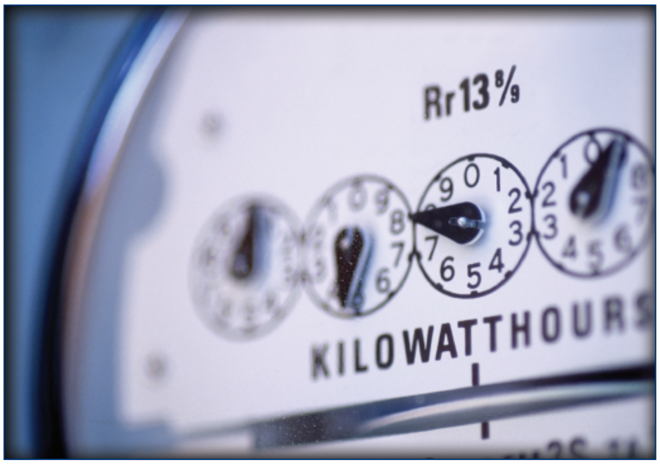


CSC
CONNECTICUT SITING COUNCIL

Review of the Connecticut Electric Utilities' Ten-Year Forecasts of Loads and Resources

2003

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
Web Site: www.ct.gov/csc

December 23, 2003

Citizens of Connecticut:

It is with great pleasure that I provide you this copy of the Connecticut Siting Council's "Review of the Connecticut Electric Utilities' Ten-Year Forecasts of Loads and Resources 2003." This report compiles and analyzes load growth forecasts of the State's electric utilities and plans to meet the demand for energy through the year 2012.

This analysis, undertaken pursuant to Connecticut General Statutes § 16-50r (a), requires

- "(1) A tabulation of estimated peak loads, resources and margins for each year;
- (2) data on energy use and peak loads for the five preceding calendar years;
- (3) a list of existing generating facilities in service;
- (4) a list of scheduled generating facilities for which property has been acquired, for which certificates have been issued and for which certificate applications have been filed;
- (5) a list of planned generating units at plant locations for which property has been acquired, or at plant locations not yet acquired, that will be needed to provide estimated additional electrical requirements, and the location of such facilities;
- (6) a list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed;
- (7) a description of the steps taken to upgrade existing facilities and to eliminate overhead transmission and distribution lines in accordance with the regulations of standards described in section 16-50t;
- and (8) for each private power producer having a facility generating more than one megawatt and from whom the person furnishing the report has purchased electricity during the preceding calendar year, a statement including the name, location, size and type of generating facility, the fuel consumed by the facility and the by-product of the consumption."

These subjects have been fully examined by the Council with full opportunity for public participation. The results of this process have been summarized in this report, and within the Executive Summary that is enclosed, which we hope you will find to useful and informative.

I invite you to review this public report and challenge the analyses contained herein. With your help I am confident that Connecticut can accurately determine its energy future while safeguarding the environment and ensuring the health and well-being of its citizens.

Please feel free to contact the Council's staff or me if you seek additional information. Thank you.

Very truly yours,

Pamela B. Katz, P.E.
Chairman

CSC
CONNECTICUT SITING COUNCIL

CONNECTICUT SITING COUNCIL

Connecticut Siting Council Report 2003

Table of Contents

Summary

Pursuant to Connecticut General Statutes § 16-50r, the Connecticut Siting Council (Council) is authorized to review the state's electric utilities' Ten-Year Forecasts of Electric Loads and Resources, including their plans to balance public demand for safe, reliable, and cost-effective electricity with an efficient mix of programs and resources to meet this demand. The Council has reviewed these forecasts since 1974; this report is the 29th issued by the agency.

The provision of electricity to state residents for the summer of 2002 proved to be a greater challenge for the Independent System Operator for the New England region (ISO-New England) and the electric utilities than in other years. Subsequently, high demand during scheduled and unscheduled downtime of electric generating facilities has forced ISO-New England and the electric utilities to initiate contingency plans to avoid power outages. The utilities continue to manage resources through:

- operating all available generating units to their reasonable limits;
- purchasing power from every available resource, both in and out of Connecticut;
- arranging to temporarily shift load on high load days to substations and transmission facilities outside Connecticut to help relieve capacity shortage in the State;
- exploring additional interruption of service with industrial and commercial customers; and
- maximizing use of customer-owned emergency generators.

The northeastern United States and eastern provinces of Canada experienced the largest blackout in United States history on August 14, 2003. Southwest Connecticut was affected in part because of supply deficiencies and voltage instability problems due to insufficient transmission and inadequate resources within the region. Prior to this event the Council had completed a nearly two year review of a new 345 thousand kilovolt transmission line proposal between Bethel and Norwalk that culminated in an approval for the project. Also, the Council acknowledges both Millstone Units 2 and 3 were operating the day of the blackout providing power and stability to the grid in remaining parts of Connecticut and southern New England. Also, the Cross Sound Cable received emergency operating orders from the Department of Energy as a measure to provide additional support to the high voltage transmission system between Connecticut and Long Island New York. The utilities continue to monitor electricity usage for transmission and substation upgrades to improve system reliability, promote efficiency, and reduce energy losses.

The restructuring of the electric industry in 1990s by the Connecticut legislature resulted in proposals for the construction of several electric generating facilities, primarily fueled with natural gas. Consistent with the Council's charge to regulate the placement of new generation while protecting the environment, the Council has approved seven applications for facilities totaling 3,712 megawatts (MW) of capacity and denied two applications for facilities totaling 1,300 MW of capacity. Each of these new facilities has been assessed and approved after considering the benefits and effects that would be expected upon the community and the environment. However, the development of these new facilities has been slower than expected, with only 1,562 MW or 43 percent of approved capacity operating in Connecticut.

The energy generating sector is experiencing volatility in the market structure overseen by ISO-New England. To some degree, this is to be expected in a newly competitive market. However, existing generation remains hampered by the aging transmisson grid and its "bottlenecks", creating ineffective pricing of electricity. In addition, market mechanisms need to be assessed and applied to planning strategics to determine if there are sufficient incentives to ensure an adequate supply of generation and demand-side resources to provide reliable service.

Furthermore, the choice to use natural gas to generate electricity has placed a new found demand on the natural gas industry. Unlike fuel oil that can be stock-piled on site or delivered by barge, natural gas is delivered via pipelines with limited capacity. The challenge to provide large quantities of fuel for the generation of electricity is countered by the priority to provide fuel for residentail heating. If such new generation facilities are not able to use back-up fuel sources (i.e. fuel oil), Connecticut may be faced with the dilemma of a) importing additional energy from other states or b) generation soley fueled by natural gas may not operate during periods of peak demand for natural gas.

The Council believes Connecticut should continue monitoring all loads and resources to confirm that the market can deliver additional generation resources to meet public demand and operated in a manner that is safe, environmentally sound, and economical to help continue the state's advance in economic activity.

Introduction

The Connecticut Siting Council (Council) has the legislative charge to annually review forecasts of electric loads and resources in the State of Connecticut.

Pursuant to such statutory provisions, every person engaged in generating electricity with a capacity of one megawatt or greater, or transmitting and distributing electricity, shall file a report to the Council on March 1 of each year and this report shall include, as applicable: (1) A tabulation of estimated peak loads, resources and margins for each year; (2) data on energy use and peak loads for the five preceding calendar years; (3) a list of existing generating facilities in service; (4) a list of scheduled generating facilities for which property has been acquired, for which certificates have been issued and for which certificate applications have been filed; (5) a list of planned generating units at plant locations for which property has been acquired, or at plant locations not yet acquired, that will be needed to provide estimated additional electrical requirements, and the location of such facilities; (6) a list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed; (7) a description of the steps taken to upgrade existing facilities and to eliminate overhead transmission and distribution lines in accordance with the regulations and standards described in section 16-50t; and (8) for each private power producer having a facility generating more than one megawatt and from whom the person furnishing the report has purchased electricity during the preceding calendar year, a statement including the name, location, size and type of generating facility, the fuel consumed by the facility and the by-product of the consumption.

LOAD FORECAST

Load Growth

The State's electric utilities, The Connecticut Light and Power Company (CL&P), The United Illuminating Company (UI), and The Connecticut Municipal Electric Energy Cooperative (CMEEC), predict incremental load growth throughout the forecast period. Total energy output requirements for the State are projected to grow from 32,852 gigawatt-hours (GWh) in 2002, at an annual average growth rate of 0.7 percent, to 35,719 GWh in 2012. CL&P projects an annual compound rate of growth of 1.0 percent through the forecast period, CMEEC projects a 0.7 percent annual average growth rate, and UI projects a modest 0.4 percent annual compound growth rate.

Historically, the demand for electricity has been related to economic growth. That positive relationship is expected to continue, however, the precise relationship is uncertain. Connecticut's electric consumption is due to the development of larger homes, an active economy, and a high-quality lifestyle that results in increased use of expanding and new electro-technologies (i.e. electric appliances, computers, and especially air conditioning).

Peak Loads

In 2002, the statewide non-coincident summer peak load was 6,851 MW, — a substantial increase over the previous record high in 1999 at 6,345 MW. However, annual summer peak loads are expected to increase over the forecast period, as indicated on Figure 1.

According to the State's utilities projection, the total peak load growth will increase by 293 MW, or less than one percent, from 6,851 MW in 2002 to 7,144 MW by the year 2012. However, ISO-New England expects Connecticut's peak load to grow at an annual rate of 1.2 percent from 2003 to 2012 based upon a percentage of demand for the region but states it may not have included subtle nuances in local utility forecasting. The extreme weather scenario identifies the affects caused by external forces and increases peak demand by a half percent due to hot weather over the reference forecast period with conservation.

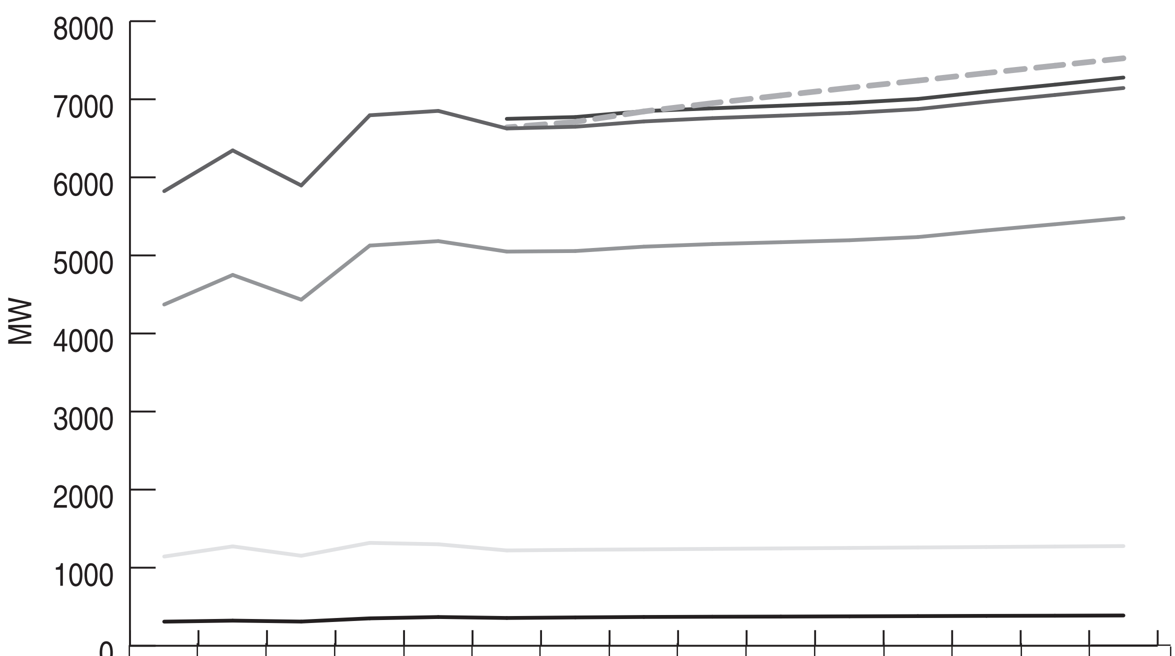
Although the purpose of forecasting is to identify the statewide risk associated with the supply and demand of electricity, such projections are affected by weather that can dramatically change demand, the economy including the price of electricity, and consumer usage patterns and conservation. There is further concern that the separation of generation from transmission/distribution companies could, if not carefully monitored, isolate the functions of supply and demand, create deeper load pockets and locked-in generation, and further constrain the existing transmission system.

Conservation and Load Management

In 2002, customers of CL&P and UI contributed nearly $75 million into the Conservation and Load Management (C&LM) Fund established by the legislature pursuant to Public Act 98-28 which created an assessment of three mills per kWh on electricity sold to each end use customer of a publicly-traded electric distribution company. The lifetime savings of energy efficiency funded through this assessment (1998 through 2012) is expected to save customers over $473 million. More than 400,000 customers, spanning all customer classes, participated in 2002. At this time, potential savings from all current and previous C&LM sources are currently forecasted to reduce summer peak in 2006 by approximately 700MW. The most successful DSM programs in 2002, measured in terms of participation and expected energy savings versus budgeted expenditures, were retail lighting; advanced design for new residential, commercial, and industrial construction; energy efficient residential washing machine sales; and custom on-site energy audits for commercial and industrial customers. The least successful programs were residential audits, heat pump water heater sales, and express services targeted to small load commercial and industrial customers for upgrading lighting, motors, and heating/cooling units.

Within the C&LM fund, a research development and demonstration (RD&D) program was established to identify and manage projects that would advance the development of reliable and efficient use of electricity. RD&D projects seek to deliver sustainable energy savings benefits to Connecticut businesses and residents. RD&D seeks to complement C&LM's portfolio of energy-efficient measures for all customers by uncovering new products and services that save energy, benefit the state's environment and economy, and enhance the reliability and quality of the

Figure 1. State and Utility Peak Demand



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CT Peak in extreme weather						6749	6772	6848	6884	6917	6953	7004	7099	7187	7278
CT Peak w/o Conservation						6640	6710	6844	6950	7049	7147	7239	7336	7430	7525
CT Peak w/Conservation	5823	6345	5896	6795	6851	6626	6648	6716	6758	6790	6824	6874	6968	7055	7144
CL&P Peak	4371	4750	4433	5126	5183	5049	5056	5112	5145	5169	5194	5235	5320	5399	5479
UI Peak	1143	1273	1153	1318	1300	1221	1229	1235	1241	1247	1253	1259	1265	1271	1277
CMEEC Peak	309	322	310	351	368	356	363	369	372	374	377	380	383	385	388

Table 1: Resources status quo vs. retirement

CT Balance of Supply and Demand of Electricity

Reported in Megawatts (MW)

	status quo generation scenario			less retirement of units scenario		
	2003	2005	2012	2003	2005	2012
Installed capacity[1]	7004	7004	7548	7004	7004	7548
Capacity additions						
Milford[2]		544			544	
Meriden[2]			544			544
Oxford[2]			512			512
Transmission Import Capability[3]	2200	2200	2200	2200	2200	2200
Load shift/Op-4 Action	562	562	562	562	562	562
Units 40 years if age or greater retired						-1739
Resources to meet Peak Demand	**9766**	**10310**	**11366**	**9766**	**10310**	**9627**
Peak Demand[4] - summer	**6626**	**6716**	**7144**	**6626**	**6716**	**7144**
CT reserves	3140	3594	4222	3140	3594	2483
Reserve/Resources* 100%	32%	36%	37%	32%	36%	26%

1 - Summer rating as reported in CSC Review of the Connecticut Electric Utilities' 2003 Twenty-Year Forcasts of Loads and Resources-Appendix A
2 - The proposed schedule for commercial operation of these facilities are either postponed or uncertain.
3 - Average of daily transfer limits during daily peak demand for summers 1997-1999, noting Millstone Units #2 and #3 did not operate in 1997 and Millstone Unit #2 did not operate in 1998.
4 - Projected peak demand as reported by CL&P, UI, and CMEEC forecast filings to the CSC on March 1, 2003.

region's power system.

This year the legislature acted to divert portions of the C&LM funding into the general fund. By placing C&LM programs at risk the State's peak demand for electricity could grow at an annual rate of 1.2 percent per year through the forecast period or an increase of 0.2 percent over peak with conservation. C&LM is a resource no different than generation or transmission in meeting demand for electricity and should not be overlooked as a resource in meeting demand.

RESOURCE FORECAST

Supply Resources

The State's supply resources are anticipated to be adequate to meet demand during the forecast period, provided all active generators committed to the ISO-New England remain available for continuing use (see Table 1). However, some subregions such as southwest Connecticut are threatened with supply deficiencies and voltage instability problems due to insufficient transmission and inadequate resources within the region. These problems became apparent during the blackout of August 14, 2003.

In the event the Millstone nuclear units or other large base load units are not available, the state's electric generators and transmission/distribution companies would institute the following plan to avoid capacity deficiencies during peak demand periods:

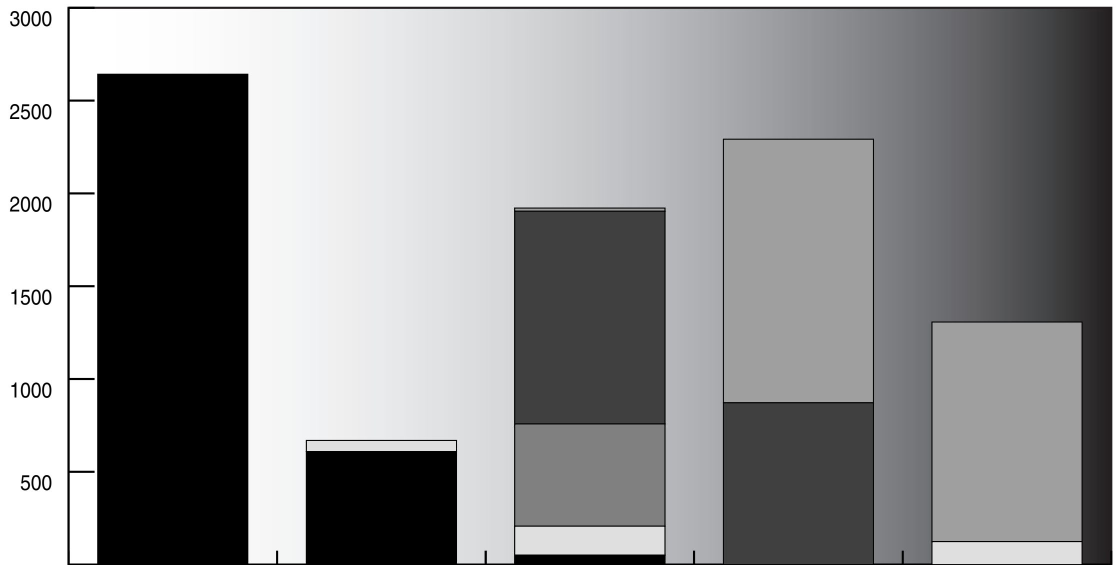
• operate all available generating units to their reasonable limits;
• purchase power from available resources, in and out of Connecticut;
• arrange to temporarily shift load on high load days to substations and transmission facilities outside Connecticut;
• explore additional interruption of service with industrial and commercial customers; and
• maximize use of customer-owned, emergency generators.

Ultimately, the state will be reliant on generation from the New England Power Pool (NEPOOL), the success of CL&M programs, and the continued operation of committed resources particularly transmission resources during periods high peak demand.

This plan has proved to be adequate in the past; however, it is increasingly important for resources to be strategically located on the grid to ensure electric supply can technically and economically serve pockets of high demand. In other words, generation should match load in each area of the State. For example, some of the facilities called upon to generate at their maximum capacity may not be able to do so because of age, constraints on the transmission system, or air emission limitations.

This year Connecticut and the region benefited from the addition of the Wallingford and Killingly facilities, being available for commercial operation during the first half 2002, with a total power output of 1,042 MW. With all planned supply resources in place, Connecticut will have a sufficient margin to meet summer peak demand. However, this scenario is speculative and subject to a number of variables, conditions, and expectations that are subject to change.

Figure 2: Distribution of Connecticut's Electric Generators by Fuel and Age.



	Available by 2005	Year built: 1990-1999	Year built: 1980-1989	Year built: 1970-1979	Year built: 1969 or before
renewable	0	60	156	0	124
coal	0	0	551	0	0
gas/oil	2642	609	51	0	0
nuclear	0	0	1146	872	0
oil/gas	0	0	17	1420	1183

Public Act 02-64 instituted sulfur dioxide emission limits on older oil-fired electric generation by year-end of 2004. This may suggest a scenario that may reduce or eliminate over 2,700 MW of generation located in Milford, New Haven, Norwalk, Bridgeport, Montville, and Middletown. However, the Act also allows the Connecticut Department of Environmental Protection to waive such emissions limits when low sulfur fuel is not available and/or the restriction threatens the reliability of the electricity supply as administered by ISO-New England. Furthermore, the loss of generation in Bridgeport and Norwalk will exacerbate transmission capabilities in southwest Connecticut and could overload grid connections between New York and New England. Indeed, ISO-New England predicts a substantial loss of reliability to southwest Connecticut if these units are prematurely retired before replacement by new additional generation, new transmission capability, or both.

Existing Generation Facilities

As depicted in Table 1, approximately 1,739 MW or 23 percent of the state's electric generation capacity is oil-fired and will be 40 years old or older by 2012. Until recently there has been little investment in new facilities since the mid-1970s, a period of high fuel costs and uncertain supply. Because the industry rates the service life of these units to be 40 years it may soon place some of these units into retirement. Figure 2 tells us that during the 1980s, various technologies like renewable, coal, and nuclear have diversified electric generation in Connecticut, since then, most new electric generation is natural gas-fired turbines.

Reliability has become a key issue to facility operation due to the age of many Connecticut generating plants. Consequently, facility operators, the ISO, and State regulators must continue to assess, test, and confirm individual facility availability. Such continuous measures include confirmation of unit ratings, repairs, and operational schedules.

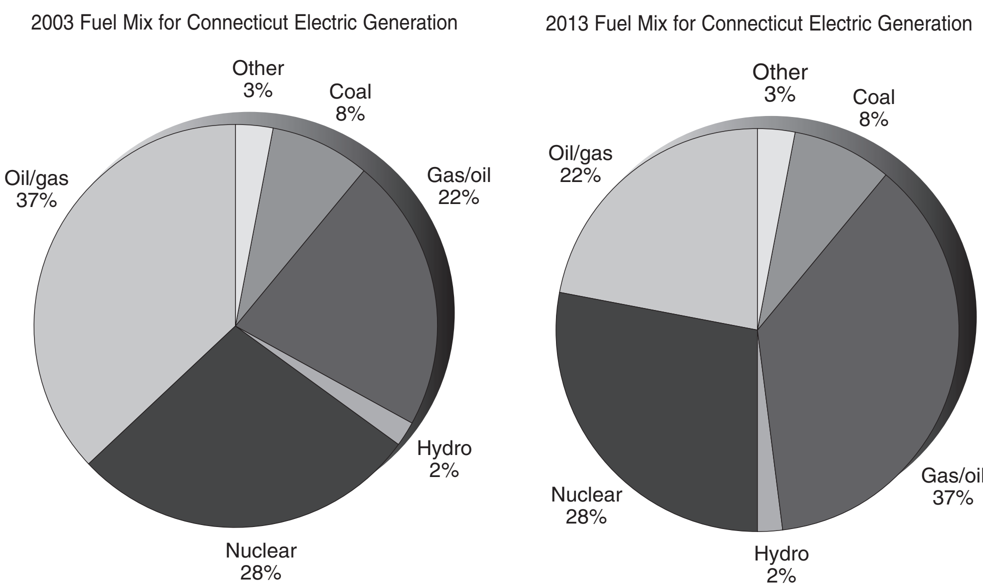
As depicted in Figure 3, the State's fuel mix for electric generation will largely change from oil-fired units to natural gas-fired units during the next ten years. This fuel mix scenario is consistent with the Department of Energy's projected fuel consumption for electric generation as depicted in Figure 4. However, without increased diversity of supply resources, the state faces an inherent risk of reduced reliability. This applies even to the economics of fuel and electric markets. Existing electric generation lacks locational value and planned electric generation is not viewed as a secured risk in today's energy market. An attractive economic climate is critical for both availability and diversity of reliable generation.

Nuclear Power Generation

Connecticut currently has two operational nuclear electric generating units contributing a total of 1,928 MW (summer rating), approximately 28 percent of the State's capacity and 47 percent of total energy output. Nuclear capacity, which formerly accounted for 45 percent of the State's operating capacity, has been reduced by the retirement of the Connecticut Yankee and Millstone Unit 1 facilities in December 1996, and July 1998, respectively.

Although no nuclear power capacity is currently planned as a new supply option,

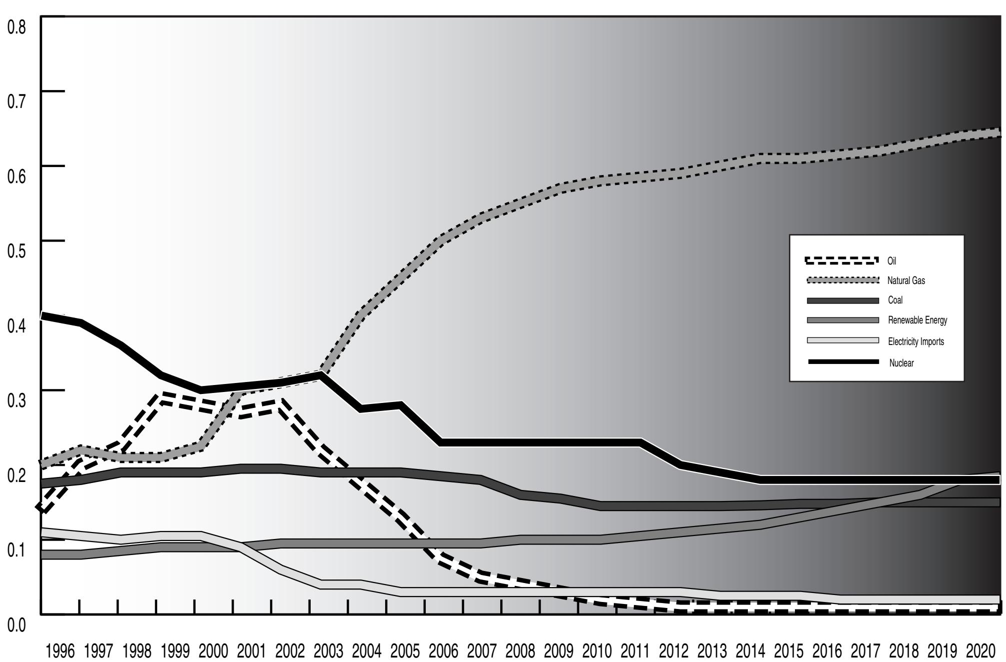
Figure 3: Connecticut Electric Fuel Mix



small gains in electrical output will be seen in the replacement of turbines. Dominion plans such upgrades by replacing the electric turbines during the refueling outages schedule for Unit 2 in the fall of 2003 and Unit 3 in the summer of 2004. Dominion expects an additional 46 MW of capacity due to the greater efficiencies of these turbines.

Nuclear power offers unique benefits and constraints. By releasing no production-connected sulfur oxides, nitrogen oxides, or carbon dioxide, nuclear power essentially represents a zero-air-emission generation source. In the event Connecticut were to permanently lose the contribution of its nuclear facilities now operating in Connecticut, the operators would 1) no longer have a surplus of sulfur dioxide allowances granted under the 1990 Clean Air Act Amendments (CAAA), and 2) face the possible loss of future emission allowances under the CAAA. Nonetheless, there remain issues of scheduled and unscheduled outages; nuclear waste storage, transport and disposal; public safety; security; and facility costs.

Figure 4: Fuel Consumption for Electric Generation within ISO-New England 1996-2020



Coal Power Generation

Connecticut currently has two coal-fired electric generating facilities contributing 553 MW, approximately eight percent of the state's current capacity. Coal reserves in the United States are expected to last over 240 years based on 1998 consumption levels. Despite this apparent benefit of supply and transport via an existing rail infrastructure, coal is not actively being considered as a supply-side fuel option due largely to the relative high expense of facility installation and the concern for control of air emissions, including possible future carbon dioxide regulations. However, with draft national energy policy encouraging development of clean-coal technology, and with the United States possessing approximately 24 percent of world's current estimated total recoverable coal, it may be a fuel that will be more seriously considered as a supply option.

Petroleum Power Generation

Connecticut currently has 28 oil-fired electric generating facilities, some of which can also burn natural gas, contributing a total of 2,611 MW or approximately 37 percent of the state's current capacity. New generation fueled solely by oil has been largely ruled out for future new supply due in part to the volatility of the

Table 2: Cost and Lead Times for New Electric Generation Technologies

Technology	Size (MW)	Leadtime (Yrs.)	Cost* (1999 $/kW)
Conventional Pulverized Coal	400	4	1,092
Gas/Oil Combined Cycle	250	3	445
Gas/Oil Combustion Turbine	160	2	331
Fuel Cells	10	3	2,041
Wind	50	3	983
Biomass	100	4	1,723

* Cost includes contingencies, but excludes interest charges

crude oil market. The United States holds an estimated two- percent of the world's known oil reserves excluding reserves in oil shale. Approximately 60 percent of the United States' oil is imported, making it potentially vulnerable to market manipulation by exporting nations. Although the current price of oil is relatively low compared to other fuel types, Connecticut utilities have sought to diversify their fuel mix away from reliance on crude oil. Nevertheless, plans for fuel diversification must always include an assessment of fuel availability, cost, and environmental effects that result if generating facilities are required to use secondary fuels.

Natural Gas Generation

Connecticut currently has 15 natural gas-fired electric generating units, some of which can burn oil, contributing a total of 1,570 MW approximately 22 percent of the State's current capacity. For the foreseeable future, natural gas is expected to be the fuel of choice for electric generation because of. lower emission factors compared to coal and oil, and primarily a North American resource base.

Natural gas electric generating facilities are preferred primarily because of the available high efficiency technology, cleaner emissions, and the relatively low capital cost per kWh produced (see Table 2). In addition, reserves from Canada have increased supply to New England by more than 50 percent through new pipelines from both western and eastern Canadian provinces. Although impacts on air quality are substantially less than coal or oil-fired facilities, it is less clear if natural gas generation will be able to economically meet future nitrogen oxide and especially carbon dioxide emission limits and how competition will affect the supply and price of natural gas to electric generating facilities.

As depicted in Table 3, the natural gas supply for new generation in New England, based on current and proposed natural gas pipeline capacity, the annual average daily consumption (1999), and the average consumption per MW of generation for new combined cycle natural gas-fired facilities, could provide approximately 11,896 MW of capacity. This would be consistent with ISO-NE's "Steady-State Analysis of New England's Interstate Pipeline Delivery Capability, 2001-2005" Phase II report identifying development of 10,766 to 12,542 MW of

Table 3: Natural Gas Capacity and Consumption Rates for New England (million cubic feet per day)

Existing Capacity Year 2000		Existing Consumption Year 1999		Total capacity 3,604,009
Algonquin	1,494,763	Connecticut	359,296	Total Consumption 1,605,559
Tennessee	1,186,346	Maine	16,586	
Iroquois	206,900	Massachusetts	922,096	
Vermont Gas	49,000	New Hampshire	55,644	Available Capacity 1,998,450
Granite State	37,000	Rhode Island	229,953	
Portland Natural Gas	230,00	Vermont	21,984	
Maritimes & Northeast	400,00			Average Consumption per MW of Generation 168
Total Capacity	3,604,009	Existing Consumption	1,605,559	Potential MW Generation in NE 11,896

gas-fired electric generation in New England.

Notwithstanding new supplies expected from the Sable Island Basin and new pipeline capacity, the use of natural gas for base load facilities, combined with other heating and transportation uses, might result in over-dependence and lack of fuel diversity which may curtail the plans for nearly one-half of the generation being considered for development in New England. Furthermore, ISO-New England's draft 2003 Regional Transmission Expansion Plan (RTEP03) Technical Report "indicate that New England's projected reliance upon natural gas-fired generating units has potentially negative system-wide impacts. The advent of several thousand megawatts of new gas-fired combined cycle units in New England could have serious reliability impacts on the system should gas pipe line interruptions or extremely cold weather occur. ISO New England has formed a Fuel Diversity Working Group to examine the problem. The effort will focus on understanding the dynamic relationships between the electric and natural gas infrastructure in New England, and how electric reliability could be impacted. The effort will provide guidance to the NEPOOL community and the gas pipeline operators on operating procedures, market rules, and transmission planning and regulatory matters."

Hydroelectric Power Generation

Connecticut hydroelectric generation consists of 30 facilities contributing 150 MW, approximately two percent of the state's current capacity. Hydro-power, long considered to be an environmentally acceptable source of power, has recently come under increased scrutiny by both recreational and environmental advocacy groups whose concerns include the effects of dams on river flow, water quality, fish populations, and wildlife habitats. The Falls Village, Bulls Bridge, Shepaug, Stevenson, and Rocky River hydro-units, totaling 115 MW of capacity, are undergoing relicensing review with the Federal Energy Regulatory Commission. Consequently, while hydropower may be considered a clean and renewable energy source, renewal of existing licenses or development of any additional large units in Connecticut would likely be limited by these constraints, relative cost, and lack of sites.

Bridgeport Harbor Generating Station; gas turbine project

Privately Owned Generation

There are approximately 105 MW of electricity generated by 58 entities in Connecticut. This portion of generation is not credited to the state's capability to meet demand; or in other words, ISO-NE does not control dispatch of these entities. However, these units serve to reduce load on the grid particularly during peak demand. These generation units range between 1 kW to 25 MW in size and are fueled primarily by natural gas with several others using oil, hydro, methane, solar and wind. The installation of additional privately-owned generation is expected, but only at competitive rates or by an entity that views self-generation as a benefit.

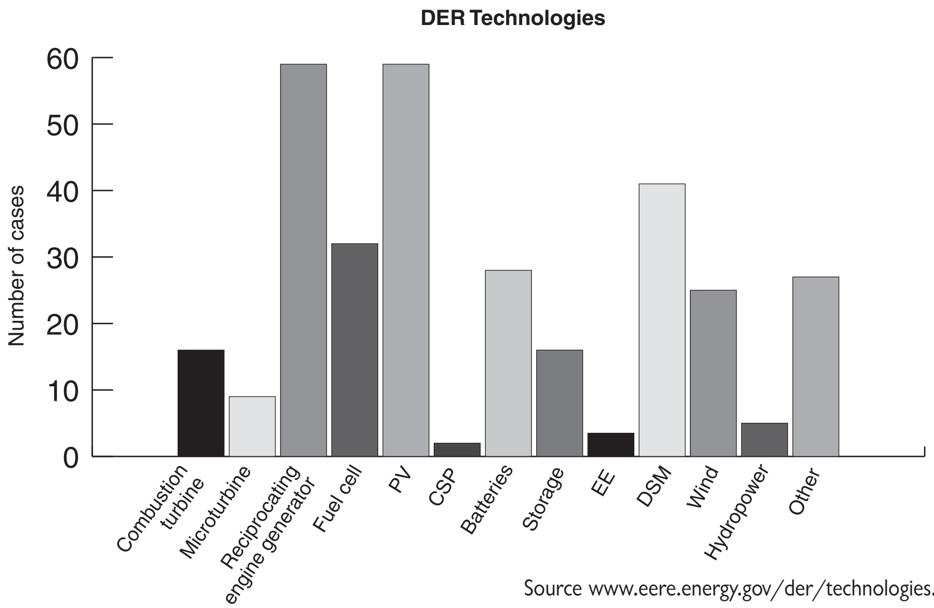
Import Resources

Since 1986, Connecticut utilities have held contracts for 479 MW from a total of 1,500 MW of import capability from the Hydro-Quebec Phase I and Phase II projects. These contracts and others in New England expired on August 31, 2001, making the 1,500 MW available for sale to wholesale and retail electric suppliers. Although the Hydro-Quebec interconnection tie is not counted toward Connecticut generation capability, it is expected to assist in meeting New England's energy needs on a competitive basis.

Distributed Energy Resources (DER)

Commercial technologies such as reciprocating engines and small combustion turbines are used in a variety of applications for energy, cogeneration, and emergency power (see Figure 5). In 1999, the DOE examined 275 distributed energy resource projects and discovered the most used DER projects were diesel- and petrol-driven reciprocating engine-generators, photovoltaics, and demand-side management (DSM). The use of fuel oil-driven reciprocating engines have issues with pollutants (emissions and noise) compared to natural-gas- and renewable-fueled technologies . Cleaner gas-fired reciprocating engines are being used which may address these concerns. DSM technologies are aimed at reducing overall energy consumption and should be considered at every opportunity to

Figure 5: National Survey of Distributed Generation Resource Technologies



Source www.eere.energy.gov/der/technologies.

counter the production of energy.

Emerging technologies that are further employed to generate electricity are fuel cells and wind turbines. The Council has reviewed numerous requests to install fuel cells for use as combined heat and power at schools and waste-water treatment plants. Wind turbines would need to be located in windy areas such as on hilltops or the shores of Long Island Sound, but the siting of these facilities could potentially compromise the preservation of scenic resources. Batteries are being used widely but only for specific purposes (i.e. wireless communications and transportation) and good for only short periods of time, however, batteries require a source for charging.

Distributed generation applications can be designed to meet a wide variety of service requirements and fulfill the needs of many customers. Such applications provided by distributed generation are combined heat and power, standby power, peak-shaving, grid support, and stand alone generation. Distributed generation has faced obstacles that include lack of technology maturation and reliability, cost associated with an economy of scale, and regulatory barriers. Regulatory barriers include interconnection requirements, permitting and siting, environmental regulations, and compliance with building and electrical codes. Market forces, technological advances, and industry restructuring should slowly continue to remove obstacles for the strategic development of distributed generation and integration of supply resources within load pockets. In addition, distributed generation has a modest advantage over large centralized systems of being secure at customer's sites and less reliant on transmission infrastructure.

Electric Restructuring

Pursuant to Public Act 98-28, Connecticut electric consumers are provided an opportunity to choose their electric generation supplier. This law is also intended to open electric generation to competition for purposes to decrease the price of electricity, foster technological innovation, and improve environmental quality through new facilities with lower emission profiles.

The Department of Public Utility Control initiated the process to unbundle generation from other components of the electric utility service; establish non-bypassable service charges to fund energy conservation programs and fund investments in renewable technologies; and establish a systems benefit charge to fund education programs, public policy programs, and provide assistance to utility workers and municipalities that are impacted by restructuring. While many of the market-based provisions of this Act have already been accomplished including the divestiture of nuclear and non-nuclear generation and customer choice of electric generation suppliers, continued oversight of electric supply markets is essential to ensure succesful attainment of objectives.

Most customers are still being served through the standard offer service of CL&P and UI. Relatively few have chosen an alternate electric generation supplier. Market conditions, customer awareness, and availability of viable alternatives are factors which may affect consumer decisions to choose an electric generation supplier other than the standard offer. The standard offer rate is in place as a transition to competition and will expire December 31, 2003. Pursuant to P.A. 03-135 the legislature has amended the standard offer rate to a transitional service rate to be established by the DPUC and effective January 1, 2004 through December 31, 2006. The legislature's action buffers consumers concerns about spikes in electric rates until a time when the availability of competitive supply is less volatile.

The supply of electricity is provided by electric generators, a non-regulated entity. These electric generators compete to sell electricity within a market that is governed daily by the ISO-New England. ISO-NE has recognized a disparity in the value of the resource compared to the compensation allocated to generators for both older fossil-fueled and newer gas-fueled facilities. ISO-NE continues to develop strategies to address market pricing that would provide the best assurance to the maintenance and development of generation capacity in the State.

Facility Siting

As a consequence of restructuring legislation, the Council's jurisdiction and statutory decision criteria have been modified to provide uniform treatment between utilities and private power producers so that a full range of environmental and economic effects can be appropriately considered for new generation facilities.

To date the Council has approved the following natural gas-fired electric generating facilities:

• 520-MW Bridgeport Energy LLC project in Bridgeport became operational in May 1999,
• 544-MW PDC-El Paso LLC project in Milford is substantially constructed but not operating,
• 544-MW NRG Northeast Generating LLC project in Meriden has halted construction and completion is undetermined,
• 792-MW Lake Road Generating Company, L.P. project in Killingly became operational June 2002,
• 512-MW Towantic Energy LLC project in Oxford, is in litigation and progress is uncertain,
• 250 MW Wallingford, PPL project in Wallingford became operational March 2002, and
• 550 MW Kleen Energy Systems, LLC project in Middletown approved November 21, 2002, but not yet under construction.

3,712 MW total

Since the deregulation of the electric industry in 1998, 1,562 MW or 43 percent of approved capacity is operating in Connecticut. Delays in project development in Milford, Meriden, and Oxford have encountered project specific obstacles; nevertheless, Milford is substantially complete and is expected to become operational in 2004. However, all of the projects listed above are experiencing a certain level of volatility in the market structure overseen by the ISO and the natural gas industry responding to a new found demand in electric generation.

Other projects listed on the ISO-NE interconnection study status for possible development include South Norwalk (100 MW), Stamford (180 MW) and Mansfield (24.9 MW). While past plans for over 2,000 MWs of additional capacity in Connecticut were once contemplated, these plans have dwindled to 305 MW of capacity today. Again the unfavorable market structure and fuel pricing may have been liable for this decline in activity.

Most plants were constructed near intersections of electric and natural gas transmission infrastructure, many on green field sites and away from load centers. However, policy makers envisioned a more streamlined development by the repowering of existing facilities that already have electric and/or gas infrastructure in place and are located near load centers. Consequently, the siting of future generation and transmission facilities is best considered together, and on a regional basis, to enable efficient electric dispatch and fuel supply.

TRANSMISSION SYSTEM

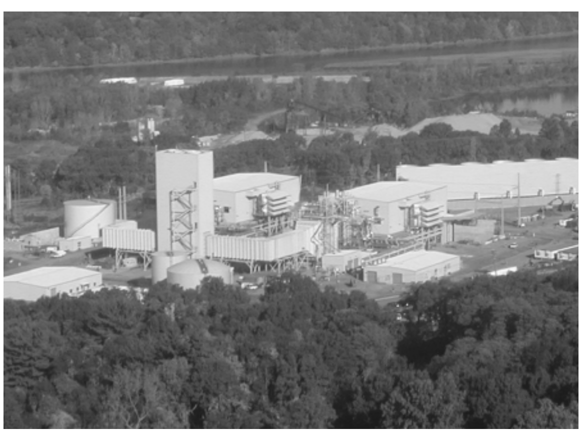
Connecticut's high voltage electric transmission system consists of approximately 1,300 circuit miles of 115-kV, 398 circuit miles of 345-kV, 5.8 circuit miles of 138-kV and 104 circuit miles of 69-kV lines as depicted in Appendix B. While much of the state's electric transmission infrastructure is already developed, the electric utilities maintain the system and expand it where needed to serve load centers and new generation. As shown in Appendix C, many of the transmission line projects being planned consist of the rebuilding, reconductoring, or uprating of existing lines to increase each line's capacity to meet load growth and/or generation dispatch conditions. Much of this development is lagging the build out of new electric generation. With this added capacity key elements of the existing electric transmission system are not able to handle the load to meet demand. CL&P proposes two new 345-kV transmission projects that would enhance system reliability, decrease congestion ("bottlenecks" within the transmission grid), and increase import capabilities. These projects are between Bethel and Norwalk and Middletown and Norwalk. CL&P proposes that these projects would benefit the State with connection to other regional systems and provide access to a greater supply of bulk power. The Bethel-Norwalk line was approved July 2003 by the Council in Docket No. 217. The Middletown-Norwalk line filed by CL&P in October 2003 will undergo a year long review by the Council in Docket No. 272.

The Council also approved a Northeast Utilities application (Docket No. 224) to replace the existing 138-kV submarine cable between Norwalk and Northport, New York, and a Cross Sound Cable application (Docket No. 221) a merchant direct current submarine cable between New Haven and Brookhaven, New York. The utilities continue to monitor electricity usage for transmission and substation upgrading to meet growing demand for power, improve system reliability, promote efficiency, and reduce energy losses.

Table 4: Planned Bulk Substations in Connecticut

Planned Substation	Date of Completion
Installation of new South Kensington 345-kV Switchyard, Berlin	2004
Installation of new Shunock 115-kV S/S, Stonington	2004
Installation of new Plumtree 345-kV S/S, Bethel	2005
Installation of new Norwalk 345-kV S/S, Norwalk	2005
Installation of new Wilton 115-kV S/S, Wilton	2005
Installation of new Trumbull Junction, Trumbull (UI)	2005
Installation of new substation in western Fairfield (UI)	2006 or later
Installation of new Beseck Junction 345 kV Switchyard	2007
Installation of new East Devon S/S 345 kV	2007
Installation of new Singer 345 kV S/S, Bridgeport	2007
Installation of new Glenbrook 345-kV S/S, Stamford	2007
Installation of new Jack' Hill 115-kV S/S, Oxford	2008
Installation of new Stepstone 115-kV S/S, Guilford	2008

While the generation and transmission infrastructure were under high demand during the hot summer of 1999, most outages were attributed to failure of distribution feeders leaving high voltage substations, and distribution transformers near end use customers. The state's utilities state that the failures were due to aged equipment and have replaced such equipment. Accordingly, Department of Public Utility Control Docket No. 99-08-01, *DPUC Investigation into Electric*



Milford Power Co. gas-fired generating plant, Milford

Capacity and Distribution noted that the southwestern corner of the State appeared to require transmission and distribution reinforcements. The utility companies have pursued numerous modifications to the existing 115 kV transmission system serving that area as load continued to grow. These modifications have included routine breaker upratings, line rebuilds and installations of capacitor banks. The DPUC investigated possible shortages of electricity in southwest Connecticut during summer periods of peak demand for 2002 and beyond (Docket No. 02-04-12). The following is an excerpt from that decision:

"It should also be noted that unplanned transmission line outages and generating unit outages are regular occurrences in the electric system. However, transmission constraints and load growth in the area exacerbate the effects of outages in the system. This is the case since the system is often being operated near its limits. Therefore, as outages occur, the effects of the outages on the system become more severe. The outages noted above are not unusual and similar events have occurred in the past. However, the consequences are becoming more severe, and ISO-NE and the utilities have had to take more drastic measures to avoid widespread blackouts. Since unplanned outages are unavoidable, it should be expected that the consequences of such events on the system would become more severe as time goes on, unless measures are taken that either decrease load or increase transmission capabilities."

This investigation found numerous instances where the existing transmission and distribution system came precipitously close to blackouts. Furthermore, on August 14, 2003, SWCT became part of a blackout that encompassed parts of Ohio, Pennsylvania, New York and Ontario, Canada. This larger eastern grid collapse, largest in United States history, affirms current grid operators' analyses that transmission congested zones can be and are vulnerable to grid instability.

ISO-New England systematically assesses load requirements, establishes reserve margins across the power pool, and dispatches energy as necessary. In addition, ISO-New England assesses each new electric generation facility requesting connection to the electric grid for transmission system reliability. Also, ISO-New England continues to monitor transmission interfaces that deliver power to Connecticut. The State is currently only able to import 2,300 MW relevant to in-State resources without compromising grid voltage and system operating stability.

The regional importance of these interconnections is important. While Connecticut undertakes this review as a measure of responsibility and to reduce potential regional disparity, the high voltage electric transmission system must be considered a regional facility capable of inter- and intra-region export and import of power. Consequently, Connecticut must continually examine its position in a regional context to import and export capacity. Such examination will likely favor the construction of regional facilities that strengthen the system grid for overall increased reliability. Some regional interconnections may not be popular to local land use authorities or local residents. However, State siting should maintain a regional perspective for maximum integration and efficient dispatch to reduce cost to high demand load areas. Regional interconnections are being considered for possible federal preemption through the Federal Energy Regulatory Commission and oversight by a Regional Transmission Organization (RTO). However, until these entities exist or obtain jurisdiction to coordinate regional facilities, Connecticut and other states will need to consider regional interests.

As shown in Table 4, as many as 13 new bulk power substations (S/S) or switchyards to reduce high-voltage transmission to lower voltage may be needed in high load areas within the State over the next five years. Many of these substations are part of a proposed 345-kV system expansion requiring switching and/or step-down capability.

Because the development of both new transmission and substation facilities might be considered undesirable by local communities, utilities must carefully assess supply locations, load center demands, and the need for new or upgraded facilities far in advance of actual construction. While the importance of regional interconnections must be understood, on-site generation and targeted conservation and load management programs must be continually evaluated as part of new transmission system planning alternatives.

Transmission lines and electric substations have received increased scrutiny by groups concerned about the possible effects of electric and magnetic fields (EMF). In 1999, an international panel of experts issued a final report titled *Research on Power-Frequency Fields Completed Under the Energy Policy Act of 1992, National Academy Press, 1999, Washington, D.C. U.S.A.* The report stated that the results of their investigation "do not support the contention that the use of electricity poses a major unrecognized public-health danger." Nonetheless, EMF remains a concern to many communities, and siting decisions should consider options to minimize effects.

RESOURCE PLANNING

The Council fully endorses and participates in the assessment of resources, modeling, and planning initiatives to maintain electric reliability. These processes include programs for conservation and load management, resource supply, and transmission planning. The complexity and necessary integration of these programs has substantially increased as increased demand has stressed existing resources. In addition, consumer costs, congestion management, targeted demand-side programs, regional transfers, and the difficulty in facility siting has presented issues that have made decision-making difficult and not without consequences. The diversion of conservation and load management funds may complicate matters further.

As shown in Appendix B, the Council continues to assess existing electric transmission, fuel supply, generation, and demand-side resources as well as planning options to maintain and improve reliability. Many design studies have been initiated to correct some of these problems with transmission enhancement. However, multiple scenarios of demand-side planning, new natural gas pipeline siting, new generation siting, and dispatch of existing generation facilities must be considered before final decisions are made by State regulators and the Independent System Operator. In Connecticut, enhancement plans for northwest Connecticut, the Norwalk-Stamford area, and southwest Connecticut are nearing completion. These and other subregional plans are expected to complement other enhancements throughout the New England electric power system consistent with reliability criteria established by NEPOOL, the Northeast Power Coordinating Council, and the North American Electric Reliability Council. The assessment of these enhancement plans and recommended strategies will be difficult and time consuming, but will allow the public participation and community involvement necessary for the efficient deployment of facilities.

In view of recent electric and gas transmission industry activity in proposing and constructing infrastructure in the State, the legislature passed An Act Concerning the Protection of Long Island Sound relating to electric power line, gas pipeline, and telecommunications crossings (Public Act No. 02-95). In support of this act the legislature extended the moratorium on development of said projects until June 3, 2004. Both P.A. 02-95 and Governor Rowland's Executive Order No. 26, created a task force to assess economic considerations and environmental preferences and the appropriateness of installing transmission lines underground or overhead and crossing Long Island Sound; feasibility of meeting all or part of the region's electric power needs through distributive generation; and electric reliability, operational and safety concerns of the region's transmission system, and the technical and economic feasibility of addressing those concerns with available electric transmission system equipment. The Institute of Sustainable Energy at Eastern Connecticut State University produced two reports one titled "Comprehensive Assessment & Report Part 1 - Energy Resources & Infrastructure of Southwest Connecticut", dated January 1, 2003, and the other, titled "Comprehensive Assessment & Report Part II - Environmental Resources and Energy Infrastructure of Long Island Sound" dated June 3, 2003. These reports examine and evaluate the State's processes for balancing energy reliability and the need for transmission expansion projects, both for Connecticut and for the region, with enhanced protection of the natural resources of Long Island Sound.

More activity among environmental organizations at the local, State, regional, national and international levels are collaborating to develop strategies to address emissions of nitrogen, sulphur, and carbon oxides. Much of this activity surrounds the use of energy in its many different forms. In particular, a *Report to New England Governors and Eastern Canadian Premiers on Climate Change Projects* dated August 2002, identified specific plans that could be implemented immediately for regional achievement.

• *LED Traffic Light Project*. Promote the replacement of conventional traffic lights in the region with more efficient, cost-effective LED traffic signals that are estimated to use 85% less energy than conventional lights and have a payback of between 2 and 3.5 years.
• *College & University Partnerships in Emission Reductions*. This project would encourage institutions to reduce greenhouse gas emissions to 10% below 1990 levels by 2012. Such an initiative could result in the reduction of 600,000 to 650,000 metric tons of carbon.
• *State/Provincial Purchasing Programs for High Efficiency-Low Emission Office Equipment*. This project would encourage the purchase of more energy efficient office equipment.
• *Use of Cleaner, More Energy-Efficient Vehicles in State/Provincial Fleets*. This project would encourage the purchase and use of cleaner, more efficient vehicles.

Furthermore this plan may encourage increased efficiency and use of alternative fuels.

CONCLUSION

These forecasts have modeled Connecticut's electric energy future for the next 10 years and show supplies should be able to meet expected demand. Nonetheless, these forecasts are models that are based on assumptions that are subject to change over time.

The change in the State's fuel mix for electric generation, over-reliance on natural gas as a fuel, transmission constraints and outages, reduced C&LM funding, and the separation of electric generation from transmission and distribution raise new concerns for the reliability of Connecticut's electric capacity. This analysis and these models should not be used as a tool to simply predict the future, but to increase learning curves, reduce risk, and to identify effective strategies to obtain desirable goals.

Issues that warrant attention include:
• targeted subregion strategies in load pockets to address transmission constraints, load growth, and generation resources;
• emergency contingency planning to manage electric supply and demand;
• regional siting to improve system efficiency and reduce uplift costs;
• long-term system reliability;
• facility management for reliable operation;
• scheduled maintenance for predictable operations;
• responding to a changing economy that has proven difficult to predict;
• long-term management of volatile fuel supplies and prices;
• reinstitute conservation investments; and
• maintaining regional transmission systems to accommodate high demand during adverse weather conditions.

Refinement of policy may also be warranted in the following areas as Connecticut's role is better defined by market conditions:
• fuel - encouragement of fuel diversity with sustainable alternative fuel facilities;
• fuel storage - incentives for back-up fuel storage;
• interconnection - encouragement of distributed energy at load centers;
• planning - continued forecast modeling for electric supply, demand, and transmission;
• regulation - streamlined siting for regional generation, electric transmission, and gas pipelines;
• education - continued education on all elements of electric restructuring, supply options, and market-based decisions; and
• conservation - refined policies to provide economic alternatives to reduce energy consumption.

In addition, market mechanisms need to be assessed and applied to planning strategies to determine if there are sufficient incentives to ensure an adequate supply of generation and demand-side resources to provide reliable service.

Appendix A
Existing Electric Generation Facilities
as of July 1, 2003

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating
Bridgeport Harbor #3	PSEG Power, LLC	Bridgeport	Coal	372.20	370.37
AES Thames	AES Thames, Inc.	Montville	Coal/oil	181.00	182.15
Bridgeport Energy	Bridgeport Energy LLC	Bridgeport	Gas	447.88	527.12
Devon #14	NRG	Milford	Gas/Oil	29.62	40.19
Devon #12	NRG	Milford	Gas/Oil	29.82	39.03
Devon #11	NRG	Milford	Gas/Oil	30.05	39.57
Devon #13	NRG	Milford	Gas/Oil	33.33	42.33
C. H. Dexter	Alstom	Windsor Locks	Gas/Oil	38.00	39.00
PPL Wallingford Unit 5	PPL EnergyPlus, LLC	Wallingford	Gas/Oil	41.02	52.02
PPL Wallingford Unit 2	PPL EnergyPlus, LLC	Wallingford	Gas/Oil	41.38	52.38
PPL Wallingford Unit 4	PPL EnergyPlus, LLC	Wallingford	Gas/Oil	42.18	47.46
PPL Wallingford Unit 1	PPL EnergyPlus, LLC	Wallingford	Gas/Oil	44.50	48.94
PPL Wallingford Unit 3	PPL EnergyPlus, LLC	Wallingford	Gas/Oil	45.61	50.51
Aetna Capitol District	Capitol District Energy Ctr.	Hartford	Gas/Oil	55.25	61.33
Lake Road 1	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	222.79	258.42
Lake Road 2	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	231.25	266.87
Lake Road 3	Lake Road Generating Co., L.P.	Killingly	Gas/oil	236.87	272.49
Rocky Glen	Rocky Glen Hydro LP	Newtown	Hydro	0.04	0.04
Dayville Pond	Summit Hydro Power	Killingly	Hydro	0.06	0.06
Bantam #1	NGC	Litchfield	Hydro	0.07	0.32
Mechanicsville	Saywatt Hydro Associates	Thompson	Hydro	0.10	0.10
Glen Falls	Summit Hydro Power	Plainfield	Hydro	0.10	0.10
Toutant	Toutant Hydro Power, Inc.	Putnam	Hydro	0.16	0.16
Gilman Hydro (netted from load)	Gilman	Bozrah	Hydro	0.18	0.18
Kinneytown A	Kinneytown Hydro Co.	Ansonia	Hydro	0.25	0.25
McCallum Enterprises	McCallum Enterprises	Derby	Hydro	0.28	0.28
Robertville #1- #2	NGC	Colebrook	Hydro	0.32	0.62
Willimantic 2	Willimantic Power Corp.	Willimantic	Hydro	0.39	0.39
Willimantic 1	Willimantic Power Corp.	Willimantic	Hydro	0.42	0.42
Putnam	Putnam Hydropower, Inc.	Putnam	Hydro	0.58	0.58
Kinneytown B	Kinneytown Hydro Co.	Seymour	Hydro	0.65	0.65

Appendix A
Existing Electric Generation Facilities
as of July 1, 2003

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating
Norwich 2nd St./Greenville Dam	CMEEC	Norwich	Hydro	0.95	0.95
Norwich 10th St.	CMEEC	Norwich	Hydro	0.98	1.17
Quinebaug	Quinebaug Associates LLC	Killingly	Hydro	0.98	2.81
Colebrook	MDC	Colebrook	Hydro	1.37	1.37
Tunnel #1- #2	NGC	Preston	Hydro	1.53	2.10
Scotland #1	NGC	Windham	Hydro	1.69	2.20
Wyre Wynd	Summit Hydro Power	Griswold	Hydro	1.80	1.80
Taftville #1- #5	NGC	Norwich	Hydro	2.03	2.03
Goodwin Dam	MDC	Hartland	Hydro	2.06	2.06
Derby Dam	McCallum Enterprises	Shelton	Hydro	7.05	7.05
Rainbow Dam	Farmington River Power Co.	Windsor	Hydro	8.20	8.20
Bulls Bridge #1- #6	NGC	New Milford	Hydro	8.40	8.40
Falls Village #1- #3	NGC	Canaan	Hydro	9.76	11.00
Stevenson #1- #4	NGC	Monroe	Hydro	28.31	28.90
Shepaug #1	NGC	Southbury	Hydro	41.51	42.56
Rocky River	NGC	New Milford	Hydro- pump storage	29.35	29.01
Hartford Landfill	CRRA	Hartford	Methane	2.57	2.57
New Milford Landfill	Vermont Electric Power Company	New Milford	Methane/Oil	3.01	3.01
Millstone 2	Dominion Nuclear CT, Inc.	Waterford	Nuclear	871.54	867.91
Millstone 3	Dominion Nuclear CT, Inc.	Waterford	Nuclear	1056.66	1070.94
Montville #11	NRG	Montville	Oil	2.60	2.70
Montville #10	NRG	Montville	Oil	2.70	2.80
Bridgeport Harbor #4	PSEG Power, LLC	Bridgeport	Oil	9.92	14.72
Norwich	CMEEC	Norwich	Oil	15.26	18.80
Cos Cob #12	NRG	Greenwich	Oil	15.73	20.63
Franklin Drive #10	NRG	Torrington	Oil	15.73	20.84
Torrington Terminal #10	NRG	Torrington	Oil	16.03	21.14
Branford #10	NRG	Branford	Oil	16.17	21.28
Tunnel #10	NGC	Preston	Oil	16.62	21.49
Middletown #10	NRG	Middletown	Oil	17.18	22.08
Devon #10	NRG	Milford	Oil	17.20	19.20

Appendix A
Existing Electric Generation Facilities
as of July 1, 2003

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating
Cos Cob #10	NRG	Greenwich	Oil	17.88	22.78
Cos Cob #11	NRG	Greenwich	Oil	18.24	23.23
Bridgeport Harbor #2	PSEG Power, LLC	Bridgeport	Oil	34.51	157.68
South Meadow #11	NGC	Hartford	Oil	35.78	46.92
South Meadow #14	NGC	Hartford	Oil	37.35	47.35
South Meadow #12	NGC	Hartford	Oil	37.70	47.87
South Meadow #13	NGC	Hartford	Oil	38.32	47.92
Norwalk Harbor #1	NRG	Norwalk	Oil	162.00	164.00
Norwalk Harbor #2	NRG	Norwalk	Oil	168.00	172.00
Middletown #4	NRG	Middletown	Oil	400.00	402.00
Montville #6	NRG	Montville	Oil	407.40	409.91
Montville #5	NRG	Montville	Oil/Gas	81.00	81.59
Devon #8	NRG	Milford	Oil/Gas	106.84	106.19
Devon #7	NRG	Milford	Oil/Gas	107.00	109.00
Middletown #2	NRG	Middletown	Oil/Gas	117.00	120.00
Middletown #3	NRG	Middletown	Oil/Gas	236.00	245.00
New Haven Harbor #1	PSEG Power, LLC	New Haven	Oil/Gas	461.18	454.64
Lisbon RRF	Riley Energy Systems	Lisbon	Refuse	12.96	13.04
Mid-CT RRF	CRRA	Hartford	Refuse	52.71	59.67
Bridgeport RRF	CRRA	Bridgeport	Refuse	59.06	59.42
Wallingford RRF	CRRA	Wallingford	Refuse/Oil	6.35	6.90
Bristol RRF	Ogden Martin Systems-CT	Bristol	Refuse/Oil	13.20	12.74
Preston RRF	SCRRRA	Preston	Refuse/Oil	16.01	16.95
Exeter	Oxford Energy, Inc.	Sterling	Tires/Oil	26.00	26.00
Pinchbeck	William Pinchbeck, Inc.	Guilford	Wood	0.01	0.01
	Seasonal Claimed Capability available for dispatch to the electric grid.			7003.74	7528.86

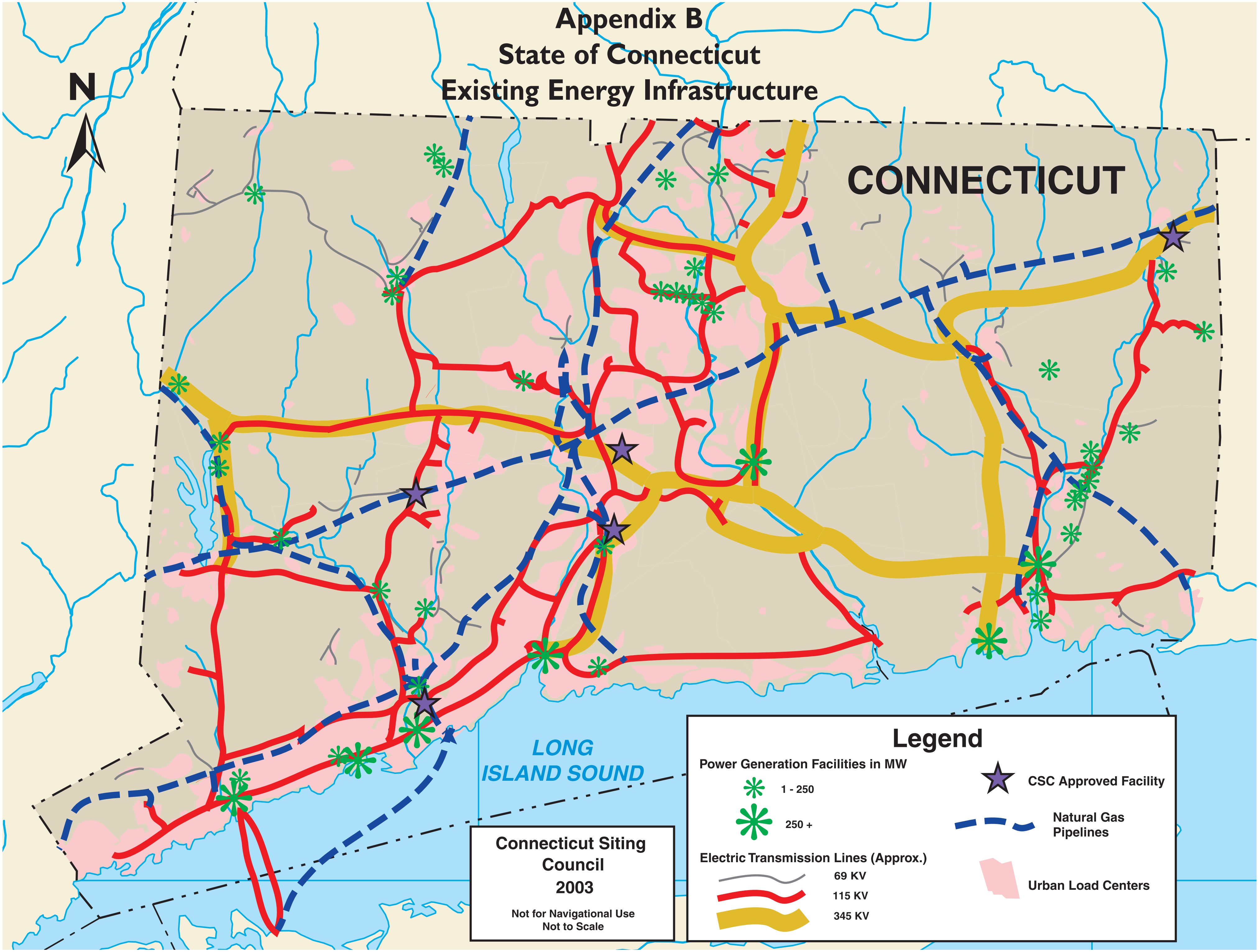
Appendix A
Existing Electric Generation Facilities — Self Generation
as of July 1, 2003

Facility (self generation)	Owner	Town	Fuel	Summer Rating	Winter Rating
Agnes Morely Apts	Agnes Morely Apts	Greenwich	Gas	0.03	0.03
Atrium Plaza	Atrium Plaza	New Haven	Gas	0.06	0.06
Bridgeport J City Ctr	Bridgeport J City Ctr	Bridgeport	Gas	0.06	0.06
Bynes Falls	Coventry Hydro	Coventry	Hydro	0.10	0.10
Candid Associates 1&2	Candid Associates	North Haven	Gas	0.12	0.12
Candid Associates 3	Candid Associates	North Haven	Gas	0.18	0.18
Component Technologies	Component Technologies	Newington	Gas	0.30	0.30
Congdom Dam	Warren Hobbs	Montville	Hydro	0.06	0.06
Connecticut Valley Hospital	State of Connecticut	Middletown	Oil	2.05	2.05
Davenport Residence	Davenport Residence	Hamden	Gas	0.06	0.06
Dorizzi Wind Turbine	John Dorizzi	Canaan	Wind	0.01	0.01
Dunbar Residence	Davenport Residence	Hamden	Gas	0.06	0.06
East Hartford High	East Hartford High	East Hartford	Gas/Oil	0.28	0.28
Fairfield Hills Hospital	Fairfield Hills Hospital	Newtown	Oil	3.95	3.95
Fairfield YMCA	Fairfield YMCA	Fairfield	Gas	0.03	0.03
Fishers Island Elec. Co.	Fishers Island Elec. Co.	Groton	Oil	1.10	1.10
Gianninoto Wind Turbine	F. Gianninoto	Redding	Wind	0.02	0.02
Gottier	Gottier, Nelson	Tolland	Oil	0.00	0.00
Greenwich YMCA	Greenwich YMCA	Greenwich	Gas	0.06	0.06
Gregory Sholz	Gregory Sholz	Simsbury	Solar	0.05	0.05
Groton Sub Base	U.S. Navy	Groton	Oil/Gas	18.50	18.50
Hartford Holiday Inn	Hartford Holiday Inn	Hartford	Gas	0.06	0.06
Hartford YMCA	Hartford YMCA	Hartford	Gas	0.12	0.12
Hartford YWCA	Hartford YWCA	Hartford	Gas	0.06	0.06
Highfield Farm	Sparkmen	Coventry	Wind	0.02	0.02
Immanuel House	Immanuel House	Hartford	Gas	0.06	0.06
Inter Church	Inter Church	Bridgeport	Gas	0.30	0.3
John Roundtree	John Roundtree	Norwalk	Solar	0.02	0.02
Laurelwood	Laurelwood	Bridgeport	Gas	0.06	0.06
Mackowiak	Richard G. Mackowiak		Hydro	0.8	0.8
Loctite	Loctite	Rocky Hill	Gas	1.18	1.18
Longobardi	Longobardi, Ann	North Haven	Gas	0.06	0.06

Appendix A
Existing Electric Generation Facilities — Self Generation
as of July 1, 2003

Facility (self generation)	Owner	Town	Fuel	Summer Rating	Winter Rating
Lyme Hydro	Lyme Hydro	Lyme	Hydro	0.01	0.01
List	Vera List		Solar	0.03	0.03
Mainstream Inc.	Mainstream Inc.	Essex	Hydro	0.01	0.01
McCann Mfg. Co.	McCann Mfg. Co.	Sterling	Hydro	0.06	0.06
New Haven JCC	New Haven JCC	Woodbridge	Gas	0.06	0.06
Norwalk Hospital	Norwalk Hospital	Norwalk	Gas	2.36	2.36
Norwich Occum	CMEEC	Norwich	Hydro	0.53	0.53
Norwich State Hospital	Norwich State Hospital	Norwich	Oil	2.00	2.00
Notre Dame Convalescent	Notre Dame Convalescent	Norwalk	Propane	0.03	0.03
Nova Metal Finishing	Nova Metal Finishing	Waterbury	Gas	0.04	0.04
Pfizer (consist of five units)	Pfizer	Groton	Oil	29.50	29.50
Pratt & Whitney	UTC	E. Hartford	Gas	23.80	23.80
Pratt & Whitney	UTC	Middletown	Gas	1.00	1.00
Rawson Mfg. Co.	Rawson Mfg. Co.	Thompson	Hydro	0.02	0.02
S CT Reg. Water Auth.	S CT Reg. Water Auth.	North Branford	Hydro	0.30	0.30
Sheraton	Sheraton	Waterbury	Gas	0.15	0.15
Smurfit-Stone Container Co.	Smurfit-Stone Container Co.	Montville	Refuse	2.00	2.00
Southbury Training School	State of Connecticut	Southbury	Oil/Gas	1.50	1.50
Southern CT Gas Co.	Southern CT Gas Co.	Milford	Gas	0.90	0.90
Sprague Paper Board	Carol Starr	Sprague	Gas	9.00	9.00
Sycamore Place	Sycamore Place	Bridgeport	Gas	0.04	0.04
Town of Manchester	Town of Manchester	Manchester	Methane	0.13	0.13
Town of Winchester	Town of Winchester	Winchester	Gas	0.60	0.60
Vernon Manor	Vernon Manor	Vernon	Gas	0.60	0.60
Westport YMCA	Westport YMCA	Westport	Gas	0.06	0.06
Yoreo	David Yoreo		Solar	0.01	0.01
	Generation retained by facility			104.55	104.552
	Total MWs of generation in Connecticut.			7212.85	7737.96

Appendix B
State of Connecticut
Existing Energy Infrastructure



Appendix C
Planned Transmission Lines in Connecticut

Transmission Line	Length (miles)	Voltage (kV)	Planned Date of Completion
Baird S/S, Bridgeport - Congress Street S/S, Bridgeport (increase conductor clearance)	2.3	115	2003
Glenbrook S/S, Stamford-Glenbrook Jct., Stamford (new)	0.1	115	2004
Frost Bridge S/S, Watertown - Campville S/S, Harwinton (rebuild)	10.3	115	2005
Manchester S/S, Manchester ñ Wapping Jct., South Windsor (rebuild)	5.1	115	2005
Norwalk Jct., Norwalk ñ Norwalk S/S, Norwalk (reconfigure 1637/1720 lines) (approved in Council Docket No. 217)	7.2	115	2005
Pequonnock S/S, Bridgeport - Seaview Tap, Bridgeport (maintain conductor ratings)	1.4	115	2005
Plumtree S/S, Bethel ñ Norwalk S/S, Norwalk (reconfigure 1470/1565 lines) (approved in Council Docket No. 217)	20	115	2005
Norwalk Harbor Station, Norwalk - Northport Station, Northport, N.Y. (replace)(approved in Council Docket No. 224)	5.8	138	2005
Plumtree S/S, Bethel ñ Norwalk S/S, Norwalk (new) (approved in Council Docket No. 217)	20	345	2005
Ledyard Jct., Ledyard - Buddington S/S (CMEEC), Groton (upgrade)	2.9	69 to 115	2005
Ledyard Jct., Ledyard - Gales Ferry S/S, Ledyard (upgrade)	1.6	69 to 115	2005
Montville Station, Montville - Gales Ferry S/S, Ledyard (upgrade)	2.4	69 to 115	2005
Tunnel S/S, Preston - Ledyard Jct., Ledyard (rebuild & upgrade)	8.5	69 to 115	2005
Manchester S/S, Manchester - Hopewell S/S, Glastonbury (rebuild)	7	115	2006
Plumtree S/S, Bethel - Middle River S/S, Danbury (new)	5.4	115	2006
Plumtree S/S, Bethel - Middle River S/S, Danbury (new)	1.8	115	2006
Wapping Jct., South Windsor - Barbour Hill S/S, South Windsor (rebuild)	2.4	115	2006
Devon S/S, Milford - Cook Hill Jct., Cheshire #1640 line (rebuild)	23.8	115	2007
Devon S/S, Milford - Deveon Switching Station, Milford (rebuild)	0.2	115	2007
Devon S/S, Milford - Devon Switching Station, Milford (rebuild)	0.2	115	2007
Devon S/S, Milford - June Street, Woodbridge, #1685 line (rebuild)	13.3	115	2007
Devon S/S, Milford - Trumbull Jct., Trumbull (rebuild)	3.1	115	2007
East Devon S/S, Milford - Devon S/S, Milford (new)	2.2	115	2007
East Meriden S/S, Meriden - Oxbow Jct., Haddam (unbundle)	7.1	115	2007
June Street, Woodbridge, - Cook Hill Jct., Cheshire #1620 line (rebuild)	10.5	115	2007
Norwalk Harbor Station, Norwalk - Glenbrook S/S, Stamford (new)	7	115	2007
Trumbull Jct., Trumbull - Norwalk S/S, Norwalk (new)	15.9	115	2007
Trumbull Junction, Trumbull - Devon S/S, Milford (rebuild)	3.1	115	2007
Beseck Jct., Wallingford,- East Devon S/S, Milford (new)	32.6	345	2007
Black Pond Jct., Middlefield-Beseck Jct, Wallingford (new switchyard)	5.8	345	2007
East Devon S/S, Milford - Singer S/S, Bridgeport (new substations and line)	3.1	345	2007
Norwalk S/S, Norwalk - Glaenbrook S/S, Stamford (new)	8.5	345	2007
Oxbow Jct., Haddam - Beseck Jct., Wallingford (new swtichyard and line)	2.6	345	2007
Scovill Rock S/S, Middletown-Chestnut Jct., Middletown (new)	2.6	345	2007
Singer S/S, Bridgeport - Norwalk S/S, Norwalk (new susbstation and line)	18.9	345	2007
Card S/S, Lebanon - Wawacus Jct., Bozrah (rebuild)	12.7	115	2008
Farmington S/S, Farmington - Newington S/S, Newington (rebuild)	3.6	115	2008
Frost Bridge S/S, Watertown - Walnut Jct, Thomaston (new)	6.4	115	2008
Colony S/S , Wallingford - N. Wallingford S/S (CMEEC) (unbundle)	2.4	115	2009
Schwab Jct., Wallingford - Colony S/S (CMEEC), Wallingford (unbundle)	1.5	115	2009
Southington S/S, Southington - Schwab Jct., Wallingford (unbundle/rebuild)	6.3	115	2009
Card S/S, Lebanon - Lake Road Station, Killingly (new)	29	345	2009
Lake Road Station, Killingly - Sherman Road S/S, Rhode Island (National Grid)(new)	7.5	345	2009
Grand Avenue S/S, New Haven - West River S/S, New Haven (upgrade)	2.6	115	Beyond Ten year Horizon
Milvon S/S, Milford to Devonn Tie S/S, Milford (reconductoring)	1.4	115	Beyond Ten year Horizon