

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**METROPOLITAN EDISON COMPANY
DOCKET NO. R-2014-2428745**

**PENNSYLVANIA ELECTRIC COMPANY
DOCKET NO. R-2014-2428743**

**PENNSYLVANIA POWER COMPANY
DOCKET NO. R-2014-2428744**

**WEST PENN POWER COMPANY
DOCKET NO. R-2014-2428742**

**Direct Testimony
of
Christopher D. Ciccone**

List of Topics Addressed

LED Street Lighting

1 interpretation. My work experience and educational background are more fully described
2 in Appendix A attached to this testimony.

3 **Q. What is the purpose of your testimony?**

4 A. The purpose of my testimony is to outline proposed tariff provisions to allow the
5 Companies to implement new light emitting diode (“LED”) street lighting services. I will
6 first describe the lighting service and then explain how the Companies propose to recover
7 the costs associated with the offering.

8 **Q. Mr. Ciccone, have you prepared exhibits to accompany your testimony?**

9 A. Yes. The following exhibits or portions of exhibits were prepared by me and are
10 described in detail in my testimony: Met-Ed/Penelec/Penn Power/West Penn CDC-1;
11 Exhibits CDC-2 for each of the Companies; pp. 100-102 of Met-Ed Company Exhibit 1;
12 pp. 103-105 of Penelec Company Exhibit 1; pp. 96-98 of Penn Power Company Exhibit
13 1; and pp. 149-151 of West Penn Company Exhibit 1 (collectively, “Companies’ Exhibits
14 1”).

15 **Q. What is the purpose of the proposed new LED street lighting offerings?**

16 A. The offerings were developed in response to customer requests for additional LED street
17 lighting options. Met-Ed and Penelec have each previously introduced tariff provisions
18 offering customer owned and maintained LED lighting.¹ In light of continued customer
19 interest in LED lighting, the Companies would now like to offer Company owned and

¹ Metropolitan Edison Company. Electric Pa. P.U.C. No. 51. Street Lighting Service - Provision G. Page 130.
Pennsylvania Electric Company. Electric Pa. P.U.C. No. 80. Municipal Street Lighting Service – Provision G (4).
Page 139.

1 maintained LED street lighting. These proposed new offerings are outlined in the
2 schedules found in Companies' Exhibits 1 at the following pages: pp. 100-102 (Met-Ed);
3 pp. 103-105 (Penelec); pp. 96-98 (Penn Power); and pp. 149-151 (West Penn).

4 **Q. What customers will be eligible for this offering?**

5 A. As a general matter, municipalities, local, state and federal governmental bodies,
6 community associations, and public authorities will be eligible. On a Company-specific
7 basis, eligibility is as follows:

8 **Met-Ed**: open to any customer currently receiving service under a street lighting
9 schedule interested in updating their Street Lighting Service or Ornamental Street
10 Lighting Service.

11 **Penelec**: open to any customer currently receiving service under a street lighting
12 schedule interested in updating their High Pressure Sodium Vapor Street Lighting
13 Service or Municipal Street Lighting Service.

14 **Penn Power**: open to any customer currently receiving service under a street lighting
15 schedule interested in updating their Street Lighting Service (Sodium Vapor), Street
16 Lighting Service (Sodium Vapor – Divided Ownership), or Street Lighting Service
17 (Mercury Vapor).

18 **West Penn Power**: open to any customer currently receiving service under a street
19 lighting schedule interested in updating their Street Lighting Service – Schedule 51,
20 Street and Area Lighting – Schedule 53, Street Lighting Service – Schedule 54, Street

1 Lighting Service – Customer-Owned Equipment – Schedule 56, Outdoor Lighting
2 Equipment and Maintenance Service – Schedule 57, or Mercury Vapor Street and
3 Highway Lighting Service – Schedule 71.

4 **Q. Will a contract be necessary to sign up for this offering?**

5 A. Yes, the initial term for all contracts will be ten years. Contracts may then be renewed
6 for successive one year terms.

7 **Q. Will participating customers be able to choose an alternative electric generation
8 supplier?**

9 A. Yes. Participating customers will be free to shop for their generation and market based
10 transmission services.

11 **Q. What type of fixture heads will be available under these offerings?**

12 A. The Companies propose to offer Cobra, Acorn, and Colonial styled fixture heads. The
13 minimum number of fixture heads required for any installation will be twelve.

14 **Q. Why do the Companies propose offering group installations?**

15 A. Offering group installations of twelve or more is more cost effective as compared to
16 installing single fixtures.

17 **Q. After installation, who is responsible for the maintenance of these lights?**

18 A. Once installed, the Companies will own and maintain the light fixtures.

1
2 **Q. What is the forecasted impact on revenues due to the introduction of LED street**
3 **lighting?**

4 A. Since this is a new product offering and the level of customer participation is uncertain, it
5 is difficult to quantify any impact on revenues at this point in time and would be
6 speculative. Therefore, a revenue analysis cannot be completed.

7 **Q. How are the Companies proposing to recover costs associated with the LED street**
8 **lighting offering?**

9 A. The Companies propose to recover costs through a fixed monthly charge for each LED
10 fixture. The proposed monthly charges, by fixture and by Company, are provided in
11 Met-Ed/Penelec/Penn Power/West Penn Exhibit CDC-1.

12 **Q. How did the Companies calculate the fixed charges?**

13 A. Exhibits CDC-2 contain all of the supporting calculations and data used to determine the
14 monthly fixture cost for each light offered. Page 1 contains the cost of service for this
15 new offering. Pages 2 thru 9 display the Levelized Payment calculations for the eight
16 fixtures offered. Page 10 shows the installation cost for each fixture. Page 11 contains
17 supporting data for the Other Distribution Plant Factor and Other Distribution O&M
18 Factor. Page 12 displays supporting details for the General Property Factor. Page 13
19 contains supporting details for the Customer Expense Factor. Page 14 shows supporting
20 work for the Property Tax Factor. Page 15 contains the details for the Overall Rate of
21 Return. Page 16 displays a table of tax depreciation rates based on the Modified
22 Accelerated Cost Recovery System (MACRS).

1 **Q. Why did the Companies perform a separate cost of service study for the LED street**
2 **lighting instead of incorporating the new offerings into the Cost of Service Study**
3 **sponsored by Hillary Stewart in Met-Ed/Penelec/Penn Power West Penn Power**
4 **Statement No. 5?**

5 A. The Companies are requiring ten-year contracts for all new LED street lighting services,
6 and therefore wanted to use a levelized fixed charge rate approach instead of the
7 traditional net plant approach incorporated in the Cost of Service Study sponsored by Ms.
8 Stewart. By using the levelized fixed charge rate approach, the costs of LED streetlights
9 are spread over the ten-year period and the resulting customer charges are more
10 affordable in the early years as opposed to a net plant approach. In addition, by requiring
11 a ten-year commitment for the new fixtures, the Companies are protected against
12 stranded cost risk. For these reasons, I believe the levelized fixed charge rate cost
13 support is more appropriate in that it benefits both customers and the Companies.

14 **Q. Is the monthly fixture charge the only cost to participating customers?**

15 A. No. All Riders applicable to the Companies' existing lighting services will also apply to
16 the LED Street Lighting Services, as detailed in the proposed tariff schedules provided in
17 the previously-referenced excerpts to Companies' Exhibits 1. In addition, if a customer
18 wishes to replace their current lighting during the initial ten year term with Company-
19 owned LED lighting under one of the LED Street Lighting Services, the customer will be
20 responsible for any remaining costs of the customer-owned lighting as well as any early
21 termination or removal fees that may apply.

22

1 **Q. How were the fixed kWh usages in the proposed tariff schedules determined for this**
2 **unmetered service?**

3 A. The lighting units will operate from dusk to dawn, which results in approximately 4,200
4 hours of operation per year. The respective lamp wattage is multiplied by the 4,200
5 hours of operation per year, divided by twelve months, and then divided by 1,000 to be
6 converted into kilowatt-hours. This calculation establishes the fixed monthly kWh usage
7 for each fixture.

8 **Q. Does this conclude your direct testimony?**

9 A. Yes, it does.

Resume: Education and Experience of Christopher D. Ciccone

Education:

2010 Bachelor of Science Degree in Economics – Pennsylvania State University,
State College, Pennsylvania
2012 – Present Various utility industry conferences and seminars (e.g., EEI Advanced
Rates Course, PJM 101: The Basics)

Experience:

5/10 – 8/10 House Republican Appropriation Committee Intern – Harrisburg, PA
9/10 – 1/12 Guest Services – Hotel State College & Company – State College, PA
2/12 – Present State Regulatory Analyst – Rates & Regulatory Affairs – Pennsylvania –
FirstEnergy Service Corporation

Assisted in development and preparation of in the following rate-related proceedings:

Pennsylvania Public Utility Commission:

Docket Nos.	P-2011-2273650	P-2011-2273668	P-2011-2273669
	P-2011-2273670	M-2012-2334387	M-2012-2334392
	M-2012-2334395	M-2012-2334398	M-2012-2303494
	M-2012-2303547	M-2012-2303545	M-2013-2360494
	M-2013-2360493	M-2013-2360497	M-2014-2419717
	M-2014-2419719	M-2014-2419780	M-2014-2419764
	M-2014-2420515	M-2014-2420507	M-2014-2420525

New York State Public Service Commission:

Case No. 13-E-0067

**Metropolitan Edison Company
 LED Street Lighting Service
 Rate Summary**

Line No.	Description	Cobra Head				Acorn		Colonial	
		50W 4000L	90W 7000L	130W 11500L	260W 24000L	50W 2500L	90W 5000L	50W 2500L	90W 5000L
1	Install Cost	\$ 456.71	\$ 572.11	\$ 608.17	\$ 939.93	\$ 1,209.07	\$ 1,277.70	\$ 728.37	\$ 800.85
2	Other Dist. Plant	\$ 79.38	\$ 99.44	\$ 105.71	\$ 163.38	\$ 210.16	\$ 222.09	\$ 126.60	\$ 139.20
3	General Plant	\$ 38.53	\$ 48.27	\$ 51.31	\$ 79.30	\$ 102.00	\$ 107.79	\$ 61.45	\$ 67.56
4	Total Install	\$ 574.62	\$ 719.81	\$ 765.18	\$ 1,182.60	\$ 1,521.22	\$ 1,607.58	\$ 916.42	\$ 1,007.62
5	Fixed Charge Rate:	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%
6	Total Revenue Requirement:	\$ 1,073.93	\$ 1,345.28	\$ 1,430.08	\$ 2,210.20	\$ 2,843.06	\$ 3,004.46	\$ 1,712.73	\$ 1,883.17
7	Revenue Requirement NPV:	\$ 661.94	\$ 829.20	\$ 881.46	\$ 1,362.31	\$ 1,752.39	\$ 1,851.87	\$ 1,055.68	\$ 1,160.74
8	Annual Levelized Payment:	\$ 77.58	\$ 97.19	\$ 103.31	\$ 159.67	\$ 205.39	\$ 217.05	\$ 123.73	\$ 136.05
9	Monthly Fixture Charge	\$ 6.47	\$ 8.10	\$ 8.61	\$ 13.31	\$ 17.12	\$ 18.09	\$ 10.31	\$ 11.34
10	Gross Receipts Tax	5.90%	5.90%	5.90%	5.90%	5.90%	5.90%	5.90%	5.90%
11	Monthly Fixutre Charge	\$ 6.87	\$ 8.61	\$ 9.15	\$ 14.14	\$ 18.19	\$ 19.22	\$ 10.96	\$ 12.05

**Metropolitan Edison Company
 Levelized Payment Calculation**

Cobra Head / 4000L / Group Install

Line No.	Year	Undepreciated Balance (A)	Book Depr. Expense (C)	Tax Depreciation		DIT Expense (F)	ADIT (G)	Rate Base Balance (H)	Interest Expense (I)	Equity Return (J)	CIT Expense (K)	Property Taxes (L)	Customer Expense (N)	Distribution O&M (O)	Total Fixed Chgs (P)	Present Value (Q)	Levelized Payment (R)
				Rate (D)	Expense (E)												
1	0	\$575															
2	1	\$536	\$38	14.29%	\$82	\$18	\$18	\$518	\$14	\$28	\$2	\$0	\$6	\$3	\$110	\$102	\$78
3	2	\$498	\$38	24.49%	\$141	\$42	\$61	\$437	\$11	\$24	-\$26	\$0	\$6	\$3	\$100	\$86	\$78
4	3	\$460	\$38	17.49%	\$101	\$26	\$86	\$373	\$10	\$20	-\$11	\$0	\$6	\$3	\$92	\$73	\$78
5	4	\$421	\$38	12.49%	\$72	\$14	\$100	\$321	\$8	\$17	-\$1	\$0	\$6	\$3	\$86	\$63	\$78
6	5	\$383	\$38	8.93%	\$51	\$5	\$106	\$277	\$7	\$15	\$5	\$0	\$6	\$3	\$81	\$55	\$78
7	6	\$345	\$38	8.92%	\$51	\$5	\$111	\$234	\$6	\$13	\$4	\$0	\$6	\$3	\$76	\$48	\$78
8	7	\$306	\$38	8.93%	\$51	\$5	\$117	\$190	\$5	\$10	\$2	\$0	\$6	\$3	\$71	\$41	\$78
9	8	\$268	\$38	4.46%	\$26	-\$5	\$111	\$157	\$4	\$9	\$11	\$0	\$6	\$3	\$67	\$36	\$78
10	9	\$230	\$38	0.00%	\$0	-\$16	\$95	\$134	\$4	\$7	\$21	\$0	\$6	\$3	\$64	\$32	\$78
11	10	\$192	\$38	0.00%	\$0	-\$16	\$79	\$112	\$3	\$6	\$20	\$0	\$6	\$3	\$61	\$28	\$78
12	11	\$153	\$38	0.00%	\$0	-\$16	\$64	\$90	\$2	\$5	\$19	\$0	\$6	\$3	\$59	\$25	\$78
13	12	\$115	\$38	0.00%	\$0	-\$16	\$48	\$67	\$2	\$4	\$18	\$0	\$6	\$3	\$56	\$22	\$78
14	13	\$77	\$38	0.00%	\$0	-\$16	\$32	\$45	\$1	\$2	\$18	\$0	\$6	\$3	\$53	\$19	\$78
15	14	\$38	\$38	0.00%	\$0	-\$16	\$16	\$22	\$1	\$1	\$17	\$0	\$6	\$3	\$51	\$17	\$78
16	15	\$0	\$38	0.00%	\$0	-\$16	\$0	\$0	\$0	\$0	\$16	\$0	\$6	\$3	\$48	\$15	\$78
17	16	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	17	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	18	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	19	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	20	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	21	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	22	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	23	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25	24	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26	25	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
27	26	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	27	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	28	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30	29	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
31	30	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32	Total	\$0	\$575		\$575	\$0		\$0	\$78	\$162	\$115	\$6	\$94	\$45	\$1,074	\$662	\$1,164

NPV	\$662	NPV Check	\$662
Levelized Payment	\$78	Fixed Charge Rate	13.50%

Calculations:

- 35 1 - Column (B): Beg. Bal. = New Install Cost; Reduced annually by Column (C); Year End Balances
- 36 2 - Column (C) = Beg. Bal Column (B) / Assumed Book Life Investment (yrs)
- 37 3 - Column (D) = MACRS Depreciation
- 38 4 - Column (E) = Column (D) X Beg. Bal. Column (B)
- 39 5 - Column (F) = (Column (E) - Column (C)) X Composite Income Tax Rate
- 40 6 - Column (G) = Column (F) + Column (G) of prior period
- 41 7 - Column (H) = Column (B) - Column (G)
- 42 8 - Column (I) = Column (H) X Assumed Debt Ratio X Assumed Debt Cost
- 43 9 - Column (J) = Column (H) X Assumed Equity Ratio X Assumed Equity Cost

- 10 - Column (K) = Column (J) X Composite Income Tax Rate / (1 - Composite Income Tax Rate) - Column F
- 11 - Column (L) = New Install Cost Beg. Bal. X Taxes Other Than Income Allocation Factor
- 12 - Column (M) = New Install Cost Beg. Bal. X A&G Allocation Factor
- 13 - Column (N) = New Install Cost Beg. Bal. X Customer Expense Allocation Factor
- 14 - Column (O) = New Install Cost Beg. Bal. X Distribution O&M Allocation Factor
- 15 - Column (P) = Column (C) + Column (F) + Column (I) + Column (J) + Column (K) + Column (L) + Column (M) + Column (N) + Column (O)
- 16 - Column (Q) = Column (P) / (1 + Rate of Return) ^ Column (A)
- 17 - Fixed Charge Rate = Levelized Payment / Beg. Bal. Column (B)

**Metropolitan Edison Company
Levelized Payment Calculation**

Cobra Head / 7000L / Group Install

Line No.	Year	Undepreciated Balance	Book Depr. Expense	Tax Depreciation		DIT Expense	ADIT	Rate Base Balance	Interest Expense	Equity Return	CIT Expense	Property Taxes	Customer Expense	Distribution O&M	Total Fixed Chgs	Present Value	Levelized Payment
				Rate	Expense												
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(N)	(O)	(P)	(Q)	(R)
1	0	\$720															
2	1	\$672	\$48	14.29%	\$103	\$23	\$23	\$649	\$17	\$35	\$2	\$0	\$8	\$4	\$137	\$127	\$97
3	2	\$624	\$48	24.49%	\$176	\$53	\$76	\$548	\$14	\$30	-\$32	\$0	\$8	\$4	\$125	\$107	\$97
4	3	\$576	\$48	17.49%	\$126	\$32	\$108	\$468	\$12	\$25	-\$14	\$0	\$8	\$4	\$116	\$92	\$97
5	4	\$528	\$48	12.49%	\$90	\$17	\$126	\$402	\$10	\$22	-\$2	\$0	\$8	\$4	\$108	\$79	\$97
6	5	\$480	\$48	8.93%	\$64	\$7	\$132	\$347	\$9	\$19	\$7	\$0	\$8	\$4	\$101	\$69	\$97
7	6	\$432	\$48	8.92%	\$64	\$7	\$139	\$293	\$8	\$16	\$5	\$0	\$8	\$4	\$95	\$60	\$97
8	7	\$384	\$48	8.93%	\$64	\$7	\$146	\$238	\$6	\$13	\$2	\$0	\$8	\$4	\$88	\$51	\$97
9	8	\$336	\$48	4.46%	\$32	-\$7	\$139	\$197	\$5	\$11	\$14	\$0	\$8	\$4	\$83	\$45	\$97
10	9	\$288	\$48	0.00%	\$0	-\$20	\$119	\$168	\$4	\$9	\$26	\$0	\$8	\$4	\$80	\$40	\$97
11	10	\$240	\$48	0.00%	\$0	-\$20	\$100	\$140	\$4	\$8	\$25	\$0	\$8	\$4	\$77	\$35	\$97
12	11	\$192	\$48	0.00%	\$0	-\$20	\$80	\$112	\$3	\$6	\$24	\$0	\$8	\$4	\$73	\$31	\$97
13	12	\$144	\$48	0.00%	\$0	-\$20	\$60	\$84	\$2	\$5	\$23	\$0	\$8	\$4	\$70	\$28	\$97
14	13	\$96	\$48	0.00%	\$0	-\$20	\$40	\$56	\$1	\$3	\$22	\$0	\$8	\$4	\$67	\$24	\$97
15	14	\$48	\$48	0.00%	\$0	-\$20	\$20	\$28	\$1	\$2	\$21	\$0	\$8	\$4	\$63	\$21	\$97
16	15	\$0	\$48	0.00%	\$0	-\$20	\$0	\$0	\$0	\$0	\$20	\$0	\$8	\$4	\$60	\$19	\$97
17	16	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	17	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	18	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	19	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	20	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	21	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	22	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	23	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25	24	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26	25	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
27	26	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	27	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	28	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30	29	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
31	30	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32	Total	\$0	\$720		\$720	\$0		\$0	\$97	\$203	\$144	\$7	\$118	\$56	\$1,345	\$829	\$1,458

33
34

NPV	\$829	NPV Check	\$829
Levelized Payment	\$97	Fixed Charge Rate	13.50%

Calculations:

- 35 1 - Column (B): Beg. Bal. = New Install Cost; Reduced annually by Column (C); Year End Balances
- 36 2- Column (C) = Beg. Bal Column (B) / Assumed Book Life Investment (yrs)
- 37 3 - Column (D) = MACRS Depreciation
- 38 4 - Column (E) = Column (D) X Beg. Bal. Column (B)
- 39 5 - Column (F) = (Column (E) - Column (C)) X Composite Income Tax Rate
- 40 6 - Column (G) = Column (F) + Column (G) of prior period
- 41 7 - Column (H) = Column (B) - Column (G)
- 42 8 - Column (I) = Column (H) X Assumed Debt Ratio X Assumed Debt Cost
- 43 9 - Column (J) = Column (H) X Assumed Equity Ratio X Assumed Equity Cost

- 10 - Column (K) = Column (J) X Composite Income Tax Rate / (1 - Composite Income Tax Rate) - Column F
- 11 - Column (L) = New Install Cost Beg. Bal. X Taxes Other Than Income Allocation Factor
- 12 - Column (M) = New Install Cost Beg. Bal. X A&G Allocation Factor
- 13 - Column (N) = New Install Cost Beg. Bal. X Customer Expense Allocation Factor
- 14 - Column (O) = New Install Cost Beg. Bal. X Distribution O&M Allocation Factor
- 15 - Column (P) = Column (C) + Column (F) + Column (I) + Column (J) + Column (K) + Column (L) + Column (M) + Column (N) + Column (O)
- 16 - Column (Q) = Column (P) / (1+ Rate of Return) ^ Column (A)
- 17 - Fixed Charge Rate = Levelized Payment / Beg. Bal. Column (B)

**Metropolitan Edison Company
Levelized Payment Calculation**

Cobra Head / 11500L / Group Install

Line No.	Year	Undepreciated Balance (B)	Book Depr. Expense (C)	Tax Depreciation		DIT Expense (F)	ADIT (G)	Rate Base Balance (H)	Interest Expense (I)	Equity Return (J)	CIT Expense (K)	Property Taxes (L)	Customer Expense (N)	Distribution O&M (O)	Total Fixed Chgs (P)	Present Value (Q)	Levelized Payment (R)
				Rate (D)	Expense (E)												
1	0	\$765															
2	1	\$714	\$51	14.29%	\$109	\$24	\$24	\$690	\$18	\$38	\$2	\$1	\$8	\$4	\$146	\$135	\$103
3	2	\$663	\$51	24.49%	\$187	\$57	\$81	\$582	\$15	\$32	-\$34	\$1	\$8	\$4	\$133	\$114	\$103
4	3	\$612	\$51	17.49%	\$134	\$34	\$115	\$497	\$13	\$27	-\$15	\$1	\$8	\$4	\$123	\$98	\$103
5	4	\$561	\$51	12.49%	\$96	\$18	\$134	\$427	\$11	\$23	-\$2	\$1	\$8	\$4	\$115	\$84	\$103
6	5	\$510	\$51	8.93%	\$68	\$7	\$141	\$369	\$10	\$20	\$7	\$1	\$8	\$4	\$108	\$73	\$103
7	6	\$459	\$51	8.92%	\$68	\$7	\$148	\$311	\$8	\$17	\$5	\$1	\$8	\$4	\$101	\$63	\$103
8	7	\$408	\$51	8.93%	\$68	\$7	\$155	\$253	\$7	\$14	\$3	\$1	\$8	\$4	\$94	\$55	\$103
9	8	\$357	\$51	4.46%	\$34	-\$7	\$148	\$209	\$5	\$11	\$15	\$1	\$8	\$4	\$89	\$48	\$103
10	9	\$306	\$51	0.00%	\$0	-\$21	\$127	\$179	\$5	\$10	\$28	\$1	\$8	\$4	\$85	\$42	\$103
11	10	\$255	\$51	0.00%	\$0	-\$21	\$106	\$149	\$4	\$8	\$27	\$1	\$8	\$4	\$82	\$38	\$103
12	11	\$204	\$51	0.00%	\$0	-\$21	\$85	\$119	\$3	\$7	\$26	\$1	\$8	\$4	\$78	\$33	\$103
13	12	\$153	\$51	0.00%	\$0	-\$21	\$64	\$90	\$2	\$5	\$25	\$1	\$8	\$4	\$75	\$29	\$103
14	13	\$102	\$51	0.00%	\$0	-\$21	\$42	\$60	\$2	\$3	\$23	\$1	\$8	\$4	\$71	\$26	\$103
15	14	\$51	\$51	0.00%	\$0	-\$21	\$21	\$30	\$1	\$2	\$22	\$1	\$8	\$4	\$67	\$23	\$103
16	15	\$0	\$51	0.00%	\$0	-\$21	\$0	\$0	\$0	\$0	\$21	\$1	\$8	\$4	\$64	\$20	\$103
17	16	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	17	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	18	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	19	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	20	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	21	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	22	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	23	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25	24	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26	25	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
27	26	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	27	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	28	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30	29	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
31	30	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32	Total	\$0	\$765		\$765	\$0		\$0	\$103	\$216	\$153	\$8	\$125	\$60	\$1,430	\$881	\$1,550

33
34

NPV	\$881	NPV Check	\$881
Levelized Payment	\$103	Fixed Charge Rate	13.50%

Calculations:

- 35 1 - Column (B): Beg. Bal. = New Install Cost; Reduced annually by Column (C); Year End Balances
- 36 2- Column (C) = Beg. Bal Column (B) / Assumed Book Life Investment (yrs)
- 37 3 - Column (D) = MACRS Depreciation
- 38 4 - Column (E) = Column (D) X Beg. Bal. Column (B)
- 39 5 - Column (F) = (Column (E) - Column (C)) X Composite Income Tax Rate
- 40 6 - Column (G) = Column (F) + Column (G) of prior period
- 41 7 - Column (H) = Column (B) - Column (G)
- 42 8 - Column (I) = Column (H) X Assumed Debt Ratio X Assumed Debt Cost
- 43 9 - Column (J) = Column (H) X Assumed Equity Ratio X Assumed Equity Cost

- 10 - Column (K) = Column (J) X Composite Income Tax Rate / (1 - Composite Income Tax Rate) - Column F
- 11 - Column (L) = New Install Cost Beg. Bal. X Taxes Other Than Income Allocation Factor
- 12 - Column (M) = New Install Cost Beg. Bal. X A&G Allocation Factor
- 13 - Column (N) = New Install Cost Beg. Bal. X Customer Expense Allocation Factor
- 14 - Column (O) = New Install Cost Beg. Bal. X Distribution O&M Allocation Factor
- 15 - Column (P) = Column (C) + Column (F) + Column (I) + Column (J) + Column (K) + Column (L) + Column (M) + Column (N) + Column (O)
- 16 - Column (Q) = Column (P) / (1+ Rate of Return) ^ Column (A)
- 17 - Fixed Charge Rate = Levelized Payment / Beg. Bal. Column (B)

**Metropolitan Edison Company
Levelized Payment Calculation**

Acorn / 2500L / Group Install

Line No.	Year	Undepreciated Balance	Book Depr. Expense	Tax Depreciation		DIT Expense	ADIT	Rate Base Balance	Interest Expense	Equity Return	CIT Expense	Property Taxes	Customer Expense	Distribution O&M	Total Fixed Chgs	Present Value	Levelized Payment
				Rate	Expense												
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(N)	(O)	(P)	(Q)	(R)
1	0	\$1,521															
2	1	\$1,420	\$101	14.29%	\$217	\$48	\$48	\$1,372	\$36	\$75	\$5	\$1	\$17	\$8	\$290	\$269	\$205
3	2	\$1,318	\$101	24.49%	\$373	\$113	\$161	\$1,158	\$30	\$63	-\$68	\$1	\$17	\$8	\$265	\$227	\$205
4	3	\$1,217	\$101	17.49%	\$266	\$68	\$229	\$988	\$26	\$54	-\$30	\$1	\$17	\$8	\$245	\$194	\$205
5	4	\$1,116	\$101	12.49%	\$190	\$37	\$266	\$850	\$22	\$46	-\$4	\$1	\$17	\$8	\$228	\$167	\$205
6	5	\$1,014	\$101	8.93%	\$136	\$14	\$280	\$734	\$19	\$40	\$14	\$1	\$17	\$8	\$214	\$146	\$205
7	6	\$913	\$101	8.92%	\$136	\$14	\$294	\$619	\$16	\$34	\$10	\$1	\$17	\$8	\$201	\$126	\$205
8	7	\$811	\$101	8.93%	\$136	\$14	\$308	\$503	\$13	\$27	\$5	\$1	\$17	\$8	\$187	\$109	\$205
9	8	\$710	\$101	4.46%	\$68	-\$14	\$295	\$415	\$11	\$23	\$30	\$1	\$17	\$8	\$176	\$95	\$205
10	9	\$608	\$101	0.00%	\$0	-\$42	\$252	\$356	\$9	\$19	\$56	\$1	\$17	\$8	\$169	\$84	\$205
11	10	\$507	\$101	0.00%	\$0	-\$42	\$210	\$297	\$8	\$16	\$54	\$1	\$17	\$8	\$162	\$75	\$205
12	11	\$406	\$101	0.00%	\$0	-\$42	\$168	\$237	\$6	\$13	\$51	\$1	\$17	\$8	\$155	\$66	\$205
13	12	\$304	\$101	0.00%	\$0	-\$42	\$126	\$178	\$5	\$10	\$49	\$1	\$17	\$8	\$148	\$58	\$205
14	13	\$203	\$101	0.00%	\$0	-\$42	\$84	\$119	\$3	\$6	\$47	\$1	\$17	\$8	\$141	\$52	\$205
15	14	\$101	\$101	0.00%	\$0	-\$42	\$42	\$59	\$2	\$3	\$44	\$1	\$17	\$8	\$134	\$45	\$205
16	15	\$0	\$101	0.00%	\$0	-\$42	\$0	\$0	\$0	\$0	\$42	\$1	\$17	\$8	\$127	\$40	\$205
17	16	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	17	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	18	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	19	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	20	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	21	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	22	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	23	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25	24	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26	25	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
27	26	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	27	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	28	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30	29	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
31	30	\$0	\$0	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
32	Total	\$0	\$1,521		\$1,521	\$0		\$0	\$206	\$429	\$304	\$15	\$249	\$119	\$2,843	\$1,752	\$3,081

33
34

NPV	\$1,752	NPV Check	\$1,752
Levelized Payment	\$205	Fixed Charge Rate	13.50%

Calculations:

- 35 1 - Column (B): Beg. Bal. = New Install Cost; Reduced annually by Column (C); Year End Balances
- 36 2- Column (C) = Beg. Bal Column (B) / Assumed Book Life Investment (yrs)
- 37 3 - Column (D) = MACRS Depreciation
- 38 4 - Column (E) = Column (D) X Beg. Bal. Column (B)
- 39 5 - Column (F) = (Column (E) - Column (C)) X Composite Income Tax Rate
- 40 6 - Column (G) = Column (F) + Column (G) of prior period
- 41 7 - Column (H) = Column (B) - Column (G)
- 42 8 - Column (I) = Column (H) X Assumed Debt Ratio X Assumed Debt Cost
- 43 9 - Column (J) = Column (H) X Assumed Equity Ratio X Assumed Equity Cost

- 10 - Column (K) = Column (J) X Composite Income Tax Rate / (1 - Composite Income Tax Rate) - Column F
- 11 - Column (L) = New Install Cost Beg. Bal. X Taxes Other Than Income Allocation Factor
- 12 - Column (M) = New Install Cost Beg. Bal. X A&G Allocation Factor
- 13 - Column (N) = New Install Cost Beg. Bal. X Customer Expense Allocation Factor
- 14 - Column (O) = New Install Cost Beg. Bal. X Distribution O&M Allocation Factor
- 15 - Column (P) = Column (C) + Column (F) + Column (I) + Column (J) + Column (K) + Column (L) + Column (M) + Column (N) + Column (O)
- 16 - Column (Q) = Column (P) / (1+ Rate of Return) ^ Column (A)
- 17 - Fixed Charge Rate = Levelized Payment / Beg. Bal. Column (B)

**Metropolitan Edison Company
Installation Costs**

<u>Line No.</u>	<u>Light Type</u>	<u>Monthly kWh</u>	<u>Lumens</u>	<u>Wattage</u>	<u>Installation Cost (12 Lights)</u>
1	Cobra Head	18	4,000	50	\$5,480.53
2	Cobra Head	32	7,000	90	\$6,865.28
3	Cobra Head	46	11,500	130	\$7,298.01
4	Cobra Head	91	24,000	260	\$11,279.16
5	Acorn	18	2,500	50	\$14,508.80
6	Acorn	32	5,000	90	\$15,332.43
7	Colonial	18	2,500	50	\$8,740.46
8	Colonial	32	5,000	90	\$9,610.25

**Metropolitan Edison Company
Distribution Costs**

Line No. Other Distribution Plant Allocated to Streetlighting

1	Total Distribution Plant to Streetlighting	\$ 26,898,000	Met-Ed Exhibit HES-1
2	Total Directly Assigned Plant to Streetlighting	\$ 22,915,000	Met-Ed Exhibit HES-1
3	Total Other Distribution Plant to Streetlighting	\$ 3,983,000	Line 1 - Line 2
4	Other Distribution Plant Factor	17.38%	Line 3 / Line 2

Other Distribution O&M Allocated to Streetlighting

5	Total Distribution O&M to Streetlighting	\$ 400,000	Met-Ed Exhibit HES-1
6	Total Directly Assigned O&M to Streetlighting	\$ 250,000	Met-Ed Exhibit HES-1
7	Other Distribution O&M to Streetlighting	\$ 150,000	Line 5 - Line 6
8	Other Distribution O&M Factor	0.65%	Line 7 / Line 2

**Metropolitan Edison Company
 General Property**

<u>Line No.</u>	<u>General Property Allocated to Streetlighting</u>	<u>ME 2013 FERC Form 1</u>	
1	Gross Investment in Streetlighting	\$ 12,229,688	<i>FF1, 207.73.g</i>
2	Total Investment in Plant	\$ 2,705,225,121	<i>FF1, 207.104.g</i>
3	Total General Plant	\$ (210,468,340)	<i>FF1, 207.99.g</i>
4	Total Investment in Plant Less General Plant	\$ 2,494,756,781	<i>Line 2 + Line 3</i>
5	Streetlighting % of Total Plant (Less General)	0.49%	<i>Line 1 / Line 4</i>
6	General Plant Allocated to Streetlighting	\$ 1,031,749	<i>Line 3 * Line 5</i>
7	General Plant Factor	8.44%	<i>Line 6 / Line 1</i>

**Metropolitan Edison Company
 Customer Expenses**

<u>Customer Accounts Expense</u>						
<u>Line No.</u>	<u>Account</u>	<u>Description</u>	ME 2013 <u>FERC Form 1</u>	<u>Allocation</u>	Streetlighting <u>Related</u>	
1	901	Supervision	\$ 5,287	0.11%	\$ 6	FF1, 322.159.b
2	902	Meter Reading	\$ 4,131,264	0.00%	\$ 0	FF1, 322.160.b
3	903	Customer Records and Collection Expenses	\$ 6,257,008	0.11%	\$ 6,656	FF1, 322.161.b
4	904	Uncollectible Accounts	\$ 14,333,240	0.81%	\$ 116,258	FF1, 322.162.b
5	905	Miscellaneous Customer Accounts Expenses	\$ 238,152	0.11%	\$ 253	FF1, 322.163.b
6		Total	\$ 24,964,951		\$ 123,173	Sum: Lines 1-5
<u>Customer Service and Information Expenses</u>						
	<u>Account</u>	<u>Description</u>	ME 2013 <u>FERC Form 1</u>	<u>Allocation</u>	Streetlighting <u>Related</u>	
7	907	Supervision	\$ 204,598	0.11%	\$ 218	FF1, 323.167.b
8	908	Customer Assistance Expense	\$ 36,521,122	0.11%	\$ 38,853	FF1, 323.168.b
9	909	Informational and Instructional Expenses	\$ 460	0.11%	\$ 0	FF1, 323.169.b
10	910	Misc. Customer Service and Information Exp	\$ 5,174,025	0.11%	\$ 5,504	FF1, 323.170.b
11		Total	\$ 41,900,205		\$ 44,575	Sum: Lines 7-10
12	373	Gross Investment in Streetlighting			\$ 12,229,688	FF1, 207.73.g
13		Customer Expense Allocation Factor			1.37%	(Line 6 + Line 11) / Line 12

Memo:

<u>Streetlighting Related Customer Accounts Expense</u>			ME 2013 <u>FERC Form 1</u>	
14	Total Revenues		\$ 752,022,790	FF1, 304.43.c
15	Total Street Lighting Revenues		\$ 6,099,704	FF1, 304.32.c
16	% of Street Lighting to Total		0.81%	Line 15 / Line 14
<u>Customer Count</u>				
17	Total number of customers		554,596	FF1, 304.43.d
18	Estimated number of streetlighting customers		590	FF1, 304.32.d
19	% of Total		0.11%	Line 18 / Line 17

**Metropolitan Edison Company
 Property Taxes**

<u>Line No.</u>	<u>Description</u>	ME 2013 FERC Form 1	
1	Local Real Estate	\$ 128,166	FF1, 263.30.i
2	PURTA	\$ 1,930,000	FF1, 263.1.2.i
3	Total	<u>\$ 2,058,166</u>	Line 1 + Line 2
 <u>Property Taxes Allocated to Income</u>			
4	Streetlighting % of Total Plant (Less General)	0.49%	<i>Page 12, Line 5</i>
5	Property Taxes Allocated to Streetlighting	\$ 10,089	<i>Line 3 * Line 5</i>
6	Property Taxes Factor	0.08%	<i>Line 5 / Page 12, Line 1</i>

**Metropolitan Edison Company
Capital Recovery Factors**

<u>Rate of Return (RoR)</u>				
<u>Line No.</u>	<u>2014 Capital Structure</u>	<u>Percent</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
1	Long Term Debt	50.04%	5.210%	2.607%
2	Common Equity	49.96%	10.900%	5.446%
3	Total	100.00%		8.053%
 <u>Depreciation</u>				
4	Depreciable Years (n)	15		
5	SLD = 1 / n	6.67%		
6	Tax Life of Investment (yrs)	7		
 <u>Taxes</u>				
		<u>2014</u>		
7	Federal Income Tax Rate	35.00%		
8	State Income Tax Rate	9.99%		
9	Effective Tax Rate	41.493500%		

**Met-Ed/Penelec/Penn Power/West Penn
LED Street Lighting Monthly Fixture Charge**

Fixture Information		
Type	Lumens	Wattage

Monthly Unit Cost			
ME	PN	PP	WPP

1	Cobra Head	4000	50
2		7000	90
3		11500	130
4		24000	260

\$ 6.87	\$ 5.89	\$ 5.25	\$ 5.52
\$ 8.61	\$ 7.41	\$ 6.59	\$ 6.94
\$ 9.15	\$ 7.88	\$ 7.01	\$ 7.38
\$ 14.14	\$ 12.24	\$ 10.84	\$ 11.44

5	Acorn	2500	50
6		5000	90

\$ 18.19	\$ 15.78	\$ 13.95	\$ 14.73
\$ 19.22	\$ 16.68	\$ 14.75	\$ 15.57

7	Colonial	2500	50
8		5000	90

\$ 10.96	\$ 9.46	\$ 8.40	\$ 8.85
\$ 12.05	\$ 10.41	\$ 9.23	\$ 9.74