

EXHIBIT 1  
DE 10-326

GRANITE STATE ELECTRIC COMPANY  
d/b/a NATIONAL GRID  
DE 10-  
Witness: Walter

ORIGINAL

N.H.P.U.C. Case No.	DE 10-326
Exhibit No.	#1
Witness	Panel 1
DO NOT REMOVE FROM FILE	

PRE-FILED DIRECT TESTIMONY

OF

JOHN E. WALTER

1 **I. Introduction and Qualifications**

2 Q. Mr. Walter, please state your name and business address.

3 A. John E. Walter, 144 Kensington Avenue, Buffalo, New York 14214.

4  
5 Q. By whom are you employed and in what capacity?

6 A. I am the Manager Outdoor Lighting for National Grid USA, including Granite State  
7 Electric Company (“National Grid” or the “Company”).

8  
9 Q. Please describe your educational background and business experience.

10 A. I am a graduate of Clarkson College of Technology, (presently Clarkson University),  
11 located in Potsdam, New York with Bachelor and Masters of Science degrees in Civil  
12 and Environmental Engineering in 1979 and 1981, respectively. I received a Masters in  
13 Business Administration degree from the State University of New York at Buffalo in  
14 1996. I am a registered professional engineer in the State of New York. I provided civil,  
15 structural and geotechnical engineering and project management services to D’Appolonia  
16 Consulting Engineers, Pittsburgh, PA (1981-1983) and Niagara Mohawk Power  
17 Corporation (“Niagara Mohawk”), Syracuse, NY (1983-1990). I transferred to a position  
18 of Manager Construction, Inspection and Street Lighting in the Operations organization  
19 of Niagara Mohawk’s Western Division, (Buffalo, NY), having managerial  
20 responsibilities of all field construction and maintenance associated within these work  
21 groups from 1990 – 1999. In 1999, I took the position of Director Outdoor Lighting for  
22 Niagara Mohawk, having responsibilities for all outdoor lighting business related  
23 functions. Following the merger of Niagara Mohawk and National Grid USA in 2002, I

1 retained the position and associated responsibilities of Director Outdoor Lighting – NY.

2 In 2008, I became Manager Outdoor Lighting, having responsibility for all policies,  
3 processes, information systems, and regulatory issues associated with the outdoor lighting  
4 business in National Grid’s New England and upstate New York service territories.

5  
6 Q. Have you previously testified before the New Hampshire Public Utilities Commission  
7 (the “Commission”) or any other regulatory commissions?

8 A. While I have not testified before the Commission, I have provided testimony before the;  
9 Massachusetts Department of Public Utilities in a rate case involving Massachusetts  
10 Electric Company and Nantucket Electric Company, Rhode Island Public Utilities  
11 Commission in a rate case involving the Narragansett Electric Company and the New  
12 York Public Service Commission in a rate case and three other cases that were  
13 consolidated in a single proceeding that related to the outdoor lighting business of  
14 Niagara Mohawk.

15  
16 **II. Purpose of Testimony**

17 Q. What is the purpose of your testimony?

18 A. My testimony presents the Company’s proposed tariff changes associated with a part-  
19 night option (“Part-Night Option”) regarding the hours of operation of street lighting  
20 service for customers taking service under the Company’s Outdoor Lighting Rate M.

21  
22 **III. Part-Night Option**

23 Q. Briefly describe the Part-Night Option proposed by National Grid.

1 A. As set forth on the proposed Sixth Revised Page 59 through Original Page 64 (pages  
2 associated with Outdoor Lighting Service Rate M) of the Company's tariff, which are  
3 attached as Schedule JEW-1, the Company is proposing a new option under its "Hours of  
4 Operation" which allows for "part-night hours of operation" in addition to "full-night  
5 service", or "normal" hours of operation." Under the Company's existing Rate M, all  
6 street lights are deemed to be in operation from approximately one half hour after sunset  
7 until approximately one half hour before sunrise (dusk-to-dawn). Under the proposed  
8 tariff provision, customers can select the Part-Night Option if the customer seeks  
9 roadway illumination during initial night time hours with street lights turning off during  
10 the later night time hours when there is low traffic volume in order to conserve energy  
11 usage.

12

13 Q. What is the typical function of the luminaire under this Part-Night Option?

14 A. Under the proposed tariff, the luminaire would be in operation on a partial basis whereby  
15 it would turn-on at approximately one-half (1/2) hour after sunset (dusk) and operate for a  
16 period equal to one-half (1/2) of the prior nights dusk-to-dawn cycle at which time the  
17 luminaire will turn off, remaining off for a period of five and one-half (5 1/2) hours at  
18 which time it will turn on if ambient light conditions are less than observed at dusk until  
19 approximately one-half (1/2) hour before sunrise (dawn).

20

21 Q. Why is National Grid proposing the Part-Night Option?

22 A. National Grid recognizes customer demand for cost savings initiatives associated with  
23 outdoor lighting service. This savings may be achieved through the reduced electric

1 consumption of the luminaire during the off cycle occurring each night. This energy  
2 savings, in aggregate, also provides a positive environmental enhancement through  
3 reduced sky glow and potential power plant carbon emission reduction. Additionally, the  
4 Part-Night Option is compliant with House Bill 585 and further supports the state's clean  
5 energy initiatives.

6  
7 Q. Why is National Grid proposing an operating schedule that will turn lights back on prior  
8 to dawn?

9 A. During certain periods of the year when dawn occurs later in the morning, early morning  
10 commuter traffic, school buses and waiting school age children create a high potential for  
11 vehicle - pedestrian conflict in a dark environment. The proposed Part-Night Option  
12 operating cycle reduces this potential conflict by operating the lights during the calendar  
13 months when it remains dark longer in the morning hours.

14  
15 Q. Are there any restrictions which prevent the customer from selecting the Part-Night  
16 Option?

17 A. No. A customer can select either services for new lighting installations or request to  
18 change the mode of operation for all or some of its existing street lights.

19  
20 Q. How will the Company notify customers of the availability of the Part-Night Option?

21 A. The Company's municipal account managers will notify municipal customers of the  
22 availability of the Part-Night Option once it is approved by the Commission.

23

1 Q. How will National Grid manage the requests for Part-Night service?

2 A. National Grid will process the requests on an as-received basis. Work orders will be  
3 created for each individual light specified for an operation option change. These orders  
4 will be scheduled and the work performed similar to all other lighting work orders.  
5 Billing changes will become effective following the completion of each work order and  
6 will be reflected on the next bill cycle. Any cost reimbursements due from the customer  
7 and the applicable Part-Night Charge to retrofit the street lights affected will be billed to  
8 the customer once all work has been performed.

9

10 Q. Describe the initial customer costs associated with the Part-Night Option.

11 A. Under the Company's proposal, the customer would be responsible for providing the  
12 appropriate services or the reimbursement of costs associated with any work zone  
13 protection, traffic control or permit fees required to perform the facility installation.  
14 Additionally, a Part Night Charge as proposed in the tariff is assessed per luminaire  
15 modified.

16

17 Q. Describe the bill impact associated with the Part-Night Option.

18 A. There are no facility pricing impacts associated with a change between Full-Night  
19 Service and Part-Night Service (i.e., the luminaire charge under both services is the  
20 same). The billing associated with the energy usage by each respective luminaire/lamp  
21 combinations is lower for Part-Night Service than Full-Night Service due to the reduced  
22 burning hours of the light.

23

1 Q. Describe the energy usage reduction associated with the Part-Night Option.

2 A. The billing for energy-based charges would be based upon 2,448 hours of operation  
3 annually for the Part-Night Option as compared to 4,175 hours annually for Full-Night  
4 Service street lighting. The difference between the two operating schedules represents  
5 the operating time savings. The actual energy cost savings is dependant upon the lamp  
6 type wattage and luminaire. The table containing the determination of the Part-Night  
7 hours of operation is included in Schedule JEW-2.

8

9 Q. Briefly describe the Part Night Charge.

10 A. The Part Night Charge represents the average costs incurred by the Company associated  
11 with an individual round trip to the specific existing light location and the work effort and  
12 material necessary to change the operating control.

13

14 Q. Why does the Company propose a Part Night Charge?

15 A. The costs related to a retrofitting a street light to provide Part-Night Service have never  
16 been incurred by the Company in the past and therefore are not a part of the Company's  
17 rates. Because the customer is requesting a service for which the Company would not  
18 have otherwise been required to perform, the cost of such service should be borne by the  
19 customer. The Part Night Charge, which is proposed at \$150.00 per application (light),  
20 was developed as a consistent and easy to administer method to recover the costs of this  
21 service. The calculation of the Part Night Charge is presented in Schedule JEW-3. The  
22 Company is proposing that the Part Night Charge also be assessed should a customer  
23 request to transfer back to Full-Night Service from Part-Night Service.

1

2 Q. Is National Grid proposing any other changes to the tariff?

3 A. The Company proposes minor, non-substantive clarifying changes to its tariff for Rate M.

4 For example, the Company has revised the “Availability” section of the tariff to clarify

5 that the “public lighting” provisions apply to the State, municipalities and other public

6 entities as well as installations on tunnels and bridges, and provided some clarifying

7 language regarding “private lighting.”

8

9 Q. What is the proposed effective date of the revised tariff?

10 A. The Company proposes these revisions become effective on a service rendered basis as of

11 January 1, 2011.

12

13 **IV. Conclusion**

14 Q. Does this conclude your testimony?

15 A. Yes.

Schedules  
Table of Contents

Schedule JEW-1	Revised Tariff Pages
Schedule JEW-2	Part Night Hours of Operation Table
Schedule JEW-3	Calculation of Part Night Charge

GRANITE STATE ELECTRIC COMPANY  
d/b/a NATIONAL GRID  
DE 10-\_\_\_\_  
Witness: Walter

**SCHEDULE JEW – 1**

**Revised Tariff Pages**

OUTDOOR LIGHTING SERVICE RATE M

AVAILABILITY

Public Lighting

Available for Street or Highways and areas within the public domain for customers designated as governmental entities, inclusive of the state, municipalities, or other public authorities.

Installations on limited access highways, tunnels, bridges and the access and egress ramps thereto are subject to the Special Rate Conditions of this tariff.

Private Lighting

Available to private customers for outdoor lighting of areas on private property where necessary fixtures can be supported on existing poles and where such service can be supplied from existing secondary distribution facilities.

In special circumstances outlined in the pole and accessory section below, the Company will install a wooden pole.

Lighting Services

Service under this rate is for full-night service street lighting whereby the luminaire operates for the entire night time period pursuant to the Hours of Operation provision below. In addition, customers may, at their option, take advantage of part-night service in which the luminaire operates for a portion of the night pursuant to the Hours of Operation provision below. Customers may select the part-night service option at the time of lighting installation or at any time during service. Any request to select the part-time night service option must be made in writing.

RATE

Luminaire Charge

<u>Size of Street Light Lumens</u>	<u>Wattage</u>	<u>Description</u>	<u>Annual Distribution Price Per Unit</u>
<u>Sodium Vapor</u>			
4,000	50	LUM HPS RWY 50W	\$50.58
9,600	100	LUM HPS RWY 100W	\$61.32
27,500	250	LUM HPS RWY 250W	\$107.67
50,000	400	LUM HPS RWY 400W	\$140.29
9,600(Post Top)	100	LUM HPS POST 100W	\$70.62
27,500(Flood)	250	LUM HPS FLD 250W	\$108.63
50,000(Flood)	400	LUM HPS FLD 400W	\$149.96
<u>Incandescent</u>			
1,000	103	LUM INC RWY 103W	\$67.52

Issued: \_\_\_\_\_

Effective: January 1, 2011

Issued by: /s/ Thomas B. King  
 Thomas B. King

Title: President

(Issued in Compliance with Order No. \_\_\_\_\_ in Docket DE 10-\_\_\_\_ dated \_\_\_\_\_)

<u>Size of Street Light Lumens</u>	<u>Lamp Wattage</u>	<u>Description</u>	<u>Annual Distribution Price Per Unit</u>
<u>Mercury Vapor</u>			
4,000	100	LUM MV RWY 100W	\$48.87
8,000	175	LUM MV RWY 175W	\$59.42
22,000	400	LUM MV RWY 400W	\$112.38
63,000	1,000	LUM MV RWY 1000W	\$213.22
22,000(Flood)	400	LUM MV FLD 400W	\$124.28
63,000(Flood)	1,000	LUM MV FLD 1000W	\$214.61

No further installation or relocation of Incandescent and Mercury Vapor lights will be made after the effective date of this rate, unless specific permission is received from the Commission's Chief Engineer.

**POLE AND ACCESSORY CHARGE**

An additional annual charge enumerated below will be applied where the Company is requested to furnish a suitable wood pole for the sole purpose of supporting a luminaire. If at a future date the pole is used for any purpose approved by the Company in addition to supporting a street and/or floodlight luminaire, the pole charge will be terminated. This pole may not be more than one (1) span from the existing secondary service located along a roadway or thoroughfare, and must be reachable for mechanized equipment.

<u>Overhead Service</u>	<u>Description</u>	<u>Annual Price Per Unit</u>
Wood Poles	POLE – WOOD	\$59.60
<u>Underground Service</u>		
<u>Non-Metallic Standard</u>		
Fiber glass – Direct Embedded	POLE FIBER PT <25FT	\$61.72
Fiber glass with Foundation <25 ft.	POLE FIBER RWY <25FT	\$104.67
Fiber glass with Foundation >=25 ft.	POLE FIBER RWY=>25	\$174.87
<u>Metal Standard</u>		
Metal Poles - Direct Embedded	POLE METAL EMBEDDED	\$124.81
Metal Poles with Foundation	POLE METAL =>25FT	\$150.39

**OTHER CHARGES**

Pursuant to RSA 9-D:4, the Company provides a part-night service that, when requested by a customer, will require the replacement of the photoelectric control that will allow for the operation of the luminaire for a portion of the night. The Company shall assess the customer a Part Night Charge of \$150 for the installation of each photoelectric control that must be replaced in order for part-night service to be operational and for the removal of such photoelectric control upon the customer's request to return to full-night service. The Part Night Charge does not include the cost or fees associated with any work-zone protection, traffic control services and/or permits required to perform the customer requested change, all of which shall be the responsibility of the customer.

Issued: \_\_\_\_\_

Effective: January 1, 2011

Issued by: /s/ Thomas B. King  
 Thomas B. King

Title: President

(Issued in Compliance with Order No. \_\_\_\_\_ in Docket DE 10-\_\_\_\_ dated \_\_\_\_\_)

#### TRANSMISSION SERVICE COST ADJUSTMENT

Transmission service is available to all retail Customers taking service under this rate. For those Customers, the Transmission Energy Charge shall be calculated in accordance with the Company's Transmission Service Cost Adjustment Provision as provided on Page 79 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### STRANDED COST ADJUSTMENT

All energy billed under this rate is subject to a Stranded Cost Energy Charge which shall be adjusted from time to time in accordance with the Company's Stranded Cost Adjustment Provision as provided on Page 80 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### DEFAULT SERVICE

Any Customer who is not purchasing generation service from another entity will receive and pay the Company for Default Service. Notice must be provided by the competitive supplier or the Customer in cases of Customer self-supply. Default Service prices shall be subject to adjustment in accordance with the Company's Default Service Adjustment Provision as provided on Page 87 of this Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### RELIABILITY ENHANCEMENT PROGRAM AND VEGETATION MANAGEMENT PLAN ADJUSTMENT

All energy billed under this rate is subject to a Reliability Enhancement Program and Vegetation Management Plan Adjustment Factor which shall be adjusted from time to time in accordance with the settlement agreement approved by the Commission in Docket No. DG 06-107.

#### RELIABILITY ENHANCEMENT PROGRAM CAPITAL INVESTMENT ALLOWANCE

Distribution base rates are subject to adjustment on an annual basis for a Reliability Enhancement Program Capital Investment Allowance pursuant to the settlement agreement approved by the Commission in Docket No. DG 06-107.

#### STORM RECOVERY ADJUSTMENT

All energy billed under this rate is subject to a Storm Recovery Adjustment Factor which shall be adjusted from time to time in accordance with the Company's Storm Recovery Adjustment Provision as provided on Page 114 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

Issued: July 21, 2010

Issued by: /s/ Thomas B. King  
Thomas B. King

Effective: July 1, 2010

Title: President

(Issued in Compliance with Order No. 25,125 in Docket No. DE 10-096 dated June 30, 2010)

Default Service may be terminated by a Customer concurrent with the Customer's next scheduled meter read date provided that notice of initiation of generation service from another entity is received by the Company two (2) or more business days before the next scheduled meter read date. Notice must be provided by the competitive supplier or the Customer in cases of Customer self-supply. If the notice of initiation of generation service from another entity is received by the Company fewer than two (2) business days before the next scheduled meter read date, Default Service shall continue until the Customer's subsequent meter read date.

**SYSTEM BENEFITS CHARGE ADJUSTMENT PROVISION**

Customers taking service under this rate will be charged a System Benefits Charge as provided on Page 77 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

**KILOWATT-HOURS PER LUMINAIRE**

The energy charges for each luminaire will be determined by multiplying the current energy charges per kilowatt-hour by the average monthly kilowatt-hours shown in the following table:

	<u>Luminaire Description</u>	<u>Full-Night Service kWh per Luminaire</u>		<u>Part-Night Service kWh per Luminaire</u>	
		<u>Monthly</u>	<u>Annual</u>	<u>Monthly</u>	<u>Annual</u>
1,000	Lumen Incandescent	37	444	22	264
4,000	Lumen Mercury Vapor	47	564	28	336
8,000	" "	76	912	45	540
22,000	" "	158	1,896	93	1,116
63,000	" "	381	4,572	223	2,676
22,000	" " (Flood)	158	1,896	93	1,116
63,000	" " (Flood)	381	4,572	223	2,676
4,000	Lumen Sodium Vapor	21	252	12	144
9,600	" "	41	492	24	288
27,500	" "	107	1,284	63	756
50,000	" "	164	1,968	96	1,152
9,600	" " (Post Top)	41	492	24	288
27,500	" " (Flood)	107	1,284	63	756
50,000	" " (Flood)	162	1,944	95	1,140

Issued: \_\_\_\_\_

Effective: January 1, 2011

Issued by: /s/ Thomas B. King

Thomas B. King

Title: President

(Issued in Compliance with No. \_\_\_\_\_ in Docket No. DE 10-\_\_\_\_ dated \_\_\_\_\_)

### SPECIAL RATE CONDITIONS

Charges for the operation of outdoor lights may be increased, if in the Company's opinion, lights are to be installed in locations or under conditions such that estimated income will be insufficient to justify the estimated cost of construction.

### BILLINGS

One-twelfth of the annual price of luminaires, poles and accessories plus energy charges, including adjustments, will be billed each and every month beginning with the month following the month in which service is rendered.

The monthly bill will be based on the following:

- (1) Luminaire Charges and Pole and Accessory Charges will be based on the annual rates above divided by 365 days to arrive at a daily rate and multiplied by the actual number of days in the billing period as measured from the date of the prior bill to the current bill date.
- (2) Charges per kWh will be based on the annual kWh per luminaire above. The monthly kWh amount shall be determined by allocating the number of annual operating hours for streetlights among the months. The sum of the monthly kWh for each light equals the annual kWh in this tariff. A daily kWh amount is determined from the monthly amount by dividing monthly kWh by the number of days in a month. The daily kWh amount is multiplied by the actual number of days for each calendar month during the billing period as measured from the date of the prior bill to the current bill date and then multiplied by the charge per kWh.

### HOURS OF OPERATION

1) Full-Night Service: All streetlights will be operated every night from approximately one-half hour after sunset until approximately one-half hour before sunrise, a total of approximately 4,175 hours each year.

2) Part-Night Service: All streetlights will be operated every night from approximately one-half hour after sunset then turning off at a time equal to one-half of the previous standard service period and, as necessary, from five and one-half hours later until approximately one-half hour before sunrise, a total of no greater than 2,448 hours each year.

### FAILURE OF LIGHTS TO BURN

Should any light fail to burn for the full period provided above, and failure is due to some cause of condition which might reasonably have been prevented by the Company, a deduction will be made from the luminaire price of such light, upon presentation of a claim from the Customer. The deduction shall be equivalent to such part of the annual price thereof as is equal to the ratio that the time of any outage bears to the annual burning time of such light or lights. The provisions of this paragraph do not apply when failure to burn is due to an act of God, or an act or order of any Public Authority or accidental or malicious breakage, provided, however, the necessary repairs are made with reasonable dispatch upon notification by the Customer.

### EXCESSIVE DAMAGE

Excessive damage to poles, lamps, fixtures, or conductors due to wanton or malicious acts will be charged to the Customer at the actual cost of labor and material required for repair or replace the unit. "Excessive damage" is defined as that which occurs more than once a year. Notification of excessive damage shall be made to the Customer by the Company prior to billing for repairs.

Issued: \_\_\_\_\_

Issued by: /s/Thomas B. King  
Thomas B. King

Effective: January 1, 2011

Title: President

(Issued in Compliance with Order No. \_\_\_\_\_ in Docket DE 10-\_\_\_\_ dated \_\_\_\_\_)

## TERM OF SERVICE

The customer shall receive and pay for outdoor lighting service for an initial term of five years from the date of installation. Unless notice of termination is given, service shall be extended thereafter for terms of one year. Either the customer or the Company may terminate outdoor lighting service by giving the other written notice at least six months before expiration of a term.

## DISCONTINUANCE OF LIGHTS

Upon expiration of the initial five year term, the Customer may discontinue lights by written notice to the Company. Such discontinuance is contingent upon the customer paying the undepreciated value of the light installation plus a removal charge of \$50 per light. Removal of such lights will be completed in a reasonable period as agreed upon.

## CONVERSION OF EXISTING INCANDESCENT AND MERCURY VAPOR LIGHTS TO SODIUM VAPOR

### A. Public Street Lights

- (1) Incandescent lights - To any municipality or other governmental agency so requesting, the Company will initiate a conversion schedule for the replacement of incandescent lights with an appropriate sodium vapor light. The conversion will be completed in a period as agreed upon.
- (2) Mercury vapor lights - To any municipality or other governmental agency so requesting, the Company will initiate a conversion schedule for the replacement of mercury vapor lights with an appropriate sodium vapor light upon payment of the undepreciated value of the existing light. This payment may be spread equally over the following twelve month period. The conversion will be completed in a period as agreed upon.

### B. Private, Street, or Outdoor Lights

Conversion of lights will be made as requested by the Customer and as agreed to by the Company, upon payment of the undepreciated value of the existing light and a \$50 per light conversion charge.

## ENERGY EMERGENCY SERVICE

In the event of a generally recognized national and/or regional energy shortage or emergency, annual outdoor lighting may be disconnected upon written request of the Customer. In this event, a monthly charge will be billed at the rate of 80% of the normal charges for the duration of time the lighting service is disconnected.

## 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.

Issued: July 16, 1998

Effective: July 1, 1998 (Applied to  
usage on and after July 1, 1998)

Issued by: /s/Lawrence J. Reilly

Lawrence J. Reilly  
Title: President

(Issued in Compliance with Order No. 22,981 in Docket DR 98-012 dated July 15, 1998)

OUTDOOR LIGHTING SERVICE RATE M

AVAILABILITY

Public Lighting

Available for Street or Highways and areas within the public domain for customers designated as governmental entities, inclusive of the state, municipalities, or other public authorities lighting to any town, city or fire district.

Installations on limited access highways, tunnels, bridges and the access and egress ramps thereto are subject to the Special Rate Conditions of this tariff.

Private Lighting

Available to private customers for outdoor lighting of areas on private property where necessary fixtures can be supported on existing poles and where such service can be supplied from existing secondary distribution facilities.

In special circumstances outlined in the pole and accessory section below, the Company will install a wooden pole.

Lighting Services

Service under this rate is for full-night service street lighting whereby the luminaire operates for the entire night time period pursuant to the Hours of Operation provision below. In addition, customers may, at their option, take advantage of part-night service in which the luminaire operates for a portion of the night pursuant to the Hours of Operation provision below. Customers may select the part-night service option at the time of lighting installation or at any time during service. Any request to select the part-time night service option must be made in writing.

RATE

Luminaire Charge

<u>Size of Street Light Lumens</u>	<u>Wattage</u>	<u>Lamp Description Code</u>	<u>Annual Distribution Price Per Unit</u>
<u>Sodium Vapor</u>			
4,000	50	<del>LUM HPS RWY 50W</del>	\$50.58
9,600	100	<del>LUM HPS RWY 100W72</del>	\$61.32
27,500	250	<del>LUM HPS RWY 250W74</del>	\$107.67
50,000	400	<del>LUM HPS RWY 400W75</del>	\$140.29
9,600(Post Top)	100	<del>LUM HPS POST 100W79</del>	\$70.62
27,500(Flood)	250	<del>LUM HPS FLD 250W 77</del>	\$108.63
50,000(Flood)	400	<del>LUM HPS FLD 400W 78</del>	\$149.96

Incandescent

1,000	103	<del>LUM INC RWY 103W 40</del>	\$67.52
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Issued: ~~July 21, 2010~~  
King

Issued by: /s/ Thomas B.

Effective: ~~January 1, 2011~~ ~~July 1, 2010~~  
President

Thomas B. King  
 Title:

(Issued in Compliance with Order No. ~~25,126~~ in Docket DE 10-~~440~~ dated ~~June 30, 2010~~)

<u>Size of Street Light Lumens</u>	<u>Lamp Wattage</u>	<u>Description Code</u>	<u>Annual Distribution Price Per Unit</u>
<u>Mercury Vapor</u>			
4,000	100	<u>LUM MV RWY 100W</u>	<del>03</del> \$48.87
8,000	175	<u>LUM MV RWY 175W</u>	<del>04</del> \$59.42
22,000	400	<u>LUM MV RWY 400W</u>	<del>05</del> \$112.38
63,000	1,000	<u>LUM MV RWY 1000W</u>	<del>06</del> \$213.22
22,000(Flood)	400	<u>LUM MV FLD 400W</u>	<del>23</del> \$124.28
63,000(Flood)	1,000	<u>LUM MV FLD 1000W</u>	<del>24</del> \$214.61

No further installation or relocation of Incandescent and Mercury Vapor lights will be made after the effective date of this rate, unless specific permission is received from the Commission's Chief Engineer.

**POLE AND ACCESSORY CHARGE**

An additional annual charge enumerated below will be applied where the Company is requested to furnish a suitable wood pole for the sole purpose of supporting a luminaire. If at a future date the pole is used for any purpose approved by the Company in addition to supporting a street and/or floodlight luminaire, the pole charge will be terminated. This pole may not be more than one (1) span from the existing secondary service located along a roadway or thoroughfare, and must be reachable for mechanized equipment.

<u>Overhead Service</u>	<u>Description Code</u>	<u>Annual Price Per Unit</u>
Wood Poles	<u>POLE - WOODP</u>	\$59.60
<u>Underground Service</u>		
<u>Non-Metallic Standard</u>		
Fiber glass <del>Direct Embedded w/o Base</del>	<u>POLE FIBER PT &lt;25FT</u>	\$61.72
Fiber glass <u>with Foundation &lt;25 ft. w/ Base</u>	<u>POLE FIBER RWY &lt;25FT</u>	\$104.67
Fiber glass <u>with Foundation w/ Base &gt;=25 ft.</u>	<u>POLE FIBER RWY =&gt;25 FT</u>	\$174.87
<u>Metal Standard</u>		
Metal Poles - <del>Direct Embedded w/o Base</del>	<u>POLE METAL EMBEDDED</u>	\$124.81
Metal Poles <u>with Foundation w/ Base</u>	<u>POLE METAL =&gt;25FT</u>	\$150.39

**OTHER CHARGES**

Pursuant to RSA 9-D:4, the Company provides a part-night service that, when requested by a customer, will require the replacement of the photoelectric control that will allow for the operation of the luminaire for a portion of the night. The Company shall assess the customer a Part Night Charge of \$150 for the installation of each photoelectric control that must be replaced in order for part-night service to be operational and for the removal of such photoelectric control upon the customer's request to return to full-night service. The Part Night Charge does not include the cost or fees associated with any work-zone protection, traffic control services and/or permits required to perform the customer requested change, all of which shall be the responsibility of the customer.

Issued: July 21, 2010  
King

Issued by: /s/ Thomas B.

Effective: January 1, 2011~~July 1, 2010~~  
President

Thomas B. King  
Title:

(Issued in Compliance with Order No. 25,126 in Docket DE 10-440-     dated June 30, 2010)

#### TRANSMISSION SERVICE COST ADJUSTMENT

Transmission service is available to all retail Customers taking service under this rate. For those Customers, the Transmission Energy Charge shall be calculated in accordance with the Company's Transmission Service Cost Adjustment Provision as provided on Page 79 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### STRANDED COST ADJUSTMENT

All energy billed under this rate is subject to a Stranded Cost Energy Charge which shall be adjusted from time to time in accordance with the Company's Stranded Cost Adjustment Provision as provided on Page 80 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### DEFAULT SERVICE

Any Customer who is not purchasing generation service from another entity will receive and pay the Company for Default Service. Notice must be provided by the competitive supplier or the Customer in cases of Customer self-supply. Default Service prices shall be subject to adjustment in accordance with the Company's Default Service Adjustment Provision as provided on Page 87 of this Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

#### RELIABILITY ENHANCEMENT PROGRAM AND VEGETATION MANAGEMENT PLAN ADJUSTMENT

All energy billed under this rate is subject to a Reliability Enhancement Program and Vegetation Management Plan Adjustment Factor which shall be adjusted from time to time in accordance with the settlement agreement approved by the Commission in Docket No. DG 06-107.

#### RELIABILITY ENHANCEMENT PROGRAM CAPITAL INVESTMENT ALLOWANCE

Distribution base rates are subject to adjustment on an annual basis for a Reliability Enhancement Program Capital Investment Allowance pursuant to the settlement agreement approved by the Commission in Docket No. DG 06-107.

#### STORM RECOVERY ADJUSTMENT

All energy billed under this rate is subject to a Storm Recovery Adjustment Factor which shall be adjusted from time to time in accordance with the Company's Storm Recovery Adjustment Provision as provided on Page 114 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

Issued: July 21, 2010

Issued by: /s/ Thomas B. King

Effective: July 1, 2010

Thomas B. King  
Title: President

(Issued in Compliance with Order No. 25,125 in Docket No. DE 10-096 dated June 30, 2010)

Default Service may be terminated by a Customer concurrent with the Customer's next scheduled meter read date provided that notice of initiation of generation service from another entity is received by the Company two (2) or more business days before the next scheduled meter read date. Notice must be provided by the competitive supplier or the Customer in cases of Customer self-supply. If the notice of initiation of generation service from another entity is received by the Company fewer than two (2) business days before the next scheduled meter read date, Default Service shall continue until the Customer's subsequent meter read date.

SYSTEM BENEFITS CHARGE ADJUSTMENT PROVISION

Customers taking service under this rate will be charged a System Benefits Charge as provided on Page 77 of the Tariff of which this rate is a part. A summary of energy charges in effect, with all adjustments, is provided on Page 84 of this Tariff.

KILOWATT-HOURS PER LUMINAIRE

The energy charges for each luminaire will be determined by multiplying the current energy charges per kilowatt-hour by the average monthly kilowatt-hours shown in the following table:

Luminaire Description	Code	Full-Night Service kWh per Luminaire		Part-Night Service kWh per Luminaire	
		Monthly kWh	Annual kWh	Monthly	Annual
1,000 Lumen Incandescent	<del>10</del>	37	444	22	264
4,000 Lumen Mercury Vapor	<del>3</del>	47	564	28	336
8,000 " "	<del>4</del>	76	912	45	540
22,000 " "	<del>5</del>	158	1,896	93	1,116
63,000 " "	<del>6</del>	381	4,572	223	2,676
22,000 " " (Flood)	<del>23</del>	158	1,896	93	1,116
63,000 " " (Flood)	<del>24</del>	381	4,572	223	2,676
4,000 Lumen Sodium Vapor	<del>70</del>	21	252	12	144
9,600 " "	<del>72</del>	41	492	24	288
27,500 " "	<del>74</del>	107	1,284	63	756
50,000 " "	<del>75</del>	164	1,968	96	1,152
9,600 " " (Post Top)	<del>79</del>	41	492	24	288
27,500 " " (Flood)	<del>77</del>	107	1,284	63	756
50,000 " " (Flood)	<del>78</del>	162	1,944	95	1,140

Issued: March 29, 2006

Issued by: /s/ Thomas B. King Cheryl A. LaFleur  
Thomas B. King Cheryl A. LaFleur

Effective: January 1, 2011 May 1, 2006

Title: President



## SPECIAL RATE CONDITIONS

Charges for the operation of outdoor lights may be increased, if in the Company's opinion, lights are to be installed in locations or under conditions such that estimated income will be insufficient to justify the estimated cost of construction.

## BILLINGS

One-twelfth of the annual price of luminaires, poles and accessories plus energy charges, including adjustments, will be billed each and every month beginning with the month following the month in which service is rendered.

The monthly bill will be based on the following:

- (1) Luminaire Charges and Pole and Accessory Charges will be based on the annual rates above divided by 365 days to arrive at a daily rate and multiplied by the actual number of days in the billing period as measured from the date of the prior bill to the current bill date.
- (2) Charges per kWh will be based on the annual kWh per luminaire above. The monthly kWh amount shall be determined by allocating the number of annual operating hours for streetlights among the months. The sum of the monthly kWh for each light equals the annual kWh in this tariff. A daily kWh amount is determined from the monthly amount by dividing monthly kWh by the number of days in a month. The daily kWh amount is multiplied by the actual number of days for each calendar month during the billing period as measured from the date of the prior bill to the current bill date and then multiplied by the charge per kWh.

## HOURS OF OPERATION

1) Full-Night Service: All streetlights will be operated every night from approximately one-half hour after sunset until approximately one-half hour before sunrise, a total of approximately 4,175 hours each year.

2) Part-Night Service: All streetlights will be operated every night from approximately one-half hour after sunset then turning off at a time equal to one-half of the previous standard service period and, as necessary, from five and one-half hours later until approximately one-half hour before sunrise, a total of no greater than 2,448 hours each year.

## FAILURE OF LIGHTS TO BURN

Should any light fail to burn for the full period provided above, and failure is due to some cause of condition which might reasonably have been prevented by the Company, a deduction will be made from the luminaire price of such light, upon presentation of a claim from the Customer. The deduction shall be equivalent to such part of the annual price thereof as is equal to the ratio that the time of any outage bears to the annual burning time of such light or lights. The provisions of this paragraph do not apply when failure to burn is due to an act of God, or an act or order of any Public Authority or accidental or malicious breakage, provided, however, the necessary repairs are made with reasonable dispatch upon notification by the Customer.

## EXCESSIVE DAMAGE

Excessive damage to poles, lamps, fixtures, or conductors due to wanton or malicious acts will be charged to the Customer at the actual cost of labor and material required for repair or replace the unit. "Excessive damage" is defined as that which occurs more than once a year. Notification of excessive damage shall be made to the Customer by the Company prior to billing for repairs.

Issued: July 16, 1998

Issued by: /s/Thomas B. KingLawrence J. Reilly  
Thomas B. KingLawrence J. Reilly

Effective: January 1, 2011July 1, 1998 (Applied to  
usage on and after July 1, 1998)

Title: President



TERM OF SERVICE

The customer shall receive and pay for outdoor lighting service for an initial term of five years from the date of installation. Unless notice of termination is given, service shall be extended thereafter for terms of one year. Either the customer or the Company may terminate outdoor lighting service by giving the other written notice at least six months before expiration of a term.

DISCONTINUANCE OF LIGHTS

Upon expiration of the initial five year term, the Customer may discontinue lights by written notice to the Company. Such discontinuance is contingent upon the customer paying the undepreciated value of the light installation plus a removal charge of \$50 per light. Removal of such lights will be completed in a reasonable period as agreed upon.

CONVERSION OF EXISTING INCANDESCENT AND MERCURY VAPOR LIGHTS TO SODIUM VAPOR

- A. Public Street Lights
- (1) Incandescent lights - To any municipality or other governmental agency so requesting, the Company will initiate a conversion schedule for the replacement of incandescent lights with an appropriate sodium vapor light. The conversion will be completed in a period as agreed upon.
  - (2) Mercury vapor lights - To any municipality or other governmental agency so requesting, the Company will initiate a conversion schedule for the replacement of mercury vapor lights with an appropriate sodium vapor light upon payment of the undepreciated value of the existing light. This payment may be spread equally over the following twelve month period. The conversion will be completed in a period as agreed upon.
- B. Private, Street, or Outdoor Lights
- Conversion of lights will be made as requested by the Customer and as agreed to by the Company, upon payment of the undepreciated value of the existing light and a \$50 per light conversion charge.

ENERGY EMERGENCY SERVICE

In the event of a generally recognized national and/or regional energy shortage or emergency, annual outdoor lighting may be disconnected upon written request of the Customer. In this event, a monthly charge will be billed at the rate of 80% of the normal charges for the duration of time the lighting service is disconnected.

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.

Issued: July 16, 1998

Issued by: /s/Lawrence J. Reilly  
Lawrence J. Reilly

Effective: July 1, 1998 (Applied to  
usage on and after July 1, 1998)

Title: President

(Issued in Compliance with Order No. 22,981 in Docket DR 98-012 dated July 15, 1998)

**SCHEDULE JEW – 2**

**Part Night Hours of Operation Table**

Part-Night Hours of Operation - Rate Schedule M																
Manchester NH																
Day of Year	Civil Twilight Starts	Sunrise	Sunrise Conversion (Decimal)	Hours After Midnight Turn-On (Decimal)	Hours/Minutes After 5:30 AM Turn-On Point (Decimal)	Sunset	Sunset Conversion (Decimal)	Civil Twilight Ends	Midnight Turn Off Point (Decimal)	Time of Midnight	Day Time Hours SR/SS (Decimal)	Night Time Hours SR/SS (Decimal)	21 Minutes Before Sunrise/ After Sunset (Decimal)	Total Burn Time Dusk to Dawn (Per Day) (Decimal)	Midnight Tracker Hours of Burn Time (Decimal)	Midnight Tracker Hours of Burn Time Savings (Decimal)
1-Jan	6:45	7:17	7.28	5.50	1.78	16:22	16.37	16:54	23:83	23:49	9.08	14.92	0.36	14.56	9.24	5.32
2-Jan	6:45	7:17	7.28	5.50	1.78	16:23	16.38	16:55	23:83	23:50	9.10	14.90	0.36	14.54	9.23	5.31
3-Jan	6:45	7:17	7.28	5.50	1.78	16:24	16.40	16:56	23:84	23:50	9.12	14.88	0.36	14.52	9.23	5.30
4-Jan	6:45	7:17	7.28	5.50	1.78	16:25	16.42	16:57	23:85	23:51	9.13	14.87	0.36	14.51	9.22	5.29
5-Jan	6:45	7:17	7.28	5.50	1.78	16:26	16.43	16:58	23:86	23:51	9.15	14.85	0.36	14.49	9.21	5.28
6-Jan	6:45	7:17	7.28	5.50	1.78	16:27	16.45	16:59	23:87	23:52	9.17	14.83	0.36	14.47	9.20	5.27
7-Jan	6:45	7:17	7.28	5.50	1.78	16:28	16.47	17:00	23:88	23:52	9.18	14.82	0.36	14.46	9.19	5.27
8-Jan	6:45	7:17	7.28	5.50	1.78	16:29	16.48	17:01	23:88	23:53	9.20	14.80	0.36	14.44	9.18	5.26
9-Jan	6:45	7:16	7.27	5.50	1.77	16:30	16.50	17:02	23:88	23:53	9.23	14.77	0.36	14.41	9.15	5.26
10-Jan	6:44	7:16	7.27	5.50	1.77	16:31	16.52	17:03	23:89	23:53	9.25	14.75	0.36	14.39	9.14	5.25
11-Jan	6:44	7:16	7.27	5.50	1.77	16:32	16.53	17:04	23:90	23:54	9.27	14.73	0.36	14.37	9.13	5.24
12-Jan	6:44	7:16	7.27	5.50	1.77	16:33	16.55	17:05	23:91	23:54	9.28	14.72	0.36	14.36	9.13	5.23
13-Jan	6:44	7:15	7.25	5.50	1.75	16:34	16.57	17:06	23:91	23:54	9.32	14.68	0.36	14.32	9.09	5.23
14-Jan	6:43	7:15	7.25	5.50	1.75	16:35	16.58	17:07	23:92	23:55	9.33	14.67	0.36	14.31	9.08	5.22
15-Jan	6:43	7:14	7.23	5.50	1.73	16:37	16.62	17:08	23:93	23:55	9.38	14.62	0.36	14.26	9.04	5.22
16-Jan	6:42	7:14	7.23	5.50	1.73	16:38	16.63	17:09	23:93	23:56	9.40	14.60	0.36	14.24	9.03	5.21
17-Jan	6:42	7:13	7.22	5.50	1.72	16:39	16.65	17:10	23:93	23:56	9.43	14.57	0.36	14.21	9.00	5.21
18-Jan	6:42	7:13	7.22	5.50	1.72	16:40	16.67	17:11	23:94	23:56	9.45	14.55	0.36	14.19	8.99	5.20
19-Jan	6:41	7:12	7.20	5.50	1.70	16:42	16.70	17:13	23:95	23:57	9.50	14.50	0.36	14.14	8.95	5.19
20-Jan	6:40	7:11	7.18	5.50	1.68	16:43	16.72	17:14	23:95	23:57	9.53	14.47	0.36	14.11	8.92	5.19
21-Jan	6:40	7:11	7.18	5.50	1.68	16:44	16.73	17:15	23:96	23:57	9.55	14.45	0.36	14.09	8.91	5.18
22-Jan	6:39	7:10	7.17	5.50	1.67	16:45	16.75	17:16	23:96	23:57	9.58	14.42	0.36	14.06	8.88	5.18
23-Jan	6:39	7:09	7.15	5.50	1.65	16:47	16.78	17:17	23:97	23:58	9.63	14.37	0.36	14.01	8.83	5.17
24-Jan	6:38	7:09	7.15	5.50	1.65	16:48	16.80	17:19	23:98	23:58	9.65	14.35	0.36	13.99	8.83	5.17
25-Jan	6:37	7:08	7.13	5.50	1.63	16:49	16.82	17:20	23:98	23:58	9.68	14.32	0.36	13.96	8.79	5.17
26-Jan	6:36	7:07	7.12	5.50	1.62	16:50	16.83	17:21	23:98	23:58	9.72	14.28	0.36	13.92	8.76	5.17
27-Jan	6:35	7:06	7.10	5.50	1.60	16:52	16.87	17:22	23:98	23:59	9.77	14.23	0.36	13.87	8.72	5.16
28-Jan	6:35	7:05	7.08	5.50	1.58	16:53	16.88	17:23	23:98	23:59	9.80	14.20	0.36	13.84	8.68	5.16
29-Jan	6:34	7:04	7.07	5.50	1.57	16:54	16.90	17:25	23:98	23:59	9.83	14.17	0.36	13.81	8.65	5.16
30-Jan	6:33	7:03	7.05	5.50	1.55	16:56	16.93	17:26	23:99	23:59	9.88	14.12	0.36	13.76	8.61	5.15
31-Jan	6:32	7:02	7.03	5.50	1.53	16:57	16.95	17:27	23:99	23:59	9.92	14.08	0.36	13.72	8.58	5.15
1-Feb	6:31	7:01	7.02	5.50	1.52	16:58	16.97	17:28	23:99	23:59	9.95	14.05	0.36	13.69	8.54	5.15
2-Feb	6:30	7:00	7.00	5.50	1.50	17:00	17.00	17:30	24:00	0:00	10.00	14.00	0.36	13.64	8.50	5.14
3-Feb	6:29	6:59	6.98	5.50	1.48	17:01	17.02	17:31	24:00	0:00	10.03	13.97	0.36	13.61	8.47	5.14
4-Feb	6:28	6:58	6.97	5.50	1.47	17:02	17.03	17:32	24:00	0:00	10.07	13.93	0.36	13.57	8.43	5.14
5-Feb	6:27	6:57	6.95	5.50	1.45	17:04	17.07	17:34	24:01	0:00	10.12	13.88	0.36	13.52	8.39	5.13
6-Feb	6:26	6:55	6.92	5.50	1.42	17:05	17.08	17:35	24:01	0:00	10.17	13.83	0.36	13.47	8.33	5.14
7-Feb	6:25	6:54	6.90	5.50	1.40	17:06	17.10	17:36	24:01	0:00	10.20	13.80	0.36	13.44	8.30	5.14
8-Feb	6:23	6:53	6.88	5.50	1.38	17:08	17.13	17:37	24:01	0:00	10.25	13.75	0.36	13.39	8.26	5.13
9-Feb	6:22	6:52	6.87	5.50	1.37	17:09	17.15	17:39	24:01	0:00	10.28	13.72	0.36	13.36	8.23	5.13
10-Feb	6:21	6:50	6.83	5.50	1.33	17:10	17.17	17:40	24:01	0:00	10.33	13.67	0.36	13.31	8.17	5.14
11-Feb	6:20	6:49	6.82	5.50	1.32	17:12	17.20	17:41	24:01	0:00	10.38	13.62	0.36	13.26	8.13	5.13
12-Feb	6:18	6:48	6.80	5.50	1.30	17:13	17.22	17:42	24:01	0:00	10.42	13.58	0.36	13.22	8.09	5.13
13-Feb	6:17	6:46	6.77	5.50	1.27	17:14	17.23	17:44	24:01	0:00	10.47	13.53	0.36	13.17	8.03	5.14
14-Feb	6:16	6:45	6.75	5.50	1.25	17:16	17.27	17:45	24:01	0:00	10.52	13.48	0.36	13.12	7.99	5.13
15-Feb	6:15	6:44	6.73	5.50	1.23	17:17	17.28	17:46	24:01	0:00	10.55	13.45	0.36	13.09	7.96	5.13
16-Feb	6:13	6:42	6.70	5.50	1.20	17:18	17.30	17:47	24:01	0:00	10.60	13.40	0.36	13.04	7.90	5.14
17-Feb	6:12	6:41	6.68	5.50	1.18	17:20	17.33	17:49	24:01	0:00	10.65	13.35	0.36	12.99	7.86	5.13
18-Feb	6:10	6:39	6.65	5.50	1.15	17:21	17.35	17:50	24:01	0:00	10.70	13.30	0.36	12.94	7.80	5.14
19-Feb	6:09	6:38	6.63	5.50	1.13	17:22	17.37	17:51	24:01	0:00	10.73	13.27	0.36	12.91	7.77	5.14
20-Feb	6:08	6:36	6.60	5.50	1.10	17:23	17.38	17:52	23:99	23:59	10.78	13.22	0.36	12.86	7.71	5.15
21-Feb	6:06	6:35	6.58	5.50	1.08	17:25	17.42	17:54	24:00	0:00	10.83	13.17	0.36	12.81	7.67	5.14
22-Feb	6:05	6:33	6.55	5.50	1.05	17:26	17.43	17:55	23:99	23:59	10.88	13.12	0.36	12.76	7.61	5.15
23-Feb	6:03	6:32	6.53	5.50	1.03	17:27	17.45	17:56	23:99	23:59	10.92	13.08	0.36	12.72	7.58	5.15
24-Feb	6:02	6:30	6.50	5.50	1.00	17:29	17.48	17:57	23:99	23:59	10.98	13.02	0.36	12.66	7.51	5.15
25-Feb	6:00	6:29	6.48	5.50	0.98	17:30	17.50	17:58	23:99	23:59	11.02	12.98	0.36	12.62	7.48	5.15
26-Feb	5:58	6:27	6.45	5.50	0.95	17:31	17.52	18:00	23:98	23:59	11.07	12.93	0.36	12.57	7.42	5.16
27-Feb	5:57	6:25	6.42	5.50	0.92	17:32	17.53	18:01	23:98	23:58	11.12	12.88	0.36	12.52	7.36	5.17
28-Feb	5:55	6:24	6.40	5.50	0.90	17:34	17.57	18:02	23:98	23:59	11.17	12.83	0.36	12.47	7.32	5.16
1-Mar	5:54	6:22	6.37	5.50	0.87	17:35	17.58	18:03	23:98	23:58	11.22	12.78	0.36	12.42	7.26	5.17
2-Mar	5:52	6:21	6.35	5.50	0.85	17:36	17.60	18:05	23:98	23:58	11.25	12.75	0.36	12.39	7.23	5.17
3-Mar	5:51	6:19	6.32	5.50	0.82	17:37	17.62	18:06	23:97	23:58	11.30	12.70	0.36	12.34	7.17	5.17
4-Mar	5:49	6:17	6.28	5.50	0.78	17:39	17.65	18:07	23:97	23:58	11.37	12.63	0.36	12.27	7.10	5.17
5-Mar	5:47	6:16	6.27	5.50	0.77	17:40	17.67	18:08	23:97	23:58	11.40	12.60	0.36	12.24	7.07	5.17
6-Mar	5:46	6:14	6.23	5.50	0.73	17:41	17.68	18:09	23:96	23:57	11.45	12.55	0.36	12.19	7.01	5.18
7-Mar	5:44	6:12	6.20	5.50	0.70	17:42	17.70	18:11	23:95	23:57	11.50	12.50	0.36	12.14	6.95	5.19
8-Mar	5:42	6:10	6.17	5.50	1.67	18:44	18.73	19:12	24:95	0:57	11.57	12.43	0.36	12.07	6.88	4.19
9-Mar	5:41	6:09	6.15	5.50	1.65	18:45	18.75	19:13	24:95	0:57	11.60	12.40	0.36	12.04	6.85	4.19
10-Mar	5:39	6:07	6.12	5.50	1.62	18:46	18.77	19:14	24:94	0:56	11.65	12.35	0.36	11.99	6.79	4.20
11-Mar	5:37	6:05	6.08	5.50	1.58	18:47	18.78	19:15	24:93	0:56	11.70	12.30	0.36	11.94	6.73	4.21
12-Mar	5:35	6:04	6.07	5.50	1.57	18:48	18.80	19:17	24:93	0:56	11.73	12.27	0.36	11.91	6.70	4.21
13-Mar	5:34	6:02	6.03	5.50	1.53	18:50	18.83	19:18	24:93	0:56	11.80	12.20	0.36	11.84	6.63	4.21
14-Mar	5:32	6:00	6.00	5.50	1.50	18:51	18.85	19:19	24:93	0:55	11.85	12.15	0.36	11.79	6.58	4.22
15-Mar	5:30	6:58	6.97													

Part-Night Hours of Operation - Rate Schedule M																
Manchester NH																
Day of Year	Civil Twilight Starts	Sunrise	Sunrise Conversion (Decimal)	Hours After Midnight Turn-On (Decimal)	Hours/Minutes After 5:30 AM Turn-On Point (Decimal)	Sunset	Sunset Conversion (Decimal)	Civil Twilight Ends	Midnight Turn Off Point (Decimal)	Time of Midnight	Day Time Hours SR/SS (Decimal)	Night Time Hours SS/SR (Decimal)	21 Minutes Before Sunrise/ After Sunset (Decimal)	Total Burn Time Dusk to Dawn Per Day (Decimal)	Midnight Tracker Hours of Burn Time (Decimal)	Midnight Tracker Hours of Burn Time Savings (Decimal)
1-Apr	6:00	6:28	6.47	5.50	0.97	19:12	19:20	19:40	24.83	0:50	12:73	11:27	0.36	10.91	6.60	4.31
2-Apr	5:58	6:27	6.45	5.50	0.95	19:13	19:22	19:42	24.83	0:50	12:77	11:23	0.36	10.87	6.57	4.31
3-Apr	5:56	6:25	6.42	5.50	0.92	19:14	19:23	19:43	24.83	0:49	12:82	11:18	0.36	10.82	6.51	4.32
4-Apr	5:54	6:23	6.38	5.50	0.88	19:15	19:25	19:44	24.82	0:49	12:87	11:13	0.36	10.77	6.45	4.32
5-Apr	5:53	6:21	6.35	5.50	0.85	19:16	19:27	19:45	24.81	0:48	12:92	11:08	0.36	10.72	6.39	4.33
6-Apr	5:51	6:20	6.33	5.50	0.83	19:18	19:30	19:46	24.82	0:49	12:97	11:03	0.36	10.67	6.35	4.32
7-Apr	5:49	6:18	6.30	5.50	0.80	19:19	19:32	19:48	24.81	0:48	13:02	10:98	0.36	10.62	6.29	4.33
8-Apr	5:47	6:16	6.27	5.50	0.77	19:20	19:33	19:49	24.80	0:48	13:07	10:93	0.36	10.57	6.23	4.34
9-Apr	5:45	6:15	6.25	5.50	0.75	19:21	19:35	19:50	24.80	0:48	13:10	10:90	0.36	10.54	6.20	4.34
10-Apr	5:44	6:13	6.22	5.50	0.72	19:22	19:37	19:51	24.79	0:47	13:15	10:85	0.36	10.49	6.14	4.35
11-Apr	5:42	6:11	6.18	5.50	0.68	19:23	19:38	19:53	24.78	0:47	13:20	10:80	0.36	10.44	6.08	4.36
12-Apr	5:40	6:09	6.15	5.50	0.65	19:24	19:40	19:54	24.78	0:46	13:25	10:75	0.36	10.39	6.03	4.37
13-Apr	5:38	6:08	6.13	5.50	0.63	19:26	19:43	19:55	24.78	0:47	13:30	10:70	0.36	10.34	5.98	4.36
14-Apr	5:37	6:06	6.10	5.50	0.60	19:27	19:45	19:56	24.78	0:46	13:35	10:65	0.36	10.29	5.93	4.37
15-Apr	5:35	6:04	6.07	5.50	0.57	19:28	19:47	19:57	24.77	0:46	13:40	10:60	0.36	10.24	5.87	4.37
16-Apr	5:33	6:03	6.05	5.50	0.55	19:29	19:48	19:59	24.77	0:46	13:43	10:57	0.36	10.21	5.83	4.37
17-Apr	5:32	6:01	6.02	5.50	0.52	19:30	19:50	20:00	24.76	0:45	13:48	10:52	0.36	10.16	5.78	4.38
18-Apr	5:30	6:00	6.00	5.50	0.50	19:31	19:52	20:01	24.76	0:45	13:52	10:48	0.36	10.12	5.74	4.38
19-Apr	5:28	5:58	5.97	5.50	0.47	19:33	19:55	20:02	24.76	0:45	13:58	10:42	0.36	10.06	5.68	4.38
20-Apr	5:27	5:56	5.93	5.50	0.43	19:34	19:57	20:04	24.75	0:45	13:63	10:37	0.36	10.01	5.62	4.39
21-Apr	5:25	5:55	5.92	5.50	0.42	19:35	19:58	20:05	24.75	0:45	13:67	10:33	0.36	9.97	5.58	4.39
22-Apr	5:23	5:53	5.88	5.50	0.38	19:36	19:60	20:06	24.74	0:44	13:72	10:28	0.36	9.92	5.53	4.40
23-Apr	5:22	5:52	5.87	5.50	0.37	19:37	19:62	20:07	24.74	0:44	13:75	10:25	0.36	9.89	5.49	4.40
24-Apr	5:20	5:50	5.83	5.50	0.33	19:38	19:63	20:09	24.73	0:44	13:80	10:20	0.36	9.84	5.43	4.41
25-Apr	5:18	5:49	5.82	5.50	0.32	19:39	19:65	20:10	24.73	0:44	13:83	10:17	0.36	9.81	5.40	4.41
26-Apr	5:17	5:47	5.78	5.50	0.28	19:41	19:68	20:11	24.73	0:44	13:90	10:10	0.36	9.74	5.33	4.41
27-Apr	5:15	5:46	5.77	5.50	0.27	19:42	19:70	20:12	24.73	0:44	13:93	10:07	0.36	9.71	5.30	4.41
28-Apr	5:14	5:44	5.73	5.50	0.23	19:43	19:72	20:14	24.73	0:43	13:98	10:02	0.36	9.66	5.24	4.42
29-Apr	5:12	5:43	5.72	5.50	0.22	19:44	19:73	20:15	24.73	0:43	14:02	9:98	0.36	9.62	5.21	4.42
30-Apr	5:11	5:41	5.68	5.50	0.18	19:45	19:75	20:16	24.72	0:43	14:07	9:93	0.36	9.57	5.15	4.42
1-May	5:09	5:40	5.67	5.50	0.17	19:46	19:77	20:17	24.72	0:43	14:10	9:90	0.36	9.54	5.12	4.42
2-May	5:08	5:39	5.65	5.50	0.15	19:47	19:78	20:19	24.72	0:43	14:13	9:87	0.36	9.51	5.08	4.42
3-May	5:06	5:37	5.62	5.50	0.12	19:49	19:82	20:20	24.72	0:43	14:20	9:80	0.36	9.44	5.02	4.42
4-May	5:05	5:36	5.60	5.50	0.10	19:50	19:83	20:21	24.72	0:43	14:23	9:77	0.36	9.41	4.98	4.42
5-May	5:03	5:35	5.58	5.50	0.08	19:51	19:85	20:22	24.72	0:43	14:27	9:73	0.36	9.37	4.95	4.42
6-May	5:02	5:33	5.55	5.50	0.05	19:52	19:87	20:24	24.71	0:42	14:32	9:68	0.36	9.32	4.89	4.43
7-May	5:00	5:32	5.53	5.50	0.03	19:53	19:88	20:25	24.71	0:42	14:35	9:65	0.36	9.29	4.86	4.43
8-May	4:59	5:31	5.52	5.50	0.02	19:54	19:90	20:26	24.71	0:42	14:38	9:62	0.36	9.26	4.83	4.43
9-May	4:58	5:30	5.50	5.50	0.00	19:55	19:92	20:27	24.71	0:42	14:42	9:58	0.36	9.22	4.79	4.43
10-May	4:57	5:28	5.47	5.50	-0.03	19:56	19:93	20:28	24.70	0:42	14:47	9:53	0.36	9.17	4.73	4.44
11-May	4:55	5:27	5.45	5.50	-0.05	19:57	19:95	20:30	24.70	0:42	14:50	9:50	0.36	9.14	4.70	4.44
12-May	4:54	5:26	5.43	5.50	-0.07	19:59	19:98	20:31	24.71	0:42	14:55	9:45	0.36	9.09	4.66	4.43
13-May	4:53	5:25	5.42	5.50	-0.08	20:00	20:00	20:32	24.71	0:42	14:58	9:42	0.36	9.06	4.63	4.43
14-May	4:52	5:24	5.40	5.50	-0.10	20:01	20:02	20:33	24.71	0:42	14:62	9:38	0.36	9.02	4.59	4.43
15-May	4:50	5:23	5.38	5.50	-0.12	20:02	20:03	20:34	24.71	0:42	14:65	9:35	0.36	8.99	4.56	4.43
16-May	4:49	5:22	5.37	5.50	-0.13	20:03	20:05	20:36	24.71	0:42	14:68	9:32	0.36	8.96	4.53	4.43
17-May	4:48	5:21	5.35	5.50	-0.15	20:04	20:07	20:37	24.71	0:42	14:72	9:28	0.36	8.92	4.49	4.43
18-May	4:47	5:20	5.33	5.50	-0.17	20:05	20:08	20:38	24.71	0:42	14:75	9:25	0.36	8.89	4.46	4.43
19-May	4:46	5:19	5.32	5.50	-0.18	20:06	20:10	20:39	24.71	0:42	14:78	9:22	0.36	8.86	4.43	4.43
20-May	4:45	5:18	5.30	5.50	-0.20	20:07	20:12	20:40	24.71	0:42	14:82	9:18	0.36	8.82	4.39	4.43
21-May	4:44	5:17	5.28	5.50	-0.22	20:08	20:13	20:41	24.71	0:42	14:85	9:15	0.36	8.79	4.36	4.43
22-May	4:43	5:16	5.27	5.50	-0.23	20:09	20:15	20:42	24.71	0:42	14:88	9:12	0.36	8.76	4.33	4.43
23-May	4:42	5:16	5.27	5.50	-0.23	20:10	20:17	20:43	24.72	0:43	14:90	9:10	0.36	8.74	4.32	4.42
24-May	4:41	5:15	5.25	5.50	-0.25	20:11	20:18	20:44	24.72	0:43	14:93	9:07	0.36	8.71	4.28	4.42
25-May	4:40	5:14	5.23	5.50	-0.27	20:12	20:20	20:45	24.72	0:43	14:97	9:03	0.36	8.67	4.25	4.42
26-May	4:39	5:13	5.22	5.50	-0.28	20:13	20:22	20:46	24.72	0:43	15:00	9:00	0.36	8.64	4.22	4.42
27-May	4:39	5:13	5.22	5.50	-0.28	20:14	20:23	20:47	24.73	0:43	15:02	8:98	0.36	8.62	4.21	4.42
28-May	4:38	5:12	5.20	5.50	-0.30	20:14	20:23	20:48	24.72	0:43	15:03	8:97	0.36	8.61	4.18	4.42
29-May	4:37	5:11	5.18	5.50	-0.32	20:15	20:25	20:49	24.72	0:43	15:07	8:93	0.36	8.57	4.15	4.42
30-May	4:37	5:11	5.18	5.50	-0.32	20:16	20:27	20:50	24.73	0:43	15:08	8:92	0.36	8.56	4.14	4.42
31-May	4:36	5:10	5.17	5.50	-0.33	20:17	20:28	20:51	24.73	0:43	15:12	8:88	0.36	8.52	4.11	4.42
1-Jun	4:35	5:10	5.17	5.50	-0.33	20:18	20:30	20:52	24.73	0:44	15:13	8:87	0.36	8.51	4.10	4.41
2-Jun	4:35	5:09	5.15	5.50	-0.35	20:19	20:32	20:53	24.73	0:44	15:17	8:83	0.36	8.47	4.07	4.41
3-Jun	4:34	5:09	5.15	5.50	-0.35	20:19	20:32	20:54	24.73	0:44	15:17	8:83	0.36	8.47	4.07	4.41
4-Jun	4:34	5:08	5.13	5.50	-0.37	20:20	20:33	20:55	24.73	0:44	15:20	8:80	0.36	8.44	4.03	4.41
5-Jun	4:33	5:08	5.13	5.50	-0.37	20:21	20:35	20:55	24.74	0:44	15:22	8:78	0.36	8.42	4.03	4.40
6-Jun	4:33	5:08	5.13	5.50	-0.37	20:21	20:35	20:56	24.74	0:44	15:22	8:78	0.36	8.42	4.03	4.40
7-Jun	4:32	5:07	5.12	5.50	-0.38	20:22	20:37	20:57	24.74	0:44	15:25	8:75	0.36	8.39	3.99	4.40
8-Jun	4:32	5:07	5.12	5.50	-0.38	20:23	20:38	20:58	24.75	0:45	15:27	8:73	0.36	8.37	3.98	4.39
9-Jun	4:32	5:07	5.12	5.50	-0.38	20:23	20:38	20:58	24.75	0:45	15:27	8:73	0.36	8.37	3.98	4.39
10-Jun	4:32	5:07	5.12	5.50	-0.38	20:24	20:40	20:59	24.76	0:45	15:28	8:72	0.36	8.36	3.98	4.38
11-Jun	4:31	5:06	5.10	5.50	-0.40	20:24	20:40	20:59	24.75	0:45	15:30	8:70	0.36	8.34	3.95	4.39
12-Jun	4:31	5:06	5.10	5.50	-0.40	20:25	20:42	21:00	24.76	0:45	15:32	8:68	0.36	8.32	3.94	4.38
13-Jun	4:31	5:06	5.10	5.50	-0.40	20:25	20:42	21:01	24.76	0:45	15:32	8:68	0.36	8.32	3.94	

Part-Night Hours of Operation - Rate Schedule M																
Manchester NH																
Day of Year	Civil Twilight Starts	Sunrise	Sunrise Conversion (Decimal)	Hours After Midnight Turn-On (Decimal)	Hours/Minutes After 5:30 AM Turn-On Point (Decimal)	Sunset	Sunset Conversion (Decimal)	Civil Twilight Ends	Midnight Turn Off Point (Decimal)	Time of Midnight	Day Time Hours SR/SS (Decimal)	Night Time Hours SS/SR (Decimal)	21 Minutes Before Sunrise/ After Sunset (Decimal)	Total Burn Time Dusk to Dawn Per Day (Decimal)	Midnight Tracker Hours of Burn Time (Decimal)	Midnight Tracker Hours of Burn Time Savings (Decimal)
1-Jul	4:35	5:10	5.17	5.50	-0.33	20:28	20:47	21:04	24.82	0:49	15.30	8.70	0.36	8.34	4.02	4.32
2-Jul	4:36	5:11	5.18	5.50	-0.32	20:28	20:47	21:03	24.83	0:49	15.28	8.72	0.36	8.36	4.04	4.32
3-Jul	4:37	5:12	5.20	5.50	-0.30	20:28	20:47	21:03	24.83	0:50	15.27	8.73	0.36	8.37	4.07	4.31
4-Jul	4:37	5:12	5.20	5.50	-0.30	20:28	20:47	21:03	24.83	0:50	15.27	8.73	0.36	8.37	4.07	4.31
5-Jul	4:38	5:13	5.22	5.50	-0.28	20:28	20:47	21:02	24.84	0:50	15.25	8.75	0.36	8.39	4.09	4.30
6-Jul	4:39	5:13	5.22	5.50	-0.28	20:27	20:45	21:02	24.83	0:50	15.23	8.77	0.36	8.41	4.10	4.31
7-Jul	4:39	5:14	5.23	5.50	-0.27	20:27	20:45	21:02	24.84	0:50	15.22	8.78	0.36	8.42	4.13	4.30
8-Jul	4:40	5:15	5.25	5.50	-0.25	20:27	20:45	21:01	24.85	0:51	15.20	8.80	0.36	8.44	4.15	4.29
9-Jul	4:41	5:15	5.25	5.50	-0.25	20:26	20:43	21:01	24.84	0:50	15.18	8.82	0.36	8.46	4.16	4.30
10-Jul	4:42	5:16	5.27	5.50	-0.23	20:26	20:43	21:00	24.85	0:51	15.17	8.83	0.36	8.47	4.18	4.29
11-Jul	4:43	5:17	5.28	5.50	-0.22	20:25	20:42	21:00	24.85	0:51	15.13	8.87	0.36	8.51	4.22	4.29
12-Jul	4:43	5:18	5.30	5.50	-0.20	20:25	20:42	20:59	24.86	0:51	15.12	8.88	0.36	8.52	4.24	4.28
13-Jul	4:44	5:19	5.32	5.50	-0.18	20:24	20:40	20:59	24.86	0:51	15.08	8.92	0.36	8.56	4.28	4.28
14-Jul	4:45	5:19	5.32	5.50	-0.18	20:23	20:38	20:58	24.85	0:51	15.07	8.93	0.36	8.57	4.28	4.29
15-Jul	4:46	5:20	5.33	5.50	-0.17	20:23	20:38	20:58	24.86	0:51	15.05	8.95	0.36	8.59	4.31	4.28
16-Jul	4:47	5:21	5.35	5.50	-0.15	20:22	20:37	20:56	24.86	0:51	15.02	8.98	0.36	8.62	4.34	4.28
17-Jul	4:48	5:22	5.37	5.50	-0.13	20:21	20:35	20:55	24.86	0:51	14.98	9.02	0.36	8.66	4.38	4.28
18-Jul	4:49	5:23	5.38	5.50	-0.12	20:21	20:35	20:54	24.87	0:52	14.97	9.03	0.36	8.67	4.40	4.27
19-Jul	4:50	5:24	5.40	5.50	-0.10	20:20	20:33	20:54	24.87	0:52	14.93	9.07	0.36	8.71	4.43	4.27
20-Jul	4:51	5:25	5.42	5.50	-0.08	20:19	20:32	20:53	24.87	0:52	14.90	9.10	0.36	8.74	4.47	4.27
21-Jul	4:52	5:26	5.43	5.50	-0.07	20:18	20:30	20:52	24.87	0:52	14.87	9.13	0.36	8.77	4.50	4.27
22-Jul	4:53	5:26	5.43	5.50	-0.07	20:17	20:28	20:51	24.86	0:51	14.85	9.15	0.36	8.79	4.51	4.28
23-Jul	4:54	5:27	5.45	5.50	-0.05	20:17	20:28	20:50	24.87	0:52	14.83	9.17	0.36	8.81	4.53	4.27
24-Jul	4:55	5:28	5.47	5.50	-0.03	20:16	20:27	20:49	24.87	0:52	14.80	9.20	0.36	8.84	4.57	4.27
25-Jul	4:56	5:29	5.48	5.50	-0.02	20:15	20:25	20:48	24.87	0:52	14.77	9.23	0.36	8.87	4.60	4.27
26-Jul	4:57	5:30	5.50	5.50	0.00	20:14	20:23	20:46	24.87	0:52	14.73	9.27	0.36	8.91	4.63	4.27
27-Jul	4:59	5:31	5.52	5.50	0.02	20:13	20:22	20:45	24.87	0:52	14.70	9.30	0.36	8.94	4.67	4.27
28-Jul	5:00	5:32	5.53	5.50	0.03	20:12	20:20	20:44	24.87	0:52	14.67	9.33	0.36	8.97	4.70	4.27
29-Jul	5:01	5:33	5.55	5.50	0.05	20:10	20:17	20:43	24.86	0:51	14.62	9.38	0.36	9.02	4.74	4.28
30-Jul	5:02	5:34	5.57	5.50	0.07	20:09	20:15	20:42	24.86	0:51	14.58	9.42	0.36	9.06	4.78	4.28
31-Jul	5:03	5:35	5.58	5.50	0.08	20:08	20:13	20:41	24.86	0:51	14.55	9.45	0.36	9.09	4.81	4.28
1-Aug	5:04	5:36	5.60	5.50	0.10	20:07	20:12	20:39	24.86	0:51	14.52	9.48	0.36	9.12	4.84	4.28
2-Aug	5:05	5:37	5.62	5.50	0.12	20:06	20:10	20:38	24.86	0:51	14.48	9.52	0.36	9.16	4.88	4.28
3-Aug	5:07	5:39	5.65	5.50	0.15	20:05	20:08	20:37	24.87	0:52	14.43	9.57	0.36	9.21	4.93	4.27
4-Aug	5:08	5:40	5.67	5.50	0.17	20:03	20:05	20:35	24.86	0:51	14.38	9.62	0.36	9.26	4.98	4.28
5-Aug	5:09	5:41	5.68	5.50	0.18	20:02	20:03	20:34	24.86	0:51	14.35	9.65	0.36	9.29	5.01	4.28
6-Aug	5:10	5:42	5.70	5.50	0.20	20:01	20:02	20:32	24.86	0:51	14.32	9.68	0.36	9.32	5.04	4.28
7-Aug	5:11	5:43	5.72	5.50	0.22	20:00	20:00	20:31	24.86	0:51	14.28	9.72	0.36	9.36	5.08	4.28
8-Aug	5:12	5:44	5.73	5.50	0.23	19:58	19:57	20:30	24.85	0:51	14.23	9.77	0.36	9.41	5.12	4.29
9-Aug	5:14	5:45	5.75	5.50	0.25	19:57	19:55	20:28	24.85	0:51	14.20	9.80	0.36	9.44	5.15	4.29
10-Aug	5:15	5:46	5.77	5.50	0.27	19:56	19:53	20:27	24.85	0:51	14.17	9.83	0.36	9.47	5.18	4.29
11-Aug	5:16	5:47	5.78	5.50	0.28	19:54	19:50	20:25	24.84	0:50	14.12	9.88	0.36	9.52	5.23	4.30
12-Aug	5:17	5:48	5.80	5.50	0.30	19:53	19:88	20:24	24.84	0:50	14.08	9.92	0.36	9.56	5.26	4.30
13-Aug	5:18	5:49	5.82	5.50	0.32	19:51	19:85	20:22	24.83	0:50	14.03	9.97	0.36	9.61	5.30	4.31
14-Aug	5:20	5:50	5.83	5.50	0.33	19:50	19:83	20:21	24.83	0:50	14.00	10.00	0.36	9.64	5.33	4.31
15-Aug	5:21	5:51	5.85	5.50	0.35	19:48	19:80	20:19	24.83	0:49	13.95	10.05	0.36	9.69	5.38	4.32
16-Aug	5:22	5:53	5.88	5.50	0.38	19:47	19:78	20:17	24.83	0:50	13.90	10.10	0.36	9.74	5.43	4.31
17-Aug	5:23	5:54	5.90	5.50	0.40	19:45	19:75	20:16	24.83	0:49	13.85	10.15	0.36	9.79	5.48	4.32
18-Aug	5:24	5:55	5.92	5.50	0.42	19:44	19:73	20:14	24.83	0:49	13.82	10.18	0.36	9.82	5.51	4.32
19-Aug	5:26	5:56	5.93	5.50	0.43	19:42	19:70	20:12	24.82	0:49	13.77	10.23	0.36	9.87	5.55	4.32
20-Aug	5:27	5:57	5.95	5.50	0.45	19:41	19:68	20:11	24.82	0:49	13.73	10.27	0.36	9.91	5.58	4.32
21-Aug	5:28	5:58	5.97	5.50	0.47	19:39	19:65	20:09	24.81	0:48	13.68	10.32	0.36	9.96	5.63	4.33
22-Aug	5:29	5:59	5.98	5.50	0.48	19:38	19:63	20:07	24.81	0:48	13.65	10.35	0.36	9.99	5.66	4.33
23-Aug	5:30	6:00	6.00	5.50	0.50	19:36	19:60	20:06	24.80	0:48	13.60	10.40	0.36	10.04	5.70	4.34
24-Aug	5:31	6:01	6.02	5.50	0.52	19:34	19:57	20:04	24.79	0:47	13.55	10.45	0.36	10.09	5.74	4.35
25-Aug	5:33	6:02	6.03	5.50	0.53	19:33	19:55	20:02	24.79	0:47	13.52	10.48	0.36	10.12	5.78	4.35
26-Aug	5:34	6:03	6.05	5.50	0.55	19:31	19:52	20:01	24.78	0:47	13.47	10.53	0.36	10.17	5.82	4.36
27-Aug	5:35	6:04	6.07	5.50	0.57	19:29	19:48	19:59	24.78	0:46	13.42	10.58	0.36	10.22	5.86	4.37
28-Aug	5:36	6:06	6.10	5.50	0.60	19:28	19:47	19:57	24.78	0:47	13.37	10.63	0.36	10.27	5.92	4.36
29-Aug	5:37	6:07	6.12	5.50	0.62	19:26	19:43	19:55	24.78	0:46	13.32	10.68	0.36	10.32	5.96	4.37
30-Aug	5:38	6:08	6.13	5.50	0.63	19:24	19:40	19:54	24.77	0:46	13.27	10.73	0.36	10.37	6.00	4.37
31-Aug	5:40	6:09	6.15	5.50	0.65	19:23	19:38	19:52	24.77	0:46	13.23	10.77	0.36	10.41	6.03	4.37
1-Sep	5:41	6:10	6.17	5.50	0.67	19:21	19:35	19:50	24.76	0:45	13.18	10.82	0.36	10.46	6.08	4.38
2-Sep	5:42	6:11	6.18	5.50	0.68	19:19	19:32	19:48	24.75	0:45	13.13	10.87	0.36	10.51	6.12	4.39
3-Sep	5:43	6:12	6.20	5.50	0.70	19:17	19:28	19:46	24.74	0:44	13.08	10.92	0.36	10.56	6.16	4.40
4-Sep	5:44	6:13	6.22	5.50	0.72	19:16	19:27	19:45	24.74	0:44	13.05	10.95	0.36	10.59	6.19	4.40
5-Sep	5:45	6:14	6.23	5.50	0.73	19:14	19:23	19:43	24.73	0:44	13.00	11.00	0.36	10.64	6.23	4.41
6-Sep	5:46	6:15	6.25	5.50	0.75	19:12	19:20	19:41	24.73	0:43	12.95	11.05	0.36	10.69	6.28	4.42
7-Sep	5:48	6:16	6.27	5.50	0.77	19:10	19:17	19:39	24.72	0:43	12.90	11.10	0.36	10.74	6.32	4.42
8-Sep	5:49	6:17	6.28	5.50	0.78	19:09	19:15	19:37	24.72	0:43	12.87	11.13	0.36	10.77	6.35	4.42
9-Sep	5:50	6:19	6.32	5.50	0.82	19:07	19:12	19:36	24.72	0:43	12.80	11.20	0.36	10.84	6.42	4.42
10-Sep	5:51	6:20	6.33	5.50	0.83	19:05	19:08	19:34	24.71	0:42	12.75	11.25	0.36	10.89	6.46	4.43
11-Sep	5:52	6:21	6.35	5.50	0.85	19:03	19:05	19:32	24.70	0:42	12.70	11.30	0.36	10.94	6.50	4.44
12-Sep	5:53	6:22	6.37	5.50	0.87	19:02	19:03	19:30	24.70	0:42	12.67	11.33	0.36	10.97	6.5	

Part-Night Hours of Operation - Rate Schedule M																
Manchester NH																
Day of Year	Civil Twilight Starts	Sunrise	Sunrise Conversion (Decimal)	Hours After Midnight Turn-On (Decimal)	Hours/Minutes After 5:30 AM Turn-On Point (Decimal)	Sunset	Sunset Conversion (Decimal)	Civil Twilight Ends	Midnight Turn Off Point (Decimal)	Time of Midnight	Day Time Hours SR/SS (Decimal)	Night Time Hours SS/SR (Decimal)	21 Minutes Before Sunrise/ After Sunset (Decimal)	Total Burn Time Dusk to Dawn (Per Day)	Midnight Tracker Hours of Burn Time (Decimal)	Midnight Tracker Hours of Burn Time Savings (Decimal)
1-Oct	6:14	6:43	6.72	5.50	1.22	18:27	18.45	18:56	24.58	0:35	11.73	12.27	0.36	11.91	7.35	4.56
2-Oct	6:16	6:44	6.73	5.50	1.23	18:26	18.43	18:54	24.58	0:35	11.70	12.30	0.36	11.94	7.38	4.56
3-Oct	6:17	6:45	6.75	5.50	1.25	18:24	18.40	18:52	24.58	0:34	11.65	12.35	0.36	11.99	7.43	4.57
4-Oct	6:18	6:46	6.77	5.50	1.27	18:22	18.37	18:50	24.57	0:34	11.60	12.40	0.36	12.04	7.47	4.57
5-Oct	6:19	6:47	6.78	5.50	1.28	18:20	18.33	18:49	24.56	0:33	11.55	12.45	0.36	12.09	7.51	4.58
6-Oct	6:20	6:48	6.80	5.50	1.30	18:19	18.32	18:47	24.56	0:33	11.52	12.48	0.36	12.12	7.54	4.58
7-Oct	6:21	6:50	6.83	5.50	1.33	18:17	18.28	18:45	24.56	0:33	11.45	12.55	0.36	12.19	7.61	4.58
8-Oct	6:22	6:51	6.85	5.50	1.35	18:15	18.25	18:44	24.55	0:33	11.40	12.60	0.36	12.24	7.65	4.59
9-Oct	6:23	6:52	6.87	5.50	1.37	18:14	18.23	18:42	24.55	0:33	11.37	12.63	0.36	12.27	7.68	4.59
10-Oct	6:25	6:53	6.88	5.50	1.38	18:12	18.20	18:40	24.54	0:32	11.32	12.68	0.36	12.32	7.73	4.60
11-Oct	6:26	6:54	6.90	5.50	1.40	18:10	18.17	18:39	24.53	0:32	11.27	12.73	0.36	12.37	7.77	4.61
12-Oct	6:27	6:55	6.92	5.50	1.42	18:09	18.15	18:37	24.53	0:32	11.23	12.77	0.36	12.41	7.80	4.61
13-Oct	6:28	6:56	6.93	5.50	1.43	18:07	18.12	18:35	24.53	0:31	11.18	12.82	0.36	12.46	7.84	4.62
14-Oct	6:29	6:58	6.97	5.50	1.47	18:05	18.08	18:34	24.53	0:31	11.12	12.88	0.36	12.52	7.91	4.62
15-Oct	6:30	6:59	6.98	5.50	1.48	18:04	18.07	18:32	24.53	0:31	11.08	12.92	0.36	12.56	7.94	4.62
16-Oct	6:31	7:00	7.00	5.50	1.50	18:02	18.03	18:31	24.52	0:31	11.03	12.97	0.36	12.61	7.98	4.62
17-Oct	6:33	7:01	7.02	5.50	1.52	18:00	18.00	18:29	24.51	0:30	10.98	13.02	0.36	12.66	8.03	4.63
18-Oct	6:34	7:02	7.03	5.50	1.53	17:59	17.98	18:27	24.51	0:30	10.95	13.05	0.36	12.69	8.06	4.63
19-Oct	6:35	7:04	7.07	5.50	1.57	17:57	17.95	18:26	24.51	0:30	10.88	13.12	0.36	12.76	8.13	4.63
20-Oct	6:36	7:05	7.08	5.50	1.58	17:56	17.93	18:24	24.51	0:30	10.85	13.15	0.36	12.79	8.16	4.63
21-Oct	6:37	7:06	7.10	5.50	1.60	17:54	17.90	18:23	24.50	0:30	10.80	13.20	0.36	12.84	8.20	4.64
22-Oct	6:38	7:07	7.12	5.50	1.62	17:53	17.88	18:21	24.50	0:30	10.77	13.23	0.36	12.87	8.23	4.64
23-Oct	6:40	7:09	7.15	5.50	1.65	17:51	17.85	18:20	24.50	0:30	10.70	13.30	0.36	12.94	8.30	4.64
24-Oct	6:41	7:10	7.17	5.50	1.67	17:49	17.82	18:18	24.49	0:29	10.65	13.35	0.36	12.99	8.34	4.65
25-Oct	6:42	7:11	7.18	5.50	1.68	17:48	17.80	18:17	24.49	0:29	10.62	13.38	0.36	13.02	8.38	4.65
26-Oct	6:43	7:12	7.20	5.50	1.70	17:47	17.78	18:16	24.49	0:29	10.58	13.42	0.36	13.06	8.41	4.65
27-Oct	6:44	7:14	7.23	5.50	1.73	17:45	17.75	18:14	24.49	0:29	10.52	13.48	0.36	13.12	8.48	4.65
28-Oct	6:46	7:15	7.25	5.50	1.75	17:44	17.73	18:13	24.49	0:29	10.48	13.52	0.36	13.16	8.51	4.65
29-Oct	6:47	7:16	7.27	5.50	1.77	17:42	17.70	18:12	24.48	0:29	10.43	13.57	0.36	13.21	8.55	4.66
30-Oct	6:48	7:17	7.28	5.50	1.78	17:41	17.68	18:10	24.48	0:29	10.40	13.60	0.36	13.24	8.58	4.66
31-Oct	6:49	7:19	7.32	5.50	1.82	17:40	17.67	18:09	24.49	0:29	10.35	13.65	0.36	13.29	8.64	4.65
1-Nov	5:50	6:20	6.33	5.50	0.83	16:38	16.63	17:08	23.48	23:29	10.30	13.70	0.36	13.34	7.68	5.66
2-Nov	5:52	6:21	6.35	5.50	0.85	16:37	16.62	17:07	23.48	23:29	10.27	13.73	0.36	13.37	7.72	5.66
3-Nov	5:53	6:22	6.37	5.50	0.87	16:36	16.60	17:05	23.48	23:29	10.23	13.77	0.36	13.41	7.75	5.66
4-Nov	5:54	6:24	6.40	5.50	0.90	16:34	16.57	17:04	23.48	23:29	10.17	13.83	0.36	13.47	7.82	5.66
5-Nov	5:55	6:25	6.42	5.50	0.92	16:33	16.55	17:03	23.48	23:29	10.13	13.87	0.36	13.51	7.85	5.66
6-Nov	5:56	6:26	6.43	5.50	0.93	16:32	16.53	17:02	23.48	23:29	10.10	13.90	0.36	13.54	7.88	5.66
7-Nov	5:58	6:27	6.45	5.50	0.95	16:31	16.52	17:01	23.48	23:29	10.07	13.93	0.36	13.57	7.92	5.66
8-Nov	5:59	6:29	6.48	5.50	0.98	16:30	16.50	17:00	23.49	23:29	10.02	13.98	0.36	13.62	7.98	5.65
9-Nov	6:00	6:30	6.50	5.50	1.00	16:29	16.48	16:59	23.49	23:29	9.98	14.02	0.36	13.66	8.01	5.65
10-Nov	6:01	6:31	6.52	5.50	1.02	16:27	16.45	16:58	23.48	23:29	9.93	14.07	0.36	13.71	8.05	5.66
11-Nov	6:02	6:33	6.55	5.50	1.05	16:26	16.43	16:57	23.49	23:29	9.88	14.12	0.36	13.76	8.11	5.65
12-Nov	6:04	6:34	6.57	5.50	1.07	16:25	16.42	16:56	23.49	23:29	9.85	14.15	0.36	13.79	8.14	5.65
13-Nov	6:05	6:35	6.58	5.50	1.08	16:24	16.40	16:55	23.49	23:29	9.82	14.18	0.36	13.82	8.18	5.65
14-Nov	6:06	6:36	6.60	5.50	1.10	16:23	16.38	16:54	23.49	23:29	9.78	14.22	0.36	13.86	8.21	5.65
15-Nov	6:07	6:38	6.63	5.50	1.13	16:23	16.38	16:54	23.51	23:30	9.75	14.25	0.36	13.89	8.26	5.63
16-Nov	6:08	6:39	6.65	5.50	1.15	16:22	16.37	16:52	23.51	23:30	9.72	14.28	0.36	13.92	8.29	5.63
17-Nov	6:10	6:40	6.67	5.50	1.17	16:21	16.35	16:51	23.51	23:30	9.68	14.32	0.36	13.96	8.33	5.63
18-Nov	6:11	6:41	6.68	5.50	1.18	16:20	16.33	16:51	23.51	23:30	9.65	14.35	0.36	13.99	8.36	5.63
19-Nov	6:12	6:43	6.72	5.50	1.22	16:19	16.32	16:50	23.52	23:31	9.60	14.40	0.36	14.04	8.42	5.62
20-Nov	6:13	6:44	6.73	5.50	1.23	16:18	16.30	16:49	23.52	23:31	9.57	14.43	0.36	14.07	8.45	5.62
21-Nov	6:14	6:45	6.75	5.50	1.25	16:18	16.30	16:49	23.53	23:31	9.55	14.45	0.36	14.09	8.48	5.62
22-Nov	6:15	6:46	6.77	5.50	1.27	16:17	16.28	16:48	23.53	23:31	9.52	14.48	0.36	14.12	8.51	5.62
23-Nov	6:16	6:48	6.80	5.50	1.30	16:16	16.27	16:47	23.53	23:32	9.47	14.53	0.36	14.17	8.57	5.61
24-Nov	6:18	6:49	6.82	5.50	1.32	16:16	16.27	16:47	23.54	23:32	9.45	14.55	0.36	14.19	8.59	5.60
25-Nov	6:19	6:50	6.83	5.50	1.33	16:15	16.25	16:46	23.54	23:32	9.42	14.58	0.36	14.22	8.63	5.60
26-Nov	6:20	6:51	6.85	5.50	1.35	16:15	16.25	16:46	23.55	23:33	9.40	14.60	0.36	14.24	8.65	5.59
27-Nov	6:21	6:52	6.87	5.50	1.37	16:14	16.23	16:46	23.55	23:33	9.37	14.63	0.36	14.27	8.68	5.59
28-Nov	6:22	6:53	6.88	5.50	1.38	16:14	16.23	16:45	23.56	23:33	9.35	14.65	0.36	14.29	8.71	5.58
29-Nov	6:23	6:55	6.92	5.50	1.42	16:13	16.22	16:45	23.57	23:34	9.30	14.70	0.36	14.34	8.77	5.57
30-Nov	6:24	6:56	6.93	5.50	1.43	16:13	16.22	16:44	23.58	23:34	9.28	14.72	0.36	14.36	8.79	5.57
1-Dec	6:25	6:57	6.95	5.50	1.45	16:12	16.20	16:44	23.58	23:34	9.25	14.75	0.36	14.39	8.83	5.57
2-Dec	6:26	6:58	6.97	5.50	1.47	16:12	16.20	16:44	23.58	23:35	9.23	14.77	0.36	14.41	8.85	5.56
3-Dec	6:27	6:59	6.98	5.50	1.48	16:12	16.20	16:44	23.59	23:35	9.22	14.78	0.36	14.42	8.88	5.55
4-Dec	6:28	7:00	7.00	5.50	1.50	16:12	16.20	16:44	23.60	23:36	9.20	14.80	0.36	14.44	8.90	5.54
5-Dec	6:29	7:01	7.02	5.50	1.52	16:11	16.18	16:43	23.60	23:36	9.17	14.83	0.36	14.47	8.93	5.54
6-Dec	6:30	7:02	7.03	5.50	1.53	16:11	16.18	16:43	23.61	23:36	9.15	14.85	0.36	14.49	8.96	5.53
7-Dec	6:31	7:03	7.05	5.50	1.55	16:11	16.18	16:43	23.62	23:37	9.13	14.87	0.36	14.51	8.98	5.52
8-Dec	6:32	7:04	7.07	5.50	1.57	16:11	16.18	16:43	23.63	23:37	9.12	14.88	0.36	14.52	9.01	5.52
9-Dec	6:33	7:05	7.08	5.50	1.58	16:11	16.18	16:43	23.63	23:38	9.10	14.90	0.36	14.54	9.03	5.51
10-Dec	6:34	7:06	7.10	5.50	1.60	16:11	16.18	16:43	23.64	23:38	9.08	14.92	0.36	14.56	9.06	5.50
11-Dec	6:34	7:07	7.12	5.50	1.62	16:11	16.18	16:43	23.65	23:39	9.07	14.93	0.36	14.57	9.08	5.49
12-Dec	6:35	7:07	7.12	5.50	1.62	16:11	16.18	16:44	23.65	23:39	9.07	14.93	0.36	14.57	9.08	5.49
13-Dec	6:36	7:08	7.13	5.50												

**SCHEDULE JEW – 3**

**Calculation of Part Night Charge**

