh
400 Watt, 22,500 Lumens*	330	153
1,000 Watt, 63,000 Lumens*	330	360

High Pressure Sodium Vapor Units

Fixture	Rate Code	Monthly kWh	Fixture Rate
250 Watt, 27,500 Lumens	340	104	$18.06
None			$42.87
400 Watt, 50,000 Lumens	340	160	$23.10

* Available at existing locations only as of February 1, 1990. New or Replacement fixtures will be comparable lumen output high pressure sodium vapor (SV) units or lighting with equivalent or better energy efficiency.

The rates in this tariff reflect interim levels pending the outcome of IPL's rate case. Interim rates are subject to refund.

Additional Facilities Charge: For secondary conductor extensions in excess of one span for overhead and the equivalent (125 feet) for underground, a charge of $0.007 per circuit foot shall be added to the monthly unit charge. A charge of $5.50 per month shall be made for each Company-owned wood distribution system pole installed solely to provide such service, which includes charges for all guys, anchors and other normal facilities attendant to such installation. If such facilities are subsequently used by Company for other purposes such monthly charges will be discontinued.

Date Filed: July 2, 2010 — Effective Date: July 6, 2010

By: Erik C. Madsen – Director, Regulatory Affairs

Docket No. E001/GR-10-276 — Order Date: June 30, 2010

All-Night Service Option:
The monthly kilowatt-hours and distribution rates for each luminaire served under the all-night service option are shown below.

For New and Existing Installations:

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
High Pressure Sodium:														
4,000	50	27	23	22	19	16	16	16	18	21	23	24	27	$14.44
5,800	70	40	34	32	29	24	23	24	27	31	35	37	40	14.44
9,500	100	59	50	47	42	35	34	35	39	46	51	53	59	19.19
16,000	150	88	74	70	62	53	51	53	59	68	76	79	88	27.14
30,000	250	142	120	113	101	85	82	85	95	110	123	128	142	27.81
50,000	400	217	183	173	154	130	126	130	144	168	188	196	217	28.12
130,000	1,000	510	430	408	362	306	296	306	340	395	442	460	510	45.14
Metal Halide:														
5,000	70	41	35	33	29	25	24	25	28	32	36	37	41	$15.07
8,000	100	56	47	45	40	34	33	34	38	44	49	51	56	20.60
13,000	150	88	74	71	63	53	51	53	59	68	77	80	88	28.28
13,500	175	96	81	77	68	57	56	57	64	74	83	87	96	28.88
20,000	250	134	113	107	95	80	78	80	89	104	116	121	134	28.88
36,000	400	209	176	167	149	126	122	126	140	162	181	189	209	29.14
100,000	1,000	502	423	402	356	301	292	301	335	389	435	454	502	43.67

For Existing Installations Only:

Lamp Nominal Light Output Lumens	Power Rating Watts	Monthly KWH per Luminaire Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Monthly Distribution Rate
Incandescent:														
600	105	49	41	39	35	29	28	29	33	38	42	44	49	$8.32
1,000	105	49	41	39	35	29	28	29	33	38	42	44	49	9.28
2,500	205	95	80	76	68	57	55	57	64	74	83	86	95	11.91
6,000	448	208	176	167	148	125	121	125	139	161	181	188	208	20.44
Mercury:														
3,500	100	54	46	44	39	33	32	33	36	42	47	49	54	$12.74
7,000	175	95	80	76	68	57	55	57	64	74	83	86	95	15.31
11,000	250	136	114	109	96	81	79	81	91	105	118	123	136	18.94
15,000	400	211	178	169	149	126	122	126	140	163	183	190	211	21.67
20,000	400	211	178	169	149	126	122	126	140	163	183	190	211	23.38
56,000	1,000	503	424	403	357	302	292	302	335	390	436	454	503	37.16

Issued: July 2, 2010

Issued by: Gary A. Long

Effective: July 1, 2010

Title: President and Chief Operating Officer

OUTDOOR LIGHTING SERVICE
SCHEDULE OL

AVAILABILITY

This Schedule is available to governmental bodies and private customers for unmetered outdoor lighting service supplied from the Company's existing overhead conductors with lighting fixtures mounted on existing poles. Mercury Vapor lighting fixtures will be unavailable at new locations after December 1, 2002.

This Schedule is for delivery service only. Customers are required to obtain an energy supply from a Competitive Supplier, self-supply (available to Market Participant End Users as described in NHPUC Order No. 24,172), or may be eligible for Default Service from the Company pursuant to Schedule DS as amended from time to time.

CHARACTER OF SERVICE

All lighting shall be photoelectrically controlled. The Company will furnish and maintain the equipment hereinafter described and shall supply service at which the lamps are designed to operate. All lighting fixtures will be group relamped in accordance with the lamp manufacturer's suggested schedule. At relamping time the fixture will be maintained in accordance with the fixture manufacturer's suggested procedures.

DELIVERY SERVICE CHARGES – MONTHLY

The Delivery Service Charges shall include Distribution Charges and Adjustments, set forth below.

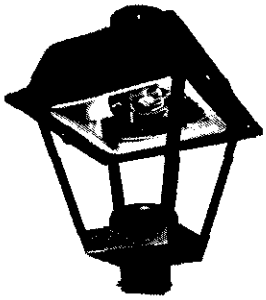
DISTRIBUTION CHARGES: LUMINAIRE – MONTHLY

Lamp Size Nominal Watts	Lamp Size Lumens Approx.	Description of Luminaire	Luminaire Price per Month	Luminaire Monthly kWh
100	3,500	Mercury Vapor Street	$7.88	40
175	7,000	Mercury Vapor Street	$9.54	67
250	11,000	Mercury Vapor Street	$10.95	95
400	20,000	Mercury Vapor Street	$13.23	154
1,000*	60,000	Mercury Vapor Street	$27.29	388
250	11,000	Mercury Vapor Flood	$11.73	95
400	20,000	Mercury Vapor Flood	$14.24	154
1,000	60,000	Mercury Vapor Flood	$24.26	388
100	3,500	Mercury Vapor Power Bracket	$7.96	40
175	7,000	Mercury Vapor Power Bracket	$8.94	67
50	4,000	Sodium Vapor Street	$8.04	21
100	9,500	Sodium Vapor Street	$9.18	43
150	16,000	Sodium Vapor Street	$9.22	60
250	30,000	Sodium Vapor Street	$11.82	101
400	50,000	Sodium Vapor Street	$15.16	161
1,000*	140,000	Sodium Vapor Street	$26.94	398
150	16,000	Sodium Vapor Flood	$10.79	60
250	30,000	Sodium Vapor Flood	$12.90	101
400	50,000	Sodium Vapor Flood	$14.80	161
1000	140,000	Sodium Vapor Flood	$27.18	398
50	4,000	Sodium Vapor Power Bracket	$7.37	21
100	9,500	Sodium Vapor Power Bracket	$8.39	43

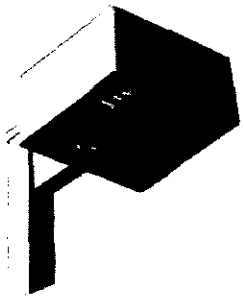
* 1,000 Watt Mercury Vapor Street and 1,000 Watt Sodium Vapor Street are no longer available. Flood lights are available with brackets and ballasts as specified by the Company.

Underground Fixtures

Underground fixtures use below-ground wiring.



Salem
Application: Downtowns, neighborhoods, parking lots
Sizes (Watts): 70, 150



Decashield
Application: Downtowns, neighborhoods, parking lots
Sizes (Watts): 150, 250, 400

Services

New Hampshire Electric Cooperative can provide the following services:

- **Consulting**
- **Design**
- **Installation**
- **Maintenance**

For more information or to order, please call 1-800-698-2007.

your NEW HAMPSHIRE **Electric Co-op**

www.nhec.coop
1-800-698-2007
http://www.nhec.com/filerepository/area_lighting.pdf

New Hampshire Electric Cooperative

Area Lighting

All fixtures feature "full cutoff" technology that offers precise ground coverage while reducing sky glare.

Schedule RAW2010-19

Overview

The Co-op offers a variety of area lighting solutions to meet your outdoor lighting needs. From decorative lights to parking lot floodlights, all of our fixtures feature "full cutoff" technology that offers precise ground coverage while reducing sky glare.

Many New Hampshire towns have passed or are considering so-called Dark Skies ordinances to protect the nighttime sky. That's why the Co-op's Area Lighting Program only offers light fixtures that greatly reduce lighting glare and sky glow. Area lighting fixtures offered by the Co-op do not illuminate above the horizontal plane. This "full cutoff" technology allows for precise and effective illumination of a specific area while reducing the glare and sky glow emitted by conventional fixtures.

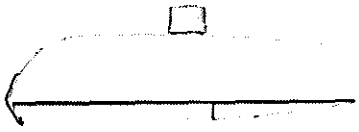
Sizing Chart

Lumens*	Wattage
4,000	50
5,800	70
9,500	100
16,000	150
30,000	250
50,000	400
130,000	1,000

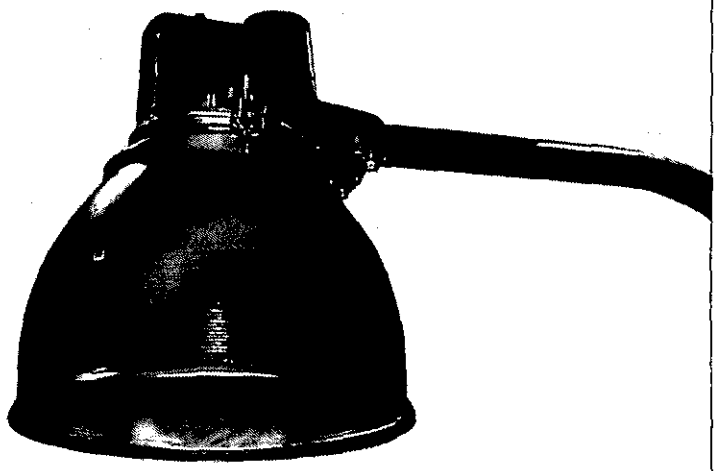
**Lumen=the amount of light emitted by the bulb, not the amount of light reaching the target surface.*

Overhead Fixtures

Overhead fixtures use existing utility overhead wiring and poles.

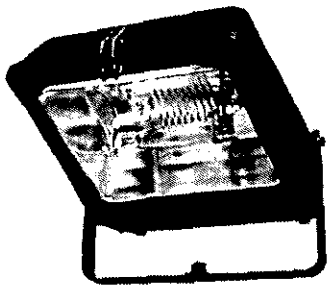


Cobra Head
Application: Streets, parking lots
Sizes (Watts): 50, 70, 100, 150, 250, 400

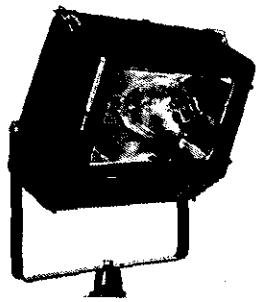


Sky Guard
Application: Streets, parking lots
Sizes (Watts): 50, 70, 100, 150, 250

Floodlights



Glarefighter
(shield not shown)
Requires 20° or less tilt above horizontal plane.
Application: Buildings, parking lots
Sizes (Watts): 250, 400



PF 1000 Powerflood
(shield not shown)
Requires 45° or less tilt above horizontal plane.
Application: Buildings, parking lots
Sizes (Watts): 1,000

The Power of Community

TRI-COUNTY ELECTRIC
A Touchstone Energy® Cooperative

Hooker, Oklahoma 580.652.2418

Rates

As a not-for-profit cooperative, Tri-County offers our member-owners access to high-quality energy at the lowest practical rates. Rate categories are assigned according to the type of account (residential, commercial) and your energy consumption.

Below is a description of each rate as defined in the cooperative's Rules and Regulations of Service .

- Residential Service – Rates R1-G, R1-S, R3-G, R3-S (+)
- General Service - Rates GS1-G, GS1-S, GS3-G and GS3-S (+)
- Irrigation Power Service - Rates IR-G, IRDW-G, IRTD-G, and IR-S (+)
- Oil Well Service - Rates OW1-G, OW1-S, OW3-G and OW3-S (+)
- Large Power Service – Rates LPP-G, LPP-S LPS-G and LPS-S (+)
- Industrial Service – Rates IS-G, IP-G, IT-G (+)
- Security Lighting Service – Rates SL (+)

  Security light service is available all areas. Security light service is available to all Members for dusk-to-dawn illumination of outdoor areas in close proximity to existing overhead distribution or service facilities with adequate capacity and suitable voltage.

  Type of Service
  Single-Phase, 60 Hertz, at available secondary voltage of 120/240 volts.

  Monthly Rate

Mercury Vapor (MV) and High Pressure Sodium (HPS) Lights	
50 Watt (type 1)	$ 7.00
100 Watt (type 2)	$ 7.00
150 Watt (type 3)	$ 7.00
175 Watt (type 4)	$ 7.00
250 Watt (type 5)	$ 11.00
400 Watt (type 6)	$ 12.00
Metal Halide (MH) Lights	
150 Watt (type 7)	$ 11.00
250 Watt (type 8)	$ 15.00

NANTUCKET ELECTRIC COMPANY

STREET AND AREA LIGHTING – COMPANY OWNED EQUIPMENT S-1
RETAIL DELIVERY SERVICE

RATE (CONTINUED)

Lamp Type / Luminaire Type	Lumen Rating	Nominal Wattage	Description	Annual kWh	Annual Luminaire Charge per Unit
Mercury Vapor (Continued)*					
Post Top					
	4,400*	100	LUM MV POST 100W	543	$62.49
	8,500*	175	LUM MV POST 175W	881	83.63
Floodlight					
	23,000*	400	LUM MV FLD 400W	1,991	116.68
	63,000*	1,000	LUM MV FLD 1000W	4,572	212.37
High Pressure Sodium Vapor					
Roadway					
	4,000	50	LUM HPS RWY 50W	255	60.71
	6,300	70	LUM HPS RWY 70W	359	73.44
	9,600	100	LUM HPS RWY 100W	493	77.48
	13,000 (Ret)*	150	LUM HPS RWY 150W	758	80.27
	16,000	150	LUM HPS RWY 150W	722	82.43
	27,500	250	LUM HPS RWY 250W	1,269	102.31
	50,000	400	LUM HPS RWY 400W	1,962	142.11
	140,000*	1000	LUM HPS RWY 1000W	4,618	190.54
Floodlight					
	6,300*	70	LUM HPS FLD 70W	359	156.45
	27,500	250	LUM HPS FLD 250W	1,269	156.45
	50,000	400	LUM HPS FLD 400W	1,962	178.19
	140,000*	1,000	LUM HPS FLD 1000W	4,618	239.77
Post Top					
	4,000**	50	LUM HPS POST 50W	255	144.48
	9,600**	100	LUM HPS POST 100W	493	145.78
Wallighter					
	27,500 (12 Hr.)*	250	WALL HPS 250W 12 HR	1,332	123.68
	27,500 (24 Hr.)	250	WALL HPS 250W 24 HR	2,663	111.83
Metal Halide					
Floodlight					
	32,000	400	LUM MH FLD 400W	1,883	170.58

* No further installation or relocation of this type and size light after the effective date of this rate.
** Post top luminaire installations will only be permitted for the "Traditional" luminaire style and only in underground development areas after the effective date of this rate.

THE NARRAGANSETT ELECTRIC COMPANY
LIMITED SERVICE - PRIVATE LIGHTING (S-10)
RETAIL DELIVERY SERVICE

RATE

The annual charges below are applicable to all street and area lighting facilities:

1. Luminaire Charges:

Lamp Type / Luminaire Type	Lumen Rating	Nominal Wattage	Description	Annual kWh	Annual Luminaire Charge Per Unit
Incandescent*					
Roadway					
	1,000*	105	LUM INC RWY 105W	438	$69.46
Mercury Vapor*					
Roadway					
	4,400*	100	LUM MV RWY 100W	543	69.46
	8,500*	175	LUM MV RWY 175W	881	72.63
	23,000*	400	LUM MV RWY 400W	1,991	120.39
	63,000*	1,000	LUM MV RWY 1000W	4,572	163.46
Floodlight					
	23,000*	400	LUM MV FLD 400W	1,991	143.14
	63,000*	1,000	LUM MV FLD 1000W	4,572	181.37
High Pressure Sodium Vapor					
Roadway					
	4,000	50	LUM HPS RWY 50W	255	69.46
	6,300	70	LUM HPS RWY 70W	359	69.72
	9,600	100	LUM HPS RWY 100W	493	72.63
16,000	150		LUM HPS RWY 150W	722	72.63
	27,500	250	LUM HPS RWY 250W	1,269	120.39
	50,000	400	LUM HPS RWY 400W	1,962	163.46
Wallighter					
	27,500 (24 hr)	250	WALL HPS 250W 24 HR	2,663	172.21
Floodlight					
	27,500	250	LUM HPS FLD 250W	1,269	143.14
	50,000	400	LUM HPS FLD 400W	1,962	181.37
Post Top					
	4,000*	50	LUM HPS POST 50W	255	155.49
	9,600*	100	LUM HPS POST 100W	493	156.80
Shoebox					
	9,600*	100	LUM HPS REC 100W-C1	493	92.30
Metal Halide					
Floodlight					
	32,000	400	LUM MH FLD 400W	1,883	181.37
	107,800*	1,000	LUM MH FLD 1000W	4,502	181.37

Sixteenth Revision of Sheet No. 53-a
Canceling Fifteenth Revision
WN U-60 of Sheet No. 53-a

PUGET SOUND ENERGY
Electric Tariff G

SCHEDULE 53
STREET LIGHTING SERVICE
(Continued)

COMPANY OWNED LIGHTS:

MONTHLY RATES PER LAMP FOR COMPANY OWNED LIGHTS:

Sodium Vapor Lamp Wattage	Rate per Month per lamp	
50	$9.02	(R)
70	$10.32	|
100	$11.63	|
150	$13.79	|
200	$16.54	|
250	$18.61	|
310	$21.52	|
400	$25.16	|
1000	$55.77	(R)

COMPANY OWNED LIGHTS - SPECIAL TERMS AND CONDITIONS: (D) (D)

1. Installation and Maintenance: The Company will install new lights upon request and shall provide all engineering and mapping, and shall provide and install (a) Luminaire, (b) Lamp, (c) Photocell, (d) Bracket, (e) Secondary voltage circuitry, and (f) secondary voltage connectors and fusing. The Customer shall pay only the additional installed cost of bracket arms in excess of 8 feet, and the additional cost of luminaires costing more than the Company standard luminaires. For the purpose of this rate the cobra head style luminaire is the Company standard.

2. Ownership of Facilities: The Company shall own, operate, and maintain all facilities installed by the Company under this schedule.

3. Types of Luminaires: Only luminaires with maintenance costs comparable to Company standard luminaires will be served under this schedule. Luminaires of types that are not approved for service under this schedule may be suitable for service under Schedule 52, Custom Lighting Service.

Issued: April 14, 2010 **Effective**: May 1, 2010
Advice No.: 2010-11

Issued By Puget Sound Energy

By: Tom DeBoer Tom DeBoer **Title**: Director, Federal & State Regulatory Affairs

AVISTA CORPORATION
dba Avista Utilities

SCHEDULE 42
COMPANY OWNED STREET LIGHT SERVICE - WASHINGTON
HIGH-PRESSURE SODIUM VAPOR
(Single phase and available voltage)

AVAILABLE:

To agencies of local, state, or federal governments in all Washington territory served by Company.

APPLICABLE:

To annual operation of dusk-to-dawn lighting for public streets and thoroughfares upon receipt of an authorized application.

MONTHLY RATE:

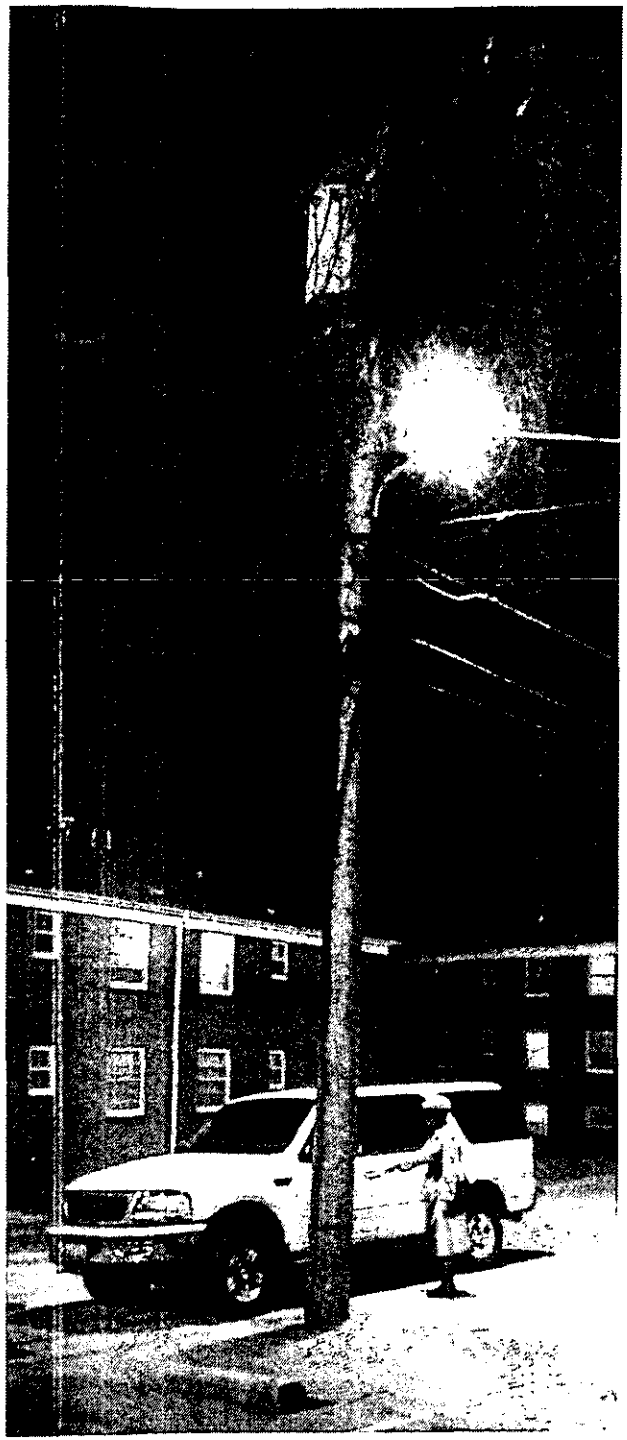
Fixture & Size	No Pole Code	No Pole Rate	Pole Facility: Wood Pole Code	Wood Pole Rate	Metal Standard: Pedestal Base Code	Pedestal Base Rate	Metal Standard: Direct Burial Code	Direct Burial Rate	Developer Contributed Code	Developer Contributed Rate	
Single High-Pressure Sodium Vapor											
(Nominal Rating in Watts)											
50W							234#	$ 10.91			(I)
100W	435	$11.06	431	$11.68	432	$ 20.70	433	20.70	436	$11.68	
100W			421*	20.70			434#	11.68			
200W	535	18.06	531	18.71	532	27.71	533	27.71	536	18.71	
200W					522*	46.94					
250W			631	22.05	632	31.06	633	31.06	636	22.05	
400W	835	27.21	831	32.40	832	41.43			836	32.40	
Double High-Pressure Sodium Vapor											
(Nominal Rating in Watts)											
100W			441	22.75	442	32.23			446	22.75	
200W			541	37.43	542	46.94					
400W					842	73.25					(I)
#Decorative Curb											
*Underground Installation											
Decorative Sodium Vapor											
100W (Granville)			no pole		475	15.62	474+	20.34			(I)
100W (Post Top)							484+	19.36			(I)
100W (Kim Light)			no pole		438	11.68					(I)
+16' Fiberglass Pole											

Issued December 28, 2009 Effective January 1, 2010*

* By Authority of Commission Order No. 10 in Docket No. UG-090134

Issued by Avista Corporation
By Kelly Norwood Vice President, State & Federal Regulation

Schedule RAW2010-24



"...your first line of defense against burglaries."

Chief Rick Easley,
KCMO Police Department

In a test involving 990 homes, nighttime crime dropped when security lights were added. Dusk-to-dawn porch lights and KCPL leased lights were installed throughout a 53-block area in a study conducted by the East Meyer Community Association. At the end of one year, overall crime in the area had increased two percent. Nighttime crimes, however, were down a dramatic 20 percent.

For more information on KCPL's leased lighting program, call (816) 471-KCPL, or visit our website at **kcpl.com**.

Kansas City Power & Light

recycled
10% post-consumer

530-0001 MO
3/00

ATT 001 DR 0002 IDSA_20100730 Dusk to Dawn Lighting in Missouri

DUSK-TO-DAWN LIGHTING IN MISSOURI

Leased lighting solutions for safety and security in homes and businesses.

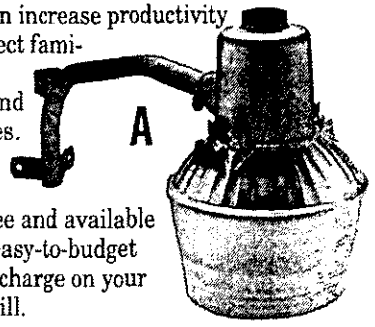
Kansas City Power & Light

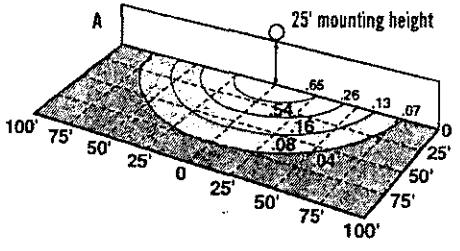
TURN LIGHTS ON, TURN CRIME OFF

Street crimes are becoming a growing concern throughout our community and our country. Not a day passes without reports of dangerous, even violent crimes from all around the area. Unfortunately, no one particular location seems any safer than another.

In a violent society, the best we can do is create safe environments for ourselves. That's why more and more homes and businesses are equipped with modern alarm and security systems, and with effective security lighting. And that's where leased lighting plays an important role.

KCPL offers a variety of lighting fixtures and applications for every security need. From backyards to parking lots, loading docks to farm lots, our modern, efficient lamps can increase productivity and protect families, friends and employees. All are maintenance-free and available for one, easy-to-budget monthly charge on your electric bill.

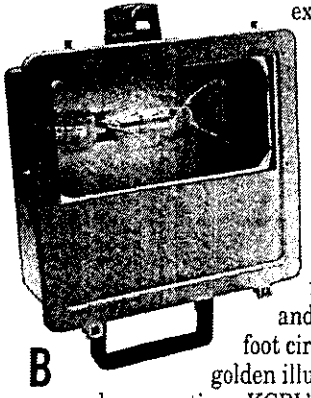




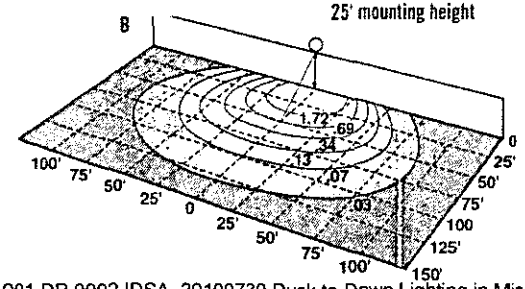
THREE BRIGHT OPTIONS FOR SECURITY AND SAFETY

KCPL leased lights feature built-in photocells for effortless, dusk-to-dawn operation. Because they're high pressure sodium, they last longer than standard incandescent bulbs and provide from 2 1/2 to 5 times the light at about 1/3 the cost.

Choose the fixture that fits your space and application and call your KCPL service center for installation and scheduling information. All are available on contracts ranging from one to three years. Reasonable monthly rates include installation, maintenance, bulb replacement and electricity. Ornamental steel poles are also available at a nominal extra charge.

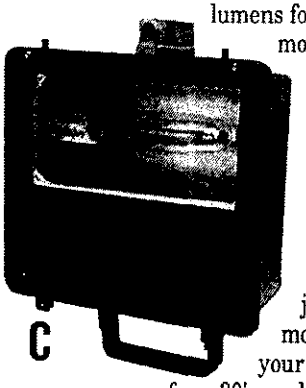


A. 70-watt high pressure sodium area light. Ideal for most residential applications. Provides light comparable to a 250-watt incandescent bulb and covers up to a 50 foot circle with warm, golden illumination. 5,800 lumen rating. KCPL's low monthly charge is just $13.08 per month. **YL-70**

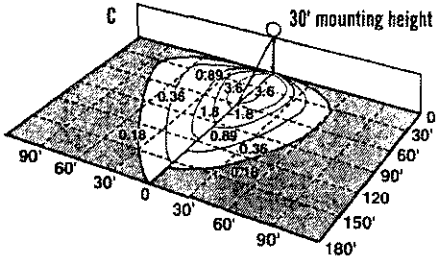


B. 150-watt high pressure sodium floodlight. Get output and operating costs equal to 750-watts of incandescent lighting with this efficient commercial or rural fixture. It's well suited to brighten parking areas, garages, outbuildings, paddocks or farm yards. It projects a directional "fan" of light up to 100 feet. Rated 16,000 lumens. Just $14.97 per month. **FL-150**

C. 400-watt high pressure sodium floodlight. Up to 2 1/2 times brighter than a 1000-watt incandescent bulb. It projects a warm, golden light directionally up to 180 feet with no back light effect, making it the outstanding choice for industrial and large commercial applications, or wherever illumination is needed over large areas. A full 50,000 lumens for only $17.37 per month. **CIL-400**



Utility pole and overhead span. (not shown) If a complete 35' wooden pole, line and installation are needed, add just $5.61 to the monthly charge on your electric bill ($5.33 for a 30' wooden pole and span).



ENERGIZING LIFE: A COMMITMENT THAT GOES BEYOND RELIABILITY

At Kansas City Power & Light, we know you expect electricity to always be there. And you should. So we've worked hard to build one of the best reliability records in the industry. We also want you to feel safe and secure. That's why we offer dusk-to-dawn leased lighting options for home or work.

TURN LIGHTS ON, TURN CRIME OFF

In today's society, it's important to take responsibility for creating safe environments wherever we are. That's why more and more homes and businesses are equipped with modern alarm and security systems as well as effective security lighting. That's where leased lighting plays an important role.

KCP&L offers a variety of lighting fixtures and applications for every security need. From backyards to parking lots, loading docks to farm lots, our modern, efficient lamps can increase productivity and protect families, friends and employees. All are maintenance free and available for one easy-to-budget monthly charge on your electric bill.

CHOOSE FROM THREE BRIGHT OPTIONS FOR SECURITY & SAFETY:

1. **70-watt high-pressure sodium area light**
2. **150-watt high-pressure sodium floodlight**
3. **400-watt high-pressure sodium floodlight**

Featuring built-in photocells, KCP&L leased lights offer effortless dusk-to-dawn operation. Because they're high-pressure sodium, they last longer than standard incandescent bulbs and provide from two-and-a-half to five times the light at about one-third the cost.

Kansas City Power & Light
ENERGIZING LIFE

ATT 002 DR 0002 IDSA_20100730 Exterior Area Lighting
673-0601 (07/06)

Exterior area lighting

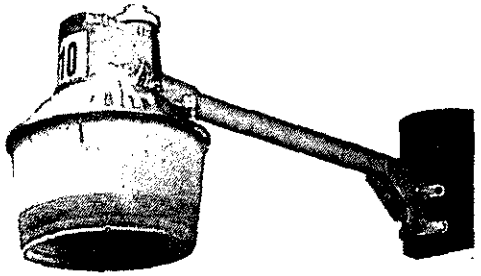
Kansas City Power & Light
ENERGIZING LIFE

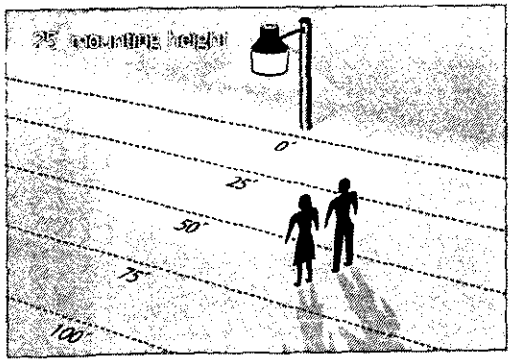
Schedule RAW2010-25

CHOOSE THE FIXTURE THAT FITS YOUR SPACE AND APPLICATION

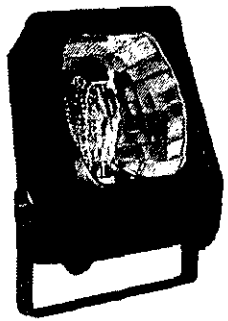
Call **(816) 471-5275** for installation and scheduling information. All fixtures are available on contracts ranging from one to three years. Reasonable monthly rates include installation, maintenance, bulb replacement and electricity. Ornamental steel poles also are available at a nominal extra charge.

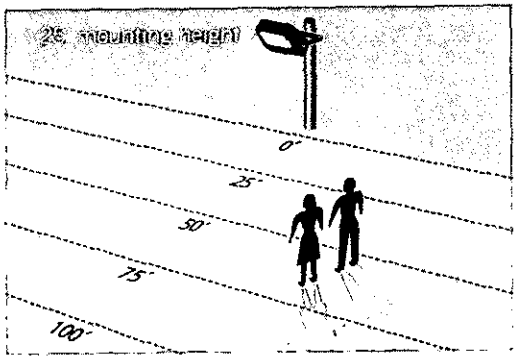
1. **70-watt high-pressure sodium area light**
   This option is ideal for most residential applications. It provides light comparable to a 250-watt incandescent bulb and covers up to a 50-foot circle with warm, golden illumination. It features a 5,800 lumen rating.



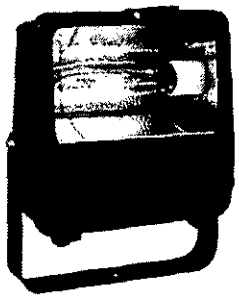


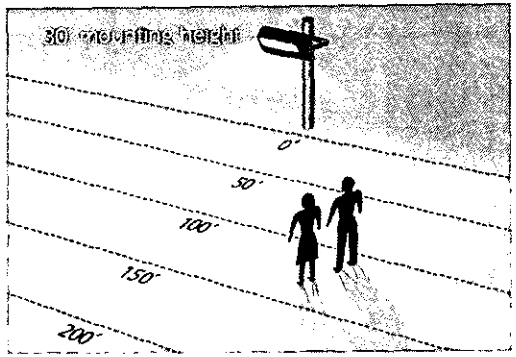
2. **150-watt high-pressure sodium floodlight**
   Get output and operating costs equal to 750 watts of incandescent lighting in this efficient commercial or rural fixture. Well suited to brighten parking areas, garages, outbuildings, paddocks or farm yards, it projects a directional "fan" of light up to 100 feet. This floodlight is rated 16,000 lumens.





3. **400-watt high-pressure sodium floodlight**
   This floodlight shines up to two-and-a-half times brighter than a 1,000-watt incandescent bulb. It projects warm, golden light directionally up to 180 feet with no back light effect. This is the outstanding choice for industrial and large commercial applications, or wherever illumination is needed over a large area.





Utility pole and overhead span (not shown)
If a new or replacement wooden pole and line installation is needed, 30 and 35-foot wooden poles are available at a low monthly fee. Ornamental steel poles are also available at a slightly higher monthly charge.

"H-135.937 Advocating and Support for Light Pollution Control Efforts and Glare Reduction for Both Public Safety and Energy Savings"

Next Policy | Previous Policy

H-135.937 Advocating and Support for Light Pollution Control Efforts and Glare Reduction for Both Public Safety and Energy Savings

Our AMA: (1) will advocate that all future outdoor lighting be of energy efficient designs to reduce waste of energy and production of greenhouse gasses that result from this wasted energy use; (2) supports light pollution reduction efforts and glare reduction efforts at both the national and state levels; and (3) supports efforts to ensure all future streetlights be of a fully shielded design or similar non-glare design to improve the safety of our roadways for all, but especially vision impaired and older drivers. (Res. 516, A-09)