

**PROVINCE OF NOVA SCOTIA**  
**BEFORE THE NOVA SCOTIA UTILITY AND REVIEW BOARD**

<b>In the Matter of an Application by</b>	)	
<b>Nova Scotia Power Inc. for</b>	)	<b>Matter No. M05339</b>
<b>Approval of the 2013</b>	)	
<b><u>Annual Capital Expenditure Plan</u></b>	)	

**DIRECT TESTIMONY OF**  
**PAUL CHERNICK**  
**ON BEHALF OF**  
**THE CONSUMER ADVOCATE**

Resource Insight, Inc.

**JANUARY 16, 2013**

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**EXHIBITS**

Exhibit PC-1

*Professional Qualifications of Paul Chernick*

1 **I. Identification**

2 **Q: Mr. Chernick, please state your name, occupation, and business address.**

3 A: I am Paul L. Chernick. I am the president of Resource Insight, Inc., 5 Water  
4 St, Arlington, Massachusetts.

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.

19 My work has considered, among other things, the cost-effectiveness of  
20 prospective new electric generation plants and transmission lines,  
21 retrospective review of generation-planning decisions, ratemaking for plant  
22 under construction, ratemaking for excess and/or uneconomical plant  
23 entering service, conservation program design, cost recovery for utility  
24 efficiency programs, the valuation of environmental externalities from  
25 energy production and use, allocation of costs of service between rate classes

1 and jurisdictions, design of retail and wholesale rates, and performance-based  
2 ratemaking and cost recovery in restructured gas and electric industries. My  
3 professional qualifications are further summarized in Exhibit PC-1.

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

5 A: Yes. I have testified more than 250 times on utility issues before various  
6 regulatory, legislative, and judicial bodies, including utility regulators in  
7 thirty states and five Canadian provinces, and two U.S. Federal agencies.  
8 This testimony has included the review of many utility-proposed power  
9 plants and purchased-power contracts.

10 **Q: Have you testified previously regarding cost allocation issues?**

11 A: Yes. I have testified in at least two dozen proceedings on utility allocation of  
12 costs among rate classes, as listed in my resume.

13 **Q: Have you testified previously regarding energy-efficiency programs?**

14 A: Yes. I have testified in at least three score proceedings on utility-funded  
15 energy-efficiency efforts, as listed in my resume.

16 **Q: Have you previously testified before this Board?**

17 A: Yes. I testified in the Board's review of the following cases:

- 18 • Nova Scotia Power's Demand Side Management Plan for 2010 and  
19 Demand Side Management Cost Recovery Rider in May 2009.
- 20 • The proposed purchased-power agreement between Nova Scotia Power  
21 Inc. ("NSPI") and a biomass project to be constructed at the NewPage  
22 Port Hawkesbury pulp and paper mill (NSUARB P-172).
- 23 • Nova Scotia Power's proposal to build the biomass project at NewPage  
24 Port Hawkesbury (NSUARB P-128.10).
- 25 • Heritage Gas's 2010 rate case (NSUARB NG-HG-R-10).

- 1       • Nova Scotia Power’s proposal to increase production depreciation rates  
2           (NSUARB NSPI-P-891).
- 3       • The Board’s review of proposed feed-in tariffs for certain distribution-  
4           connected renewable projects (NSUARB BRD-E-R-10).
- 5       • Nova Scotia Power general rate application (NSUARB NSPI P-892), with  
6           respect to cost allocation and rate design.
- 7       • The Board’s review of proposed a proposed load-retention tariff and  
8           rate (NSUARB NSPI P-202).
- 9       • The application of Efficiency Nova Scotia Corporation (ENSC)  
10           Electricity Demand-Side Management Plan for 2013–2015

## 11   **II. Introduction and Summary**

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

13   A: My testimony is sponsored by the Nova Scotia Consumer Advocate.

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

15   A: I review six issues raised by NSPI’s 2013 ACE application:

- 16       • The structure of the Economic Analysis Model (EAM) that NSPI uses  
17           “to calculate the economic value added of any project.” (Application at  
18           12)
- 19       • NSPI’s treatment of Administrative Overhead (AO) in the computation  
20           of project costs.
- 21       • NSPI’s treatment of Allowance for Funds Used During Construction  
22           (AFUDC) in the computation of project costs.
- 23       • NSPI’s failure to consistently analyze the alternative of deferring  
24           economic investments.
- 25       • NSPI’s projection of replacement energy costs.

- 1           • The analysis of transmission project 43285, in which NSPI proposes to  
2           add a second capacitor bank to the Bridgewater 99W substation.

3   **Q: What are your conclusions?**

4   A: I conclude that

- 5           • NSPI's EAM model does not properly reflect the costs of capital  
6           expenditures.
- 7           • NSPI's treatment of AO and AFUDC is inappropriate and understates  
8           the costs of capital expenditures.
- 9           • NSPI has not properly reviewed the option of deferring economic  
10          investments. Since NSPI's forecasts rising replacement power prices,  
11          equipment failure rates and other factors underlying many projects'  
12          benefits, the net present value of revenue requirements may be reduced  
13          by forgoing the first year's benefits and reducing the present value of  
14          cost recovery for the project.
- 15          • NSPI's estimates of replacement energy costs include several counter-  
16          productive features.
- 17          • The economic analyses of the Bridgewater Capacitor Bank use  
18          unrealistic load and cost data, such as assuming that loads will be above  
19          forecast peak load for 20% of the year, that all savings occur at the  
20          highest-value times, and that cost of replacement energy will be higher  
21          than NSPI's own forecasts. This particular project is expected to cost  
22          \$1.1 million, but correcting NSPI's methodologies may be important in  
23          much larger projects over time.

24   **Q: What are your recommendations?**

25   A: I recommend that

- 1       • The Board require NSPI to refile all the projects evaluated with the  
2       EAM, computing the net present value of revenue requirements,  
3       including 100% of AO and AFUDC as costs and without any pre-  
4       operational credit for these cost components. For each economically-  
5       justified project for which deferral of the project is technically feasible,  
6       NSPI should provide the net present value of revenue requirements for  
7       delays of one year and (if a one-year delay reduces revenue  
8       requirements) longer periods, to determine the least-cost timing of the  
9       project.
- 10       • The Board should not approve the Bridgewater Capacitor Bank until  
11       NSPI files corrected analyses correcting the errors I discuss in Section  
12       VI, below.
- 13       • For the 2014 and subsequent ACE proceedings, the Board should  
14       require NSPI to continue using the corrected revenue requirements  
15       approach, with current and realistic input assumptions. If NSPI can  
16       demonstrate that a portion of AO is truly fixed and independent of  
17       capital expenditures, that portion can be credited to revenue  
18       requirements during construction. While some of the AO allocated to a  
19       project may just represent reshuffling of fixed costs, others (pensions,  
20       legal costs, permitting) are real incremental costs and should be  
21       included.
- 22       • In its reply evidence, NSPI should provide clarity regarding its  
23       assumptions related to replacement energy costs. If such clarity is not  
24       provided, for the 2014 and subsequent ACE proceedings, the Board  
25       should require NSPI to provide derivation of the replacement energy  
26       cost assumptions.

1 **III. The Economic Analysis Model**

2 **Q: What economic test does NSPI use in evaluating the economics of capital**  
3 **projects?**

4 A: The Economic Analysis Model (EAM) used by NSPI produces a number of  
5 economic indicators internally, including at least the following:

- 6 1. Internal rate of return (IRR) of “cash flow after taxes,” which is the  
7 project’s
  - 8 • operating savings
  - 9 • minus income taxes (as if the savings were additional taxable  
10 profit, rather than a reduction in revenue requirements)
  - 11 • plus the depreciation tax deduction,
  - 12 • minus the capital investment.
- 13 2. Years to payback for cash flow after taxes, that is, the number of years  
14 before the cumulative operating savings (with imputed taxes) exceed the  
15 initial investment.
- 16 3. Net present value of cash flow after taxes.
- 17 4. Net present value of Economic Value Added (EVA), which is the same  
18 as cash flow after taxes, other than the substitution of annual book  
19 depreciation and return on investment (reduced for the tax shelter on  
20 debt and not including taxes on equity return) for the project capital  
21 investment.
- 22 5. The net present value of “free cash flow,” which appears to be another  
23 rearrangement of the components of cash flow after taxes or EVA.
- 24 6. The net present value of revenue requirements.



1           The net present values in items 3, 4 and 5 are identical in the examples I  
2           have reviewed.<sup>1</sup>

3     **Q: Does NSPI actually use all these tests in screening the projects it**  
4     **proposes in the capital expenditure plan?**

5     A: No. For most projects, NSPI appears to rely on the IRR, net present value  
6     and years to payback for its computation of after-tax cash flow (application,  
7     p. 3). In addition,

8           NS Power applies a revenue requirement analysis for larger capital  
9           projects to better understand rate impacts for customers. The  
10          methodology still applies a discounting factor of inputs, but incorporates  
11          cash and non-cash inputs that effect revenue requirement. It is further  
12          used to compare project alternatives on a unit basis such as \$/MWh.  
13          Recently this methodology was applied to evaluate investment decisions  
14          for renewable generation against independent power producer contracts  
15          that are expressed on a \$/MWh basis over a specific term. (NSUARB  
16          IR-11a)

17    **Q: Are NSPI's primary economic tests appropriate?**

18    A: No. As I discuss in Sections IV and V, NSPI's primary tests ignore real costs  
19    and fail to address the optimal timing of projects. But even if the inputs and  
20    assumptions were appropriate, NSPI's preferred indicators of value do not  
21    represent the appropriate economic objective for NSPI's capital planning,  
22    which would be minimizing the cost of providing service (consistent with  
23    other regulatory constraints and objectives, such as safety and reliability).

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<sup>1</sup> The EAM computations for 29 generation capital projects are included in the spreadsheet attachments to SBA IR-44, and additional examples are shown in SBA IR-29 and NSUARB IR-53 Attachment 1. NSPI also uses the EAM for at least some transmission projects, as demonstrated by the EAM outputs provided for the Dartmouth Loop in NSUARB IR-29 Attachment 1 and tower painting in SBA IR-94 Attachment 3.

1           Rather than being an afterthought for certain “larger capital projects,”  
2           minimization of the net present value of revenue requirements should be used  
3           as NSPI’s primary screen.

4   **Q: How does NSPI’s version of after-tax cash flow differ from revenue**  
5   **requirements?**

6   A: The approaches are so different that comparing them is difficult, but I have  
7   identified the following features that vary between the two computations:

- 8   • NSPI’s cash-flow computation imputes income taxes on operating savings,  
9       even though the operating savings would reduce revenue requirements and  
10      result in no net tax effect.
- 11   • NSPI’s cash-flow computation excludes the costs of return on investment  
12      and the income taxes on the equity portion of return.
- 13   • NSPI’s cash-flow computation excludes AO and AFUDC.

14   **Q: How might NSPI’s use of its cash flow, rather than revenue**  
15   **requirements, affect choices among alternatives?**

16   A: That is difficult to determine, given the range of possible cost and benefit  
17   patterns. Excluding return on investment and associated income taxes (and  
18   tax credits) related to capital projects may distort choices between expensed  
19   and capitalized expenditures, as suggested in NSUARB IR-11c, which asked:

20           Does NSPI consider the cash cost of Return on Rate Base when  
21           analyzing multiple options where one would be repair and presumably  
22           expensed?

23   NSPI responded as follows:

24           Yes. The cost of both equity and debt are inherent in the discount rate  
25           applied in the Economic Analysis Model (EAM). The discount rate used  
26           is NS Power’s Weighted Average Cost of Capital (WACC).

1           This response does not explain how the differences in timing of costs  
2           between expensed and capitalized costs are actually captured by NSPI's  
3           method. Nor is it factually correct: the discount rate that NSPI uses is not the  
4           WACC, but instead the WACC reduced by the tax shield on debt payments.  
5           Revenue requirements are not reduced for the tax effects of debt, and are  
6           instead increased by the taxes paid on equity.

#### 7   **IV. NSPI Treatment of Costs**

##### 8   **Q: How has NSPI changed the treatment of costs in this filing?**

9   A: For its principle economic analyses, the cash-flow and economic value add  
10   computations, NSPI excludes Administrative Overhead (AO) and Allowance  
11   for Funds Used During Construction (AFUDC). NSPI's explained these  
12   omissions as follows:

13           The capital investment for each project...no longer includes  
14           Administrative Overhead (AO) and Allowance for Funds Used During  
15           Construction (AFUDC). AO and AFUDC are non-cash items and  
16           therefore not a part of Economic Value Add (EVA) and NPV analysis  
17           (these are cash based approaches to economic analysis). (Application, p.  
18           12)

19           NS Power implemented this change in an effort to provide a higher  
20           degree of accuracy when isolating direct cash flows associated with the  
21           project analysis. Isolating Administrative Overhead and Allowance For  
22           Funds Used During Construction further enables the identification of  
23           inputs used in a revenue requirement analysis. (NSUARB IR-11a)

24           AO and AFUDC are both accrued, allocated and estimated capital  
25           amounts that reflect credits to operating income. They do not reflect  
26           outlays of cash. (NSUARB IR-10a)

27           When asked "how is NSPI accounting for the non-cash elements  
28           capitalized that would contribute further to customer's costs?", NSPI  
29           responded that "Non-cash items are not included in a discounted cash flow

1 analysis such as NPV. Non-cash items are incorporated in a revenue  
2 requirement analysis.” (NSUARB IR-11d) NSPI further elaborated as  
3 follows:

4 Applying AO and AFUDC as cash items misrepresents and overstates  
5 the capital cash investment that is evaluated. Where two projects had  
6 significantly different AO and/or AFUDC amounts and these figures  
7 represented a material portion of the projects’ total capital cost, the cash  
8 approach would provide the more accurate representation of the  
9 economic value of the projects for customers. (NSUARB IR-11e)

10 NSPI believes that “by isolating the impact of investments on cash flow,  
11 these changes more accurately depict the capital investment requirement.”  
12 (NSUARB IR-11e)

13 **Q: How does NSPI treat AO and AFUDC for revenue requirements**  
14 **purposes?**

15 A: For revenue requirements purposes, NSPI describes these costs as “AO &  
16 AFUDC credits, which are credited during construction and expensed over  
17 the useful life of the asset.” (NSUARB IR-19c) While computations in the  
18 EAM spreadsheet are sometimes difficult to follow, the EAM appears to  
19 reflect AO and AFUDC in the following ways:

- 20 • Reducing revenue requirement in the year of expenditure by AFUDC and  
21 70% of AO.<sup>2</sup>
- 22 • Further reducing revenue requirement in the year of expenditure by  
23 reducing taxes by the following quantity, where  $t$  is the income tax rate:

$$24 \quad t \div (1-t) \times (\text{AFUDC} + 70\% \times \text{AO})$$

- 25 • Ignoring all return (interest and earning for shareholders) on AFUDC and  
26 AO and the income taxes on the earnings to cover those costs.

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<sup>2</sup> The other 30% of AO is included in tax depreciation over time.

- 1           • Including AO and AFUDC in book depreciation.

2           The first three points distort and understate the costs of AFUDC and  
3           AO.

4   **Q: Can you estimate the magnitude of the error in NSPI’s modeling of**  
5   **AFUDC and AO?**

6   A: Yes. In an unused tab of an EAM spreadsheet, I input the following  
7   parameters:

- 8           • A direct capital cost of \$100,000 in 2013.  
9           • Book depreciation rate of 4%.  
10          • Tax depreciation (CCA) rate of 8%.  
11          • Either zero or \$10,000 or AFUDC and AO.  
12

13           Table 1 summarizes the results, expressed in terms of 2012 present  
14   value of revenue requirements (PVRR). The present value of the revenue  
15   requirements from the direct expenditures is 97.3% of the expenditure.<sup>3</sup> In  
16   contrast, adding a dollar of AFUDC to the direct cost *reduces* PVRR by  
17   \$1.16 and adding a dollar of AO reduces PVRR by \$1.10. In NSPI’s model,  
18   adding costs to a project reduces its revenue requirements.  
19

20   **Table 1: Effect of AFUDC and AO in NSPI's Revenue Requirements Model**

Direct	AFUDC	AO	PVRR	Incremental PV of	
				AFUDC	AO
\$100,000			\$97,389		
\$100,000	\$10,000		\$85,836	-\$11,554	
\$100,000	\$10,000	\$10,000	\$74,875	-\$11,554	-\$10,961
\$100,000		\$10,000	\$86,428		-\$10,961

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<sup>3</sup> This is the present value of a 2013 investment discounted back to 2012. Discounting back to 2013 produces a PVRR of about 103.7% of the investment.

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These counterintuitive results clearly indicate that the EAM model is incorrect.

**A. Administrative Overhead**

**Q: Does NSPI agree that AO is a real cost of capital additions?**

A: NSPI’s position on this important question is ambiguous. On the one hand, some of NSPI’s responses to discovery clearly indicate that capital projects cause administrative costs:

AO is a charge to capital of a portion of costs associated with the administrative resources used to support capital projects. As the amount of resources required to complete capital work decreases, the associated administration of such resources is not required and therefore would not be required in the business. (NSUARB IR-10b)

Overhead expenses are integral costs associated with the construction of capital assets...[T]he cost of a capital asset not only includes direct construction or development costs (such as materials and labour), but also overhead costs attributable to construction or development activities. (SBA IR-24)

Although overhead costs are both real and substantial, they cannot be identified with specific capital projects or expenditures. For this reason, overhead costs that contribute to the capital program must be allocated to capital projects. (SBA IR-24)

When asked “Would any administrative overhead cost...be an incremental cost that would only be incurred to support the proposed capital investment?” NSPI responded in part that AO is “incremental to the capital spend.” (SBA IR-8)

In other words, capital projects cause NSPI to incur costs that are not tracked as part of the project, and those costs are estimated for each project

1 through overhead cost factors that assume a fixed ratio of overheads to direct  
2 expenditures (or to labor).

3 **Q: Where does the ambiguity in NSPI's position arise?**

4 A: In a couple places. First, there is NSPI's peculiar treatment of AO, which it  
5 ignores for cash-flow purposes and treats as a reduction in revenue  
6 requirements during construction. Second, while NSPI acknowledges that  
7 AO is "incremental to the capital spend," NSPI also claims that AO is "non-  
8 cash and [is] therefore extraneous to evaluating the impact of investments on  
9 cash flow." (SBA IR-8)

10 **Q: Has NSPI provided any justification for ignoring the additional  
11 overhead costs incurred to support capital projects, or treating overhead  
12 costs as reducing revenue requirements?**

13 A: No.

14 **Q: Has NSPI documented the composition of the overhead costs, in support  
15 of its positions?**

16 A: No. When asked for detail on the AO charges, NSPI has provided only  
17 general descriptions and high-level totals by type of plant. (NSUARB IR-19,  
18 CA IR-18, SBA IR-24)

19 **Q: Might the composition of the overhead costs justify treating part of those  
20 costs as NSPI has treated them?**

21 A: In principle, that might be relevant. If NSPI really believed that the overhead  
22 costs were fixed and independent of capital expenditures (which would be  
23 inconsistent with the discovery responses I cite above), it might justify that  
24 position by showing that the overhead costs comprise primarily fixed costs  
25 (e.g., software licenses, leases, return on plant or contracts that would cover  
26 much higher levels of activity without additional costs and could not be

1 avoided by lower levels of activity).<sup>4</sup> On the other hand, if the overhead costs  
2 are driven by the number of employees, their compensation, the number of  
3 vehicles and the amount of equipment they use, and variable costs supporting  
4 those employees, the overhead costs are incremental, as NSPI has  
5 acknowledged.

6 **Q: How should AO be treated in NSPI's capital investment modelling?**

7 A: Unless NSPI can demonstrate that a specific portion of AO allocated to  
8 capital investment is fixed and independent of that investment, the entirety of  
9 AO should be treated as a cash expense, included in the cash-flow analyses.  
10 In revenue requirements analyses, NSPI should impute no credit for AO  
11 during construction, unless it can demonstrate that the AO allocated to the  
12 capital expenditure exceeds the incremental AO incurred.

13 ***B. Allowance for Funds Used During Construction***

14 **Q: Does NSPI agree that AFUDC is a real cost of capital additions?**

15 A: Once again, NSPI's position is ambiguous. On the one hand, some of NSPI's  
16 responses to discovery clearly indicate that capital projects cause AFUDC.  
17 The response to SBA IR-8 describes AFUDC as "incremental to the capital  
18 spend." NSPI also clearly considers AFUDC to be a real cost when it states  
19 that

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<sup>4</sup> Even if a portion of a cost component is fixed, the total cost of that component may vary with labor and other drivers. For example, NSPI's investment in its Water Street headquarters is fixed, but incremental demand for working space for incremental employees has resulted in a request for expenditures on furniture and modifications to convert non-office space to office use (NSUARB IR-35), which may then increase other costs (such as off-site storage, or travel time to retrieve material from storage).



1 “cost-of-capital invested in construction work in progress is included in  
2 an allowance for funds used during construction [citing FASB ASC 980-  
3 360-20] as an addition to the cost of property constructed using a  
4 weighted average cost-of-capital. This will be charged to operations  
5 through depreciation over the service life of the related assets and  
6 recovered through future revenues.” (SBA IR-23 Attachment 1)

7 The inclusion of AFUDC in the cost of a capital asset ensures that the  
8 financing costs (i.e. debt, equity and preferred shares) related to  
9 financing NS Power’s capital program are equitably recovered over the  
10 life of the asset. (NSUARB IR-10c)

11 On the other hand, NSPI also says that AFUDC is non-cash and  
12 “therefore extraneous to evaluating the impact of investments on cash flow.”  
13 (SBA IR-8) NSPI also insists that “AFUDC is charged as a component of the  
14 capital cost of a project and the offsetting credit reduces interest costs  
15 recorded in the current period as an expense.” (NSUARB IR-10c) These  
16 assertions appear to assume that NSPI does not really raise funds or pay  
17 return on those funds during the construction period.

18 **Q: Is there any question as to whether NSPI pays for the capital used to**  
19 **finance capital expenditures, during the construction period?**

20 A: No.

21 **Q: Does NSPI offer any other excuses for treating AFUDC as non-cash**  
22 **expenditures?**

23 A: Yes. NSPI asserts that “projects are not financed individually and the effects  
24 of financing are captured in the discount rate.” (SBA IR-8)

25 **Q: Are these excuses valid?**

26 A: No. The fact that “projects are not financed individually” is irrelevant. Just as  
27 any one project does not have dedicated financing, it also does not have  
28 dedicated construction employees. Carrying out millions of dollars in

1 construction projects requires additional capital, just as it requires additional  
2 labor.

3 The second excuse has nothing to do with the inclusion of AFUDC as a  
4 cost. If NSPI expects to spend \$1 million in purchases in 2014, to go into  
5 service immediately without any AFUDC, it would discount that sum in  
6 exactly the same way as \$1 million in construction expenditures that are  
7 completed in 2014 with \$100,000 of AFUDC. Nothing in NSPI's discounting  
8 of cash flows, revenue requirements, or any other metric corrects for the error  
9 in its treatment of AFUDC.

10 **Q: How should AFUDC be treated in NSPI's capital investment modelling?**

11 A: AFUDC should be treated as a cash expense and hence should be included in  
12 the cash-flow analyses. In revenue requirements analyses, NSPI should  
13 impute no credit for AFUDC during construction.

#### 14 **V. Investment Timing**

15 **Q: Does NSPI use its EAM model to determine the least-cost timing for  
16 investments driven by economic considerations?**

17 A: No. In my review of the workpapers that NSPI has provided (in the  
18 Attachments to SBA IR-29, SBA IR-44, SBA IR-94, NSUARB IR-29 and  
19 NSUARB IR-53), I see no situations in which NSPI has compared the  
20 economics of different in-service dates for the same project. NSPI generally  
21 shows that the project at a proposed date produces benefits under its  
22 preferred metrics. In some cases, NSPI compares different types of solutions  
23 for the same problem (e.g., fibre reinforced plastic or steel pipe in CI 40308,  
24 refurbish or replace pumps in CI 41506).

25 **Q: Why does the timing of an investment matter?**

1 A: Delaying an investment one year reduces the present value of its costs (and  
2 of the revenue requirements) by the difference between the discount rate and  
3 the inflation rate. With NSPI's estimates of a 2% inflation rate and a 6.48%  
4 cost of capital, each year's delay reduces the present-value cost of the project  
5 by about 4.2%. Unless the first-year benefits (expected avoided repair costs  
6 and replacement power) exceed 4.2% of the present value of revenue  
7 requirements, customers would be expected to be better off delaying the  
8 project a year. The same logic applies to additional years of delay.

9 In addition, delaying a project may allow for updating information on  
10 loads, fuel prices, use of generation resources, and other factors relevant to  
11 the need for and economics of the project. After a few years of delay, NSPI  
12 may find that the project is not needed, or a much smaller alternative will be  
13 adequate, or some much larger solution will be required.

## 14 **VI. Projection of Replacement Energy Costs**

15 **Q: How do replacement energy costs figure into the project justifications?**

16 A: The EAM computations for many generation projects include as project  
17 benefits the avoided cost of prolonged outages following failure of  
18 equipment that would be replaced or refurbished in the project.

19 **Q: How did NSPI estimate the avoided energy costs of outages?**

20 A: According to NSPI,

21 Year 2013 and 2014 Strategist Fuel and Purchased Power forecasts  
22 (Strategist runs), developed using the Fuel Adjustment Mechanism Plan  
23 of Administration methodology, were used to calculate incremental  
24 replacement energy costs. (NSUARB IR-51b)

25 NSPI then escalated the 2014 avoided costs by 2% annually (NSUARB  
26 IR-51d).

1           As shown in the “RE Costs and Capacity” sheet of the EAM model,  
2           NSPI computed the incremental energy cost of replacement energy for each  
3           plant for plant type, representing the difference between the energy cost of  
4           the plant and whatever might replace that plant’s output during an outage.  
5           Specifically, NSPI produced those replacement energy costs for the  
6           following plant groups (listed in declining order of replacement energy cost):

- 7           • Hydro as a group,
- 8           • Trenton 6,
- 9           • Tufts Cove 6,
- 10          • Tufts Cove 1–3,
- 11          • Trenton 5,
- 12          • Lingan 1–4,
- 13          • Point Tupper, and
- 14          • Point Aconi.

15   **Q: Do NSPI’s estimates of the replacement energy costs make sense?**

16   A: To some extent. Hydro is obviously the most expensive resource to replace,  
17   since it has no fuel cost and it must be replaced by coal and gas. Among the  
18   fossil-fueled units, Trenton 6 is the lowest-cost unit, followed by Tufts Cove  
19   6. Replacing energy from Trenton 5 or 6 would generally require running a  
20   plant on Cape Breton, increasing line losses and requiring more than one  
21   replacement MWh for each lost MWh.

22           Other aspects of the replacement power costs raise questions. Point  
23   Aconi and Point Tupper have lower fuel costs than Lingan, and should be  
24   more expensive to replace than Lingan, but NSPI assigns them lower  
25   replacement costs. Point Tupper is also closer to load than Lingan, so line  
26   losses should further increase the cost of replacing Point Tupper power.

1           Considering the low capacity factors at Lingan, replacing one Lingan unit  
2           would usually result in dispatching another unit more, imposing a very low  
3           incremental fuel cost.

4           Similarly, it is strange that NSPI reports such large differentials for  
5           replacing the Tufts Cove steam units, although the complexity of dispatch for  
6           these units (constrained by transmission limits and shaped by seasonal  
7           variation in fuel prices) may produce some counterintuitive outcomes.

8           Another peculiarity is that NSPI uses the same replacement power costs  
9           for all four Lingan units, and the same replacement power costs for Tufts  
10          Cove units 1–3, despite differences in the heat rates of units within the plants.  
11          Replacement power for Lingan 1 and 2, which will be operating only in the  
12          winter, should be more expensive than replacement power for Lingan 3 and  
13          4, which are expected to operate year round.

14       **Q: How should the Board deal with these questions about NSPI's**  
15       **replacement power assumptions?**

16       A: Unfortunately, the schedule in this proceeding has not afforded the Board or  
17       the parties an opportunity for further discovery after NSPI provided its  
18       assumptions regarding replacement power cost. Some clarification may be  
19       provided in NSPI's reply evidence or in cross-examination.

20           If the state of the record on these issues is essentially unchanged by the  
21           end of this proceeding, the Board should order NSPI to provide derivation of  
22           the replacement energy cost assumptions in future ACE filings. The  
23           complexity of the replacement energy cost computations and some other  
24           portions of the economic analyses in the ACE filings would also argue for a  
25           technical conference each year to review those computations.

1 **VII. Bridgewater 99W Substation Second Capacitor Bank (Project 43285)**

2 **Q: Please describe NSPI's Project 43285.**

3 A: This project would add a second 36 MVAR capacitor bank at the  
4 Bridgewater transmission substation (substation 99W), at a cost of \$1.1  
5 million.

6 **Q: What is NSPI's justification for this project?**

7 A: In CI 43285 in the application (page 1 and Attachment 3), NSPI lays out the  
8 potential savings. While NSPI for system loads with the Bowater Mersey  
9 load on line and with it off line, only the no-Bowater case is relevant. NSPI  
10 estimates that the capacitor bank would be operated in 20% of the time (or  
11 1,740 hours annually), all in the winter, and claims that it would produce the  
12 following two groups of benefits:

- 13 • Reducing transmission losses across the entire NSPI system. The estimates  
14 of these loss reductions range from 1 MW with Bowater and 0.4 MW  
15 without Bowater in the Application to 1.2 MW in NSUARB IR-81 Figure 2  
16 and CA IR-2a (which appear to assume that Bowater is on line).<sup>5</sup> In the  
17 without-Bowater case, the savings would be about 700 MWh annually,  
18 which NSPI values at approximately \$55,100/year in energy cost  
19 reductions.
- 20 • “Potentially” increasing the transfer limit of the Onslow South interface,  
21 now approximately 900 MW, by 25 MW, allowing gas-fired Halifax  
22 generation to be replaced by less expensive generation an additional 1% of  
23 the time, saving approximately \$130,000/year.

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<sup>5</sup> The 1.2 MW loss figure is based on a new computation with the South Canoe wind plant on line. Oddly, while NSPI says that “Onslow South flows are not affected” by South Canoe, it reports higher loss reductions with South Canoe than without the plant.

1 **Q: Is NSPI's estimate of the loss savings estimates reasonable?**

2 A: No, for two reasons. First, the reduction in losses is based on peak load  
3 conditions that are unlikely to occur at all in the future, and certainly would  
4 not occur in 1,750 hours annually. The Application does not specify the load  
5 levels for which losses were estimated, but NSUARB IR-81 shows a load of  
6 2,149.6 MW, apparently including Bowater. Subtracting Bowater's load,  
7 NSPI's loss computation would have used a load of about 2,070 MW.

8 These modeled load levels are representative of recent annual peak  
9 loads. NSPI's June 2012 long-term forecast shows peak-loads forecasts under  
10 2,100 MW for 2013, falling below 2,070 MW in 2018 and continuing to  
11 decline over time (10 Year System Outlook 2012–2021, Table 2). That  
12 forecast appears to include the Bowater load (since the Bowater closure was  
13 announced in June 2012 and was not mentioned in the forecast). The current  
14 short-term load forecast shows a 2014 peak below 2,000 MW (18 Month  
15 Forecast and Assessment of System Capacity and Adequacy, October 2012–  
16 April 2014).

17 These peak loads occur only once a year. Few hours typically have load  
18 levels close to peak. For example, in 2011, the Nova Scotia peak load was  
19 about 2,176 MW, but only 34 hours had loads over 2,000 MW and 7 hours  
20 had loads over 2,050 MW. The highest 1,750 hours averaged 1,712 MW,  
21 79% of the annual peak. The lowest of those 1,750 hours had a load of about  
22 1,541 MW, 71% of the peak.

23 NSPI reports that reducing load by removing Bowater's roughly 80  
24 MW reduced the loss saving 60%, from 1 MW to 0.4 MW. Reducing the  
25 modeled loads another 400 MW, to the average load in the top 1,750 hours,  
26 would further reduce the loss savings, probably to near zero for most of those  
27 hours. Since the capacitors consume energy when they are in use, NSPI

1 would actually dispatch the capacitors for much less than 1,750 hours under  
2 these conditions.

3 Second, NSPI's analysis uses very high costs for replacing the energy  
4 losses. The Application did not provide an economic analysis for the project,  
5 and NSPI refused to perform a full economic analysis when requested to do  
6 so (SBA IR-95, NSUARB IR-81). Rather than providing estimated annual  
7 benefits, NSPI provided only a "10-year average winter generation cost" (CA  
8 IR-19).

9 The ten-year average price that NSPI assumed for replacement power  
10 from Tufts Cove replacement energy is higher than NSPI's 2013 and 2014  
11 forecasts for Tufts Cove fuel costs (for either the steam plant or the  
12 combined-cycle plant) in the initial application for the 2013 GRA and in the  
13 update in that proceeding.<sup>6</sup> In fact, the dispatch price assumed in evaluating  
14 this project was 11% higher than the January 2014 forecast cost for Tufts  
15 Cove Unit 2 (the least efficient steam unit) in the fuel-cost update and 23%  
16 higher than the winter average cost in the winter (December, January and  
17 February).

18 While NSPI assumes in the evaluation of the capacitors that the high-  
19 load hours in which the capacitors would be activated would all be in the  
20 winter (CA IR-19a), that is not true. Table 2 shows the monthly distribution  
21 of the highest 1,750 hours in each year, averaged over 2007, 2008 and 2010.<sup>7</sup>  
22 Of the 1,750 hours with the highest loads on Onslow South in each year, an

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<sup>6</sup> The specific fuel costs are confidential, so I will only report the relationships among the confidential values.

<sup>7</sup> The Onslow South data on the Nova Scotia Power Oasis web site for 2009, 2011 and 2012 are incomplete. November is missing from 2009, February–May from 2011, and May and December from 2012.



1 average of 320 were in January (the highest-cost month), 731 were in  
 2 December and February (with costs considerably lower than in January), 387  
 3 hours were in March and November (with still lower costs), and 312 were in  
 4 the lowest-cost months of April–October. The dispatch price assumed in  
 5 evaluating the Bridgewater capacitor bank was 40% higher than NSPI’s own  
 6 estimate of the Tufts Cove 2 fuel cost for 2014, weighted by the distribution  
 7 of hours with high loads on Onslow South.

8  
 9

**Table 2: Distribution of Highest Loads on Onslow South**

<b>Month</b>	<b>Hours in Top 1,750</b>
January	316
February	331
March	234
April	95
May	10
June	15
July	52
August	24
September	7
October	70
November	199
December	398
Annual	1,750

10 Using the average monthly fuel cost per MWh may overstate the  
 11 dispatch cost of Tufts Cove 2, since the fuel costs include costs of cycling  
 12 and keeping the boiler warm in hours when it is not actually the marginal  
 13 unit. The cost of replacement power will be still lower in hours in which  
 14 lower-cost generators are at the margin.

15 **Q: Why does the ACE application assume replacement energy costs that are**  
 16 **so much higher than the energy costs forecast in the GRA?**

1 A: I do not know. NSPI says that the projections of energy costs should be  
2 consistent:

3 The incremental replacement energy costs used in the EAM were  
4 derived using Strategist dispatch optimization software. The values used  
5 here are consistent with the most recent set of General Rate Application  
6 (GRA) assumptions. (Application, p. 12)

7 While the fuel costs would be expected to escalate after 2014, and may  
8 eventually justify adding the Bridgewater capacitors, fuel costs in 2023  
9 cannot be used to justify installing the capacitors in 2013. Those costs would  
10 need to rise more than 40% to produce the \$55,100 annual savings NSPI  
11 claims, since the lower loads outside the peak hour would result in lower  
12 losses. With lower load levels and lower energy costs, the annual savings  
13 might be more like \$20,000 than \$55,100.

14 **Q: What about NSPI's estimate of the savings from additional transmission**  
15 **capacity on Onslow South?**

16 A: That estimate is not reliable, either. Again, there are two considerations.  
17 First, the value of the savings depends on the overstated Tufts Cove energy  
18 costs used in the loss analysis.

19 Second, while NSPI assumes that the full 900 MW capacity of Onslow  
20 South is fully used in 1% of hours (87.6 hours annually) and that operating  
21 the capacitors would allow another 25 MW to flow through Onslow South in  
22 those hours. In fact, load on Onslow South exceeded 850 MW just 23 times  
23 in 2007, never in 2008, three times in 2009, never in 2010, never in 2011 and  
24 twice in 2012.<sup>8</sup> Loads closer to 900 MW are much rarer, with only three  
25 hours over 890 MW in 2007 and none since. With the lower loads following

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<sup>8</sup> As noted above, some years are missing some data. The 2009 data are missing only November; in the five years with November data, November has no loads over 850 MW.

1 closure of the Bowater paper mill, and consistently falling loads due to DSM,  
2 the additional capacity on Onslow South might only be useful an average of a  
3 few hours per year. And when the capacity is needed, it is unlikely that the  
4 full 25 MW would be used. Hence, the fuel savings from that additional  
5 transmission capacity result from importing more like 3 hours  $\times$  12 MW = 36  
6 MWh annually, rather than the range NSPI assumes of 87.6 hours  $\times$  25 MW  
7 =2,190 MWh to 87.6 hours  $\times$  60 MW =5,256 MWh, or about 1%–2% of  
8 NSPI’s assumption. Since NSPI reports savings of \$133,000/year with its  
9 assumptions,<sup>9</sup> the corrected benefit would be about \$1,000–\$2,000 annually.

10 **Q: Would your corrected estimates of energy savings justify adding the**  
11 **Bridgewater capacitors?**

12 A: No. Annual savings would be much lower than the carrying costs for this  
13 \$1.1 million project.

14 **Q: Does this conclude your testimony?**

15 A: Yes.

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<sup>9</sup> NSPI has designated its computations in CA IR-19 as confidential, so I have avoided revealing with number of megawatts produces the \$133,000 savings estimate.

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**SUMMARY OF PROFESSIONAL EXPERIENCE**

- 1986– Present* **President, Resource Insight, Inc.** Consults and testifies in utility and insurance economics. Reviews utility supply-planning processes and outcomes: assesses prudence of prior power planning investment decisions, identifies excess generating capacity, analyzes effects of power-pool-pricing rules on equity and utility incentives. Reviews electric-utility rate design. Estimates magnitude and cost of future load growth. Designs and evaluates conservation programs for electric, natural-gas, and water utilities, including hook-up charges and conservation cost recovery mechanisms. Determines avoided costs due to cogenerators. Evaluates cogeneration rate risk. Negotiates cogeneration contracts. Reviews management and pricing of district heating systems. Determines fair profit margins for automobile and workers' compensation insurance lines, incorporating reward for risk, return on investments, and tax effects. Determines profitability of transportation services. Advises regulatory commissions in least-cost planning, rate design, and cost allocation.
- 1981–86* **Research Associate, Analysis and Inference, Inc.** (Consultant, 1980–81). Researched, advised, and testified in various aspects of utility and insurance regulation. Designed self-insurance pool for nuclear decommissioning; estimated probability and cost of insurable events, and rate levels; assessed alternative rate designs. Projected nuclear power plant construction, operation, and decommissioning costs. Assessed reasonableness of earlier estimates of nuclear power plant construction schedules and costs. Reviewed prudence of utility construction decisions. Consulted on utility rate-design issues, including small-power-producer rates; retail natural-gas rates; public-agency electric rates, and comprehensive electric-rate design for a regional power agency. Developed electricity cost allocations between customer classes. Reviewed district-heating-system efficiency. Proposed power-plant performance standards. Analyzed auto-insurance profit requirements. Designed utility-financed, decentralized conservation program. Analyzed cost-effectiveness of transmission lines.
- 1977–81* **Utility Rate Analyst, Massachusetts Attorney General.** Analyzed utility filings and prepared alternative proposals. Participated in rate negotiations, discovery, cross-examination, and briefing. Provided extensive expert testimony before various regulatory agencies. Topics included demand forecasting, rate design, marginal costs, time-of-use rates, reliability issues, power-pool operations, nuclear-power cost projections, power-plant cost-benefit analysis, energy conservation, and alternative-energy development.

## EDUCATION

SM, Technology and Policy Program, Massachusetts Institute of Technology, February 1978.

SB, Civil Engineering Department, Massachusetts Institute of Technology, June 1974.

## HONORS

Chi Epsilon (Civil Engineering)

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Institute Award, Institute of Public Utilities, 1981.

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“Analysis of Fuel Substitution as an Electric Conservation Option,” (with Ian Goodman and Eric Espenhorst), Boston Gas Company, December 22 1989.

“The Development of Consistent Estimates of Avoided Costs for Boston Gas Company, Boston Edison Company, and Massachusetts Electric Company” (with Eric Espenhorst), Boston Gas Company, December 22 1989.

“The Valuation of Externalities from Energy Production, Delivery, and Use: Fall 1989 Update” (with Emily Caverhill), Boston Gas Company, December 22 1989.

“Conservation Potential in the State of Minnesota,” (with Ian Goodman) Minnesota Department of Public Service, June 16 1988.

“Review of NEPOOL Performance Incentive Program,” Massachusetts Energy Facilities Siting Council, April 12 1988.

“Application of the DPU’s Used-and-Useful Standard to Pilgrim 1” (With C. Wills and M. Meyer), Massachusetts Executive Office of Energy Resources, October 1987.

“Constructing a Supply Curve for Conservation: An Initial Examination of Issues and Methods,” Massachusetts Energy Facilities Siting Council, June 1985.

“Final Report: Rate Design Analysis,” Pacific Northwest Electric Power and Conservation Planning Council, December 18 1981.

## **PRESENTATIONS**

“Adding Transmission into New York City: Needs, Benefits, and Obstacles.” Presentation to FERC and the New York ISO on behalf of the City of New York. October 2004.

“Plugging Into a Municipal Light Plant,” With Peter Enrich and Ken Barna. Panel presentation as part of the 2004 Annual Meeting of the Massachusetts Municipal Association. January 2004.

“Distributed Utility Planning.” With Steve Litkovitz. Presentation to the Vermont Distributed-Utility-Planning Collaborative, November 1999.

“The Economic and Environmental Benefits of Gas IRP: FERC 636 and Beyond.” Presentation as part of the Ohio Office of Energy Efficiency’s seminar, “Gas Utility Integrated Resource Planning,” April 1994.

“Cost Recovery and Utility Incentives.” Day-long presentation as part of the Demand-Side-Management Training Institute’s workshop, “DSM for Public Interest Groups,” October 1993.

“Cost Allocation for Utility Ratemaking.” With Susan Geller. Day-long workshop for the staff of the Connecticut Department of Public Utility Control, October 1993.

“Comparing and Integrating DSM with Supply.” Day-long presentation as part of the Demand-Side-Management Training Institute’s workshop, “DSM for Public Interest Groups,” October 1993.

“DSM Cost Recovery and Rate Impacts.” Presentation as part of “Effective DSM Collaborative Processes,” a week-long training session for Ohio DSM advocates sponsored by the Ohio Office of Energy Efficiency, August 1993.

“Cost-Effectiveness Analysis.” Presentation as part of “Effective DSM Collaborative Processes,” a week-long training session for Ohio DSM advocates sponsored by the Ohio Office of Energy Efficiency, August 1993.

“Environmental Externalities: Current Approaches and Potential Implications for District Heating and Cooling” (with R. Brailove), International District Heating and Cooling Association 84th Annual Conference; June 1993.

“Using the Costs of Required Controls to Incorporate the Costs of Environmental Externalities in Non-Environmental Decision-Making.” Presentation at the American Planning Association 1992 National Planning Conference; presentation cosponsored by the Edison Electric Institute. May 1992.

“Cost Recovery and Decoupling” and “The Clean Air Act and Externalities in Utility Resource Planning” panels (session leader), DSM Advocacy Workshop; April 15 1992.

“Overview of Integrated Resources Planning Procedures in South Carolina and Critique of South Carolina Demand Side Management Programs,” Energy Planning Workshops; Columbia, S.C.; October 21 1991;

“Least Cost Planning and Gas Utilities.” Conservation Law Foundation Utility Energy Efficiency Advocacy Workshop; Boston, February 28 1991.

“Least-Cost Planning in a Multi-Fuel Context,” NARUC Forum on Gas Integrated Resource Planning; Washington, D.C., February 24 1991.

“Accounting for Externalities: Why, Which and How?” Understanding Massachusetts’ New Integrated Resource Management Rules; Needham, Massachusetts, November 9 1990.

“Increasing Market Share Through Energy Efficiency.” New England Gas Association Gas Utility Managers’ Conference; Woodstock, Vermont, September 10 1990.

“Quantifying and Valuing Environmental Externalities.” Presentation at the Lawrence Berkeley Laboratory Training Program for Regulatory Staff, sponsored by the U.S. Department of Energy’s Least-Cost Utility Planning Program; Berkeley, California, February 2 1990;

“Conservation in the Future of Natural Gas Local Distribution Companies,” District of Columbia Natural Gas Seminar; Washington, D.C., May 23 1989.

“Conservation and Load Management for Natural Gas Utilities,” Massachusetts Natural Gas Council; Newton, Massachusetts, April 3 1989.

New England Conference of Public Utilities Commissioners, Environmental Externalities Workshop; Portsmouth, New Hampshire, January 22–23 1989.

“Assessment and Valuation of External Environmental Damages,” New England Utility Rate Forum; Plymouth, Massachusetts, October 11 1985; “Lessons from Massachusetts on Long Term Rates for QFs”.

“Reviewing Utility Supply Plans,” Massachusetts Energy Facilities Siting Council; Boston, Massachusetts, May 30 1985.

“Power Plant Performance,” National Association of State Utility Consumer Advocates; Williamstown, Massachusetts, August 13 1984.

“Utility Rate Shock,” National Conference of State Legislatures; Boston, Massachusetts, August 6 1984.

“Review and Modification of Regulatory and Rate Making Policy,” National Governors’ Association Working Group on Nuclear Power Cost Overruns; Washington, D.C., June 20 1984.

“Review and Modification of Regulatory and Rate Making Policy,” Annual Meeting of the American Association for the Advancement of Science, Session on Monitoring for Risk Management; Detroit, Michigan, May 27 1983.

### **ADVISORY ASSIGNMENTS TO REGULATORY COMMISSIONS**

District of Columbia Public Service Commission, Docket No. 834, Phase II; Least-cost planning procedures and goals; August 1987 to March 1988.

Connecticut Department of Public Utility Control, Docket No. 87-07-01, Phase 2; Rate design and cost allocations; March 1988 to June 1989.

### **EXPERT TESTIMONY**

1. **MEFSC 78-12/MDPU 19494**, Phase I; Boston Edison 1978 forecast; Massachusetts Attorney General; June 12 1978.

Appliance penetration projections, price elasticity, econometric commercial forecast, peak demand forecast. Joint testimony with Susan C. Geller.

2. **MEFSC 78-17**; Northeast Utilities 1978 forecast; Massachusetts Attorney General; September 29 1978.

Specification of economic/demographic and industrial models, appliance efficiency, commercial model structure and estimation.

3. **MEFSC 78-33**; Eastern Utilities Associates 1978 forecast; Massachusetts Attorney General; November 27 1978.

Household size, appliance efficiency, appliance penetration, price elasticity, commercial forecast, industrial trending, peak demand forecast.

4. **MDPU 19494**; Phase II; Boston Edison Company Construction Program; Massachusetts Attorney General; April 1 1979.

Review of numerous aspects of the 1978 demand forecasts of nine New England electric utilities, constituting 92% of projected regional demand growth, and of the NEPOOL demand forecast. Joint testimony with S.C. Geller.

5. **MDPU 19494**; Phase II; Boston Edison Company Construction Program; Massachusetts Attorney General; April 1 1979.

Reliability, capacity planning, capability responsibility allocation, customer generation, co-generation rates, reserve margins, operating reserve allocation. Joint testimony with S. Finger.

6. **ASLB, NRC 50-471**; Pilgrim Unit 2, Boston Edison Company; Commonwealth of Massachusetts; June 29 1979.

Review of the Oak Ridge National Laboratory and NEPOOL demand forecast models; cost-effectiveness of oil displacement; nuclear economics. Joint testimony with S.C. Geller.

7. **MDPU 19845**; Boston Edison Time-of-Use Rate Case; Massachusetts Attorney General; December 4 1979.

Critique of utility marginal cost study and proposed rates; principles of marginal cost principles, cost derivation, and rate design; options for reconciling costs and revenues. Joint testimony with S.C. Geller. Testimony eventually withdrawn due to delay in case.

8. **MDPU 20055**; Petition of Eastern Utilities Associates, New Bedford G. & E., and Fitchburg G. & E. to purchase additional shares of Seabrook Nuclear Plant; Massachusetts Attorney General; January 23 1980.

Review of demand forecasts of three utilities purchasing Seabrook shares; Seabrook power costs, including construction cost, completion date, capacity factor, O&M expenses, interim replacements, reserves and uncertainties; alternative energy sources, including conservation, cogeneration, rate reform, solar, wood and coal conversion.

9. **MDPU 20248**; Petition of MMWEC to Purchase Additional Share of Seabrook Nuclear Plant; Massachusetts Attorney General; June 2 1980.

Nuclear power costs; update and extension of MDPU 20055 testimony.

10. **MDPU 200**; Massachusetts Electric Company Rate Case; Massachusetts Attorney General; June 16 1980.

Rate design; declining blocks, promotional rates, alternative energy, demand charges, demand ratchets; conservation: master metering, storage heating, efficiency standards, restricting resistance heating.

11. **MEFSC 79-33**; Eastern Utilities Associates 1979 Forecast; Massachusetts Attorney General; July 16 1980.

Customer projections, consistency issues, appliance efficiency, new appliance types, commercial specifications, industrial data manipulation and trending, sales and resale.

12. **MDPU 243**; Eastern Edison Company Rate Case; Massachusetts Attorney General; August 19 1980.

Rate design: declining blocks, promotional rates, alternative energy, master metering.

13. **Texas PUC 3298**; Gulf States Utilities Rate Case; East Texas Legal Services; August 25 1980.

Inter-class revenue allocations, including production plant in-service, O&M, CWIP, nuclear fuel in progress, amortization of canceled plant residential rate design; interruptible rates; off-peak rates. Joint testimony with M. B. Meyer.

14. **MEFSC 79-1**; Massachusetts Municipal Wholesale Electric Company Forecast; Massachusetts Attorney General; November 5 1980.

Cost comparison methodology; nuclear cost estimates; cost of conservation, co-generation, and solar.

15. **MDPU 472**; Recovery of Residential Conservation Service Expenses; Massachusetts Attorney General; December 12 1980.

Conservation as an energy source; advantages of per-kWh allocation over per-customer-month allocation.

16. **MDPU 535**; Regulations to Carry Out Section 210 of PURPA; Massachusetts Attorney General; January 26 1981 and February 13 1981.

Filing requirements, certification, qualifying facility (QF) status, extent of coverage, review of contracts; energy rates; capacity rates; extra benefits of QFs in specific areas; wheeling; standardization of fees and charges.

17. **MEFSC 80-17**; Northeast Utilities 1980 Forecast; Massachusetts Attorney General; March 12 1981 (not presented).

Specification process, employment, electric heating promotion and penetration, commercial sales model, industrial model specification, documentation of price forecasts and wholesale forecast.

18. **MDPU 558**; Western Massachusetts Electric Company Rate Case; Massachusetts Attorney General; May 1981.

Rate design including declining blocks, marginal cost conservation impacts, and promotional rates. Conservation, including terms and conditions limiting renewable, cogeneration, small power production; scope of current conservation program; efficient insulation levels; additional conservation opportunities.

19. **MDPU 1048**; Boston Edison Plant Performance Standards; Massachusetts Attorney General; May 7 1982.

Critique of company approach, data, and statistical analysis; description of comparative and absolute approaches to standard-setting; proposals for standards and reporting requirements.

20. **DCPSC FC785**; Potomac Electric Power Rate Case; DC People’s Counsel; July 29 1982.

Inter-class revenue allocations, including generation, transmission, and distribution plant classification; fuel and O&M classification; distribution and service allocators. Marginal cost estimation, including losses.

21. **NHPUC DE1-312**; Public Service of New Hampshire-Supply and Demand; Conservation Law Foundation, et al.; October 8 1982.

Conservation program design, ratemaking, and effectiveness. Cost of power from Seabrook nuclear plant, including construction cost and duration, capacity factor, O&M, replacements, insurance, and decommissioning.

22. **Massachusetts Division of Insurance**; Hearing to Fix and Establish 1983 Automobile Insurance Rates; Massachusetts Attorney General; October 1982.

Profit margin calculations, including methodology, interest rates, surplus flow, tax flows, tax rates, and risk premium.

23. **Illinois Commerce Commission 82-0026**; Commonwealth Edison Rate Case; Illinois Attorney General; October 15 1982.

Review of Cost-Benefit Analysis for nuclear plant. Nuclear cost parameters (construction cost, O&M, capital additions, useful life, capacity factor), risks, discount rates, evaluation techniques.

24. **New Mexico PSC 1794**; Public Service of New Mexico Application for Certification; New Mexico Attorney General; May 10 1983.

Review of Cost-Benefit Analysis for transmission line. Review of electricity price forecast, nuclear capacity factors, load forecast. Critique of company ratemaking proposals; development of alternative ratemaking proposal.

25. **Connecticut Public Utility Control Authority 830301**; United Illuminating Rate Case; Connecticut Consumers Counsel; June 17 1983.

Cost of Seabrook nuclear power plants, including construction cost and duration, capacity factor, O&M, capital additions, insurance and decommissioning.

26. **MDPU 1509**; Boston Edison Plant Performance Standards; Massachusetts Attorney General; July 15 1983.

Critique of company approach and statistical analysis; regression model of nuclear capacity factor; proposals for standards and for standard-setting methodologies.

27. **Massachusetts Division of Insurance**; Hearing to Fix and Establish 1984 Automobile Insurance Rates; Massachusetts Attorney General; October 1983.

Profit margin calculations, including methodology, interest rates.



- 28. Connecticut Public Utility Control Authority** 83-07-15; Connecticut Light and Power Rate Case; Alloy Foundry; October 3 1983.

Industrial rate design. Marginal and embedded costs; classification of generation, transmission, and distribution expenses; demand versus energy charges.

- 29. MEFSC** 83-24; New England Electric System Forecast of Electric Resources and Requirements; Massachusetts Attorney General; November 14 1983, Rebuttal, February 2 1984.

Need for transmission line. Status of supply plan, especially Seabrook 2. Review of interconnection requirements. Analysis of cost-effectiveness for power transfer, line losses, generation assumptions.

- 30. Michigan PSC** U-7775; Detroit Edison Fuel Cost Recovery Plan; Public Interest Research Group in Michigan; February 21 1984.

Review of proposed performance target for new nuclear power plant. Formulation of alternative proposals.

- 31. MDPU** 84-25; Western Massachusetts Electric Company Rate Case; Massachusetts Attorney General; April 6 1984.

Need for Millstone 3. Cost of completing and operating unit, cost-effectiveness compared to alternatives, and its effect on rates. Equity and incentive problems created by CWIP. Design of Millstone 3 phase-in proposals to protect ratepayers: limitation of base-rate treatment to fuel savings benefit of unit.

- 32. MDPU** 84-49 and 84-50; Fitchburg Gas & Electric Financing Case; Massachusetts Attorney General; April 13 1984.

Cost of completing and operating Seabrook nuclear units. Probability of completing Seabrook 2. Recommendations regarding FG&E and MDPU actions with respect to Seabrook.

- 33. Michigan PSC** U-7785; Consumers Power Fuel Cost Recovery Plan; Public Interest Research Group in Michigan; April 16 1984.

Review of proposed performance targets for two existing and two new nuclear power plants. Formulation of alternative policy.

- 34. FERC** ER81-749-000 and ER82-325-000; Montaup Electric Rate Cases; Massachusetts Attorney General; April 27 1984.

Prudence of Montaup and Boston Edison in decisions regarding Pilgrim 2 construction: Montaup's decision to participate, the Utilities' failure to review their earlier analyses and assumptions, Montaup's failure to question Edison's decisions, and the utilities' delay in canceling the unit.

- 35. Maine PUC** 84-113; Seabrook 1 Investigation; Maine Public Advocate; September 13 1984.

Cost of completing and operating Seabrook Unit 1. Probability of completing Seabrook 1. Comparison of Seabrook to alternatives. Rate effects. Recommendations regarding utility and PUC actions with respect to Seabrook.

- 36. MDPU 84-145; Fitchburg Gas and Electric Rate Case; Massachusetts Attorney General; November 6 1984.**

Prudence of Fitchburg and Public Service of New Hampshire in decision regarding Seabrook 2 construction: FGE's decision to participate, the utilities' failure to review their earlier analyses and assumptions, FGE's failure to question PSNH's decisions, and utilities' delay in halting construction and canceling the unit. Review of literature, cost and schedule estimate histories, cost-benefit analyses, and financial feasibility.

- 37. Pennsylvania PUC R-842651; Pennsylvania Power and Light Rate Case; Pennsylvania Consumer Advocate; November 1984.**

Need for Susquehanna 2. Cost of operating unit, power output, cost-effectiveness compared to alternatives, and its effect on rates. Design of phase-in and excess capacity proposals to protect ratepayers: limitation of base-rate treatment to fuel savings benefit of unit.

- 38. NHPUC 84-200; Seabrook Unit 1 Investigation; New Hampshire Public Advocate; November 15 1984.**

Cost of completing and operating Seabrook Unit 1. Probability of completing Seabrook 1. Comparison of Seabrook to alternatives. Rate and financial effects.

- 39. Massachusetts Division of Insurance; Hearing to Fix and Establish 1985 Automobile Insurance Rates; Massachusetts Attorney General; November 1984.**

Profit margin calculations, including methodology and implementation.

- 40. MDPU 84-152; Seabrook Unit 1 Investigation; Massachusetts Attorney General; December 12 1984.**

Cost of completing and operating Seabrook. Probability of completing Seabrook 1. Seabrook capacity factors.

- 41. Maine PUC 84-120; Central Maine Power Rate Case; Maine PUC Staff; December 11 1984.**

Prudence of Central Maine Power and Boston Edison in decisions regarding Pilgrim 2 construction: CMP's decision to participate, the utilities' failure to review their earlier analyses and assumptions, CMP's failure to question Edison's decisions, and the utilities' delay in canceling the unit. Prudence of CMP in the planning and investment in Sears Island nuclear and coal plants. Review of literature, cost and schedule estimate histories, cost-benefit analyses, and financial feasibility.

- 42. Maine PUC 84-113; Seabrook 2 Investigation; Maine PUC Staff; December 14 1984.**

Prudence of Maine utilities and Public Service of New Hampshire in decisions regarding Seabrook 2 construction: decisions to participate and to increase ownership share, the utilities' failure to review their earlier analyses and assumptions, failure to question PSNH's decisions, and the utilities' delay in halting construction and canceling the unit. Review of literature, cost and schedule estimate histories, cost-benefit analyses, and financial feasibility.

- 43. MDPU 1627; Massachusetts Municipal Wholesale Electric Company Financing Case; Massachusetts Executive Office of Energy Resources; January 14 1985.**

Cost of completing and operating Seabrook nuclear unit 1. Cost of conservation and other alternatives to completing Seabrook. Comparison of Seabrook to alternatives.

- 44. Vermont PSB 4936; Millstone 3; Costs and In-Service Date; Vermont Department of Public Service; January 21 1985.**

Construction schedule and cost of completing Millstone Unit 3.

- 45. MDPU 84-276; Rules Governing Rates for Utility Purchases of Power from Qualifying Facilities; Massachusetts Attorney General; March 25 1985, and October 18 1985.**

Institutional and technological advantages of Qualifying Facilities. Potential for QF development. Goals of QF rate design. Parity with other power sources. Security requirements. Projecting avoided costs. Capacity credits. Pricing options. Line loss corrections.

- 46. MDPU 85-121; Investigation of the Reading Municipal Light Department; Wilmington (MA) Chamber of Commerce; November 12 1985.**

Calculation on return on investment for municipal utility. Treatment of depreciation and debt for ratemaking. Geographical discrimination in street-lighting rates. Relative size of voluntary payments to Reading and other towns. Surplus and disinvestment. Revenue allocation.

- 47. Massachusetts Division of Insurance; Hearing to Fix and Establish 1986 Automobile Insurance Rates; Massachusetts Attorney General and State Rating Bureau; November 1985.**

Profit margin calculations, including methodology, implementation, modeling of investment balances, income, and return to shareholders.

- 48. New Mexico PSC 1833, Phase II; El Paso Electric Rate Case; New Mexico Attorney General; December 23 1985.**

Nuclear decommissioning fund design. Internal and external funds; risk and return; fund accumulation, recommendations. Interim performance standard for Palo Verde nuclear plant.

- 49. Pennsylvania PUC R-850152;** Philadelphia Electric Rate Case; Utility Users Committee and University of Pennsylvania; January 14 1986.

Limerick 1 rate effects. Capacity benefits, fuel savings, operating costs, capacity factors, and net benefits to ratepayers. Design of phase-in proposals.

- 50. MDPU 85-270;** Western Massachusetts Electric Rate Case; Massachusetts Attorney General; March 19 1986.

Prudence of Northeast Utilities in generation planning related to Millstone 3 construction: decisions to start and continue construction, failure to reduce ownership share, failure to pursue alternatives. Review of industry literature, cost and schedule histories, and retrospective cost-benefit analyses.

- 51. Pennsylvania PUC R-850290;** Philadelphia Electric Auxiliary Service Rates; Albert Einstein Medical Center, University of Pennsylvania and AMTRAK; March 24 1986.

Review of utility proposals for supplementary and backup rates for small power producers and cogenerators. Load diversity, cost of peaking capacity, value of generation, price signals, and incentives. Formulation of alternative supplementary rate.

- 52. New Mexico PSC 2004;** Public Service of New Mexico, Palo Verde Issues; New Mexico Attorney General; May 7 1986.

Recommendations for Power Plant Performance Standards for Palo Verde nuclear units 1, 2, and 3.

- 53. Illinois Commerce Commission 86-0325;** Iowa-Illinois Gas and Electric Co. Rate Investigation; Illinois Office of Public Counsel; August 13 1986.

Determination of excess capacity based on reliability and economic concerns. Identification of specific units associated with excess capacity. Required reserve margins.

- 54. New Mexico PSC 2009;** El Paso Electric Rate Moderation Program; New Mexico Attorney General; August 18 1986. (Not presented).

Prudence of EPE in generation planning related to Palo Verde nuclear construction, including failure to reduce ownership share and failure to pursue alternatives. Review of industry literature, cost and schedule histories, and retrospective cost-benefit analyses.

Recommendation for rate-base treatment; proposal of power plant performance standards.

- 55. City of Boston, Public Improvements Commission;** Transfer of Boston Edison District Heating Steam System to Boston Thermal Corporation; Boston Housing Authority; December 18 1986.

History and economics of steam system; possible motives of Boston Edison in seeking sale; problems facing Boston Thermal; information and assurances required prior to Commission approval of transfer.

- 56. Massachusetts Division of Insurance;** Hearing to Fix and Establish 1987 Automobile Insurance Rates; Massachusetts Attorney General and State Rating Bureau; December 1986 and January 1987.

Profit margin calculations, including methodology, implementation, derivation of cash flows, installment income, income tax status, and return to shareholders.

- 57. MDPU 87-19;** Petition for Adjudication of Development Facilitation Program; Hull (MA) Municipal Light Plant; January 21 1987.

Estimation of potential load growth; cost of generation, transmission, and distribution additions. Determination of hook-up charges. Development of residential load estimation procedure reflecting appliance ownership, dwelling size.

- 58. New Mexico PSC 2004;** Public Service of New Mexico Nuclear Decommissioning Fund; New Mexico Attorney General; February 19 1987.

Decommissioning cost and likely operating life of nuclear plants. Review of utility funding proposal. Development of alternative proposal. Ratemaking treatment.

- 59. MDPU 86-280;** Western Massachusetts Electric Rate Case; Massachusetts Energy Office; March 9 1987.

Marginal cost rate design issues. Superiority of long-run marginal cost over short-run marginal cost as basis for rate design. Relationship of consumer reaction, utility planning process, and regulatory structure to rate design approach. Implementation of short-run and long-run rate designs. Demand versus energy charges, economic development rates, spot pricing.

- 60. Massachusetts Division of Insurance 87-9;** 1987 Workers' Compensation Rate Filing; State Rating Bureau; May 1987.

Profit margin calculations, including methodology, implementation, surplus requirements, investment income, and effects of 1986 Tax Reform Act.

- 61. Texas PUC 6184;** Economic Viability of South Texas Nuclear Plant #2; Committee for Consumer Rate Relief; August 17 1987.

STNP operating parameter projections; capacity factor, O&M, capital additions, decommissioning, useful life. STNP 2 cost and schedule projections. Potential for conservation.

- 62. Minnesota PUC ER-015/GR-87-223; Minnesota Power Rate Case; Minnesota Department of Public Service; August 17 1987.**

Excess capacity on MP system; historical, current, and projected. Review of MP planning prudence prior to and during excess; efforts to sell capacity. Cost of excess capacity. Recommendations for ratemaking treatment.

- 63. Massachusetts Division of Insurance 87-27; 1988 Automobile Insurance Rates; Massachusetts Attorney General and State Rating Bureau; September 2 1987. Rebuttal October 8 1987.**

Underwriting profit margins. Effect of 1986 Tax Reform Act. Biases in calculation of average margins.

- 64. MDPU 88-19; Power Sales Contract from Riverside Steam and Electric to Western Massachusetts Electric; Riverside Steam and Electric; November 4 1987.**

Comparison of risk from QF contract and utility avoided cost sources. Risk of oil dependence. Discounting cash flows to reflect risk.

- 65. Massachusetts Division of Insurance 87-53; 1987 Workers' Compensation Rate Refiling; State Rating Bureau; December 14 1987.**

Profit margin calculations, including updating of data, compliance with Commissioner's order, treatment of surplus and risk, interest rate calculation, and investment tax rate calculation.

- 66. Massachusetts Division of Insurance; 1987 and 1988 Automobile Insurance Remand Rates; Massachusetts Attorney General and State Rating Bureau; February 5 1988.**

Underwriting profit margins. Provisions for income taxes on finance charges. Relationships between allowed and achieved margins, between statewide and nationwide data, and between profit allowances and cost projections.

- 67. MDPU 86-36; Investigation into the Pricing and Ratemaking Treatment to be Afforded New Electric Generating Facilities which are not Qualifying Facilities; Conservation Law Foundation; May 2 1988.**

Cost recovery for utility conservation programs. Compensating for lost revenues. Utility incentive structures.

- 68. MDPU 88-123; Petition of Riverside Steam & Electric Company; Riverside Steam and Electric Company; May 18 1988, and November 8 1988.**

Estimation of avoided costs of Western Massachusetts Electric Company. Nuclear capacity factor projections and effects on avoided costs. Avoided cost of energy interchange and power plant life extensions. Differences between median and expected oil prices. Salvage value of cogeneration facility. Off-system energy purchase projections. Reconciliation of avoided cost projection.

- 69. MDPU 88-67; Boston Gas Company; Boston Housing Authority; June 17 1988.**  
Estimation of annual avoidable costs, 1988 to 2005, and levelized avoided costs. Determination of cost recovery and carrying costs for conservation investments. Standards for assessing conservation cost-effectiveness. Evaluation of cost-effectiveness of utility funding of proposed natural gas conservation measures.
- 70. Rhode Island PUC Docket 1900; Providence Water Supply Board Tariff Filing; Conservation Law Foundation, Audubon Society of Rhode Island, and League of Women Voters of Rhode Island; June 24 1988.**  
Estimation of avoidable water supply costs. Determination of costs of water conservation. Conservation cost-benefit analysis.
- 71. Massachusetts Division of Insurance 88-22; 1989 Automobile Insurance Rates; Massachusetts Attorney General and State Rating Bureau; Profit Issues, August 12 1988, supplemented August 19 1988; Losses and Expenses, September 16 1988.**  
Underwriting profit margins. Effects of 1986 Tax Reform Act. Taxation of common stocks. Lag in tax payments. Modeling risk and return over time. Treatment of finance charges. Comparison of projected and achieved investment returns.
- 72. Vermont PSB 5270, Module 6; Investigation into Least-Cost Investments, Energy Efficiency, Conservation, and the Management of Demand for Energy; Conservation Law Foundation, Vermont Natural Resources Council, and Vermont Public Interest Research Group; September 26 1988.**  
Cost recovery for utility conservation programs. Compensation of utilities for revenue losses and timing differences. Incentive for utility participation.
- 73. Vermont House of Representatives, Natural Resources Committee; House Act 130; "Economic Analysis of Vermont Yankee Retirement"; Vermont Public Interest Research Group; February 21 1989.**  
Projection of capacity factors, operating and maintenance expense, capital additions, overhead, replacement power costs, and net costs of Vermont Yankee.
- 74. MDPU 88-67, Phase II; Boston Gas Company Conservation Program and Rate Design; Boston Gas Company; March 6 1989.**  
Estimation of avoided gas cost; treatment of non-price factors; estimation of externalities; identification of cost-effective conservation.
- 75. Vermont PSB 5270; Status Conference on Conservation and Load Management Policy Settlement; Central Vermont Public Service, Conservation Law Foundation, Vermont Natural Resources Council, Vermont Public Interest Research Group, and Vermont Department of Public Service; May 1 1989.**

Cost-benefit test for utility conservation programs. Role of externalities. Cost recovery concepts and mechanisms. Resource allocations, cost allocations, and equity considerations. Guidelines for conservation preapproval mechanisms. Incentive mechanisms and recovery of lost revenues.

- 76. Boston Housing Authority Court 05099; Gallivan Boulevard Task Force vs. Boston Housing Authority, et al.; Boston Housing Authority; June 16 1989.**

Effect of master-metering on consumption of natural gas and electricity. Legislative and regulatory mandates regarding conservation.

- 77. MDPU 89-100; Boston Edison Rate Case; Massachusetts Energy Office; June 30 1989.**

Prudence of BECo's decision to spend \$400 million from 1986–88 on returning the Pilgrim nuclear power plant to service. Projections of nuclear capacity factors, O&M, capital additions, and overhead. Review of decommissioning cost, tax effect of abandonment, replacement power cost, and plant useful life estimates. Requirements for prudence and used-and-useful analyses.

- 78. MDPU 88-123; Petition of Riverside Steam and Electric Company; Riverside Steam and Electric; July 24 1989. Rebuttal, October 3 1989.**

Reasonableness of Northeast Utilities' 1987 avoided cost estimates. Projections of nuclear capacity factors, economy purchases, and power plant operating life. Treatment of avoidable energy and capacity costs and of off-system sales. Expected versus reference fuel prices.

- 79. MDPU 89-72; Statewide Towing Association, Police-Ordered Towing Rates; Massachusetts Automobile Rating Bureau; September 13 1989.**

Review of study supporting proposed increase in towing rates. Critique of study sample and methodology. Comparison to competitive rates. Supply of towing services. Effects of joint products and joint sales on profitability of police-ordered towing. Joint testimony with I. Goodman.

- 80. Vermont PSB 5330; Application of Vermont Utilities for Approval of a Firm Power and Energy Contract with Hydro-Quebec; Conservation Law Foundation, Vermont Natural Resources Council, Vermont Public Interest Research Group; December 19 1989. Surrebuttal February 6 1990.**

Analysis of a proposed 450-MW, 20 year purchase of Hydro-Quebec power by twenty-four Vermont utilities. Comparison to efficiency investment in Vermont, including potential for efficiency savings. Analysis of Vermont electric energy supply. Identification of possible improvements to proposed contract.

Critique of conservation potential analysis. Planning risk of large supply additions. Valuation of environmental externalities.



- 81. MDPU 89-239; Inclusion of Externalities in Energy Supply Planning, Acquisition and Dispatch for Massachusetts Utilities; December 1989; April 1990; May 1990.**
- Critique of Division of Energy Resources report on externalities. Methodology for evaluating external costs. Proposed values for environmental and economic externalities of fuel supply and use.
- 82. California PUC; Incorporation of Environmental Externalities in Utility Planning and Pricing; Coalition of Energy Efficient and Renewable Technologies; February 21 1990.**
- Approaches for valuing externalities for inclusion in setting power purchase rates. Effect of uncertainty on assessing externality values.
- 83. Illinois Commerce Commission Docket 90-0038; Proceeding to Adopt a Least Cost Electric Energy Plan for Commonwealth Edison Company; City of Chicago; May 25 1990. Joint rebuttal testimony with David Birr, August 14 1990.**
- Problems in Commonwealth Edison's approach to demand-side management. Potential for cost-effective conservation. Valuing externalities in least-cost planning.
- 84. Maryland PSC 8278; Adequacy of Baltimore Gas & Electric's Integrated Resource Plan; Maryland Office of People's Counsel; September 18 1990.**
- Rationale for demand-side management, and BG&E's problems in approach to DSM planning. Potential for cost-effective conservation. Valuation of environmental externalities. Recommendations for short-term DSM program priorities.
- 85. Indiana Utility Regulatory Commission; Integrated Resource Planning Docket; Indiana Office of Utility Consumer Counselor; November 1 1990.**
- Integrated resource planning process and methodology, including externalities and screening tools. Incentives, screening, and evaluation of demand-side management. Potential of resource bidding in Indiana.
- 86. MDPU 89-141, 90-73, 90-141, 90-194, and 90-270; Preliminary Review of Utility Treatment of Environmental Externalities in October QF Filings; Boston Gas Company; November 5 1990.**
- Generic and specific problems in Massachusetts utilities' RFPs with regard to externality valuation requirements. Recommendations for corrections.
- 87. MEFSC 90-12/90-12A; Adequacy of Boston Edison Proposal to Build Combined-Cycle Plant; Conservation Law Foundation; December 14 1990.**
- Problems in Boston Edison's treatment of demand-side management, supply option analysis, and resource planning. Recommendations of mitigation options.
- 88. Maine PUC 90-286; Adequacy of Conservation Program of Bangor Hydro Electric; Penobscot River Coalition; February 19 1991.**

Role of utility-sponsored DSM in least-cost planning. Bangor Hydro's potential for cost-effective conservation. Problems with Bangor Hydro's assumptions about customer investment in energy efficiency measures.

- 89. Virginia State Corporation Commission** PUE900070; Order Establishing Commission Investigation; Southern Environmental Law Center; March 6 1991.

Role of utilities in promoting energy efficiency. Least-cost planning objectives of and resource acquisition guidelines for DSM. Ratemaking considerations for DSM investments.

- 90. MDPU 90-261-A;** Economics and Role of Fuel-Switching in the DSM Program of the Massachusetts Electric Company; Boston Gas Company; April 17 1991.

Role of fuel-switching in utility DSM programs and specifically in Massachusetts Electric's. Establishing comparable avoided costs and comparison of electric and gas system costs. Updated externality values.

- 91. Private arbitration;** Massachusetts Refusetech Contractual Request for Adjustment to Service Fee; Massachusetts Refusetech; May 13 1991.

NEPCo rates for power purchases from the NESWC plant. Fuel price and avoided cost projections vs. realities.

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- 100. South Carolina PSC 91-606-E;** Petition of South Carolina Electric and Gas for a Certificate of Public Convenience and Necessity for a Coal-Fired Plant; South Carolina Department of Consumer Affairs; January 20 1992.

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- 109. South Carolina PSC 92-209-E**; In Re Carolina Power & Light Company; South Carolina Department of Consumer Affairs; November 24 1992.

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- 110 Florida Department of Environmental Regulation** hearings on the Power Plant Siting Act; Legal Environmental Assistance Foundation, December 1992.

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- 111. Maryland PSC 8487;** Baltimore Gas and Electric Company, Electric Rate Case; January 13 1993. Rebuttal Testimony: February 4 1993.

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- 112. Maryland PSC 8179;** for Approval of Amendment No. 2 to Potomac Edison Purchase Agreement with AES Warrior Run; Maryland Office of People's Counsel; January 29 1993.

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- 113. Michigan PSC U-10102;** Detroit Edison Rate Case; Michigan United Conservation Clubs; February 17 1993.

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- 115. Michigan PSC U-10335;** Consumers Power Rate Case; Michigan United Conservation Clubs; October 1993.

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- 117. FERC 2422 et al.,** Application of James River–New Hampshire Electric, Public Service of New Hampshire, for Licensing of Hydro Power; Conservation Law Foundation; 1993.

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- 120. Vermont PSB 5724**, Central Vermont Public Service Corporation rate request; Vermont Department of Public Service. Joint surrebuttal testimony with John Plunkett. August 1994.

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- 121. MDPU 94-49**, Boston Edison integrated resource-management plan; Massachusetts Attorney General. August 1994.

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- 122. Michigan PSC U-10554**, Consumers Power Company DSM Program and Incentive; Michigan Conservation Clubs. November 1994.

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- 123. Michigan PSC U-10702**, Detroit Edison Company Cost Recovery, on behalf of the Residential Ratepayers Consortium. December 1994.

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- 124. New Jersey Board of Regulatory Commissioners EM92030359**, Environmental costs of proposed cogeneration; Freehold Cogeneration Associates. November 1994.

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- 125. Michigan PSC U-10671**, Detroit Edison Company DSM Programs; Michigan United Conservation Clubs. January 1995.

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- 130. DCPSC Formal 917, II, Prudence of DSM expenditures of Potomac Electric Power Company; Potomac Electric Power Company. Rebuttal testimony, February 1995.**

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- 132. New Orleans City Council CD-85-1, New Orleans Public Service rate increase; Alliance for Affordable Energy. Rebuttal, May 1995.**

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- 135. North Carolina Utilities Commission E-2, Sub 669. December 1995.**

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- 136. Arizona Commerce Commission** U-1933-95-317, Tucson Electric Power rate increase; Residential Utility Consumer Office. January 1996.
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- 137. Ohio PUC** 95-203-EL-FOR; Campaign for an Energy-Efficient Ohio. February 1996
- Long-term forecast of Cincinnati Gas and Electric Company, especially its DSM portfolio. Opportunities for further cost-effective DSM savings. Tests of cost effectiveness. Role of DSM in light of industry restructuring; alternatives to traditional utility DSM.
- 138 Vermont PSB** 5835; Vermont Department of Public Service. February 1996.
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- 139. Maryland PSC** 8720, Washington Gas Light DSM; Maryland Office of People's Counsel. May 1996.
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- A.** Attorney General. Oral testimony in support of "estimation of Market Value, Stranded Investment, and Restructuring Gains for Major Massachusetts Utilities," July 1996.
- Stranded costs. Calculation of loss or gain. Valuation of utility assets.
- 141. MDPU DPU** 96-70; Massachusetts Attorney General. July 1996.
- Market-based allocation of gas-supply costs of Essex County Gas Company.
- 142. MDPU DPU** 96-60; Massachusetts Attorney General. Direct testimony, July 1996; surrebuttal, August 1996.
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- 144. New Hampshire PUC** DR 96-150, Public Service Company of New Hampshire stranded costs; New Hampshire Office of Consumer Advocate. December 1996.
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- 145. Ontario Energy Board** EBRO 495, LRAM and shared-savings incentive for DSM performance of Consumers Gas; Green Energy Coalition. March 1997.



LRAM and shared-savings incentive mechanisms in rates for the Consumers Gas Company Ltd.

- 146. New York PSC** Case 96-E-0897, Consolidated Edison restructuring plan; City of New York. April 1997.

Electric-utility competition and restructuring; critique of proposed settlement of Consolidated Edison Company; stranded costs; market power; rates; market access.

- 147. Vermont PSB** 5980, proposed statewide energy plan; Vermont Department of Public Service. Direct, August 1997; rebuttal, December 1997.

Justification for and estimation of statewide avoided costs; guidelines for distributed IRP.

- 148. MDPU** 96-23, Boston Edison restructuring settlement; Utility Workers Union of America. September 1997.

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- 149. Vermont PSB** 5983, Green Mountain Power rate increase; Vermont Department of Public Service. Direct, October 1997; rebuttal, December 1997.

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- 150. MDPU** 97-63, Boston Edison proposed reorganization; Utility Workers Union of America. October 1997.

Increased costs and risks to ratepayers and shareholders from proposed reorganization; risks of diversification; diversion of capital from regulated to unregulated affiliates; reduction in Commission authority.

- 151. MDTE** 97-111, Commonwealth Energy proposed restructuring; Cape Cod Light Compact. Joint testimony with Jonathan Wallach, January 1998.

Critique of proposed restructuring plan filed to satisfy requirements of the electric-utility restructuring act of 1997. Failure of the plan to foster competition and promote the public interest.

- 152. NH PUC** Docket DR 97-241, Connecticut Valley Electric fuel and purchased-power adjustments; City of Claremont, N.H. February 1998.

Prudence of continued power purchase from affiliate; market cost of power; prudence disallowances and cost-of-service ratemaking.

- 153. Maryland PSC** 8774; APS-DQE merger; Maryland Office of People's Counsel. February 1998.

Power-supply arrangements between APS's operating subsidiaries; power-supply savings; market power.

- 154. Vermont PSB 6018**, Central Vermont Public Service Co. rate increase; Vermont Department of Public Service. February 1998.
- Prudence of decisions relating to a power purchase from Hydro-Quebec. Reasonableness of avoided-cost estimates. Quality of DU planning.
- 155. Maine PUC 97-580**, Central Maine Power restructuring and rates; Maine Office of Public Advocate. May 1998; Surrebuttal, August 1998.
- Determination of stranded costs; gains from sales of fossil, hydro, and biomass plant; treatment of deferred taxes; incentives for stranded-cost mitigation; rate design.
- 156. MDTE 98-89**, purchase of Boston Edison municipal streetlighting, Towns of Lexington and Acton. Affidavit, August 1998.
- Valuation of municipal streetlighting; depreciation; applicability of unbundled rate.
- 157. Vermont PSB 6107**, Green Mountain Power rate increase, Vermont Department of Public Service. Direct, September 1998; Surrebuttal drafted but not filed, November 2000.
- Prudence of decisions relating to a power purchase from Hydro-Quebec. Least-cost planning and prudence. Quality of DU planning.
- 158. MDTE 97-120**, Western Massachusetts Electric Company proposed restructuring; Massachusetts Attorney General. Joint testimony with Jonathan Wallach, October 1998. Joint surrebuttal with Jonathan Wallach, January 1999.
- Market value of the three Millstone nuclear units under varying assumptions of plant performance and market prices. Independent forecast of wholesale market prices. Value of Pilgrim and TMI-1 asset sales.
- 159. Maryland PSC 8794 and 8804**; BG&E restructuring and rates; Maryland Office of People's Counsel. Direct, December 1998; rebuttal, March 1999.
- Implementation of restructuring. Valuation of generation assets from comparable-sales and cash-flow analyses. Determination of stranded cost or gain.
- 160. Maryland PSC 8795**; Delmarva Power & Light restructuring and rates; Maryland Office of People's Counsel. December 1998.
- Implementation of restructuring. Valuation of generation assets and purchases from comparable-sales and cash-flow analyses. Determination of stranded cost or gain.
- 161. Maryland PSC 8797**; Potomac Edison Company restructuring and rates; Maryland Office of People's Counsel. Direct, January 1999; rebuttal, March 1999.
- Implementation of restructuring. Valuation of generation assets and purchases from comparable-sales and cash-flow analyses. Determination of stranded cost or gain.
- 162. Connecticut DPUC 99-02-05**; Connecticut Light and Power Company stranded costs; Connecticut Office of Consumer Counsel. April 1999.

Projections of market price. Valuation of purchase agreements and nuclear and non-nuclear assets from comparable-sales and cash-flow analyses.

- 163. Connecticut DPUC 99-03-04;** United Illuminating Company stranded costs; Connecticut Office of Consumer Counsel. April 1999.

Projections of market price. Valuation of purchase agreements and nuclear assets from comparable-sales and cash-flow analyses.

- 164. Washington UTC UE-981627;** PacifiCorp–Scottish Power Merger, Office of the Attorney General. June 1999.

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- 165. Utah PSC 98-2035-04;** PacifiCorp–Scottish Power Merger, Utah Committee of Consumer Services. June 1999.

Review of proposed performance standards and valuation of performance.

- 166. Connecticut DPUC 99-03-35;** United Illuminating Company proposed standard offer; Connecticut Office of Consumer Counsel. July 1999.

Design of standard offer by rate class. Design of price adjustments to preserve rate decrease. Market valuations of nuclear plants. Short-term stranded cost

- 167. Connecticut DPUC 99-03-36;** Connecticut Light and Power Company proposed standard offer; Connecticut Office of Consumer Counsel. Direct, July 1999; Supplemental, July 1999.

Design of standard offer by rate class. Design of price adjustments to preserve rate decrease. Market valuations of nuclear plants. Short-term stranded cost.

- 168. W. Virginia PSC 98-0452-E-GI;** electric-industry restructuring, West Virginia Consumer Advocate. July 1999.

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- 169. Ontario Energy Board RP-1999-0034;** Ontario Performance-Based Rates; Green Energy Coalition. September 1999.

Rate design. Recovery of demand-side-management costs under PBR. Incremental costs.

- 170. Connecticut DPUC 99-08-01;** standards for utility restructuring; Connecticut Office of Consumer Counsel. Direct, November 1999; Supplemental January 2000.

Appropriate role of regulation. T&D reliability and service quality. Performance standards and customer guarantees. Assessing generation adequacy in a competitive market.

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- 172. Connecticut Superior Court CV 99-049-7597;** United Illuminating Company stranded costs; Connecticut Office of Consumer Counsel. December 1999.

Errors of the CDPUC, in its discounted-cash-flow computations, in selecting performance assumptions for Seabrook, and in setting minimum bid price.

- 173. Ontario Energy Board RP-1999-0044;** Ontario Hydro transmission-cost allocation and rate design; Green Energy Coalition. January 2000.

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- 174. Utah PSC 99-2035-03;** PacifiCorp Sale of Centralia plant, mine, and related facilities; Utah Committee of Consumer Services. January 2000.

Prudence of sale and management of auction. Benefits to ratepayers. Allocation and rate treatment of gain.

- 175. Connecticut DPUC 99-09-12;** Nuclear Divestiture by Connecticut Light & Power and United Illuminating; Connecticut Office of Consumer Counsel. January 2000.

Market for nuclear assets. Optimal structure of auctions. Value of minority rights. Timing of divestiture.

- 176. Ontario Energy Board RP-1999-0017;** Union Gas PBR proposal; Green Energy Coalition. March 2000.

Lost-revenue-adjustment and shared-savings incentive mechanisms for Union Gas DSM programs. Standards for review of targets and achievements, computation of lost revenues. Need for DSM expenditure true-up mechanism.

- 177. NY PSC 99-S-1621;** Consolidated Edison steam rates; City of New York. April 2000.

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- 178. Maine PUC 99-666;** Central Maine Power alternative rate plan; Maine Public Advocate. Direct, May 2000; Surrebuttal, August 2000.

Likely merger savings. Savings and rate reductions from recent mergers. Implications for rates.

**179. MEFSB 97-4;** MMWEC gas-pipeline proposal; Town of Wilbraham, Mass. June 2000.

Economic justification for natural-gas pipeline. Role and jurisdiction of EFSB.

**180. Connecticut DPUC 99-09-03;** Connecticut Natural Gas Corporation Merger and Rate Plan; Connecticut office of Consumer Counsel. September 2000.

Performance-based ratemaking in light of mergers. Allocation of savings from merger. Earnings-sharing mechanism.

**181. Connecticut DPUC 99-09-12RE01;** Proposed Millstone Sale; Connecticut Office of Consumer Counsel. November 2000.

Requirements for review of auction of generation assets. Allocation of proceeds between units.

**182. MDTE 01-25;** Purchase of Streetlights from Commonwealth Electric; Cape Light Compact. January 2001

Municipal purchase of streetlights; Calculation of purchase price under state law; Determination of accumulated depreciation by asset.

**183. Connecticut DPUC 00-12-01 and 99-09-12RE03;** Connecticut Light & Power rate design and standard offer; Connecticut Office of Consumer Counsel. March 2001.

Rate design and standard offer under restructuring law; Future rate impacts; Transition to restructured regime; Comparison of Connecticut and California restructuring challenges.

**184. Vermont PSB 6460 & 6120;** Central Vermont Public Service rates; Vermont Department of Public Service. Direct, March 2001; Surrebuttal, April 2001.

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**185. New Jersey BPU EM00020106;** Atlantic City Electric Company sale of fossil plants; New Jersey Ratepayer Advocate. Affidavit, May 2001.

Comparison of power-supply contracts. Comparison of plant costs to replacement power cost. Allocation of sales proceeds between subsidiaries.

**186. New Jersey BPU GM00080564;** Public Service Electric and Gas transfer of gas supply contracts; New Jersey Ratepayer Advocate. Direct, May 2001.

Transfer of gas transportation contracts to unregulated affiliate. Potential for market power in wholesale gas supply and electric generation. Importance of reliable gas supply. Valuation of contracts. Effect of proposed requirements contract on rates. Regulation and design of standard-offer service.

- 187. Connecticut DPUC** 99-04-18 Phase 3, 99-09-03 Phase 2; Southern Connecticut Natural Gas and Connecticut Natural Gas rates and charges; Connecticut Office of Consumer Counsel. Direct, June 2001; Supplemental, July 2001.
- Identifying, quantifying, and allocating merger-related gas-supply savings between ratepayers and shareholders. Establishing baselines. Allocations between affiliates. Unaccounted-for gas.
- 188. New Jersey BPU** EX01050303; New Jersey electric companies' procurement of basic supply; New Jersey Ratepayer Advocate. August 2001.
- Review of proposed statewide auction for purchase of power requirements. Market power. Risks to ratepayers of proposed auction.
- 189. NY PSC** 00-E-1208; Consolidated Edison rates; City of New York. October 2001.
- Geographic allocation of stranded costs. Locational and postage-stamp rates. Causation of stranded costs. Relationship between market prices for power and stranded costs.
- 190. MDTE** 01-56, Berkshire Gas Company; Massachusetts Attorney General. October 2001.
- Allocation of gas costs by load shape and season. Competition and cost allocation.
- 191. New Jersey BPU** EM00020106; Atlantic City Electric proposed sale of fossil plants; New Jersey Ratepayer Advocate. December 2001.
- Current market value of generating plants vs. proposed purchase price.
- 192. Vermont PSB** 6545; Vermont Yankee proposed sale; Vermont Department of Public Service. Direct, January 2002.
- Comparison of sales price to other nuclear sales. Evaluation of auction design and implementation. Review of auction manager's valuation of bids.
- 193. Connecticut Siting Council** 217; Connecticut Light & Power proposed transmission line from Plumtree to Norwalk; Connecticut Office of Consumer Counsel. March 2002.
- Nature of transmission problems. Potential for conservation and distributed resources to defer, reduce or avoid transmission investment. CL&P transmission planning process. Joint testimony with John Plunkett.
- 194. Vermont PSB** 6596; Citizens Utilities Rates; Vermont Department of Public Service. Direct, March 2002; Rebuttal, May 2002.
- Review of 1991 decision to commit to long-term uneconomic purchase from Hydro Québec. Alternatives; role of transmission constraints. Calculation of present damages from imprudence.

- 195. Connecticut DPUC 01-10-10;** United Illuminating rate plan; Connecticut Office of Consumer Counsel. April 2002

Allocation of excess earnings between shareholders and ratepayers. Asymmetry in treatment of over- and under-earning. Accelerated amortization of stranded costs. Effects of power-supply developments on ratepayer risks. Effect of proposed rate plan on utility risks and required return.

- 196. Connecticut DPUC 01-12-13RE01;** Seabrook proposed sale; Connecticut Office of Consumer Counsel. July 2002

Comparison of sales price to other nuclear sales. Evaluation of auction design and implementation. Assessment of valuation of purchased-power contracts.

- 197. Ontario EB RP-2002-0120;** Review of transmission-system code; Green Energy Coalition. October 2002.

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- 198. New Jersey BPU ER02080507;** Jersey Central Power & Light rates; N.J. Division of the Ratepayer Advocate. Phase I December 2002; Phase II (oral) July 2003.

Prudence of procurement of electrical supply. Documentation of procurement decisions. Comparison of costs for subsidiaries with fixed versus flow-through cost recovery.

- 199. Connecticut DPUC 03-07-02;** CL&P rates; AARP. October 2003

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- 200. Connecticut DPUC 03-07-01;** CL&P transitional standard offer; AARP. November 2003.

Application of rate cap. Legislative intent.

- 201. Vermont PSB 6596;** Vermont Electric Power Company and Green Mountain Power Northwest Reliability transmission plan; Conservation Law Foundation. December 2003.

Inadequacies of proposed transmission plan. Failure of to perform least-cost planning. Distributed resources.

- 202. Ohio PUC Case 03-2144-EL-ATA;** Ohio Edison , Cleveland Electric, and Toledo Edison Cos. rates and transition charges; Green Mountain Energy Co. Direct February 2004.

Pricing of standard-offer service in competitive markets. Critique of anticompetitive features of proposed standard-offer supply, including non-bypassable charges.

- 203. NY PSC** Cases 03-G-1671 & 03-S-1672; Consolidated Edison Company Steam and Gas Rates; City of New York. Direct March 2004; Rebuttal April 2004; Settlement June 2004.

Prudence and cost allocation for the East River Repowering Project. Gas and steam energy conservation. Opportunities for cogeneration at existing steam plants.

- 204. NY PSC** 04-E-0572; Consolidated Edison rates and performance; City of New York. Direct, September 2004; rebuttal, October 2004.

Consolidated Edison's role in promoting adequate supply and demand resources. Integrated resource and T&D planning. Performance-based ratemaking and streetlighting.

- 205. Ontario EB** RP 2004-0188; cost recovery and DSM for Ontario electric-distribution utilities; Green Energy Coalition. Exhibit, December 2004.

Differences in ratemaking requirements for customer-side conservation and demand management versus utility-side efficiency improvements. Recovery of lost revenues or incentives. Reconciliation mechanism.

- 206. MDTE** 04-65; Cambridge Electric Light Co. streetlighting; City of Cambridge. Direct, October 2004; Supplemental January 2005.

Calculation of purchase price of street lights by the City of Cambridge.

- 207. NY PSC** 04-W-1221; rates, rules, charges, and regulations of United Water New Rochelle; Town of Eastchester and City of New Rochelle. Direct, February 2005.

Size and financing of proposed interconnection. Rate design. Water-mains replacement and related cost recovery. Lost and unaccounted-for water.

- 208. NY PSC** 05-M-0090; system-benefits charge; City of New York. Comments, March 2005.

Assessment and scope of, and potential for, New York system-benefits charges.

- 209. Maryland PSC** 9036; Baltimore Gas & Electric rates; Maryland Office of People's Counsel. Direct, August 2005.

Allocation of costs. Design of rates. Interruptible and firm rates.

- 210. British Columbia Utilities Commission** Project No. 3698388, British Columbia Hydro resource-acquisition plan; British Columbia Sustainable Energy Association and Sierra Club of Canada BC Chapter. Direct, September 2005.

Renewable energy and DSM. Economic tests of cost-effectiveness. Costs avoided by DSM.

- 211. Connecticut DPUC** 05-07-18; financial effect of long-term power contracts; Connecticut Office of Consumer Counsel. Direct September 2005.



Assessment of effect of DSM, distributed generation, and capacity purchases on financial condition of utilities.

- 212. Connecticut DPUC 03-07-01RE03 & 03-07-15RE02;** incentives for power procurement; Connecticut Office of Consumer Counsel. Direct, September 2005. Additional Testimony, April 2006.

Utility obligations for generation procurement. Application of standards for utility incentives. Identification and quantification of effects of timing, load characteristics, and product definition.

- 213. Connecticut DPUC Docket 05-10-03;** Connecticut L&P; time-of-use, interruptible and seasonal rates; Connecticut Office of Consumer Counsel. Direct and Supplemental Testimony February 2006.

Seasonal and time-of-use differentiation of generation, congestion, transmission and distribution costs; fixed and variable peak-period timing; identification of pricing seasons and seasonal peak periods; cost-effectiveness of time-of-use rates.

- 214. Ontario Energy Board Case EB-2005-0520;** Union Gas rates; School Energy Coalition. Evidence, April 2006.

Rate design related to splitting commercial rate class into two classes: new break point, cost allocation, customer charges, commodity rate blocks.

- 215. Ontario Energy Board Case EB-2006-0021;** natural gas demand-side-management generic issues proceeding; School Energy Coalition. Evidence, June 2006.

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