

State of North Carolina

Before the Utilities Commission

In the Matter of the Application of)
Carolina Power and Light for a)Docket No. E-2, Sub 669
Certificate of Public Convenience and)
Necessity to Construct Approximately)
500 MW of Combustion-Turbine)
Capacity in Wayne County)

Direct Testimony of

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on behalf of

The Southern Environmental Law Center

Resource Insight, Inc.

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Exhibits

Exhibit ____ (PLC-1)	Professional Qualifications of Paul Chernick.
Exhibit ____ (PLC-2)	Model Program Descriptions.
Exhibit ____ (PLC-3)	Effects of SELC Model Programs.

1 Introduction and Summary

1 Witness Identification and Qualifications

Q: Please state your name, position, and business address.

A: I am Paul L. Chernick. I am president of Resource Insight, Inc., 18 Tremont Street, Suite 1000, Boston, Massachusetts.

Q: Please summarize your qualifications.

A: I hold a Masters degree in Technology and Policy from the Massachusetts Institute of Technology. I have been a utility analyst since 1977, first for the Massachusetts Attorney General and then as a consultant. My experience, publications, presentations, and previous testimony are listed in Exhibit _____ (PLC-1).

Q: Please summarize your experience with electric utility planning.

A: In numerous reports and in testimony before state and federal regulatory agencies, I have addressed virtually every aspect of utility resource planning: demand forecasting; the integrated resource planning process, including the treatment of risk and the selection of the final plan; demand-side management; selection of supply resources, including generation, transmission, and purchases; calculation of avoided costs (both generation and transmission-and-distribution); valuation of environmental costs and risks, and their incorporation into the resource-planning process;

recovery of resource acquisition costs; and incentives for utility performance. This experience is detailed in Exhibit____(PLC-1).

Q: Have you previously testified before the North Carolina Utilities Commission?

A: Yes. In 1992, I testified twice in North Carolina Utilities Commission Docket No. E-100, Sub 64 (Integrated Resource Planning Docket), once on IRP principles and practice, and once on cost recovery and incentives. In early 1995, I testified on avoided costs for small power producers in Docket No. E-100, Sub 74.

2 Summary of Testimony

Q: What is the purpose of your testimony?

A: My testimony discusses alternatives to the approximately 500 MW of combustion turbine capacity for which CP&L has requested a Certificate of Public Convenience and Necessity (CPCN) for 1998.

Q: Please summarize your testimony.

A: CP&L's request would not be necessary if CP&L had aggressively pursued options for power purchases and energy efficiency. These non-construction alternatives would increase CP&L's flexibility in a time of uncertainty, and better prepare CP&L for the increasingly competitive future anticipated for the electric utility industry.

Q: Please summarize your recommendations.

A: Given CP&L's planning to date, it must acquire some resources

in the near term. The Commission should issue a certificate for one CT, of up to 250 MW, in case CP&L is unable to acquire sufficient resources in other ways. The Company should be placed on notice that issuance of the certificate does not guarantee cost recovery, which should be contingent on CP&L's compliance with the other requirements of the order.

The Commission should also instruct CP&L to use this certificate only as a last resort, if vigorous efforts to acquire short-term purchases and efficiency improvements are inadequate. CP&L should promptly prepare a solicitation for power purchases and exchanges, clearly specifying CP&L's requirements and evaluation criteria. The Company should also gear up DSM programs to reduce customer bills and increase customer satisfaction, and rethink the long-term viability and justification for the load-building programs.

2 Inadequate Consideration of Power Purchases

Q: How has CP&L evaluated the opportunity for power purchases?

A: As described in the testimony of Witness Montague, CP&L has not solicited any proposals for power supply, but as relied on unsolicited proposals, apparently for long-term sales from new facilities. In the entire period three-year period 1992-94, CP&L received only ten solicitations, from only eight sources. This is hardly a vigorous use of the new competitive market.

It is not clear how CP&L evaluated the proposals.

Q: Is this an adequate effort?

A: No. In the increasingly open and competitive market for wholesale generation services, CP&L has the opportunity to purchase power under a range of terms and conditions, and over a large geographic area.

Q: What additional actions should CP&L have taken?

A: CP&L should have issued an explicit solicitation, with a clear statement of its objectives and its evaluation method. Given CP&L's concerns, the solicitation should emphasize the desire for a short contract term, with flexibility in the amount of capacity purchased.

Q: What are the advantages of purchasing power?

A: CP&L may be able to buy power at less cost than building and running new generation. Especially with a short-term purchase, CP&L could defer acquisition of capacity in a period in which equipment prices are falling and efficiency is improving, and maintain flexibility while important uncertainties in utility and environmental regulation are resolved.

Q: How would a short-term purchase help CP&L reduce uncertainties in utility regulation?

A: The industry is experiencing changes in wholesale, and in some places, retail electric utility marketplace, creating increased opportunities to buy and sell with remote utilities, at prices and conditions set by agreement and market, rather than regulation. There is a potential for separation of generation and distribution functions, perhaps resulting in stranding of generation costs. It is not clear whether, ten years from now, CP&L (or whatever the retail utility serving

the present CP&L service territory is called) will own any central generation.

Q: How would a short-term purchase help CP&L reduce uncertainties in environmental regulation?

A: The delay in commitment to new capacity would allow resolution, or at least greater clarity, in the environmental uncertainties discussed above. If future regulations seem likely to increase the costs of operating CP&L's existing coal units, a short-term purchase would give CP&L an opportunity to expand capacity in a manner that would reduce those costs. An example might be installation of gas-fired combined-cycle units, or repowering of older coal plants with lower-emission "clean coal" technologies, such as coal-gasification and various fluidized-bed designs.

3 Neglect of Energy Efficiency

Q: How has CP&L neglected the potential of energy efficiency?

A: In its 1995 IRP and previously, CP&L has failed to pursue a wide range of cost-effective energy-efficiency options it could have pursued through demand-side management (DSM) programs. CP&L rejected almost all efforts that would produce any upward rate effects, and has not even pursued all options that would reduce rates. In Plan G of the 1995 IRP, CP&L analyzed a more active DSM portfolio, which the utility estimated would reduce capacity needs by 200 MW by 1998 and 400 MW by 2003. Compared to the supply-only equivalent Plan A,

CP&L estimated that this additional DSM would produce a net reduction in present-value costs of \$157 million and raise average rates only \$0.00051/kWh, or less than 0.7%. Since CP&L does not appear to account for any reductions in transmission and distribution costs, or the range of potential environmental compliance costs, the actual savings would likely be much higher, and the rate effect would likely be an even less significant increase, or even a decrease.

Q: Has CP&L "taken advantage of all cost-effective demand-side management programs that have the capability to reduce peak demand," as stated by Witness Montague, at page 5 of his prefiled direct?

A: No, in two ways. First, CP&L has rejected cost-effective DSM that would reduce peak demand and reduce total bills for its customers, wherever CP&L believes that the associated reduction in sales might not result in absolutely minimum rates. As I discuss below, CP&L's belief that reducing energy consumption through DSM will reduce revenue in the long term may well be incorrect in an increasingly competitive market.

Second, CP&L has failed to take advantage of DSM options that its own studies indicate would reduce rates, as well as reducing peak loads and total costs to customers. For example, residential air-conditioning efficiency measures are shown in Xenergy's "Comprehensive DSM Assessment" for CP&L to pass the RIM and TRC tests, but are not included in CP&L's new

construction or equipment replacement programs.¹

Q: Have you reviewed the feasibility of the DSM savings in Plan G?

A: Yes. CP&L's IRP does not describe the Plan G DSM portfolio, so I cannot review the reasonableness of the specific derivation of that plan. However, I asked my staff and consultants to examine the cost and potential for a few DSM programs:

- a residential new-construction program, to increase the efficiency of the building shell (the walls, roof and windows) and equipment (air conditioners or heat pump, lighting, and water heating) in new homes;
- a program to encourage the installation of high-efficiency air conditioner and heat pumps when those residential appliances require replacement;
- a program to encourage the comprehensive improvement of cooling systems when a major overhaul would be required, including
- replacing the chiller (or other cooling system) with a new, high-efficiency unit, rather than overhauling it;
- upgrading the efficiency of the delivery system (pipes, pumps, ducts, fans, motors, variable-speed drives, and the like) and auxiliaries (such as the cooling tower);
- installing a smaller chiller, saving money and further improving efficiency;

¹ The RIM tests appear to be applied assuming that CP&L pays the entire incremental cost of the measure. This is a worst-case assumption; rate reductions would be even larger if the participant assumes some of the costs.

- reducing cooling load by improving efficiency of lighting and other internal heat sources, as well as reducing solar gain;
- a non-residential new-construction program;
- a non-residential equipment replacement program.

These programs are described in more detail in Exhibit _____ (PLC-xx).

Q: How much energy and peak demand could these programs save?

A: As developed in Exhibit _____ (PLC-xx), using assumptions that would tend to understate the savings and overstate their costs, the programs could save roughly

- 110 MW by 1998,
- 380 MW by 2002,
- 650 MW by 2005.

The capacity savings values include CP&L's projected 13% reserve margin.

Q: How much would these programs cost?

A: The programs' costs would be about those shown in the below table.

Program	¢/kWh (typical 1996\$)	\$/kW-yr	
		<i>total</i>	<i>net of 2¢/kWh</i>
Res New Construction	6.3	\$108	\$74
Air Conditioner Replacement	7.4	\$62	\$41
Early HVAC Retirement	1.9	\$59	better than free
Equipment Replacement	2.1	\$73	\$3
Non-Res New Construction	4.2	\$128	\$64

These costs are quite low compared to the generation, transmission, and distribution costs they would avoid. The 2-cent credit reflects the near-term energy benefits of the DSM program; a benefit that is not shared by the proposed CTs.

Q: How could increased energy efficiency affect CP&L's customers, and the well-being of North Carolina?

A: The effects are overwhelmingly beneficial. By definition, cost-effective DSM reduces total costs to CP&L's customers. This cost reduction improves the profitability and viability

of local businesses, decreases the costs of industrial production, encourages business expansion, reduces the cost of living and doing business in the CP&L service territory, and increases the share of consumer income available for local discretionary spending.

The comprehensive cooling program is also likely to improve the productivity of CP&L's large customers, by improving the quality of lighting and climate control.

In addition to these direct benefits for residents and businesses, the increases in local spending, profitability, and business activity will tend to result in increased local employment and income.

Q: How could increased energy efficiency affect the well-being of North Carolina?

A: Most of the effects on CP&L customers would be generally considered to be benefits to the state, as well. In addition, increased investment, employment, and profitability will result in increased tax revenues.

Q: How could increased energy efficiency affect CP&L?

A: Increased energy efficiency, particularly when delivered by CP&L through DSM programs, can benefit CP&L in many ways, through economic activity, reduced weather sensitivity, reduced vulnerability to environmental regulations, and increased customer loyalty.

Q: How would the effects of energy efficiency on economic activity benefit CP&L?

A: All of the benefits to CP&L's customers would also benefit the

Company. Increased economic activity will tend to result in additional customers; reduced costs and improved competitiveness will tend to make those customers' loads more stable and predictable through economic cycles.

Q: How would the effects of energy efficiency on weather sensitivity benefit CP&L?

A: The programs described above will particularly reduce summer weather-driven peak cooling loads, improving load factors and making CP&L less vulnerable to heat waves. Extremely hot weather generally coincides with reduced generation capacity, due to warming of air for combustion turbines and of cooling water for steam units. In addition, long periods of hot weather may coincide with drought conditions, as in 1988, reducing hydro-electric generation, thermal generation capacity (as cooling water levels fall), and fuel supply (as river levels fall to low for barges). Extreme weather conditions are likely to become more common with the continuation of global warming, which is now accepted as a current and future reality by the international scientific community.²

Q: How would energy efficiency reduce CP&L's vulnerability to environmental regulations?

A: Lower levels of energy consumption will benefit CP&L by reducing its vulnerability to potentially expensive

²Working Group I of the Intergovernmental Panel on Climate Change released a report in early December, finding, "the balance of evidence suggests that there is a discernible human influence on global climate." (*Science*, December 8, 1995, page 1565.)

environmental regulations, including

- limits on CO₂ emissions to slow global warming;
- limits on NO_x emissions to reduce ozone levels in North Carolina and downwind;
- limits on NO_x emissions to protect sensitive forest regions, especially in mountains, including national parks;
- limits on short-term (e.g., 5-minute) local SO₂ concentrations, to protect asthmatics;
- limits on mercury emissions;
- limits on fine-particulate emissions.

Most of these potential environmental constraints are most likely to occur as some form of cap or trading system, in which less energy consumption (and particularly less coal burning) will allow CP&L to avoid installing some controls or buying some allowances, or to sell additional allowances to other emitters. In other cases, new environmental rules may increase fuel and variable operating costs, so reducing energy usage reduces costs.

Q: How could CP&L DSM programs increase customer loyalty?

A: DSM programs reduce customer bills, reducing their dissatisfaction and interest in looking elsewhere for energy supplies. They can also establish a cooperative, problem-solving relationship between CP&L and its customers.

Q: On what types of DSM efforts has CP&L concentrated its efforts?

A: CP&L appears to have put most of its efforts into load-

building programs, such as the promotion of heat pumps through the Common Sense Home Program (which also requires electric water heating and range) and the High-Efficiency Heat Pump Program.

Q: How do these load-building programs affect CP&L, its customers, and the well-being of North Carolina?

A: The effects of load-building programs depend on the nature of the end-uses and the loads being promoted. Some applications of additional electricity are highly efficient, providing large benefits for low total costs. Examples of this set of end uses might include microwave and other specialized electric cooking; ultraviolet disinfection of hospital air; freeze-concentration of food products and chemicals; and the use of various types of light in drying high-quality, low-emission paints and finishes. Promoting these high-value uses of electricity produces satisfied, productive customers, stable loads, and a more prosperous service territory. Customers who get a lot of additional service from a small increment on their electric bill will tend to be loyal as CP&L customers, looking to CP&L for solutions to other problems, rather than going first to other suppliers. These high-value end uses are also likely to remain competitive with alternatives, and their users are more likely to remain economically competitive.

Other end uses of electricity--particularly in supplying bulk heat for space heating and water heating--have much less efficiency and less benefits, especially where gas is

available as an alternative. Promotional programs may encourage these end uses even where they are not cost-effective for the ultimate consumer; for example, CP&L's new-construction program may further reduce the cost to the builder of installing electric space and water heating in new homes, but result in higher utility bills than if the home used gas. The high electric bills that result from low-value electricity uses are likely to result in less satisfied customers, who are less prosperous and competitive, more likely to change energy sources or suppliers, and less likely to see CP&L as an ally in solving future energy problems.

Q: What is the role of load building in CP&L's resource planning?

A: To the extent that the loads being promoted (e.g., water heating, cooking) fall on the summer peak, load-building contributes to CP&L's immediate need for capacity. To the extent that the loads being promoted (e.g., space heating) fall on the winter peak, load-building reduces CP&L's ability to increase on-peak supply through seasonal exchanges with winter-peaking utilities (TVA, APS, Florida). The additional energy requirements of the promoted loads accelerate CP&L's need for new baseload capacity, decrease its ability to sell baseload capacity off-system, and increase its vulnerability to future environmental requirements.

4 Resource Planning, Competition, and Uncertainty

Q: How might CP&L best maintain its flexibility and respond to

the uncertainties discussed by Mr. Montague at page 7 of his testimony: industry deregulation, increasing competition, and changing environmental requirements?

A: These uncertainties can be moderated by a number of strategies, including:

- avoiding long-term generation capacity commitments,
- minimizing environmental exposure due to generation from existing coal plants,
- emphasizing resources that are tied to the distribution system,
- increasing customer competitiveness and loyalty.

Q: Why should CP&L avoid long-term generation capacity commitments?

A: Industry deregulation and increasing competition could result in CP&L's generation resources being separated from its retail utility, competing in a commodity bulk power market. Some of the associated costs may be stranded in the transition. Increasing the amount of generation capacity in play in this time of uncertainty only increases CP&L's exposure.

As discussed above, changing environmental requirements may change the economics of CP&L's existing and proposed supply resources. Today's baseload generation may be the next decade's cycling generation, or require extensive repowering to remain baseloaded. A premature commitment to any type of generation may lock CP&L into an uneconomic supply mix.

Q: How can CP&L avoid long-term generation capacity commitments?

A: Long-term generation capacity commitments can be avoided by

reducing load growth with increased energy efficiency and decreased load building efforts, and by satisfying the remaining capacity needs with short-term purchases.

Q: Is Mr. Montague correct in saying at page 7 that purchasing power from a third party would limit CP&L flexibility?

A: This can be a consequence for poorly selected resources and poorly drafted contracts. To maximize flexibility, CP&L could solicit existing utility resources for a relatively short contract period (say 3-10 years), with provisions for annual election of capacity takes.³ In addition, CP&L could solicit short-term (e.g., five- to ten-year) offers from new facilities.

Q: Mr. Montague suggests that there is no point in CP&L soliciting further offers, since any third party would buy the same equipment as CP&L, and CP&L gets the lowest possible price. Is this correct?

A: The prices Mr. Montague lists for CP&L's proposed combustion turbines are certainly quite favorable. However, another owner might be able to furnish capacity at a lower cost, either by getting a better price on the equipment (which might occur, for example, if the equipment manufacturer were a partner in the generation project) or by getting lower financing costs.

A more dramatic cost reduction may be achievable by

³ For example, Jersey Central Power and Light recently signed contracts for up to 700 MW of power from utilities in Pennsylvania, New York, and Ohio, through 2004. One of those utilities, Pennsylvania Power and Light, currently sells peaking capacity to Baltimore Gas and Electric under a contract that allows BG&E to select the size of its purchase with a two-year lead time.

purchases from existing generation, either from a utility that has excess capacity, or a winter-peaking utility that has excess summer capacity. Even if CP&L were the best equipment buyer on the planet, the market price for peaking capacity might be lower than its cost of a new facility.

Q: How can CP&L minimize the environmental risks associated with generation from existing coal plants?

A: Energy-efficiency efforts in the next few years will reduce the usage of those plants and the costs of responding to environmental initiatives. Near-term DSM efforts will also build CP&L's capability for achieving larger savings in the future if they are needed or desired. In addition, relying on short-term capacity purchases, rather than a long-term commitment to new peaking capacity, gives CP&L more flexibility in reducing dependence on the older coal plants. When the contracts run out, CP&L can buy more power, build new CTs, build gas-fired combined-cycle plants, install distributed photovoltaics and fuel cells, repower the dirtiest of its existing coal plants, expand DSM programs, or otherwise respond to current information.⁴

Q: What resources are tied to the distribution system, and why should CP&L pursue them?

A: Energy efficiency in the T&D system (larger conductors, low-loss transformers, improved system configurations), DSM, and

⁴ While any period in time has some uncertainties for any business, we can certainly hope that the next few years will resolve many of the extraordinary regulatory and environmental uncertainties currently facing electric utilities.

distributed generation (such as photovoltaics at the end of summer-peaking feeders, or fuel cells in customers' basements) are all closely associated with the distribution system, and are likely to remain the responsibility of the local monopoly retail utility, whatever may happen to generation. Hence, these costs are less likely to be stranded in any future industry.

Q: How can CP&L increase customer competitiveness and loyalty?

A: By lowering participants' energy bills, and often improving the quality of service, DSM adds value to the electric service CP&L provides, enhancing the Company's competitive position with respect to alternative suppliers. Customers will still value reductions in their *total* energy service costs, not just lower prices for one component of those costs, regardless of whom they buy electricity from. In a freely competitive market where all service providers have equal access to cheap supply, the ability to provide energy efficiency and other value-added services may be decisive in winning and retaining customers.

Q: Should competition change the way utilities view lost revenue from DSM and its impacts on rates?

A: Yes. DSM should be seen as a low-cost way to attract load, rather than a burden that discourages customers. In a more competitive market, CP&L's competitors will be offering customers packages of both cheap electricity and usage-reducing efficiency improvements. When competing for individual customers, CP&L can either meet the competition by losing *some* revenues with efficiency and a lower electricity

price, or lose *all* the revenues by unsuccessfully competing only on electricity price. If the generation function is separated from the retail utility, the local utility will not be able to attract load with a low price for bulk power, since the same power supply will be available over a wide regional area. Energy efficiency would become an increasingly important factor in attracting load to particular service territories.

Q: Does the provision of DSM services threaten CP&L's ability to attract and retain large, cost-sensitive industrial customers?

A: No, for several reasons. First, the costs of DSM can be collected from the rate classes participating in each program, so that the industrial class is assured of receiving lower total bills, regardless of whether DSM activity is greater in other sectors. Second, CP&L can concentrate its DSM efforts on vulnerable customers, using DSM to reduce the bills of customers who would otherwise be likely to relocate or seek other power supplies. Third, rates for the most price-sensitive large customers are usually set through special contracts, which do not usually reflect cost of service and need not reflect class-average DSM costs.⁵

5 Recommendations

Q: What actions do you recommend the Commission take with respect to CP&L's request in this docket?

⁵ Indeed, the rate discounts to these customers can be reduced, to the extent that efficiency improvements reduce their bills.

A: The Commission should issue a certificate for one CT, of up to 250 MW, in case CP&L is unable to acquire sufficient resources in other ways. The Commission should also:

- express a preference for short-term purchases and efficiency improvements;
- instruct CP&L to prepare a solicitation for power purchases and exchanges, clearly specifying CP&L's requirements and evaluation criteria;
- require CP&L to prepare a new analysis of the long-term viability and justification for each load-building program;
- urge CP&L to start planning for distributed generation services;
- instruct CP&L to pursue DSM to avoid as much of the planned generation additions as is possible, without increasing customer bills, including programs based on the model programs presented in this testimony; and
- condition recovery of the costs of any capacity built under a certificate issued in this docket on CP&L's showing that the capacity was required despite vigorous pursuit of other alternatives.

Q: Does this conclude your testimony?

A: Yes.