BEFORE THE CONNECTICUT SITING COUNCIL

Application of the Connecticut Light and Power Company for a Certificate of Environmental Compatibility and Public Need for an Electric-Transmission-Line Facility between Plumtree Substation and Norwalk Substation in Norwalk	))))))	**Docket No. 217**

DIRECT TESTIMONY OF

JOHN PLUNKETT AND PAUL CHERNICK

ON BEHALF OF

THE OFFICE OF CONSUMER COUNSEL

Optimal Energy, Inc.

Resource Insight, Inc.

MARCH 12, 2002

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I. Identification and Qualifications

Q: Mr. Plunkett, please state your name, position, and business address.

A: I am John J. Plunkett, President of Optimal Energy, Inc. My office is at 14 School St., Bristol, Vermont 05443.

Q: Summarize your qualifications.

A: I am an economist specializing in efficiency and renewables as energy resources and business investments. On behalf of government agencies, citizen groups, and utilities, I have led interdisciplinary teams in all aspects of developing, analyzing and negotiating comprehensive, state-of-the-art energy-efficiency-investment portfolios in Iowa, Massachusetts, Maryland, New Jersey, New York, and Vermont. I have advised and testified before state regulators on integrating energy efficiency in utility-resource plans in the District of Columbia, Florida, Illinois, Indiana, Maryland, Massachusetts, North Carolina, Ontario, Pennsylvania, and Vermont.

My work over the past five years has emphasized transforming markets, targeting savings to defer utility distribution investment, and adding value to retail energy products and services. Since 2000, I have led program planning for Efficiency Vermont, the world's first energy-efficiency utility, as part of multi-organizational enterprise operating under a $27 million contract with the Vermont Public Service Board to deliver statewide energy-efficiency programs for the customers of Vermont's twenty-one electric utilities. Since 1999 I have led the consultant team providing the Long Island Power Authority with implementation planning and management support for its Clean Energy Initiative, a five-year portfolio of programs investing $170 million in efficiency savings and renewable-energy programs that Optimal Energy helped design in 1998. I have been the lead consultant on efficiency-program cost-effectiveness analysis in utility collaboratives in Massachusetts since 1999 and in New Jersey since 1996.

Currently I am leading the consulting team assessing technical, achievable and economic potential for energy-efficiency and renewable resources in New York State and five subregions, on behalf of the New York State Research and Development Authority. I am serving the same role for an analysis updating statewide projection of economically achievable efficiency potential for state of Vermont, on behalf of the Vermont Department of Public Service. In a parallel project I am leading a study analyzing the potential for demand-side resources to defer the need for major transmission upgrades, on behalf of Vermont Electric Company.

Prior to co-founding Optimal Energy in 1996, I was the senior vice-president of Resource Insight, Inc. from 1990 to 1996. I was a senior economist at Komanoff Energy Associates from 1984 to 1990, and a staff economist at the Institute for Local Self-Reliance from 1978-83. I earned a BA with Distinction in economics from Swarthmore College, where I was graduated Phi Beta Kappa in 1983. Exhibit OCC-JP-PC-1 provides details of my education and experience.

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

A: I am Paul L. Chernick. I am President of Resource Insight, Inc., 347 Broadway, Cambridge, Massachusetts.

Q: Summarize your professional education and experience.

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

I was a utility analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in utility regulation and planning, first as a research associate at Analysis and Inference, after 1986 as president of PLC, Inc., and in my current position at Resource Insight. In these capacities, I have advised a variety of clients on utility matters.

My work has considered, among other things, the cost-effectiveness of prospective new generation plants and transmission lines, retrospective review of generation-planning decisions, ratemaking for plant under construction, ratemaking for excess and/or uneconomical plant entering service, conservation program design, cost recovery for utility efficiency programs, the valuation of environmental externalities from energy production and use, allocation of costs of service between rate classes and jurisdictions, design of retail and wholesale rates, and performance-based ratemaking (PBR) and cost recovery in restructured gas and electric industries. My professional qualifications are further summarized in Exhibit OCC-JP-PC-2.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified approximately one hundred and ninety times on utility issues before various regulatory, legislative, and judicial bodies, including the Arizona Commerce Commission, Connecticut Department of Public Utility Control, District of Columbia Public Service Commission, Florida Public Service Commission, Maryland Public Service Commission, Massachusetts Department of Public Utilities, Massachusetts Energy Facilities Siting Council, Michigan Public Service Commission, Minnesota Public Utilities Commission, Mississippi Public Service Commission, New Mexico Public Service Commission, New Orleans City Council, New York Public Service Commission, North Carolina Utilities Commission, Public Utilities Commission of Ohio, Pennsylvania Public Utilities Commission, Rhode Island Public Utilities Commission, South Carolina Public Service Commission, Texas Public Utilities Commission, Utah Public Service Commission, Vermont Public Service Board, Washington Utilities and Transportation Commission, West Virginia Public Service Commission, Federal Energy Regulatory Commission, and the Atomic Safety and Licensing Board of the U.S. Nuclear Regulatory Commission.

Q: Have you testified previously before the Connecticut Department of Public Utility Control (the Department)?

A: Yes. I testified in

- Docket No. 83-03-01, a United Illuminating (UI) rate case, on behalf of the Office of Consumer Counsel, on Seabrook costs.
- Docket No. 83-07-15, a Connecticut Light and Power (CL&P) rate case, on behalf of Alloy Foundry, on industrial rate design.
- Docket No. 99-02-05, the CL&P stranded-cost docket.
- Docket No. 99-03-04, the UI stranded-cost docket.
- Docket No. 99-03-35, the UI standard-offer docket.
- The initial phase of Docket No. 99-03-36, the CL&P standard-offer docket.
- Docket No. 99-08-01, investigation into electric capacity and distribution.
- Docket No. 99-09-12, the nuclear-divestiture plan for CL&P and UI.
- Docket No. 99-09-03, on the performance-based ratemaking proposal of Connecticut Natural Gas.
- Docket No. 99-09-12 RE01, on the Millstone auction.

- Docket No. 99-03-36 RE03, on CL&P's Generation Services Charge.
- Dockets Nos. 99-04-18 Phase 3 and 99-09-03 Phase 2, on the proposed earnings-sharing mechanism of Southern Connecticut Natural Gas and Connecticut Natural Gas.

Q: Are you the author of any publications on utility planning and ratemaking issues?

A: Yes. I am the author of publications on rate design, cost allocation, cost recovery, cost-benefit analysis, and other ratemaking issues. Several of my recent papers and report deal with issues in electric and gas industry restructuring, including integrated resource planning and performance-based ratemaking.

II. Introduction and Summary

Q: On whose behalf are you testifying?

A: Our testimony is sponsored by the Office of Consumer Counsel ("OCC").

Q: What is the purpose of your direct testimony?

A: We testify on the potential for distributed resources—demand-side resources and distributed generation—to affect the facilities Connecticut Light and Power ("CL&P" or "the Company") has proposed in its Application, principally a 345-kV transmission line from the Plumtree substation to Norwalk. Load reductions from distributed resources can eliminate the need for the proposed line, or reduce the need for transmission enough to allow CL&P to substitute a lower-voltage alternative that would not require the higher towers and wider rights-of-way of the proposed project. We discuss analyses prepared by both CL&P and the New England Independent System Operator (ISO-NE).

Q: Please summarize your testimony.

A: We find that CL&P has not properly considered the potential contribution from additional demand-side resources to help alleviate the need for transmission capacity it seeks to add with the proposed facilities. We have found that additional load reductions from DSM offer highly valuable and extremely inexpensive contributions toward solving the transmission capacity problems in southwestern Connecticut. An analysis by ISO-New England reveals that additional load reductions would provide significant benefits in terms of both reduced congestion costs and improved reliability.

The Company clearly has the capability to secure substantial additional savings by continuing, expanding, intensifying, and targeting its existing conservation and load management (C&LM) portfolio in southwestern Connecticut. Still to be determined is how much and how quickly CL&P can actually acquire additional savings annually over the next 5-10 years.

Q: Please summarize your recommendations.

A: We recommend that the Siting Council deny the Company's request and direct CL&P to vigorously pursue distributed resources and more modest transmission options to ameliorate the current problems in Norwalk-Stamford and SWCT. The Council should also

- Direct the Company to carefully integrate distributed resources in all future assessments of the need for additional transmission capacity, especially the Beseck-Norwalk line.
- Put CL&P on notice that it must file information on the financial and environmental costs of facilities if it intends to include their benefits in supporting an application.

- Suggest that, if the planned 345-kV loop (including the proposed line) is intended to serve the HVDC merchant line to Long Island planned by CL&P's unregulated affiliate, any future filing for approval of part of the 345-kV loop clearly identify that justification, including identification of the portion of the 345-kV loop that will be treated as merchant capacity.
- Require that CL&P initiate a process for projecting achievable savings from geographically targeting C&LM and distributed generation programs, and for integrating this analysis into its transmission and distribution planning.

III. Transmission Problems in Southwest Connecticut

Q: What transmission problems in Southwest Connecticut is the proposed transmission project intended to solve?

A: The application, discovery responses by CL&P and ISO-NE, and other reports of ISO-NE identify two distinct areas of concern and three problems.

The two areas of concern are as follows:

- Southwest Connecticut (SWCT), as CL&P defines it, is a roughly rectangular region stretching from Greenwich east past New Haven and north past Danbury. This region had a peak load of 1,195 MW in 2001. SWCT contains about 2,800 MW of central-station generation and has 1,700 MW of transmission connection to the rest of Connecticut.
- Norwalk-Stamford, the southwestern corner of SWCT. This region had a peak load of 3,296 MW in 2001. Norwalk-Stamford contains 470 MW of central-station generation and has 1,100 MW of transmission connection to the rest of SWCT, plus a cable from Norwalk to Long Island.

Each of these areas contains load served by CL&P, UI, and the Connecticut Municipal Electric Energy Cooperative.

The three supply problems are as follows:

- *Reliability for Norwalk-Stamford* in the event of multiple contingencies (loss of transmission lines and/or generators). This is the problem described in Graphs 1–3 of the Application. However, ISO-NE contradicts CL&P's position about the value of additional transmission across the Norwalk-Stamford interface. ISO-NE's "TEAC7" presentation (at 17, 18) shows no reliability improvements from increasing the Norwalk-Stamford interface limits.[1]
- *Reliability of the rest of SWCT.* This issue is not discussed in the Application. Some ISO-NE reports (e.g., "TEAC7") show the reliability problem in the rest of SWCT to be as serious as in Norwalk-Stamford.
- *The economic costs of dispatching local generation out of economic order in the SWCT load pocket*. This issue is not a reliablity problem but one with economic implications. It is extensively discussed in ISO-NE reports. It is also listed in three different ways in DR OCC 1-12 (as decreasing congestion costs, allowing transmission of less expensive energy, and promoting competition, all of which are basically the same effect). Since the load in the Norwalk-Stamford area does not exceed the interface capacity in all but a few peak hours (in which local generation is likely to be economic to operate, anyway), there does not appear to be any significant difference between Norwalk-Stamford and the rest of SWCT in this regard.

[1]"TEAC7." January 24, 2002, power-point presentation by ISO-NE, available as of 3/11/02 on the ISO's web site, www.iso-ne.com.

Q: Does the proposed facility contribute to solving each of these problems?

A: Not all of them. Indeed, the value of the Plumtree-Norwalk 345 kV line is not unambiguous on the current record for any of the three existing problems.

The proposed line would increase capacity across the Norwalk-Stamford interface, and provide backup for outages of transmission and generation in the Norwalk-Stamford region. That point is made by CL&P in Graphs 1–3 of the Application. Remarkably enough, the Company has not determined how much the proposed line would increase the capacity across the Norwalk-Stamford interface, but "anticipates" that the transfer capability would increase "on the order of 200 MW." (DR OCC 1-9)

It is not clear from the Application that the proposed Plumtree-Norwalk 345 kV line would help with the problems of the rest of SWCT. The Application shows the proposed transmission line running from one part of SWCT to another, without adding any capacity to the SWCT interface. The Application does not analyze any benefits of the Plumtree-Norwalk line for SWCT outside of Norwalk-Stamford. None of the materials provided by CL&P and ISO-NE seem to contain any indication that this line would relieve the SWCT constraints. However, the 345kV–115kV transformers at Plumtree are listed as part of the SWCT interface ("TEAC7" at 73), so the proposed line might increase transfer capacity across that interface, to the extent that the existing 345kV capacity into Plumtree exceeds the transformer capacity. Indeed, CL&P "anticipates that the Plumtree-Norwalk 345-kV line will increase the south-western Connecticut transfer capability on the order of 200 MW" (DR OCC 1-10). This is identical to the language for the Norwalk-Stamford interface.[2]

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[2]This appears to be somewhat less than the capability of each of the existing 115-kV lines into the Norwalk-Stamford area, suggesting that the existing 345-kV supply to Plumtree is not sufficient to fully serve the existing 115-kV lines and the new 345-kV lines.

Q: How do CL&P and ISO-NE deal with the SWCT constraints, if the Plumtree-Norwalk line has little or no effect on those constraints?

A: Both CL&P and ISO-NE have conducted most of their analysis by comparing the current situation with a situation in which both the Plumtree-Norwalk 345 kV line and the Beseck-Norwalk 345 kV line are constructed. Even the analyses that ISO-NE has performed of other voltage options appear to assume the existence of both lines.[3]

Q: Is the Beseck-Norwalk 345 kV line the subject of this proceeding?

A: It is our understanding that the Council has ruled that the Beseck-Norwalk 345 kV line is not at issue in this proceeding. On discovery, CL&P has refused to answer even the most basic questions about the Beseck-Norwalk 345 kV line, such as the load level at which it would be necessary (e.g., DR OCC-1-1)

Q: How should the Beseck-Norwalk 345 kV line affect the Council's decision in this proceeding?

A: Since the costs of the Beseck-Norwalk 345 kV line (financial and environmental) and the need for the line have been declared to be outside the scope of

[3]The ISO-NE analyses also make some peculiar assumptions about generation availability. The "Southwestern Connecticut Reliability Study" models cases in which as many as seven of SWCT's nine major units, including the five largest, are unavailable simultaneously at peak. If each of these units has a 10% forced outage rate (and that may be high for the newer technologies), the probability of the five largest units being unavailable simultaneously is 0.00001, and the chance of two of the smaller units being out of service is about one in ten, bringing the probability to one in a million. The probability of all those outages coinciding with peak load (in, for example, the top 5% of hours), is about one in 20 million, or roughly one hour in 2,000 years. Some of the combined transmission and generation contingencies are even less likely: the data in OCC 1-28 indicates that the Norwalk-Stamford 115-kV lines have an average outage rate below 2% in summer peak periods. Planning for contingencies is appropriate, but at some point the probabilities of events are too small to worry about. This is particularly true for transmission reliability, since most customers' reliability will be constrained by outages on the distribution system.

this proceeding, any benefits of the line must be excluded as well. The Council's recognition of the Beseck-Norwalk 345 kV line should be limited to the fact that it is planned, and that load reductions in SWCT may delay or avoid its $400-million cost. No weight can be given to any analysis that assumes that the Beseck-Norwalk line will be built.

Q: Has CL&P identified how large a load reduction would be necessary to delay the need or reduce the capacity, cost and environmental effects of the Plumtree-Norwalk line?

A: The Company provided inconsistent responses on this point. On the one hand,

> CL&P did not investigate the influence of growth rates in peak demands and energy consumption on the timing of the need for the Plumtree-Norwalk project or the completion of the 345-kV loop, because it determined that the need exists under load conditions that have already occurred. (DR OCC-1-6)

On the other hand, DR OCC 1-11 asserts that

> Graph 3 on page 11 of the Application indicates that the approximate transfer capability within the Norwalk-Stamford area is 1,000 MW [with] two transmission lines out of service and Norwalk generation on-line. Without Norwalk Harbor generation, the transfer capability drops to approximately 650 MW. The peak load demand reached on August 9, 2001 was 1,200 MW. This demand is 200 MW more than transfer capability with Norwalk Harbor generation available and 550 MW more than the transfer capability with Norwalk Harbor generation. Therefore, the current minimum need is for 200 MW of load relief and/or local generation reliably operating over peaks, or 550 MW to be able to eliminate reliability dependence on Norwalk Harbor generation.

This latter response exhibits some obvious errors. First, the references to "transfer capability" are misleading. The values plotted in Graph 3 are total capacity values, including both transmission-transfer capability from outside the load pocket and generation capacity within the pocket. The response suggests that the transmission-interface capability is reduced when Norwalk Harbor is not operating. That does not appear to be the case.

Second, Graph 3 shows a load-carrying capability of 1,050–1,250 MW with two lines out of service and all generation available. Thus, the 1,195-MW peak load in 2001 was 145 MW above the region's capacity following the worst double contingency. Since the 1,195 MW peak represented unusually extreme weather conditions, about 93 MW above the peak for a normal summer (DR OCC 1-1, Attachment C; DR 1-15, Attachment B), the 145-MW shortfall represents a triple contingency of extreme weather coinciding with the outage of the region's two most important lines.

Third, the computation of a 550-MW shortfall would represent a quintuple contingency (extreme summer, two lines out, and two Norwalk units out).[4] The Company does not plan for quintuple, or even quadruple, contingencies. If the standard of this response were applied to past loads, Norwalk-Stamford would have been capacity deficient since 1981.

Q: What is a reasonable assessment of the load reduction necessary to restore second-contingency reliability for the Norwalk-Stamford area?

A: Under normally extreme weather and 2001 economic conditions, to maintain power supply to all customers after the worst double-contingency outage would require a reduction of about 60 MW. With the actual 2001 peak weather conditions, the required reduction would be about 150 MW. The Company predicts that these requirements will grow about 20 MW annually (DR OCC 1-15).

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[4]If the lines each has a 2% forced-outage rate (their 1998-2001 summer average), and the generators have a 10% forced-outage rate, the probability of these outages coinciding is about one in 32 million, which would occur in about one hour in 6,800 years. The probability of extreme weather in the same hour is vanishingly low.

Q: How long has the Norwalk-Stamford area been deficient in capacity?

A: Actual load was above the second-contingency regional capacity by 1994 (according to Graph 3 of the Application) or 1999 (according to DR CSC 1-5).

Q: Has CL&P identified how large a load reduction would be necessary to delay the need or reduce the capacity, cost or environmental effect of the Beseck-Norwalk line?

A: The Company directly refused to answer that question, because the Beseck-Norwalk line is not a part of this application (DR OCC-1-13).

IV. Integrating Distributed Resources into the Company's Transmission Planning

A. Integrated Planning for Transmission

Q: How should utilities respond to anticipated constraints on their transmission systems?

A: Each utility should start by identifying the major transmission additions that are already in its long-term budget, or that may be required within the planning horizon. For each such addition, the utility should determine whether it is load-driven, that is, whether it could be avoided or deferred by reductions in forecast loads. For each area in which load is driving avoidable major additions, the utility should then seek distributed resources that would avoid or defer the additions at a net cost (net of other benefits of the resources) that is less than the benefit of deferring or avoiding the addition. Where lower-cost resources are found, the utility should pursue the distributed alternatives.

This process of integrating distributed resources into the planning of transmission facilities is variously referred to as distributed utility planning or distributed integrated-resource planning.

Q: What do you mean by distributed resources?

A: We mean demand-side resources, distributed generation, and, where applicable, smaller transmission-and-distribution options. Each of these resources can be targeted to the particular areas in which loads are creating the need for a transmission addition.

Q: What do you mean by demand-side resources?

A: Reductions in customer demand constitute resources to the extent they avoid the need for supply. There are two distinct types of demand-side resources. Efficiency resources are savings from applying high-efficiency technologies for lighting, cooling, and other end-uses. Load-management resources involve temporary curtailment and/or shifting of electricity usage on request. Connecticut utilities and regulators have referred to both as conservation and load management (C&LM).

Q: Why should CL&P factor distributed resources into its transmission planning?

A: Reducing demand may allow CL&P to eliminate, postpone, or reduce the scale of transmission investments that would otherwise be needed to maintain reliable electric service and allow for reasonably economic dispatch of generation. Load reductions produce benefits similar to those claimed for the proposed transmission lines, including improving reliability and reducing uneconomic dispatch of generation in load pockets, such as SWCT.

Reducing transmission investments through distributed resources can have a number of benefits:

- Reducing financial costs to consumers, including the costs of the transmission, generation energy and capacity costs, distribution investments, and line losses.
- Reducing the risks of future stranded transmission costs.
- Reducing the environmental effects of building and maintaining new transmission structures, and clearing new right-of-way.
- Reducing the amount of air pollution, water consumption, and other environmental effects associated with energy generation.

Q: How do distributed resources provide environmental benefits associated with reduced energy usage?

A: Energy conservation (and in many cases load management) reduces the total amount of electricity that must be generated in New England and the Northeast. Cogeneration tends to reduce emissions, by displacing both central electric generation and a thermal load (such as a boiler) with the same fuel use. All distributed resources tend to reduce line losses by delivering electricity directly to customers. Reductions of energy usage at peak periods is particularly effective at reducing line losses, since variable losses rise as the square of current.

In contrast, the proposed transmission line would primarily change the location of the energy generation, by allowing more energy generated in other parts of the region to be imported to SWCT.

Q: In DR OCC 1-12, CL&P asserts that the proposed line would "allow for the transmittal of less expensive electric energy generated from cleaner-burning plants into southwest Connecticut and the Norwalk-Stamford sub-area" and "improves air quality in southwestern Connecticut if certain generating units operate less frequently." Would construction of the line

reliably result in the operation of cleaner-burning plants and in improved air quality?

A: The Company has not demonstrated that either of these assertions is true, and the response to OCC 1-12 is simply speculative. It is certainly possible that the existence of the proposed line would sometimes result in a new clean gas plant outside SWCT running to replace a higher-emission plant in SWCT. Other outcomes are also possible, including that

- The plant in the SWCT that is turned down is Wallingford, a combustion turbine burning gas, to be replaced by a less expensive but dirtier heavy-oil or coal plant from New England or New York. This is especially likely in the winter, when gas tends to be relatively expensive.
- The plant in the SWCT that is turned down is New Haven Harbor, burning gas, to be replaced by energy from an old New York coal plant.

Hence, in contrast to energy conservation, it is not clear that constructing the proposed line will have net air-quality benefits.

Q: Does CL&P face the need to make distribution investments that might be avoided by the same load reductions that would defer, downsize, or avoid the proposed Plumtree-Norwalk line and the planned Beseck-Norwalk line?

A: Yes. Attachment 5 to Towns 1-14 indicates that several areas in SWCT (Glennbrook, Stamford, and Middle River) have distribution problems that may be relieved by DSM or distributed generation. These are simply examples; there may be many other circuits facing overloads in this fast-growing area.

The proposed transmission line will not reduce the need for these distribution upgrades. As explained in Attachment 5 to Towns 1-14, DSM and distributed generation can improve distribution reliability without new line construction, while ameliorating the transmission problems in the same area.

Q: If CL&P has to build transmission facilities eventually anyway, how does postponing their need reduce costs?

A: Each year of delay avoids the annual carrying charges associated with return on and of capital associated with the investment. In this case, each year of delay has a very high value. The proposed Plumtree-Norwalk line would cost approximately $125 million, and the anticipated Beseck-Norwalk line would cost about $400 million, for a total cost of $525 million.[5] Deferring this investment by one year would reduce the present value of transmission revenue requirements by approximately $50 million, even were CL&P eventually to build the exactly the same projects with one year's delay.

Q: What is the basic economic test for determining whether targeting distributed resources is superior to construction of a planned transmission addition?

A: The societal test is appropriate for these decisions. So long as the total cost of a plan with distributed resources is lower than the total costs of the traditional transmission expansion, avoidance or some deferral of the expansion is economic. Much of the targeted C&LM will typically have net costs (that is, net of other avoided costs) far below the average cost of the transmission project, i.e., the cost of the planned addition divided by the kilowatt of load that requires the additions.[6]

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[5]The origin of this second line is identified as the Middletown area in some documents, and as Wallingford in others.

[6]The least-cost resource portfolio might therefore include some resources with costs per kilowatt that are greater than the average cost of the planned transmission project, if they are needed to produce sufficient load reductions.

Q: Has this approach been applied previously?

A: Yes. A number of New York utilities have performed analyses of distributed-resource alternatives to transmission projects. Most of the Vermont utilities have agreed to apply integrated planning procedures to all large transmission and distribution projects, and a number of such analyses have been preformed. The Vermont Distributed Utility Planning Guidelines are attached as Exhibit OCC-JP-PC-3.

Q: Has the Siting Council recognized the influence of lowering demand on the need for expanding transmission capacity?

A: Yes. Twenty-seven years ago, the Power Facility Evaluation Council found that decelerated load growth due to the energy crisis of 1973-4 and its aftermath had postponed the need for adding transmission capacity to serve southwestern Connecticut.[7] The Council expressly recognized the potential for demand-reducing efforts to postpone the need for additional transmission capacity.[8] In Docket No. 26, the Siting Council found that "recent decreases in load growth ...will result in considerable delay in the requirement for a 345 kV loop into the southwestern area...."[9]

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[7]Findings 27–56, February 24, 1975, Power Facility Evaluation Council Findings and Opinion in Docket No. 5. Attachment to response to DR AG 1-39.

[8]Finding 46, February 24, 1975, Power Facility Evaluation Council Findings and Opinion in Docket No. 5.

[9]Connecticut Siting Council, Findings in Docket No. 26, October 8, 1982, Finding 27, at 4.

B. The Company's Transmission-Planning Process

Q: Where in CL&P's planning in support of this Application should the Siting Council expect to see distributed resources represented?

A: Demand-side resources usually appear as reductions in a multi-year forecast of future peak demand and electric energy consumption. The demand and energy forecast supporting the need for transmission facilities covered in this Application should be net of savings from CL&P's planned and committed C&LM programs for the future.[10] CL&P also should have examined the potential for additional demand side resources to further lower future demand. This should have manifested itself as an alternate, lower forecast reflecting demand and energy savings from additional C&LM program investment.

The Company at least should have assessed the impact of such a lower forecast on the timing of the need for additional transmission capacity. To the extent that additional C&LM would materially influence the timing of capacity need, then CL&P should have re-computed the present worth of the delayed investments. The Company also should have projected the costs of acquiring the additional demand-side resources, net of any non-transmission benefits (i.e., avoided electricity production energy and capacity costs, avoided distribution capacity costs). The difference in present-worth costs between the two cases would represent the economic savings from pursing the alternative involving reduced loads through additional CL&M and delayed transmission investment.

Q: Did CL&P's planning follow this approach?

A: No.

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[10]The effects of past years' C&LM programs are reflected in the base year demand and energy, i.e. current peak demand and energy consumption would be higher by the cumulative annual savings from past years' programs.

Q: How did CL&P treat demand-side resources in its Application?

A: Demand-side management garnered all of two sentences in CL&P's Application:

> Based on current peak load projections, demand-side management programs and distributed generation cannot meet the large scale reinforcement needed in southwestern Connecticut. It would be difficult to compensate for the magnitudes of load growth coupled with potential generation requirements, and would pose substantial implementation difficulties.[11]

Q: What difficulties is CL&P referring to, and how do they compare with those associated with this project?

A: The Company's answer to essentially this question reveals a deep-seated bias against distributed resources in general and demand-side resources in particular. The question posed and answer provided in discovery are reproduced in their entirety:

Q: How did the Company respond to the following question:

> **At p. 43, the Application states: "It (demand-side management and distributed generation) would be difficult to compensate for the magnitudes of load growth coupled with potential generation retirements, and would pose substantial implementation difficulties."**
>
> **Please explain specifically how "difficult" it would be for DSM and DG to offset load growth and scheduled generation retirements.**
>
> **What basis or criteria did the Company use to determine that it would be too difficult these options to substitute for or postpone the need for the project?**
>
> **What are the nature and extend of these "implementation difficulties?"**
>
> **On what basis did the Company conclude that these DSM-related and DG "difficulties" are so severe that they outweigh the difficulties associated with the proposed transmission line construction project?**

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[11] Application at 43.

Please provide any analysis conducted to support the response to each part of this request.

A: CL&P replied as follows:

Several factors make demand side management (DSM) and distributed generation (DG) programs a much more difficult solution for a large scale problem such as that in southwestern Connecticut (See response to Data Request OCC-01, Q-OCC-003). These include the willingness of the consumer to participate in DSM and DG programs, implementation complexities to ensure desired results, and sustainability that requires it to meet increases in future demand. Also see response to Data Request OCC-01, QOCC-021.

The willingness of a consumer to participate in DSM or DG programs must outweigh the perceived minimal cost savings, the potential for significant business revenue loss, the inconvenience, and potential local air and noise pollution regulations and reporting requirement.

There are also implementation difficulties including: the need for wide-area distribution to cover all contingency conditions, reliable on-line communication networks to a central control location, increased operating complications for ISO-NE/CONVEX, the potential adverse impact on the environment, questionable fuel supply and potential conflicts with local zoning requirement. Similar to generation reserve margins, it is expected that a reserve margin will also be required for DSM & DG.

Finally, if implemented, the program must be sustainable and address increases in demand. Consumers may be concerned over the frequency and duration of interruptions. On the other hand CL&P is concerned with the continual long-term availability and operability of these programs to forego the need to construct new transmission lines. Auditable mechanisms must ensure the deliverability of the services that are contracted with the programs. Once a transmission line is constructed, it is available for the life of the facility unlike DSM & DG results which may be primarily outside of the direct control of the system operator.

In summary, the difficulties presented by the above factors contributes to DSM an DG failing to provide a certain long-term solution that can be relied upon to address the reliability concerns in southwester Connecticut. The consequences of these programs stagnating or diminishing over time may result in widespread service interruptions until such time a new transmission line is constructed.

> On this basis, the difficulties associated with the proposed transmission line construction outweigh the potential and risks associated with DG & DSM on such a widespread area.

Q: What strikes you as biased in this passage?

A: This response reveals a deep-seated preference for transmission-based solutions and an equally strong resistance to non-transmission alternatives. It runs counter to CL&P's reliance on more than 450 MW of system-wide C&LM savings produced since 1990, particularly the contribution from energy-efficiency programs. None of the litany of difficulties recited in the response should be considered a valid basis for dismissing the additional savings available from energy-efficiency investment. For example,

- As explained below, there is more than ample "willingness to participate" in CL&P's existing efficiency programs
- While it is understandable for transmission planners to regard the unfamiliar details of efficiency programs as somewhat daunting, "implementation complexities to ensure desired results" is hardly an acceptable reason for ruling out efficiency savings as part of an alternative to transmission investments.
- "Sustainability to meet increases in demand" is an attribute unique to efficiency programs like CL&P's that focus on new construction, which is a key drive of load growth
- Comprehensive efficiency programs such as CL&P's produce considerably more than "minimal perceived bill savings."
- There are no real "potential for significant business revenue loss,... inconvenience, [or]...potential local air and noise pollution regulations and reporting requirements" associated with CL&P's energy-efficiency programs

- It is hard to believe that CL&P is serious about its idea that the plethora of "implementation difficulties" mentioned would require a "reserve margin" for additional efficiency savings. This would suggest that CL&P should increase the planning reserve margin for existing loads because they are the result of past risky investments in over 450 MW of efficiency improvements.
- The stated concern with "continual long-term availability and operability of these programs" is misplaced with regard to most efficiency programs, especially those involving high-efficiency upgrades to long-lasting buildings and equipment. In such cases, the efficiency improvements will tend to last as long as the underlying loads themselves. For example, the savings from a high-efficiency 300-ton chiller are at least as certain as the underlying load of a customer with the 300-ton cooling demand.

Q: Did the Company perform any studies that demonstrate that demand-side resources could not substitute cost-effectively for capacity from the proposed 345 kV Plumtree-Norwalk line?

A: No. According to CL&P, "the Company has performed no studies specifically to demonstrate this because the potential peak load reduction is too small to offset the need for the proposed line."[12]

Q: Did CL&P adequately account for currently planned demand-side resources in assessing the need for the Plumtree-Norwalk line?

A: We cannot answer this question unequivocally on the basis of the Company's Application or its discovery responses. No savings from future DSM investments appear to be included in need assessment in application. On the other

[12]CL&P Response to DR Towns 1-42.

hand, CL&P indicates that it does count savings from future program activity in its 2001 load forecast filed with the Siting Council. We cannot tell conclusively whether CL&P includes these savings in the load forecast at 41 (Figure 3) of its Application. Nor can I tell whether ISO-NE included future C&LM program savings in its analyses of the congestion savings and reliability benefits of load reductions in southwestern Connecticut.

Q: What does CL&P say about whether it counted DSM savings from future DSM activities in the load forecast for southwestern Connecticut?

A: We asked CL&P in discovery to "provide the Applicant's forecast of peak load and energy savings, by program and by customer class, by year, for as much of the study period as possible, from all currently planned conservation and load management programs, for...Southwestern Connecticut." CL&P replied,

> the plans for years beyond 2002 are currently being developed. Forward looking, five-year projections of DSM peak load MW impacts are provided in the annual Forecast of Loads and Resources filed with the Connecticut Siting Council. No forecasts were provided for Southwestern Connecticut since the Southwestern Connecticut area includes United Illuminating Co. and municipal electric company service territories.[13]

Q: Does this suggest that CL&P did not count savings from future program activity in its load forecast beyond 2002?

A: Yes. But the Company's 2001 DSM load forecast filed with the Siting Council shows that CL&P definitely counts the future impacts of both future DSM programs and past DSM programs. In other words, CL&P's future projected savings from DSM explicitly subtract negative savings projected for past programs from the positive savings achieved from future programs. Exhibit OCC-JP-PC-4 reproduces annual additions and subtractions for DSM in

[13]Company response to DR OCC 1-2.

CL&P's 2002 forecast. It predicts that next year, summer demand will rise by 16 MW because of the removal from service of energy-efficiency improvements installed over 10 years ago. CL&P's demand forecast therefore attributes a net of only 37 MW from CL&P's current DSM programs, which by themselves are projected to save 53 MW. Starting in 2008, this forecast shows that the net effect of DSM is to raise future peak loads by 18-87 MW/year, as "negative" savings from past programs grow and no new savings from future are projected past 2007.

Q: What is wrong with this approach?

A: The Company assumes that the savings from all efficiency improvements disappear as the measures reach the ends of their lives—typically the end of the equipment's life. This assumption ignores long-term market transformation that has accompanied CL&P's market intervention in the late 1980s and throughout the 1990s. It is highly likely that old electronic ballasts and efficient motors installed in 1990 will be replaced in kind simply because the original equipment they substituted for is hard to find if it is available at all. What was considered efficient in 1990 is most often now the baseline, or close to it. Standards and common practice have advanced over the last decade, in no small measure due to CL&P's programs, especially over the past five years as they have become integrated with regional and national efforts to transform markets. Consequently, CL&P's demand forecast is biased upward by the overstatement of the expiration of decades-old DSM investments.

Q: Does CL&P project only 16 MW of savings from its C&LM programs in 2002?

A: That is the number that appears in the Company's latest forecast, as reproduced in Exhibit OCC-JP-PC-4. It does not agree with the 47.7 MW that CL&P

projects for 2002 in response to discovery.[14] If the correct answer is 47.7 MW, then CL&P's forecast for 2002 is upwardly biased by 32 MW.

C. ISO-NE Estimates of the Benefits of Load Reductions

Q: Did ISO-NE reflect distributed resources in its analysis of the need for the proposed transmission facilities?

A: Yes, in a limited way.

Q: Explain how ISO-NE's analysis dealt with additional distributed resources.

A: "[T]hrough the [regional transmission expansion plan] process (RTEP01), ISO-NE has evaluated the reliability and economic benefits of assumed amounts of load reductions, which could include demand-side management efforts."[15] According to a presentation of ISO-NE's Frank Mezzanotte at an October 15, 2001 meeting of the Southwest Connecticut Reliability Study (at 5), one of the goals of the RTEP process is "to elicit from the marketplace solutions to the identified problems, which solutions may include generation plants and demand-side management...."[16]

At that meeting, ISO-NE presented results of a study analyzing "DSM Impacts on Transmission Congestion." Congestion costs are the above-market energy costs paid to run uneconomic generation (compared to regional merit-order dispatch) to maintain sub-area reliability. ISO-NE analyzed the impact on congestion costs from two demand-side alternatives in southwestern Connecti-

[14]CL&P response to DR OCC 1-2 at 2.

[15]ISO-NE response to DR Towns 2-5.

[16]See Mezzanotte, Frank. 2001. "Southwest Connecticut Reliablity Study Meeting." A power-point presentation that includes ISO-NE's agenda for the 10/24/01 meeting, available as of 3/11/02 on the ISO's web site, www.iso-ne.com, in a file named "SW CT RC TEAC.ppt"

cut: (1) a 1.4% reduction in all hourly loads, roughly 42 MW, equivalent to about a year's worth of load growth; and (2) 250 MW of "price-responsive DSM," including voluntary demand reduction (Mezzanotte at 35, 36).[17]

Q: What value did the ISO study find for distributed resources?

A: Exhibit OCC-JP-PC-5 reproduces the ISO-NE presentation. The ISO's analyses showed that reducing hourly loads in southwestern Connecticut by 1.4% would save around $53 million in congestion costs through 2006. The 250 MW of load response would save $259 million over the same five-year period (Mezzanotte at 40, 41). Discounting the reported annual savings and dividing by the 250 MW and 42 MW from the load-response and conservation savings yields a range of $878 and $1,229 per kW of load reduction, respectively, during the five-year study period.

Q: Do these values include the value of reliability improvements from reducing loads?

A: No. The analysis was confined to the congestion costs avoided by load reductions.

Q: Did ISO-NE analyze the reliability benefits of load reductions?

A: Yes, in a subsequent analysis presented in January 2002.

Q: How did ISO-NE analyze the reliability benefits of load reductions?

A. ISO-NE's objective was to quantify "the impact on NEPOOL reliability of generation additions or attrition in the sub-areas....The objective is accomplished by decreasing or increasing the load in each sub-area, one sub-area at a time. Decreasing the load has the equivalent effect of adding perfect generation capacity to the respective sub-areas" ("TEAC7" at 12).

[17] This reduction consists of 125 MW each in Norwalk-Stamford and in the rest of SWCT.

Q: What did the ISO-NE reliability analysis find for southwestern Connecticut?

A: Exhibit OCC-JP-PC-6 reproduces Slide 15 of the ISO-NE TEAC 7 presentation, which plots the percentage change in pool reliability against sub-area load reduction. The graph shows that a 100 MW load reduction in southwestern Connecticut (including Norwalk-Stamford) will reduce NEPOOL loss-of-energy expectation (LOLE) by 50%. Reducing load 200 MW reduces NEPOOL LOLE by 80%. That is better than the effect of the proposed line, which (if it actually increases interface capacity by 200 MW) reduces LOLE by 75%.

As ISO-NE put it, "the southwestern Connecticut and Norwalk-Stamford sub-areas are the most sensitive to generation additions or attrition. Adding generation to these sub-area will contribute the most to improving NEPOOL system reliability" ("TEAC7" at 20).

Q: Why do you characterize ISO-NE's analysis as "limited"?

A: As ISO-NE pointed out, its "static analysis did not consider delay of resource additions in response to conservation….Conservation may delay the need for generation or transmission improvements."[18]

The ISO's analysis of efficiency impacts was crude at best. ISO-NE did not develop what it believed to be credible forecasts of additional efficiency potential or the costs of acquiring it. The timing and magnitudes of the conservation savings modeled in the ISO's analysis do not adequately represent the expected pattern from additional program efforts, which build over time as market penetration increases.

[18] "DSM Impacts on Transmission Congestion, Presentation to TEAC, October 15, 2001" at 38.

V. Additional Demand-Side Resources in Southwestern Connecticut

A. The Company's Position on Additional Savings Potential from DSM

Q: Does CL&P offer any quantification of the potential for demand-side resources to displace the proposed transmission facilities?

A: Yes, in response to a data request from the towns of Bethel, Redding, Weston and Wilton, CL&P stated:

> If the life-cycle costs of the proposed transmission line were allocated to demand-side management (DSM) programs, the Company believes that peak loads for the Norwalk-Stamford area have the potential to be reduced by as much as thirty-four (34) MW.[19]

Q: Is this a reasonable estimate of the maximum load reductions that CL&P could economically achieve with C&LM in the Norwalk-Stamford area?

A: No.

Q: Why not?

A: The Company's estimate is fundamentally flawed for two reasons. First, it wrongly assumes that additional demand-side resources in southwestern Connecticut must somehow be spread through the entire state. Second, it fails to account for the extremely low—indeed, negative—costs associated with relieving transmission constraints by expanding, intensifying and targeting its current C&LM programs.

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[19]Company response to DR Towns 1-43.

Q: What is wrong with CL&P's estimate of the amount of peak savings achievable from spending the lifetime costs of the proposed transmission project on C&LM programs?

A: The Company only applied 21% of the 160 MW in savings it had estimated would be realized by spending $195 million more on DSM. It arrived at the larger figure by dividing the $195 million present worth of the transmission project by 0.8 MW realized per million dollars spent on its 2001 DSM programs.[20] The problem with CL&P's approach is that it presumes that the Company can only achieve savings in southwestern Connecticut through statewide efforts. In effect, CL&P assumes in its response that four-fifths of every megawatt of savings must go to other parts of the state.

In reality, nothing prevents CL&P from targeting additional DSM investment beyond statewide initiatives to specific geographic areas where savings have particularly high value—such as southwestern Connecticut. The correct answer is that, if additional savings cost $1,200/kW (i.e., 0.8 MW per $1,000,000), CL&P could achieve 160 MW wherever it spent the money.

Q: Are you testifying that CL&P could deploy its C&LM programs to achieve 160 MW of additional savings in southwestern Connecticut?

A: No, we are not. We have not done the program planning it would take to develop budgets and project savings from expanding and/or intensifying existing programs, adding new ones, and targeting all of them to southwestern Connecticut over the next 3–10 years. The Siting Council should make this the responsibility of the Applicant.

[20] CL&P response to DR Towns 1-43.

Q: Is there any evidence that CL&P could secure more peak load reductions from its existing efficiency programs in southwestern Connecticut?

A: Yes. CL&P and UI currently administer a strong suite of efficiency programs, backed by over a decade of success in CL&P's case. Since January 2000, both CL&P and UI have administered these programs in consultation with the Energy Conservation Management Board. At $60 million, CL&P's 2001 spending was second only to the 1991 peak of $74 million.[21] Exhibit OCC-JP-PC-7 reproduces CL&P's recent summary of its C&LM programs planned for 2002.

Despite significantly higher budgets in the past two years, however, there are recent signs that market demand for efficiency programs exceeds the programs' supply of available funds. The clear implication of this oversubscription—in a recession, no less—is that money is the only thing standing in the way of additional DSM savings in southwestern Connecticut. Such additional savings are available without changing existing programs or adding new ones.

Q: What signs point to additional customer demand to participate in existing CL&M programs?

A: Presentations by both CL&P and (especially) UI to the Energy Conservation Management Board (ECMB) indicated that 2001 budgets constrained program activity last year. In its first-quarter report, CL&P informed the DPUC that "through April 30, 2001, the Company has committed approximately 72% of its total annual program budget of $63.8 million for the year."[22] By the end of July,

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[21]CL&P response to DR CSC 1-6.

[22]CL&P First Quarter 2001 Conservation and Load Management Status Report, Presented to the Department of Public Utility Control, May 4 2001, Docket No. 99-09-30, Compliance Order No. 8, Attachment B, at 2.

"essentially 80–90% of the program budget for 2001 is committed as of this time."[23] CL&P's RFP program soliciting projects from customers and trade allies consistently yielded proposals well in excess of the funding available.[24]

Signs that funding limitations were constraining savings were even stronger for UI, whose territory falls almost entirely within southwestern Connecticut. During the first half of 2001, UI experienced "unprecedented demand" for its Energy Blueprint (serving nonresidential new construction) and Energy Opportunities (pursuing savings from existing customers).[25] By August, UI had to re-allocate budgets to accommodate demand up to that point, and stopped accepting new project applications for the year.[26] UI had also committed its entire budget for its Small Business Advantage program by then.[27] Demand became so strong that UI was forced to suspend incentive offerings in the third quarter for both the Energy Blueprint and the Energy Opportunities programs.[28]

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[23]CL&P Second Quarter 2001 Conservation and Load Management Status Report, Presented to the Department of Public Utility Control, August 1 2001, Docket No. 99-09-30, Compliance Order No. 8, Attachment B, at 2.

[24]CL&P Third Quarter 2001 Conservation and Load Management Status Report, Presented to the Department of Public Utility Control, August 1 2001, Docket No. 99-09-30, Compliance Order No. 8, Attachment B, at 7.

[25]United Illuminating Second Quarter 2001 Status Report to the ECMB, August 14 2001, at 2.

[26]Ibid. at 12.

[27]Ibid. at 10.

[28] United Illuminating Conservation and Load Management Third Quarter 2001 Report to the ECMB, November 6 2001, at 2.

Q: Is available funding likely to limit achievement of C&LM savings in 2002?

A: Yes; in fact, funding will constrain 2002 savings even more than 2001. This is because "[f]or 2002, program budgets [for CL&P and UI] were reduced by $13.5 million due to the transfer of $12 million from the C&LM Fund by PA 01-9 Section 13, June Sp. S., to the state's General Fund for use by the Department of Public Works (DPW) and by $1.5 million for the establishment of the Institute for Sustainable Energy at Eastern Connecticut State University."[29] As a result, both CL&P and UI were forced to cut program budgets across the board for 2002. It follows that the programs could increase savings beyond what is contained in current plans if $13.5 million in additional funds were made available.

Q: Is there any reason to believe that CL&P is close to exhausting the achievable savings from energy-efficiency programs?

A: No, not at all. This is because CL&P's current programs focus primarily on "a market transformation approach....This approach seeks to predispose customers to choose efficient alternatives when purchasing equipment for replacement and renovation."[30] This suggests that there will remain significant savings potential from efficiency potential for two related reasons. First, "lost-opportunity" markets such as replacement and renovation present new savings potential from efficiency improvement every year as another set of customers enters the market to add or replace facilities and equipment. All the evidence we have seen

[29]Report of the Energy Conservation Management Board, Year 2001 Programs and Operations, January 31 2002, at 13.

[30]CL&P 2002 Load Forcast, Chapter III, Demand-Side Management, filed with the Siting Council on March 1 2002, at III-2.

confirms that opportunities will continue to abound for efficiency improvements in these markets for the foreseeable future.

The second reason that CL&P's market transformation orientation leaves significant opportunities for realizing additional savings is that relatively little of CL&P's programs are devoted to efficiency retrofits. Retrofit savings involve either early retirement of functioning equipment with high-efficiency alternatives, or installation of supplemental materials or technology. Early retirements offer significant savings for two reasons. First, only a small fraction of existing equipment turns over naturally each year, leaving a large stock of inefficient candidates for early retirement. Second, existing equipment is often far less efficient that even the least efficient new equipment available in the market today, so the savings from installing high-efficiency new equipment are higher than in normal end-of-life replacement.

Q: Aside from increasing funding for existing programs, what else could be done to further increase savings from existing efficiency programs in southwestern Connecticut?

A: The Company could take steps to increase participation in markets already served by its existing programs, increase savings per participant, or both. This applies both to market-driven opportunities like new construction, renovation and replacement, and especially to retrofit markets. CL&P can accomplish this by strengthening program strategies in the affected areas, such as more aggressive marketing, greater financial assistance and incentives, and more-attractive program delivery.

Q: Please provide an example of strategies CL&P could deploy to increase participation and savings from small business customers in the Norwalk-Stamford area

A: The Company's Small Business Advantage program pursues retrofit-savings commercial customers with demand below 100 kW. The program offers up to 50% of the installed cost of high-efficiency lighting retrofits, and between half and all the incremental cost of other efficiency improvements. See Exhibit OCC-JP-PC-7 at 2. In some circumstances, participating customers can obtain interest-free financing for their portion of installed costs.

The Company could make this program even more attractive to customers by adopting the approach some utilities (such as Potomac Electric Power and Green Mountain Power) used in the early 1990s. With the "direct install" approach, CL&P could offer all customers demanding less than 100 kW in the Norwalk-Stamford area free installation of all measures recommended as cost-effective. CL&P could expect 90% of customers contacted to agree to an on-side visit with recommendations, and another 90% of these to authorize CL&P to proceed with a work order to install the recommended measures.

Enhancements to other CL&P programs targeted to southwestern Connecticut would also offer further savings.

Q: Is there any evidence that CL&P is in a position to effectively target its efficiency programs geographically?

A: Yes. We found two kinds of evidence that support CL&P's capability to deliver and integrate targeted efficiency programs. The first is that CL&P already has a vehicle in its C&LM portfolio to target geographically its entire portfolio of programs. This is known as the Community Based Program. In 2001, CL&P and UI fielded this program in two locations with apparently favorable results. There is no reason CL&P could not use this approach to maximize savings in the Norwalk-Stamford area or the larger southwestern Connecticut area.

The Company also provided evidence that it has built the capability to target its DSM programs to alleviate transmission and distribution constraints with near-pinpoint accuracy. In response to discovery, CL&P provide a copy of a report detailing its ability to use "Strategic Asset Optimization" (SAO) to identify individual customers as candidates for demand-side programs, and to determine the impact of these savings on existing circuits. According to this report,

> Traditionally, conservation planning has been an 'across-the-board' program in which the utility has not targeted particular customers subsets of geographic areas for conservation. Rather, all customers in all areas were targeted....SAO allows the utility to target both customer subsets and geographic areas.
>
> Figure 6 shows a map of the Stamford area with all C&I customers shown and scaled by their kW demand levels. There are approximately 250 C&I customers in this area shown and personally contacting each of them about a conservation program would be expensive. From historical conservation program experiences it is known that medical and health facilities and schools tend to participate in conservation program at rates higher than the general population of commercial and industrial establishments. Further, it is known that lighting contributes a substantial percentage of the electrical load of these types of businesses....In total, the 23 customers...have non-coincident demand of 6,902 kW. The more efficient lighting could reduce demand levels by 414 kW.[31]

The report goes on to demonstrate how conservation and load management programs could be deployed to provide relief on specific circuits.

[31]"Strategic Asset Optimization in the Connecticut Light & Power Service Territory," 2/13/02 Draft, prepared by Taratec Corporation and EPRI Solutions, provided in response to DR Towns 3-14, Attachment 5.

Q: Have you estimated how much additional savings CL&P might be able to achieve in southwestern Connecticut and the Norwalk Stamford area?

A: Yes, we have developed preliminary estimates of additional savings that could be achieved if additional funding were made available and if programs were intensified, expanded, and targeted to these areas, based on CL&P's own projections for 2002. Based on our necessarily brief review of CL&P's existing program designs and savings targets, we estimate that it could achieve an additional 24.1 MW per year in southwestern Connecticut and another 8.7 MW in the Norwalk-Stamford area. If sustained for five years, these additional targeted efforts would provide 121 MW in cumulative annual peak load reductions by 2007 in southwestern Connecticut, 55 MW of which would be realized in the Norwalk-Stamford area.

Q: How did you develop these estimates?

A: We started with CL&P's projected spending and savings for 2002 programs provided in response to DR OCC 1-2. We estimated the portion of these savings attributable to southwestern Connecticut and Norwalk-Stamford by comparing CL&P's estimates of peak loads for its system as a whole and in these regions for 2002, which it provided in response to DR OCC 1-1. Thus, we attributed 65.7% of the 2002 savings that CL&P projected for each program to southwestern Connecticut, and 23.6% of these savings to Norwalk-Stamford.

Next, we used our professional judgment to develop factors to multiply by 2002 goals for individual programs to reflect the likely effect over time of sustained efforts to intensify, expand, and target the programs to achieve maximum savings—to increase both participation and savings per participant. These factors ranged from a 25% increase in savings from the Residential New-

Construction Program to a three-fold increase in savings from the Small Business Energy Advantage program.

The net result of our approach is to increase projected savings in southwestern Connecticut from residential programs by about half, and to double savings from commercial and industrial programs.

Q: Substantiate your earlier testimony that additional peak demand savings could be realized relatively inexpensively.

A: The Company estimated that it could achieve 0.8 MW per million dollars in DSM spending based on 2001 results.[32] When we reproduced this calculation, I obtained 0.77 MW per million dollars, which translates to a gross cost of $1,296 per kW. This does not account for the substantial value of the energy savings produced by these programs. We found that in many cases the value of energy savings associated with CL&P's efficiency programs exceeded the entire cost of the programs. In effect, this means that the cost of achieving peak load reductions was negative.

Q: Explain how you reached this finding.

A: We computed the net cost of peak demand savings from the 2002 efficiency programs by deducting an estimate of the value of the energy savings. First, we used updated information CL&P provided about costs and projected peak demand savings from individual programs in 2002 to compute the gross cost per kW-year by program. We did so by amortizing the budget over the life of the savings CL&P implied for each programs, and divided the amortized cost by the Company's projected summer peak reductions. We found that summer peak-load savings from 2002 programs cost between $43/kW-yr. for the Custom

[32] CL&P Response to DR Towns 1-43.

Services program and $778/kW-yr. for the residential electric heat retrofit program.

Next, we computed the present worth of the lifetime energy savings associated with each program, then amortized this value and divided it by the annual peak-demand savings CL&P projects for each program. The energy savings have present worths ranging from $16/kW-yr. for residential HVAC to $615/kW-yr. for the Electric Space-Heat Retrofit program. After crediting each program's gross cost per kW-year with the amortized value of its lifetime energy savings per kW-yr., we arrived at net costs per kW-yr. for each program. Residential programs average a net cost of *negative* $19/kW-yr. of peak demand reduction; commercial and industrial programs average (-$37/kW-yr.)

Q: Can you provide any evidence corroborating your findings?

A: Yes. CL&P indicates that the total resource benefits of its 2002 programs exceed total resource costs, in some cases, such as C&I programs, by significant amounts. For example, the benefit/cost ratio for the Express Services program is 3.9. This is consistent with our finding that these programs offer tremendously economical sources of demand-side transmission capacity.

Q: Is there anything in the statute creating Connecticut's C&LM charge that prevents CL&P from committing additional funds to secure additional load reductions from energy-efficiency?

A: Not that we could find. In fact, the legislation contains a provision that appears to direct the DPUC to ensure that utilities pursue cost-effective demand-side alternatives to new distribution capacity. It reads:

> (e) the Department Of Public Utility Control, in a proceeding on a rate amendment proposed by an electric distribution company based upon an alleged need for increased revenues to finance an expansion of the capacity of its electric distribution system, *shall determine whether demand-side management would be more cost-effective in meeting any demand for electricity for which the increase in capacity is proposed*.[33]

B. The ISO's Position on Additional DSM Savings

Q: What position has ISO-NE taken on the amount of additional demand-side resources that could be acquired in southwestern Connecticut?

A: The ISO states, "at this time, and based on its experience, ISO-NE believes that it is unlikely that the amounts of load reduction it has assumed as providing economic or reliability benefits can be achieved through implementation of DSM."[34] Elsewhere, ISO-NE has observed, "There has been an insufficient number of load and/or generation initiatives in Southwest Connecticut."[35]

Q: Do you believe ISO-NE's early experience with load-response programs is indicative of the potential that additional efficiency investment offers for transmission capacity relief?

A: No. In fact, ISO-NE has more than a decade of experience to draw on with respect to efficiency. The ISO need only add to 2001 load the Company's estimates of peak load reductions from CL&P's C&LM programs over the past 10 years. Present-day load in southwestern Connecticut would be 456 MW

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[33]Public Act 98-28, An Act Concerning Electric Restructuring, Section 52(e), emphasis added.

[34]ISO-NE Response to DR Towns 2-5.

[35]Mezzanotte at 10.

higher without the cumulative annual savings from CL&P's programs since 1990.[36]

Q: Is it reasonable to dismiss a single transmission alternative because it could not by itself reduce the need for the proposed facility?

A: No, it is not. There may be combinations of energy efficiency, load response, and distributed generation that, when put together, may be able to alter and/or defer planned transmission facilities. Dismissing each component of a potential portfolio because individually it would be insufficient to alter investment plans could lead CL&P to mistakenly reject a combination of alternatives that could solve the transmission problems at a lower financial and environmental cost.

VI. Other Distributed Resources

A. Load-Management Options

Q: Could load management help relieve the problems in SWCT and Norwalk-Stamford?

A: Yes. The reliability problems associated with double contingencies occurring at times of high loads; these double contingencies are rare events. Load management that reduced loads an average of just a few hours per year would probably be sufficient to contribute to resolving the reliability issues. If the reliability of power supply is in doubt, customers should have little reason to resist reductions in usage that, while possibly inconvenient, keep them in operation.

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[36]This estimate is based on applying the same proportions between kW and kWh that CL&P reported for 2001.

The uneconomic dispatch problem can also be addressed by load management, particularly in the form of load response. When energy prices are high, many office buildings, schools, retailers, and other large customers would be willing to dim their lights and reduce air-conditioner use by a few hours on a given day.

The ISO has recently issued a request for 80 MW of load response in SWCT for June–September 2002.[37] Were CL&P to actively develop load-management systems, it might well be able to implement far more than 80 MW. These programs would logically start with addition of communications capability for the large customers who already have energy control systems.

Q: Are customers in Connecticut interested in participating in load management programs?

A: Yes. The Company found that 65% of residential customers considered themselves to be likely to participate in a load-modification program and would accept a 6-degree increase in air-conditioner thermostat setting at times of need (and also of high cost).[38] The Company has found in initial tests that loads decrease about 1 kilowatt per customer on air-conditioner thermostat control, for an achievable potential of 422 MW company-wide.[39] Extrapolating this

[37] A Request for Proposal (RFP), 2002 Load Response Program, Southwest Connecticut Emergency Capability Supplement, (LRP SWCT ECS), Issued February 27, 2002. It is unfortunate that ISO-NE waited so long to initiate this effort, and that CL&P and UI have not been running their own load-management programs directed to relieving the transmission constraints in this area.

[38] "Residential Load Management Market Assessment Survey Results," prepared for Northeast Utilities by RLW Analytics (DR Towns 3-14, Attachment 2).

[39] "Northeast Utilities Residential Load Management: Residential Market Assessment and the Carrier Thermostat Project," prepared by CL&P (DR Towns 3-14, Attachment 3). This value is much less than the technical potential value, and is discounted for customer acceptability.

value to the regions of interest, and assuming potential in UI and CMEEC service territories is comparable to that in CL&P's territory, the potential would be about 275 MW in SWCT and 100 MW in of this potential would be in Norwalk-Stamford.

The Company has also found that commercial and industrial customers were willing to interrupt 239 MW of load, especially if fewer than five interruptions are necessary each year, especially for just a few hours at a time.[40] The same extrapolation would suggest about 155 MW of this potential would be in the SWCT region, and 55 MW in Norwalk-Stamford.

Even were only a third of this potential actually achieved, load would be decreased by 140 MW in SWCT and 50 MW in Norwalk-Stamford.

B. Distributed Generation

Q: What do you mean by distributed generation?

A: Distributed-generation options can include both (1) units at a customer scale, ranging from under 100 kW to perhaps 20 MW, as well as (2) utility-scale plants of 20 MW and more.[41] The latter may be owned by third parties, who sell their energy and capacity into the regional market. The Company would pay the owners for the benefits they provide in deferring transmission, and retain the right to dispatch the generators as needed to support the transmission system.

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[40] "Commercial & Industrial Load Response Market Assessment and Focus Groups," December 31, 2000, prepared by Connecticut Light & Power for the Connecticut Department of Public Utility Control (DR Towns 3-14, Attachment 4).

[41] Curiously, CL&P assumes that distributed generation refers to units under 5 MW (DR ENE 1-4) and utility-scale generation refers to units in the hundreds of megawatts (DR OCC 1-19). It is not clear how CL&P would categorize a Cos Cob 16-MW unit. In any case, CL&P does not appear to have considered the possibility of encouraging such units.

We assume that any distributed generation installed in SWCT would be quite clean. Other than photovoltaics, which burn nothing, most distributed generation would burn gas, in turbines, fuel cells, and perhaps in reciprocating engines with advanced NOx controls.

Q: What factors determine the applicability of distributed generation on a utility system?

A: Customer-scale distributed generation may be usefully divided into at least the following five categories, for the purpose of assessing potential:

- *Heat-load driven cogeneration opportunities.* These require large heat loads for a large part of the year. The use of absorption cooling to replace existing or planned air conditioning can add a summer heat load to facilities that already have winter space-heating load, in addition to eliminating the electric chiller load. Other promising candidate sites are those with heated swimming pools and/or large year-round hot-water loads (e.g., hospitals).[42]
- *Reliability- and power-quality-driven opportunities.* Relatively small on-site generators may be desirable for many large customers, for back-up power supply and in some situations, for improving power quality. Customer contributions for those services would reduce the net cost of the equipment in its role of reducing loads on the system.
- *Site-specific renewable generation.* Examples might include generation from landfill gas or other waste or biomass gasification.

[42]To ensure that the cogenerator can operate when needed, it will probably need to be able to operate when there is no heat load. If the cogenerator serves an absorption cooling load, it would normally be operating when the SWCT and Norwalk-Stamford interfaces are constrained.

- *Photovoltaics,* which can be widely dispersed in small increments but are only helpful in dealing with problems caused by summer day-time peaks.
- *Utility-sited generation,* which does not provide such on-site customer benefits as power quality, steam, or heat. Such generation could be owned by third parties, be installed on a permanent or temporary basis, and be connected directly to distribution feeders.

Assessing the potential for the first three categories will require detailed site-specific analysis, including discussions with potential hosts. Photovoltaic potential, on the other hand, can be assessed more generically, based on assumed distribution of roof alignments, shading, and other inputs. Utility generation is also likely to be generic.

Q: What technologies are suitable for distributed generation?

A: The specific technologies that are available for each category (and the costs of those technologies) will change over time. Initially, the attractive technologies will be mostly turbines of various sizes, perhaps with some fuel cells serving customers who need very high-quality power, such as computer centers. Over time, fuel cells are likely to become important for a wider range of applications, and other technologies, such as Stirling engines, may become important for residential-scale reliability and cogeneration applications.

Q: Has CL&P investigated the potential for distributed generation in SWCT and especially Norwalk-Stamford?

A: No. The CL&P does not have any such analyses (DR OCC 1-21). It has started some analysis and begun planning demonstration projects for photovoltaics and fuel cells (DR ENE 1-4). While the proposed and funded fuel cells projects are in SWCT, the Company does not appear to have undertaken any broader effort to promote distributed generation in its service territory (DR ENE-1-4).

The Company approaches distributed generation as a customer option for reducing electricity bills, rather than a utility option for reducing the costs of providing electric service (DR OCC 1-21). As a result, CL&P does not distinguish between distributed generation potential in SWCT and in other parts of its territory.

Indeed, the Company's responses on distributed generation consist largely of vague and undocumented assertions that distributed generation causes problems on distribution circuits (DR OCC 1-21, ENE-1-4).[43] In contrast, Attachment 5 to Towns-3-14 suggests that distributed generation (in that example, consisting of multiple 150-kW units on customer premises) would improve reliability while reducing loads on the system.

Q: Has CL&P encouraged customers to install cogeneration and other distributed-generation systems in Norwalk-Stamford and SWCT?

A: No. The Company refers queries on its efforts (e.g., DR OCC 1-17, 1-18) to its response to DR ENE 1-4. In this response the Company basically complains that distributed generation may have some unspecified problems, describes the substation fuel-cell proposal (for which CL&P is pursuing outside funding, rather than acquiring it as a system resource) and a fuel-cell project CL&P is actually funding, and lists a number of R&D projects.

[43]Response OCC-1-21 claims that "according to resources, as a rule of thumb a distribution circuit can reasonably accept up to 15 percent of its load in the for of distributed generation before encountering operating and reliability problems." The response does not identify the "resources" nor their assumptions about the size of individual units, the location of the units, or anything else that might contribute to the unspecified "operating and reliability problems." The same response assumes that distributed generation would be limited to 15% of load (or about the amount of the current shortfall), and then assumes that distributed generation must resolve the constraint by itself, without the assistance of C&LM, load response, or capacitors.

Indeed, CL&P is still paying three customers in Norwalk-Stamford and another two customers in SWCT to *not* develop cogeneration. These five customers had proposed 7 MW of cogeneration in the mid-1990s (DR OCC-1-23).

Q: Has CL&P determined the number of customers in Norwalk-Stamford and SWCT who might be most interested in distributed generation due to reliability and quality concerns, or the presence of large and consistent heat loads for cogeneration?

A: No. In response to a question about such analyses for either CL&P or UI, the Company was able to provide only sales by rate class and a breakdown of commercial and industrial employment for Fairfield County (DR OCC 1-25). CL&P has neither identified suitable locations for distributed generation on its own system nor determined whether UI has identified such locations (DR OCC 1-22). The Company has identified one substation at which it can locate a fuel cell: this is not a particularly desirable location, since it does not allow for increasing the value of the fuel cell by using waste heat or providing backup service to customers.

In 2001, CL&P finally requested proposals for development of distributed generation, with an emphasis on SWCT (DR OCC 1-22). Unfortunately, CL&P does not appear to be pursuing the approach laid out in Attachment 5 to DR Towns 3-14, which shows how CL&P could identify customers in a capacity-constrained area that are likely to be suitable hosts for distributed generation or DSM.

Q: What has CL&P done to encourage the installation of utility-scale generation in Norwalk-Stamford or the rest of SWCT?

A: Nothing. In response to DR OCC 1-19, CL&P lists

- Performing system impact studies and modifying transmission to allow generators to connection to the transmission system. These activities are required by FERC.
- Providing a list of utility-owned land in SWCT, as requested by the DPUC.
- "Supporting" the efforts of ISO-NE to "highlight the concern over reliability and congestion." The ISO does not appear to have taken any actions to encourage construction of merchant generation in SWCT, such as offering financial incentives, even though the tight supply situation has been apparent since the formation of the ISO. The ISO is supporting CL&P's transmission plan, without subjecting it to a market test against new generation.

In short, CL&P has only provided the minimum required by regulators.

C. Smaller Transmission Options

Q: Has CL&P adequately explored transmission alternatives to the Plumtree-Norwalk 345-kV line?

A: Not very carefully. The Company dismissed the option of an additional Plumtree-Norwalk 115-kV circuit, which would probably avoid the need for new structures and additional right-of-way, reducing environmental effects. The basis for this dismissal is two paragraphs on page 42 of the Application. That dismissal asserts that multiple 115-kV lines would be necessary to equal the capabilities of one 345-kV line, and that the 115-kV solution would not allow the system to withstand the loss of Norwalk Harbor. Yet the proposed Plumtree-Norwalk 345-kV line is only expected to add 200 MW to the Norwalk-Stamford interface; the average capacity of the five existing 115-kV lines is 220 MW. So it does not appear that the 345-kV line adds to the capacity achievable by a 115 kV line, or provides better supply; nor is there any evidence supporting CL&P's claim that more than one 115-kV line would be needed.

All the detailed analyses that ISO-NE has performed compare a 115-kV loop or a 230-kV loop to a 345-kV loop, including the Beseck-Norwalk line. Since that latter line is not part of this docket, those analyses cannot be compared in this case, pursuant to earlier decisions. Consequently, these CL&P analyses appear to be irrelevant to the issues before the Council.

In addition, response OCC 1-29 asserts that part of the summer peak problem in the SWCT and Norwalk-Stamford is "a high reactive load (MVAR), which is typical of air-conditioning load." If the summer megawatt transfer capacity of the SWCT and Norwalk-Stamford interfaces is constrained by reactive power flows, CL&P may be able to reduce reactive flows, and increase the capability for importing real power, by installing capacitors.

Q: If additional capacitors and a 115-kV line from Plumtree to Norwalk were not sufficient to carry the projected load of Norwalk-Stamford and SWCT, would that imply that the 345-KV line is needed?

A: No. The question is whether some combination of the smaller transmission options, distributed generation, load management, and energy efficiency would be preferable to the Plumtree-Norwalk 345-kV line. The Company has not considered any such alternative.

VII. Evaluation of the Company's Transmission Planning Process

Q: Has CL&P conducted adequate transmission planning for the SWCT and Norwalk-Stamford areas?

A: No. The following aspects of CL&P's planning have been deficient.

- The Company failed to start the analysis of alternatives and the deployment of distributed resources planning in a timely fashion. CL&P has known that it might face constraints in SWCT for decades. Graph 3 of the Application indicates that the load in the Norwalk-Stamford area has been within 10% of the second-contingency area capability since 1989, and above the second-contingency area capability since 1994.[44]
- The Company has not seriously considered the distributed-resource alternatives to the proposed line.
- The Company failed to estimate the amount of load reduction necessary to defer any part of its transmission plan.
- The Company has not screened distributed alternatives against the full cost of its plan, including the Beseck-Norwalk line.
- The Company has not considered the value of delaying its transmission plan.

Q: Can the Council rely on CL&P's judgment about the appropriateness of distributed resources and other smaller-scale solutions to the problems of Norwalk-Stamford and SWCT?

A: No. Unfortunately, CL&P has a conflict of interest in this matter. An unregulated affiliate of CL&P has announced its intent to build merchant HVDC underwater cables from Norwalk to Long Island. Those cables would use the excess capacity of the proposed Plumtree-Norwalk line and the planned Beseck-Norwalk line. In presentations, such as that to the mayor of Norwalk, CL&P has quite candidly described the Plumtree-Norwalk and Beseck-Norwalk lines as being "Phase 2" of a plan culminating in "Phase 3," the cables to Long Island

[44] The historical loads reported in DR CSC 1-5 are inconsistent with Graph 3, and suggest that Norwalk-Stamford only became deficient in 1999.

(AG 1-2, Attachment 3, Group D). Since the ability of CL&P affiliates to build those cables, and charge unregulated market rates for their use, depends on the completion of the current proposal and the rest of "Phase 2," CL&P's interests are not the same as those of ratepayers or of the state of Connecticut in this matter.

Long Island seems likely to be short on generation capacity for some time to come. The cables from Norwalk to Long Island may be cost-justified to serve Long Island load, and the Plumtree-Norwalk and Beseck-Norwalk lines might be justified to serve the cables. If so, CL&P should combine its planned projects into a single application, and explain the benefits in a coherent manner. The Company should also demonstrate that the merchant line would not be subsidized by ratepayers.[45]

Q: What are the risks of pursuing CL&P's transmission plan?

A: The Company's cost projections are just estimates, subject to increases for construction, litigation, and the costs of the right-of-way that must be condemned. The timing of the transmission additions, especially the Beseck-Norwalk line on which the CL&P and ISO-NE analyses rely so heavily, is also uncertain.

In addition, CL&P could spend the $500 million, or $600 million, or whatever the lines eventually cost, and find that events had made the investment irrelevant. For example, the commercialization of low-cost distributed generation, followed by widespread acceptance by customers with high reliability requirements, could result in a significant reduction in load. Similarly, location

[45]Currently, transmission costs are spread over the entire NEPOOL region, as a single postage-stamp rate. New England appears to be moving towards "license-plate" rates, in which customers of each utility or in each region will pay for their local transmission. Thus, most of the costs of the new lines are likely to be borne by Connecticut ratepayers.

of a couple of new large generators in SWCT or Norwalk-Stamford could eliminate the load pocket. Along these lines, the development of the Neptune underwater transmission project—which would bring 2,400 MW of power from New Brunswick, Nova Scotia, and Maine to southern New England (including Connecticut) and New York—would potentially make Norwalk or Bridgeport a supply node for Connecticut, rather than a load pocket.

Even changes in load due to levels of economic activity and energy efficiency could make the transmission investments obsolete. Indeed, falling load forecasts have already delayed construction of 345 kV lines into SWCT by twenty years or so.

VIII. Conclusions and Recommendations

Q: Is the Company's dismissal of demand-side resources in its Application justified?

A: No. The Siting Council has recognized that the need for transmission capacity is linked directly to load growth. Load is not something that is immutable. Connecticut utilities have proved conclusively over the past twelve years that efficiency investments can significantly and economically reduce demand without diminishing service quality. It is incumbent upon CL&P to explore the possibility of deploying such programs to relieve capacity constraints.

The Company's own analysis suggests that diverting the lifetime costs of the proposed facilities to efficiency programs would provide 160 MW of load relief, not the 30 MW it mistakenly believes. Recent studies by ISO-NE show that load reductions of 100 MW would reduce reliability risks by 50%, and cut congestion costs enough to pay for the gross cost per kW that CL&P's 2001 C&LM programs saved, before netting out the generation costs avoided by lower electric energy consumption. Once the avoided costs of electric generation and distribution are subtracted, the net cost to achieve additional MW of transmission capacity relief from CL&P's programs is negative. In other words, additional transmission capacity relief from expanded C&LM savings in southwestern Connecticut is better than free.[46]

The Company's approach also fails to account for the following beneficial attributes of efficiency programs:

- Each MW of targeted C&LM helps push back the critical load date, which buys time to acquire more demand-side resources.
- The ISO's analysis shows that load reductions in southwestern Connecticut offer New England the greatest yield for each dollar spent to improve reliability.
- Based on ISO-NE's analysis, just five years' worth of congestion relief from conservation would pay the gross cost of CL&P's existing efficiency programs.
- Cumulative annual savings in load reductions build over time even at steady market penetration rates. Since efficiency program penetration rates tend to increase over time, the trajectory of future efficiency program savings should increase substantially

[46]The benefits of C&LM and distributed generation in reducing energy use and costs, pushing down the regional clearing prices for energy and capacity, and reducing requirements for distribution investments, are all in addition to the benefits of relaxing the transmission constraints, improving reliability, and reducing the amount of uneconomic dispatch.

Q: Has the Company adequately analyzed load-management opportunities for reducing to the need for transmission expansion?

A: No. The Company has identified large potential for load management, but has not attempted to apply it to solving the problems in SWCT and Norwalk-Stamford.

Q: Has the Company adequately analyzed opportunities for distributed generation to reduce to the need for transmission expansion?

A: No. The Company has done very little to analyze or encourage distributed generation for SWCT and Norwalk-Stamford.

Q: Has the Company adequately analyzed opportunities for smaller transmission alternative to reduce to the need for the Plumtree-Norwalk 345-kV line?

A: No.

Q: How much capacity have you identified in alternative resources?

A: We have found the following resources for which some quantification is possible:

- From enhanced and targeted energy-efficiency programs, about 24 MW annually for SWCT, including 9 MW annually in Norwalk-Stamford. In four years, this would reduce loads by 96 MW for SWCT, including 36 MW in Norwalk-Stamford.
- From load management, 140 to 430 MW for SWCT, including 50–150 MW in Norwalk-Stamford.
- From an additional 115 kV transmission circuit along the Plumtree-Norwalk line, about 200 MW for both SWCT and Norwalk-Stamford.
- From cogeneration units deferred by CL&P payments, 7 MW for SWCT, including 2 MW in Norwalk-Stamford.

In addition, we have not been able to quantify the potential for

- other distributed generation, including deferred UI units, cogenerators, photovoltaics, and micro-turbines and fuel cells for customer back-up and power quality.
- capacitors to improve power factor and reduce reactive power flows at peak.
- replacement of electric cooling and dehumidification loads with gas-fired equipment.

Q: What are your recommendations?

A: We recommend that the Siting Council deny the Company's request and direct CL&P to pursue vigorously distributed resources and more modest transmission options to ameliorate the current problems in Norwalk-Stamford and SWCT. The Council should also

- Direct the Company to integrate carefully distributed resources in all future assessments of the need for additional transmission capacity, especially the Beseck-Norwalk line.
- Put CL&P on notice that it must file information on the financial and environmental costs of facilities if it intends to include their benefits in supporting an application.
- Suggest that, if the planned 345-kV loop (including the proposed line) is intended to serve the HVDC merchant line to Long Island planned by CL&P's unregulated affiliate, any future filing for approval of part of the 345-kV loop clearly identify that justification, including identification of the portion of the 345-kV loop that will be treated as merchant capacity.
- Require that CL&P initiate a process for projecting achievable savings from geographically targeting C&LM and distributed generation programs,

and for integrating this analysis into its transmission and distribution planning.

Q: Does this conclude your testimony?

A: Yes, at this time. Since we received large amounts of discovery a mere two business days prior to filing testimony and as yet have received no answers to discovery on ISO-NE, we reserve the right to supplement this testimony in the near future.