

STATE OF MASSACHUSETTS
BEFORE THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

In re: Petition of City of Cambridge)
Regarding Streetlight Purchase)

Docket No. 04-65

DIRECT TESTIMONY OF
PAUL CHERNICK
ON BEHALF OF
THE CITY OF CAMBRIDGE

Resource Insight, Inc.

OCTOBER 4, 2004

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ATTACHMENTS

Attachment PLC-1	<i>Professional Qualifications of Paul Chernick</i>
Attachment PLC-2	<i>DTE-Accepted Calculations of Streetlight Purchase Price</i>
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Attachment PLC-4	<i>Cambridge Streetlighting Net Plant Computed with DTE 01-25 Method</i>

1 **I. Identification and Qualifications**

2 **Q: State your name, occupation and business address.**

3 A: I am Paul L. Chernick. I am the president of Resource Insight, Inc., 347
4 Broadway, Cambridge, Massachusetts 02139.

5 **Q: Summarize your professional education and experience.**

6 A: I received an SB degree from the Massachusetts Institute of Technology in
7 June, 1974 from the Civil Engineering Department, and an SM degree from
8 the Massachusetts Institute of Technology in February, 1978 in technology
9 and policy. I have been elected to membership in the civil engineering
10 honorary society Chi Epsilon, and the engineering honor society Tau Beta Pi,
11 and to associate membership in the research honorary society Sigma Xi.

12 I was a utility analyst for the Massachusetts Attorney General for more
13 than three years, and was involved in numerous aspects of utility rate design,
14 costing, load forecasting, and the evaluation of power supply options. Since
15 1981, I have been a consultant in utility regulation and planning, first as a
16 research associate at Analysis and Inference, after 1986 as president of PLC,
17 Inc., and in my current position at Resource Insight. In these capacities, I
18 have advised a variety of clients on utility matters. My work has considered,
19 among other things, power supply planning, rate design, cost allocation, and
20 utility industry restructuring.

21 My resume is attached as Attachment PLC-1.

22 **Q: Have you testified previously in utility proceedings?**

23 A: Yes. I have testified approximately one hundred and seventy times on utility
24 issues before various regulatory, legislative, and judicial bodies, including
25 utility rate regulators in Massachusetts, Vermont, Maine, Rhode Island, New

1 Hampshire, Maryland, Delaware, Connecticut, Texas, New Mexico, District
2 of Columbia, Michigan, Minnesota, Ohio, South Carolina, North Carolina,
3 Florida, Pennsylvania, New York, Arizona, Illinois, Utah, Washington, West
4 Virginia, Mississippi, and Ontario, as well as the New Orleans City Council,
5 the Federal Energy Regulatory Commission, and the Atomic Safety and
6 Licensing Board of the U.S. Nuclear Regulatory Commission.

7 **Q: Have you testified previously before this Department?**

8 A: I testified in approximately 45 proceedings before the Department (mostly
9 when it was called the Department of Public Utilities). These proceedings are
10 listed in Attachment PLC-1.

11 **Q: Did you present testimony in any proceedings concerning the calculation
12 a purchase price for streetlights?**

13 A: Yes, in two proceedings: DTE 98-89, involving the purchase of streetlights
14 by Acton and Lexington, and DTE 01-25, involving the purchase of
15 streetlights by three towns: Harwich, Sandwich and Edgartown. My
16 testimony in these cases is described briefly in Attachment PLC-1.

17 **II. Introduction**

18 **Q: On whose behalf are you testifying?**

19 A: I am testifying on behalf of the City of Cambridge.

20 **Q: What is the purpose of your testimony?**

21 A: I was asked to review the calculation by Cambridge Electric Light Company
22 (CELC, or the Company) of the purchase price for municipal streetlights in
23 Cambridge. I evaluated these calculations against the standard established in
24 G.L. c. 164, §34A. Under this standard, a municipality wishing to purchase

1 its streetlights from the distribution utility must pay the utility “its
2 unamortized investment, net of any salvage value obtained by the electric
3 company under the circumstances, in the lighting equipment owned by the
4 electric company in the municipality.”

5 **Q: Under this standard, how should the purchase price be calculated?**

6 A: The calculation of unamortized investment for purposes of purchasing
7 streetlights should be consistent with the company’s traditional accounting
8 practices for tracking “original investment” and “accumulated depreciation”
9 for ratemaking purposes. In utility practice, the unamortized investment is
10 equal to the gross plant in service (that is, cumulative additions minus
11 cumulative retirements), net of accumulated depreciation. Depreciation rates
12 are set and periodically reviewed by the Department.

13 Gross plant in service is simply a running total of prior additions net of
14 retirements, plus or minus any transfers or adjustments to the plant balance.
15 Accumulated depreciation is the running total of depreciation expense, net of
16 retirements, since retirements are subtracted from both gross plant and
17 depreciation reserves.¹ Each year’s depreciation in turn is the product of the
18 current year’s gross plant balance times a depreciation rate.²

19 **Q: Has the DTE adopted this method in the past streetlight purchase
20 proceedings?**

21 A: Yes. In DTE 98-89, the Department found that “the unamortized investment
22 is equal to the book value of gross plant in service, net of accumulated

¹This treatment prevents the net plant from changing as plant is retired.

²Depreciation is commonly computed on the average plant balance during the period, estimated as the average of the balance at the beginning and end of the period. The period may be a year, as in the computations used in all the NStar streetlighting cases, a quarter, or a month.

1 depreciation.” The computation that Boston Edison offered and the
2 Department accepted used the method I just described. The Department,
3 NStar, and municipalities have referred to this approach to valuing
4 streetlights as the “Boston Edison Method.”

5 In DTE 01-25 (involving the purchase of streetlights by Harwich,
6 Sandwich and Edgartown), the Department endorsed the suitability of the
7 Boston Edison Method for calculating the purchase price of streetlights.
8 However, in that ruling, the Department also approved a variation on the
9 Boston Edison Method, to accommodate Commonwealth Electric’s lack of
10 community-specific annual data on additions and retirements. The
11 modification retained the Boston Edison Method’s use of depreciation rates
12 used in ratemaking and accounting, as well as permitting equipment that was
13 more than 100% depreciated to offset the costs of equipment that was not
14 fully depreciated.

15 In DTE 02-11 (involving the purchase of streetlights by Waltham),
16 Boston Edison had the required community-specific data on additions and
17 retirements and used the Boston Edison Method, and the Department
18 approved that computation.

19 **Q: Are the findings of the Department in these cases relevant to this**
20 **proceeding?**

21 **A:** Yes. While in each of these cases, the dispute involved issues specific to
22 those towns, the Department endorsed the basic principle and method that I
23 have applied here.

24 Attachment PLC-2 presents calculations of the purchase price for one
25 community in each of the three proceedings, using the method approved in
26 that case. The final purchase price differed due to changes in inputs, but the
27 final method was the same as shown in Attachment PLC-2.

1 **Q: Has the Cambridge attempted to negotiate a purchase price for the**
2 **Town's streetlights?**

3 A: Yes.

4 **Q: What has been the result of those negotiations?**

5 A: The City and the Company have been unable to resolve their dispute on the
6 proper method of calculating the unamortized streetlight investment.

7 **Q: Please summarize your conclusions.**

8 A: The Company proposes an excessive purchase price. The Company's
9 approach substantially overstates the unamortized lighting investment. It is
10 inconsistent with the statute, the Boston Edison Company method approved
11 by the Department in Docket No. DTE 98-89, and expressly endorsed in
12 DTE 01-25, and DTE 02-11, and standard utility ratemaking practices.

13 The purchase price calculated as of December 31, 2003 for the
14 streetlighting plant serving municipal customers should be about \$876,000,
15 not the \$1,726,000 proposed by the Company. The final purchase price
16 should be updated to include for actual additions and retirements prior to
17 closing date.

18 **III. The Company's Streetlight-Pricing Proposal**

19 **Q: Can you explain the method CELC used to calculate of the streetlight**
20 **purchase price?**

21 A: I cannot be precise in answering that question, since CELC has not provided
22 the derivation. I can say the results of the Company's calculations are clearly
23 inconsistent with the statute and the Boston Edison method of streetlight
24 valuation previously approved by the Department. The Company has asserted
25 that its computation of accumulated depreciation is based on Iowa mortality

1 curves, and the general pattern of that depreciation is consistent with the use
2 of such mortality curves.

3 **Q: What documentation has the Company provided to support its proposed**
4 **valuation of the streetlight equipment?**

5 A: The Company has provided a spreadsheet with the following information, by
6 vintage:

- 7 • the original cost of the lights installed in each year net of retirements of
8 that vintage from 1943 (which may represent the oldest surviving lights
9 in the City), through 2003,
- 10 • a claimed depreciation reserve for that vintage,
- 11 • a breakdown of outdoor lighting investment into the three categories,
12 City, MDC and Private Lighting.

13 **Q: How did the Company determine the depreciation reserve by vintage?**

14 A: The Company has not explained the basis for its calculation. CELC did not
15 compute accumulated depreciation booked over the period 1943-2003 from
16 the depreciation rates used for ratemaking purposes, as in Boston Edison
17 method. Rather, it appears that CELC has arbitrarily determined depreciation
18 reserves for each vintage, independent of how much it has booked or charged
19 for depreciation.

20 **Q: Is CELC's method an appropriate approach for setting the sales price**
21 **for streetlights under G.L. c. 164, §34A?**

22 A: No. CELC's method has the following problems:

- 23 • *Fails to credit the ratemaking depreciation rate for all the plant being*
24 *purchased.*

25 The computation of the "unamortized investment" requires the use of
26 depreciation rates that must be the same as the rates used in ratesetting.

1 In various years, Cambridge Electric has charged depreciation rates for
2 Account 373 ranging from 4.5% to 6.46% (Exhibit CAM-4). In
3 contrast, CELC's calculation of the streetlighting buyout effectively
4 applies low and declining depreciation rates, falling from about 4.5% in
5 the first year that equipment is in service to 1.6% by the 60th year of
6 service.³ These variable depreciation rates are computed in Attachment
7 PLC-3.⁴

- 8 • *Prevents any Cambridge streetlight from having a negative net book*
9 *value.*

10 The City has paid more than the full original cost for lights older than
11 the depreciation life, which CELC reported as 18 years in its 1996–98
12 FERC Form 1 reports. These older lights should contribute a negative
13 net value to the purchase price. CELC's calculation arbitrarily reduces
14 the depreciation rate as equipment ages, so that it reports positive net
15 plant even for equipment that was installed 60 years ago. Exhibit CAM-
16 2 provides CELC's remaining gross plant and claimed depreciation

³I calculated these effective depreciation rates as a function of remaining investment, thereby assuming zero depreciation on the investment in that vintage that was retired before year-end 2003. I also calculated CELC's claimed total depreciation for each vintage (2003 reserve plus retirements of that vintage through 2003, computed as the difference between original additions and remaining plant in service) as a percentage of original additions of that vintage. The implied depreciation rates for the various vintages are much less regular with this method, probably because of transfers. The depreciation rates still fall from about 4.5% for 2003 additions to a fraction of a percent in most years prior to 1982.

⁴Remaining cost and depreciation reserve are also broken down by subaccount, but for a given vintage, the ratio of accumulated depreciation to gross plant for each year is the same across subaccounts. Even where the Company has indicated it used different depreciation rates for different subaccounts, in the years 1992 through 1999, this ratio is the same across subaccounts. (Exhibit CAM-3). This seems to be inconsistent with what little we know about the Company's methodology.

1 reserve by year, starting in 1943. The Company claims positive net
2 plant for streetlights installed in the 1940s, which are over three times
3 their assumed depreciation lives.

4 **Q: Are these problems shared by the method used by Boston Edison in**
5 **setting the purchase price for Lexington’s and Acton’s lights in DPU 98-**
6 **89?**

7 A: No. The Boston Edison Method, which has since been used in setting prices
8 for Bedford, Newton, Boston, Brookline, Stoneham, Natick, Framingham,
9 Westwood, Burlington, Winchester, Chelsea, Waltham and (in modified
10 form) Harwich, Sandwich and Edgartown:

- 11 • Applies the same streetlighting depreciation rates the utility used for
- 12 ratemaking and accounting purposes.
- 13 • Allows older lights in Cambridge to have negative net values, which
- 14 offset the positive values of younger Cambridge lights.⁵

15 **Q: Has the DTE addressed the use of Iowa curves in computing**
16 **accumulated depreciation?**

17 A: Yes. The Department rejected this method in DTE 01-25. In explaining its
18 rejection of Commonwealth Electric’s Iowa-curve method, that Order noted
19 with approval that the Boston Edison Method “computes, rather than
20 allocates, accumulated depreciation for the streetlights to be sold based on
21 depreciation rates used for ratemaking and accounting purposes” (DTE 01-25
22 at 6). The Department also praised the method for permitting “fully-

⁵Because Boston Edison implicitly used negative net values for older lights and offset those against the positive value of younger lights, Boston Edison sold more than 3,000 lights to Lexington for the nominal value of one dollar. Similarly, in DTE 01-25, the Department noted that all three towns had “negative unamortized investment” under the approved method.

1 depreciated streetlights with negative values to reduce the unamortized
2 investment of newer streetlights” (ibid.).

3 The Order in DTE 01-25 clarified the intent of the DTE 98-89 order that
4 “The Company must value streetlighting equipment based on a depreciation
5 rate that recognizes the useful life of the streetlighting equipment” (at 4); the
6 depreciation rate must be based on the average useful life of the equipment as
7 used for ratemaking and accounting purposes, rather than the useful life of
8 the surviving equipment.

9 **Q: Could the Company’s calculation be valid in some circumstances?**

10 A: It is difficult to say for certain, not knowing the basis of CELC’s calculation.
11 However, it is possible that the Company’s approach (whatever it is) may be
12 appropriate for some purposes, for example, for determining the “economic
13 value” of the plant or a price for sale to a third party. Whatever its basis and
14 underlying principle, CELC’s method cannot be valid for use in the sale of
15 streetlights to a municipality, which must be at gross plant net of depreciation
16 charged.

17 The purpose of the calculation is to determine the portion of the original
18 investment in streetlighting that the Company has not yet recovered.

19 **IV. Purchase-Price Computation for CELC’s Streetlights**

20 **Q: Have you performed a corrected calculation of the purchase prices for
21 the City of Cambridge?**

22 A: Yes. Applying the Boston Edison method, I computed the accumulated
23 depreciation and net plant as of year-end 2003, using depreciation rates
24 provided by the Company. Those values appear to be consistent with the
25 depreciation rates used in setting CELC’s rates.

1 **Q: What is the source of your input assumptions?**

2 A: Wherever possible, I used information provided by the Company, namely:

- 3 • Gross plant additions, retirements, transfers and adjustments, by year,
4 from 1943 to 2002 (Exhibit CAM-3).
5 • Gross plant balances from 1943 to 2002 (Exhibit CAM-3).
6 • Depreciation rates charged in various years from Exhibit CAM-4.
7 • The municipal fraction of that cost by vintage from Exhibit CAM-2.

8 For 2003, I set additions equal to the vintage-2003 plant and retirements
9 reported in Exhibit CAM-2, and retirements equal to the difference between
10 gross plant at the end of 2002 (from Exhibit CAM-3) and 2003 (from Exhibit
11 CAM-2). Again, all the data are from CELC.

12 **Q: How did you determine the streetlighting depreciation rate for each**
13 **year?**

14 A: I used the following depreciation rates, from Exhibit CAM-4:

- 15 • Through 1976, the 6.46% rate that CELC reported for 1973.
16 • For 1977–1985, the 5% rate that CELC reported for 1978.
17 • For 1986–1990, the 4.5% rate that CELC reported for 1986.
18 • For 1991, the 6.1% rate that CELC reported for that year.
19 • For 1992–1999, the plant-weighted average of sub-account rates that
20 CELC reported for those years.
21 • For 2000–2003, the 6.29% rate that CELC reported for those years.

22 The weighted average of the rates CELC specified for 1992–1999 is
23 essentially the same as the 6.29% rate CELC reports for 2000–2003.

24 Based on conversations with CELC staff, it is my understanding that the
25 Company has no major disagreements with the annual depreciation rates I
26 used.

1 **Q: Please explain each step of your calculation.**

2 A: The details of my calculation are provided in Exhibit CAM-5. I have
3 highlighted in bold all of the data inputs provided by the Company. The
4 calculation consists of the following steps:

- 5 • Starting with the initial 1942 plant balance reported by CELC, the gross
6 plant in service at the end of each year is the previous year's balance,
7 plus the current year's additions (and any transfers or adjustments) and
8 minus the current year's retirements.
- 9 • Each year's depreciation is the product of the current year's
10 depreciation rate and average gross plant balance, which in turn is the
11 average of year-end gross plant in the current and previous years.
- 12 • Each year's final depreciation reserve is the previous year's reserve,
13 plus the current year's depreciation, minus current retirements.⁶
14 Consistent with the Boston Edison Method, I assumed that accumulated
15 depreciation in 1942 was half of the gross plant in that year.
- 16 • Each year's net plant is the year-end gross plant in service less year-end
17 depreciation reserve.

18 **Q: How did you allocate streetlight investment between the City and the**
19 **MDC and Private Lighting categories?**

20 A: I used the Company's allocation. In Exhibit CAM-2, CELC estimates that
21 78% of the net streetlighting plant is for municipal lights. I multiplied

⁶I assumed that the adjustments were not depreciated, and I ignored the possibility of accrued depreciation on transferred plant (which nets out to only about \$5,000). The 1957 transfer out of streetlighting of \$171,000 (over a third of streetlighting plant) results in large calculated negative net book for a few years; if the transferred plant were as depreciated as average streetlighting plant in that year, net book would be only slightly negative in a single year.

1 CELC's total net streetlighting plant by 0.78 to estimate the municipal
2 fraction.

3 **Q: What are the results of your calculation?**

4 A: I calculate a net book value for CELC's streetlights of \$1,123,706, as of year-
5 end 2003. I estimate the a municipal purchase price of 78% of the net book,
6 or \$876,000, for year-end 2003.

7 **Q: Has the DTE used any alternative approaches for implementing the
8 Boston Edison Method of calculating streetlight purchase price?**

9 A: Yes. In the case of the purchase of streetlights by Harwich, Sandwich and
10 Edgartown in DTE 01-25, Commonwealth could only provide the original
11 cost of the surviving plant by vintage. Commonwealth was unable to provide
12 town-specific annual additions and retirements. Even with this incomplete
13 information, the Department accepted calculations consistent with the Boston
14 Edison Method.

15 It is not appropriate to use the DTE 01-25 approximation here, because
16 CELC has provided a complete history of annual additions and retirements
17 data specific to Cambridge streetlighting. In DTE 01-25 the approximate
18 approach was only authorized because the complete history was not
19 available.

20 In calculating the purchase price in Waltham, after DTE 01-25 was
21 decided, Boston Edison used the complete set of community-specific
22 additions and retirements, and the original DTE 98-89 method for calculating
23 accumulated depreciation with respect to that complete set of additions and
24 retirements.

25 I used CELC's complete set of annual additions and retirements in
26 preparing Exhibit CAM-5 to compute accumulated depreciation, with the

1 Boston Edison Method approved in DTE 98-89 and reaffirmed in DTE 01-
2 25.

3 **Q: Would the purchase price for Cambridge differ much if calculated from**
4 **remaining additions, rather than from original additions and**
5 **retirements, as in DTE 01-25 ?**

6 A: Yes. In the case of Cambridge, the DTE 01-25 variation on the “Boston
7 Edison” method would produce a substantially lower price than the
8 computation using the full history of Cambridge-specific additions and
9 retirements. Attachment PLC-4 shows this computation.

10 **V. Recommendation**

11 **Q: What action do you recommend the Department take in this matter?**

12 A: The Department should instruct CELC to transfer the lights serving the City
13 at the \$876,000 calculated in Exhibit CAM-5 as of end-of-the-year 2003,
14 subject to adjustment for actual additions, transfers, adjustments, retirements,
15 and depreciation up to the closing date, December 31, 2003.

16 **Q: Does this complete your testimony?**

17 A: Yes.