2007 Forecast of Loads and Resources

for the Period 2007-2016

The Connecticut Light & Power Company

March 1, 2007

Connecticut Light & Power

The Northeast Utilities System

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EXECUTIVE SUMMARY

A Continuing Responsibility to Ensure Electric Delivery System Reliability

The Connecticut Light and Power Company ("CL&P" or "the Company") serves more than 1.1 million customers in Connecticut. CL&P's primary responsibility is to provide safe and reliable electric delivery service to our customers. In order to ensure reliable electric service, CL&P monitors system loads and plans delivery system modifications and upgrades needed to meet its expected load growth.

This report focuses primarily on the high voltage electric transmission system. Transmission systems transport power from major generation sites to the "neighborhood" systems that distribute power to residences, businesses, and communities. In the past, CL&P managed all four of the elements that impact electric service reliability – generation, transmission, distribution and demand side management. However, with the advent of the restructuring of Connecticut's electric industry, CL&P no longer manages where and when generation is built.

CL&P's transmission system plays an important role in ensuring electric service reliability, and it must be robust enough to accommodate an ever-changing wholesale generation market. This transmission system also plays a critical supporting role in the economic growth of Connecticut by providing access to diverse and competitively-priced electrical energy resources. It is the crucial link between merchant power generation and Connecticut consumers.

Since the advent of restructuring, power-supply costs have risen significantly due largely to fuel prices, but also due to federally mandated charges which are in part due to insufficient transmission ties within Connecticut and between Connecticut and the rest of the New England power grid. CL&P is investing in Connecticut's future by strengthening the regional transmission infrastructure that will enhance system reliability and promote competitive wholesale generation markets.

Connecticut Faces Challenges on Three Fronts

From a forecast of loads and resources perspective, CL&P foresees that electric service reliability is facing challenges along three fronts over the next ten years:

- managing load growth
- adding generation to meet rising demand and compensate for plant retirements
- increasing transmission capability to ensure reliability and access to competitive supply, including renewable energy resources.

Highlights of the challenges for each of these three fronts follow.

Managing Load Growth

Challenges

- Although customers are reacting to higher energy prices by reducing their overall consumption, peak demand for electricity continues to grow.
- Despite investing over $600 million in conservation measures over the last 10 years, Connecticut's peak load, normalized for weather, has grown by over 25 percent.
- Last summer, Connecticut set a new record for peak electric demand -- approximately 7,367 MWs as reported by the Independent System Operator of New England ("ISO-NE")

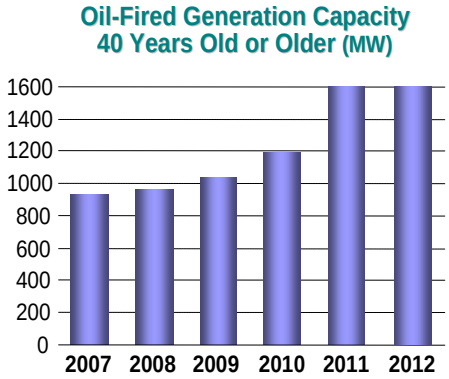
Solutions

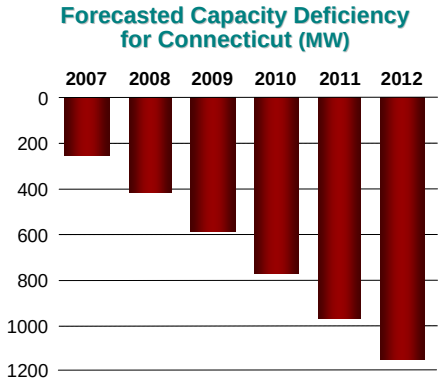
- Continue, expand, and focus energy efficiency and demand response programs -- with a strong focus toward efforts in southwest Connecticut.
- Pursue demand response programs that can cost-effectively reduce system peaks.

Adding Generation to Meet Rising Demand and Compensate for Plant Retirements

Challenges

- Connecticut's native generation resources are aging and increasingly insufficient for serving the state's needs, and there is the potential that the limited expansion on the horizon will only displace current resources.
- Connecticut faces the potential retirements of some older generating plants. Connecticut currently has 942 megawatts ("MWs") of 40-year-old oil-fired generating capacity -- projected to reach 1,613 MWs in 2012.
- Several plants are environmentally and economically challenged, but high-cost and high-emission generation cannot be retired until adequate reinforcements are constructed, as evidenced by their Reliability-Must-Run ("RMR") contracts.
- Resource limitations could lead to emergency system operation under times of high customer demand for electricity, including load shedding.
- In its 2006 Regional System Plan ("RSP06"), ISO-NE forecasts Connecticut will have a generation capacity deficiency of 1,154 MWs in 2012 – assuming no new plants and no retirements of existing generation.
- With 1,613 MWs of potential retirements, by 2012, Connecticut's total capacity deficiency could grow to 2,767 MWs – or over 30% of Connecticut's peak load.
- Connecticut's legal mandates for renewable energy are rising, but much of the region's planned renewable energy is in northern New England and eastern Canada.





Solutions

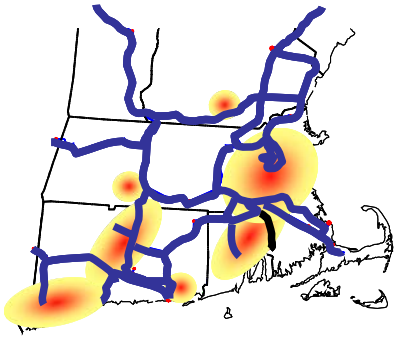
- Develop fuel-efficient, fast-start, and diverse generation resources, including customer-side, merchant and utility-side.
- Develop and implement an energy-supply plan that can efficiently address Connecticut's needs in terms of generation types, fuel diversity and location with more local control. Coupled with energy and demand-response programs, this will secure an effective mix of resources that will benefit Connecticut consumers.
- Develop renewable energy resources in keeping with the Connecticut's 2007 State Energy Plan.

Increasing Transmission Capability to Ensure Reliability and Market Access

Challenges

- Transmission infrastructure, historically built to serve customer load from utility-owned generation within a limited geographic area, must be upgraded to serve the same customer load reliably from remote merchant generation.
- Power flows instantaneously across the system without regard to state boundaries. The system is connected throughout New England and with New York and Canada. This broader base for the power grid gives each state an added measure of reliability and shared vulnerabilities.
- Mandatory reliability standards managed by the North American Electric Reliability Council ("NERC") and overseen by the Federal Energy Regulatory Commission ("FERC") as a result of the Energy Policy Act of 2005 provide for severe financial penalties of up to $1 million per day for each non-compliance occurrence.

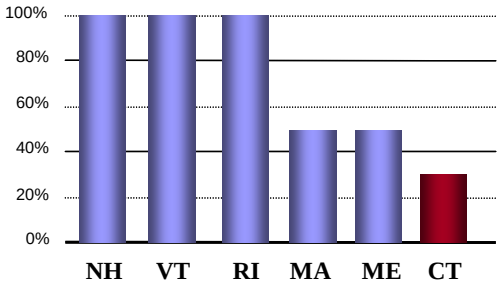
New England's 345-kV Transmission Lines and Major Load Centers



- ISO-NE has responsibility to meet reliability standards set by NERC and the Northeast Power Coordination Council ("NPCC") for planning and operating the New England grid. CL&P's planning and operations must also meet federal reliability standards and the reliability requirements of the ISO-NE.

- Among New England states, Connecticut is the least able to serve peak load using power imports.
- Connecticut imports are limited by its transmission system to 2,500 MWs – about 30% of the state's peak load.
- Consequently, at least 70% of the electricity needed to serve customer peak demand must be generated in Connecticut.
- Following the upgrades associated with the New England East-West Solution projects (see page 6), the Connecticut power import capability is projected to increase to almost 45% of the state's peak load.

Percentage of Peak Load that Could Be Served by Transmission Imports

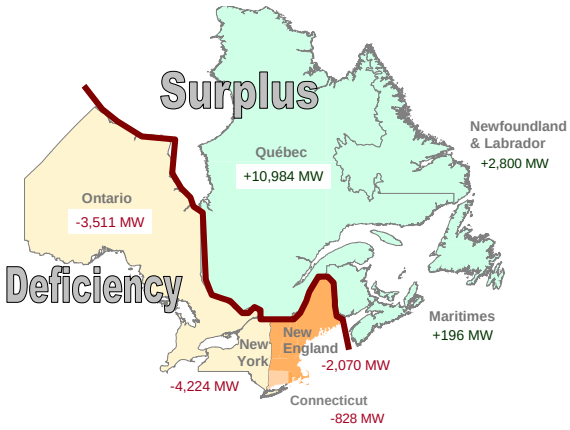


Note: Chart uses approximate values based on known interface limits.

Challenges (continued)

- Transmission has an essential role to play in providing access to renewable energy.
- Renewable resources like wind and hydro power will likely not be sited close to load centers, so transmission will be needed to move this power to the load.
- The prospect of transporting renewable energy from northern New England and Canada is particularly promising.
- Long-term forecasts show surplus summer generation in the eastern provinces of Canada and insufficient generation in Ontario, New York, and New England.

Projected Capacity Surplus/Deficiency in 2014



Source: ISO-NE RSP05, using 50/50 loads

- In 2004, the Connecticut legislature passed a law requiring that 345-kilovolt ("kV") transmission lines (the voltage used for New England's transmission backbone) be built underground under certain conditions – unless it is not technically feasible.
- Because underground systems are significantly more complex than overhead, this requirement delays how promptly transmission solutions can be built and adds to the cost borne by Connecticut customers.
- In September of 2006, ISO-NE determined that $117 million of the $357 million estimated for the Bethel-Norwalk Project would be borne solely by Connecticut and not allocated across New England because a feasible and practical all-overhead alternative had not been used.

- As the Connecticut Siting Council knows, the electrical characteristics and other attributes of underground transmission cable systems, in comparison to overhead lines, make underground lines difficult to incorporate within the existing transmission system, especially at voltages of 345-kV and higher. Underground lines create system operation and reliability issues that can be difficult and expensive to manage.

Solutions

- Connecticut needs to continue to site and build needed electric transmission infrastructure, to remove bottlenecks addressing both reliability needs and the needs of a robust competitive wholesale generation market.
- ISO-NE's RSP06 identified five key reliability concerns – including Connecticut's power import limitations -- in the part of New England's transmission systems that Connecticut shares with Massachusetts and Rhode Island.
- In December 2006, ISO-NE presented to the regional Planning Advisory Committee results of an extensive planning study that identified the possible electrical solutions for addressing these reliability concerns.
- Northeast Utilities and National Grid, the two owners of the transmission facilities affected by the planning, also presented a set of four major reliability concept projects that can work together to solve the five reliability concerns.

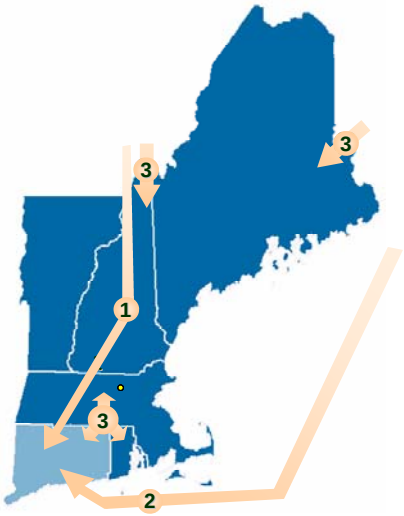
- Collectively, these four concept projects are being referred to as the New England East-West Solution ("NEEWS") and are moving into the project design phase in 2007.

- Conceptually, there are three possible paths for getting Canadian power to Connecticut:

  Option 1: Build new transmission lines over land direct from Canada to Connecticut.

  Option 2: Build new transmission lines through the sea direct from Canada to Connecticut.

  Option 3: Import more power into New England and strengthen Connecticut's ties with New England by building the NEEWS projects.



- Strengthening Connecticut's transmission interconnection with the rest of New England will give the state the opportunity to share in the region's access to Canada's projected surplus summer power.
- Northern New England transmission facilities would also likely need to be reinforced to accommodate additional imports.

Chapter 1: INTRODUCTION

1.1 Report Overview

In this report, CL&P presents and discusses:

- the forecast of electric energy and peak demand
- conservation and load management
- national and regional transmission reliability standards
- regional transmission planning process under the ISO-NE
- load areas of Connecticut currently under transmission system reliability evaluation.

CL&P also presents tables listing proposed additions and upgrades to its transmission system through the forecast period.

1.2 Key Issue – Reliability of the New England Electric Power System

ISO-NE's RSP06 identified several transmission bottlenecks in the New England transmission system.

In December 2006, ISO-NE presented the results of a major study of the southern New England transmission grid to determine the electrical solutions that best address the multitude of reliability concerns for these areas. Transmission planners from Northeast Utilities and National Grid participated in the ISO-NE study. The proposed electrical solutions include the addition of new 345-kV and 115-kV transmission lines in Massachusetts, Connecticut and Rhode Island. Some existing 115-kV transmission lines would also be upgraded. At this time, Northeast Utilities and National Grid expect to begin filing siting applications for the projects in 2008. To the extent that reliability concerns involve inter-state transmission, the solutions will likely require some level of siting collaboration among the states.

Chapter 2: FORECAST OF LOADS AND RESOURCES

Chapter Highlights

- The CL&P system load continues to set new peaks despite rising energy costs and nationally-recognized energy efficiency programs.
- While CL&P uses its own Reference Plan Forecast for financial forecasting, the Company uses ISO-NE's load forecast for transmission planning purposes.
- Connecticut's reserve capacity is dwindling.

2.1 Electric Energy and Peak-Demand Forecast

The forecast contained in this chapter is based on the Company's budget forecast which was prepared in October 2006. Although this forecast is used for CL&P's financial planning, it is important to note that it is not used for transmission planning. ISO-NE has responsibility for regional transmission planning and independently develops its own forecast which is used by CL&P for its transmission planning.

The Reference Plan is based on the total franchise area that CL&P serves. As a delivery company, changes in market share due to industry restructuring are irrelevant and are therefore not factored into this forecast. The forecast excludes wholesale sales for resale and bulk power sales. Furthermore, this forecast includes the conservation and load management ("C&LM") program savings projections that were developed last year for the Company's budget forecast, and does not include the updated C&LM savings projections that are shown in Chapter 3 of this report. However the differences between the two C&LM projections are not significant.

2.1.1 Reference Plan Forecast

CL&P's Reference Plan Forecast contains the results of the end-use models by customer class, adjusted for CL&P's forecasted C&LM and economic development programs. It also includes projected reductions resulting from distributed generation ("DG") projects in accordance with Public Act 05-01, June Special Session, *An Act Concerning Energy Independence* ("PA 05-01"). It does not include reductions due to ISO-NE's load response program.

The Reference Plan assumes:

- normal weather based on a thirty-year average (i.e., 1972-2001) of heating and cooling degree days and a reference case economic forecast
- continued funding for new C&LM and economic development programs throughout the forecast period
- modest assumptions about losses resulting from new DG projects.

When this forecast was being developed, the process of applying for monetary grants in accordance with PA 05-01 had just begun. While many customers had expressed an interest in DG, it was unknown how many would apply for grants and actually install DG equipment. Thus, it was not possible to tally up energy and peak demand reductions expected for particular customers. Instead, it was assumed that a percentage of potential energy and peak demand reductions would actually occur.

The Reference Plan Forecast projects a weather-normalized compound annual growth rate in total electrical energy output requirements of 0.9 percent for CL&P between 2007 and 2016.

Without the Company's C&LM programs, the forecasted growth rate would be 1.6 percent. The normalized growth rate in summer-peak demand in the Reference Plan Forecast is forecasted to be 1.9 percent. Similarly, if the C&LM programs were excluded, the forecasted growth rate would be 2.6 percent.

Table 2-1 provides historic output and summer peaks, normalized for weather, for the 2002-2006 period, and forecast output and peaks for the 2007-2016 period. The peak-load forecast is the maximum sum of the hourly forecasts of load for each customer class, company use and associated losses. The sum of the class hourly loads for each year, company use and associated losses is the annual forecast of system electrical energy requirements or output. This is the amount of energy which must be supplied by generating plants to serve the loads on the distribution system.

The Reference Plan Forecast, as a 50/50 forecast, assumes normal weather throughout the year, with normal peak-producing weather episodes in each season. The forecasted mean daily temperature for the summer peak day is 83º Fahrenheit ("ºF") and is based on the average peak-day temperatures from 1972-2001.

The historical peak-day mean temperatures range from 76º F to 88º F with deviations from the average peak-day temperatures being random, recurring and unpredictable occurrences. For example, the lowest peak-day mean temperature occurred in 2000, while the highest occurred in 2001. This variability of peak-producing weather means that over the forecast period there will be years when the actual peaks will be significantly above or below forecasted peaks.

2.1.2 Forecast Scenarios

Table 2-1 also contains scenarios demonstrating the variability of peak-load data around the 50/50 peak forecast due to weather. The high load scenario roughly corresponds conceptually to ISO-NE's 90/10 forecast, described below. The table shows that weather has a significant impact on the peak-load forecast with variability of up to 10 percent, or approximately 600 MWs, above and below the 50/50 forecast, which is based on normal weather.

To illustrate, the 2016 summer peak forecast reflecting average peak-producing weather is 6,111 MWs. However, either extremely mild or extremely hot weather could result in a range of potential peak loads from 5,529 MWs to 6,743 MWs. This 1,214 MWs of variation, which is a band of about plus or minus 10 percent around the average, demonstrates the potential impact of weather alone on forecasted summer-peak demand.

Extremely hot weather is unpredictable, yet the impact is immediate. A hot day in the first year of the forecast that matches the extreme peak day weather in 2001 could produce peak-load demand greater than that forecasted for the sixth year under normal weather assumptions. Even a moderately hot day such as experienced on the 2005 peak-load day could increase peak demand by approximately 200 MWs.

Table 2-1: CL&P 2007 Reference Plan Forecast Summer Peak

	Net Electrical Energy Output Requirements		Reference Plan (50/50 Case)			Extreme Hot Scenario			Extreme Cool Scenario		
Year	Output GWH	Annual Change (%)	Peak MW	Annual Change (%)	Load Factor (2)	Peak MW	Annual Change (%)	Load Factor (2)	Peak MW	Annual Change (%)	Load Factor (2)
HISTORY											
2002	24880		5183		0.548						
2003	25190	1.2%	4980	-3.9%	0.577						
2004	25496	1.2%	4818	-3.3%	0.602						
2005	26119	2.4%	5402	12.1%	0.552						
2006	24871	-4.8%	5512	2.0%	0.515						
Compound Rates of Growth (2002-2006)											
	0.0%		1.5%								
HISTORY NORMALIZED FOR WEATHER											
2002	24806		4988		0.568						
2003	25077	1.1%	5092	2.1%	0.562						
2004	25578	2.0%	5020	-1.4%	0.580						
2005	25498	-0.3%	5277	5.1%	0.552						
2006	24926	-2.2%	5084	-3.7%	0.560						
Compound Rates of Growth (2002-2006)											
	0.1%		0.5%								
FORECAST											
2007	25320	1.6%	5257	3.4%	0.550	5735	12.8%	0.504	4804	-5.5%	0.602
2008	25613	1.2%	5359	2.0%	0.544	5855	2.1%	0.498	4893	1.8%	0.596
2009	25847	0.9%	5443	1.6%	0.542	5955	1.7%	0.495	4961	1.4%	0.595
2010	26090	0.9%	5541	1.8%	0.537	6071	1.9%	0.491	5046	1.7%	0.590
2011	26322	0.9%	5630	1.6%	0.534	6176	1.7%	0.486	5120	1.5%	0.587
2012	26580	1.0%	5728	1.7%	0.528	6291	1.9%	0.481	5203	1.6%	0.582
2013	26694	0.4%	5853	2.2%	0.521	6434	2.3%	0.474	5314	2.1%	0.573
2014	26874	0.7%	5916	1.1%	0.519	6514	1.2%	0.471	5363	0.9%	0.572
2015	27049	0.7%	5988	1.2%	0.516	6603	1.4%	0.468	5420	1.1%	0.570
2016	27290	0.9%	6111	2.1%	0.508	6743	2.1%	0.461	5529	2.0%	0.562
Compound Rates of Growth (2006-2016)											
	0.9%		1.0%			2.0%			0.0%		
Normalized Compound Rates of Growth (2006-2016)											
	0.9%		1.9%			2.9%			0.8%		

1. Sales plus losses and company use.
2. Load Factor = Output (MWH) / (8760 Hours X Season Peak (MW)).

Forecasted Reference Plan Peaks are based on normal peak day weather (83º mean daily temperature). Forecasted High Peaks are based on the weather that occurred on the 2001 peak day (88º mean daily temperature). Forecasted Low Peaks are based on the weather that occurred on the 2000 peak day (76º mean daily temperature).

2.1.3 ISO-NE Demand Forecasts

ISO-NE independently develops annual forecasts of peak loads for each New England state. The forecast used for transmission planning studies is a 90/10 forecast which means that the actual peak load has a 10 percent chance of exceeding the forecasted load level and a 90 percent chance of falling below the forecasted load level.

ISO-NE uses this 90/10 demand forecast philosophy to develop its transmission plans because this planning approach results in greater certainty of providing reliable service under severe weather conditions.

2.2 Resources: Existing and Planned Generation Supply

CL&P no longer owns any in-state generation resources; however, the Company continues to purchase generation under a number of power-purchase agreements, including an entitlement in Vermont Yankee. CL&P also purchases generation under Rate 980 from a number of facilities whenever they choose to sell. In both cases, CL&P sells the energy into the wholesale market or uses the energy to reduce loads.

It should be noted that CL&P no longer owns generation and is not serving load with its own resources as a result of electric industry restructuring in Connecticut.

Per Connecticut General Statute Section 16-244c, by July 1, 2008, CL&P and United Illuminating ("UI") are required to submit power contracts totaling at least 100 MWs of Class I renewable energy source projects to the Department of Public Utility Control ("DPUC") for approval.

2.2.1 Capacity Forecast

The capacity tables in this chapter provide estimates of CL&P's supply resources at present or during the 2007-2016 forecast period. All resources have winter and summer ratings in MWs to reflect the effects of varying seasonal conditions, such as the effect that ambient air and water temperatures have on thermal unit ratings. Winter ratings are used in assessing CL&P's capacity situation relative to winter-peak demand, and summer ratings are used in assessing its capacity situation relative to summer-peak demand.

2.2.2 Existing Supply Resources

Table 2-2 lists existing supply resources in which CL&P has ownership or entitlement interests for Winter 2006/2007 and Summer 2007. The entitlement percentage for Vermont Yankee has been adjusted to reflect the recently completed up-rating work.

This table lists CL&P's supply resources based on ownership or entitlement, arranged by: Base Load, Intermediate, Peaking, Pumped Storage, Hydroelectric, and Purchases categories.

Table 2-2

Generating Facilities in Which CL&P Has Ownership or Entitlement By Category

	Winter Rating (MW) 2006/07	Summer Rating (MW) 2007	Year Installed	Location	CL&P's Percent Entitlement
Base Load					
Vermont Yankee	48.98	48.98	1972	Vernon, VT	7.897
Nuclear Subtotal	48.98	48.98			
Intermediate	0.00	0.00			
Peaking	0.00	0.00			
Pumped Storage	0.00	0.00			
Hydroelectric	0.00	0.00			
Purchases					
System	45.00	45.00			
Non-Utility	349.07	336.03			
Purchase Subtotal	394.07	381.03			
TOTAL GENERATION	443.05	430.01			

Base-load units are typically operated around the clock, intermediate units are those used to supply additional load required over a substantial part of the day, and peaking units supply power usually during the hours of highest demand. On occasion, some of the more efficient intermediate units operate as base-load units, while others may be called upon to operate as peaking capacity. Accordingly, these categories are intended to be generally descriptive rather than definitive, and reflect past operating patterns.

2.2.3 Planned Generation Resource Additions, Deactivations or Retirements

CL&P has nothing to report on planned additions, deactivations or retirements of CL&P owned generating resources.

2.2.4 Ten Year Capacity Forecast

Tables 2-3 and 2-4 summarize the ten-year capacity situation for CL&P during the summer and winter peak periods of 2007 through 2016. The tables show CL&P's reserve margin expressed in MWs.

Table 2-3

2007-2016 Summer Forecast of Capacity (MW) at the Time of Summer Peak

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Supply Before Sales or Exchanges	430.01	430.01	378.66	340.66	340.66	287.95	238.97	225.77	44.77	41.77
Capacity Sales	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Generation Available	430.01	430.01	378.66	340.66	340.66	287.95	238.97	225.77	44.77	41.77
Reserve	430.01	430.01	378.66	340.66	340.66	287.95	238.97	225.77	44.77	41.77

Table 2-4

2006/7-2015/16 Winter Forecast of Capacity (MW) at the Time of Winter Peak

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Supply Before Sales or Exchanges	443.05	443.04	398.04	391.14	352.14	352.14	243.49	243.49	230.75	48.60
Capacity Sales	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Generation Available	443.05	443.04	398.04	391.14	352.14	352.14	243.49	243.49	230.75	48.60
Reserve	443.05	443.04	398.04	391.14	352.14	352.14	243.49	243.49	230.75	48.60

Supply before sales or exchanges is made up of supply resources in which CL&P has ownership or entitlement interest as summarized in Tables 2-3 and 2-4, including purchases.

Capacity sales are unit or system power sales that result in a transfer of capacity from CL&P to the purchaser.

Net generation available is the sum of the foregoing categories.

Reserve is the difference between Net Generation Available and the Estimated Peak Load. Since CL&P no longer serves load with its own resources, reserve equals net generation available.

2.2.5 Resource Purchases

Table 2-5 provides a listing of CL&P's contracted entitlements in existing cogeneration and small power production facilities of 1 MW and greater located in Connecticut from which CL&P purchased power in 2006. The winter and summer claimed capacity of the generation at each production facility is provided.

TABLE 2-5

EXISTING CUSTOMER OWNED FACILITIES 1 MW AND ABOVE
PROVIDING GENERATION TO THE CONNECTICUT LIGHT AND POWER SYSTEM

EXISTING & PROVIDED GENERATION TO CL&P DURING 2006

Project Name	Location	(1) Facility Type	Fuel Source	By-Product of Fuel Consumption	Estimated Capacity kW	Max Claimed Capability Winter	Max Claimed Capability Summer
FACILITIES UNDER LONG TERM CONTRACT (2)							
AES	Montville, CT	COGEN	Coal	Steam	181,000	182,150	181,000
Algonquin(Dexter)	Windsor Locks, CT	COGEN	Gas	Steam	39,000	39,000	38,000
Derby Dam	Shelton, CT	SPP	Hydro	-	6,900	7,050	7,050
Goodwin Dam	Hartland, CT	SPP	Hydro	-	3,294	3,000	3,000
Colebrook	Colebrook, CT	SPP	Hydro	-	3,000	1,550	1,550
Quinebaug	Danielson, CT	SPP	Hydro	-	2,161	1,298	307
Kinneytown B	Seymour, CT	SPP	Hydro	-	1,500	1,510	654
Mid-CT CRRA(So. Meadow 5/6)	Hartford, CT	SPP	Refuse	-	67,000	59,675	52,709
Preston (SCRRRA)	Preston, CT	SPP	Refuse	-	13,850	16,848	16,011
Bristol RRF	Bristol, CT	SPP	Refuse	-	13,200	12,736	13,200
Lisbon	Lisbon, CT	SPP	Refuse	-	13,500	13,036	12,961
Wallingford RRF	Wallingford, CT	SPP	Refuse	-	7,100	6,900	6,350
Hartford Landfill	Hartford, CT	SPP	Methane	-	2,445	2,368	2,368
					353,950	**347,121**	**335,160**
FACILITIES NOT UNDER LONG TERM CONTRACT (3)							
Pratt & Whitney	E. Hartford, CT	COGEN	Gas	Steam	23,800	N/A	N/A
Rainbow (Farmington River Power)	Windsor, CT	SPP	Hydro	-	8,200	8,200	8,200
Ten Co./The Energy Network	Hartford,CT	COGEN	Gas	Steam	4,500	N/A	N/A
Wyre Wynd	Jewett City, CT	SPP	Hydro	-	2,780	2,780	1,297
WM Renewable	New Milford,CT	SPP	Methane	-	2,009	2,009	2,009
					41,289	**12,989**	**11,506**
				TOTAL EXISTING	**395,239**	**360,110**	**346,666**

(1) "SPP" Denotes a Small Power Producer, "COGEN" Denotes a Cogenerator.
(2) Estimated Capacity Represents Contracted Capacity.
(3) Estimated Capacity Represents Estimated Installed Capacity.

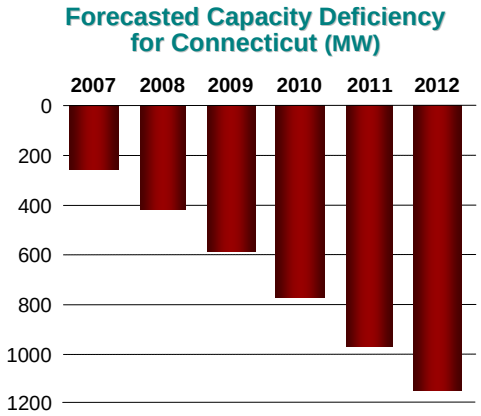
2.3 Generation Capacity Concerns

Although CL&P no longer owns or operates generation, it continues to have a responsibility to ensure the reliability of the electric system to deliver power to customers. CL&P has fundamental concerns about Connecticut's generation capacity.

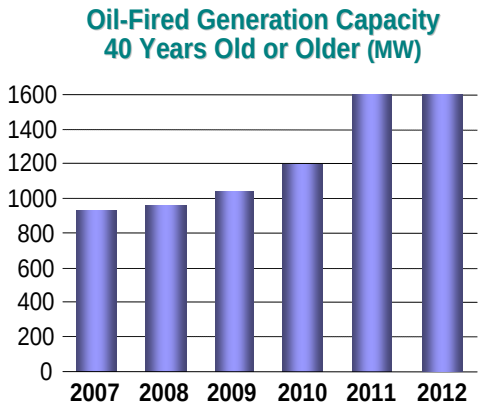
Connecticut's Generation Is Increasingly Inadequate

ISO-NE forecasts that Connecticut will have a capacity deficiency of 1,154 MWs in 2012 – assuming no new power plants and no retirements of existing generation.

Resource limitations could lead to emergency system operation under times of high customer demands for electricity.



Connecticut's Generation Is Growing Older



Connecticut faces the potential retirements of some older generating plants.

Several plants are environmentally and economically challenged, as evidenced by RMR contracts.

Connecticut currently has 942 MWs of 40-year-old oil-fired capacity, projected to reach 1,613 MWs in 2012.

With 1,613 MWs of potential retirements, by 2012 the 1,154 MWs of Connecticut capacity deficiency could grow to 2,767 MWs.

These factors, when combined with the state's limited ability to import power by means of transmission, constitute a growing threat to system reliability.

Chapter 3: CONSERVATION AND LOAD MANAGEMENT

Chapter Highlights

- CL&P is collaborating with others in the development of nationally-recognized C&LM programs.
- C&LM programs have been specifically targeted in southwest Connecticut ("SWCT") to help reduce customer demand for electricity.
- C&LM programs are most effective in reducing energy usage when they receive stable and consistent funding.

The C&LM Plan for 2007 ("Plan") was filed with the DPUC on October 2, 2006. A product of close collaboration between CL&P and UI, (together "the Companies") and the Energy Conservation Management Board ("ECMB"), the Plan was submitted to the DPUC in Docket 06-10-02, *DPUC Review of the CL&P and UI C&LM Plan for 2007and 2008*. The Plan received input from members of the public, industry groups and private enterprise, and was given final approval by the ECMB in September 2006. CL&P's budget in the 2007 Plan is $56.6 million.

As a result of PA 05-01, noted previously, the DPUC opened Docket 05-07-14PH01, *DPUC Investigation to Reduce Federally Mandated Congestion Charges*. The Companies and the ECMB proposed continuing the 2006 PA 05-01 near-term measures for 2007 and will be spending an additional $20.5 million to implement energy efficiency and demand-response programs focused on reducing federally mandated congestion charges ("FMCCs"). With the inclusion of PA 05-01 derived C&LM funding, CL&P will spend approximately $77.1 million on C&LM programs in 2007.

Beginning in the summer of 2002, CL&P has taken specific actions in response to potential electricity shortages in SWCT. Energy efficiency activities in 2007 will continue to focus on, and support, that critical area. However, these activities, and any additional programs, are dependent upon continued stable funding. These activities target all fifty-four towns of SWCT, especially the ten priority towns served by CL&P in the Norwalk-Stamford sub-area. Included in CL&P's projections are the savings from its filed Plan that include the additional C&LM programs resulting from the PA 05-01.

Over the years, CL&P's C&LM programs have led the energy-efficiency industry. Many of these programs have received national recognition. In October 2005, the American Council for an Energy Efficient Economy ("ACEEE") rated Connecticut number one in the United States for energy saved as a percentage of electric sales. The United States Environmental Protection Agency ("EPA") honored the Northeast Energy Efficiency Partnership ("NEEP") and its sponsors, including CL&P, with an ENERGY STAR® Sustained Excellence 2006 Award for its continued leadership in protecting the environment through energy efficiency. The EPA also honored CL&P with a 2006 ENERGY STAR Homes award for its 2005 Residential New Construction program's successes.

However, even with the success of its C&LM programs, Connecticut is facing energy challenges which continue to threaten the state's economy and quality of life.

While C&LM will be a key part of resolving Connecticut's energy issues, new generation and additional transmission resources will be required.

3.1 Current Conservation & Load Management Programs

Table 3-1 summarizes the projected peak impacts from CL&P's C&LM program activity over the forecast period 2007-2016 based on current funding levels outlined in the beginning of this chapter. These peak-load reductions reflect the direct impact of both historical and planned program activity over the ten-year period beginning in 2007 and include the impacts of PA 05-01-funded C&LM initiatives.

TABLE 3-1

CL&P-SPONSORED C&LM PEAK LOAD MW IMPACTS

SUMMER IMPACT			
	Impact of Current Forecast	**Impact of Prior Activity**	**Total Summer Impact**
2007	143	546	689
2008	176	475	651
2009	209	451	660
2010	242	436	678
2011	275	406	681
2012	307	366	674
2013	340	329	669
2014	369	309	678
2015	397	262	659
2016	426	230	656

WINTER IMPACT			
	Impact of Current Forecast	**Impact of Prior Activity**	**Total Winter Impact**
2007	145	589	734
2008	185	529	714
2009	224	507	732
2010	264	488	752
2011	304	465	768
2012	343	408	751
2013	382	308	690
2014	403	272	674
2015	422	214	636
2016	440	176	616

Note: Totals may vary due to rounding

The 'Impact of the Current Forecast' columns included in the tables above reflect C&LM program activity for the period 2007 - 2016, based on the proposed level of funding described in Section A.

Many factors could affect the level of savings that actually occur in the forecast period, including changes in available funding, changes in the energy consumption of CL&P customers, or changes in the economic climate.

3.2 Ten-Year C&LM Forecast

Table 3-2 presents the potential annual energy savings and summer and winter peak-load reductions forecasted for the C&LM programs implemented in the CL&P service territory for the program budgets described in the beginning of Chapter 3. Table 3-2 also reflects ten years of projected program activity beginning in 2007. The projected impacts of C&LM programs have been shown as separate line items since the average impact of energy efficiency programs is greater than ten years, while load-response activities have a more immediate, short-term impact.

3.3 Forecast Sensitivity

The C&LM programs utilize a complementary mix of lost opportunity, retrofit, and market transformation implementation strategies to achieve savings. The energy savings and peak-load reductions projected in this forecast are sensitive to changes in a number of factors including changes in the electricity marketplace and to customer attitudes.

The most significant variable in determining energy savings is the stability of funding, as noted earlier in this chapter. In 2007, there are several legislative proposals that will restore partial or full funding to C&LM programs that are being reviewed by the Connecticut State Legislature. Projections are based on the continued implementation of a suite of programs similar in nature and focus to the Plan filed on October 2, 2006. Any legislative or regulatory changes in geographic and program focus will produce results which may vary from these projections.

Table 3-2

CL&P C&LM Programs Annual Energy Savings
and
Peak Load Reduction by Customer Class

Connecticut Light and Power

2007 - 2016

GWh Sales Saved

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Residential	22	89	155	221	287	351	414	427	436	445
Commercial	31	124	218	311	404	496	587	679	770	862
Industrial	8	31	54	78	101	124	147	170	193	216
Total GWh Sales Conserved	61	244	427	610	792	970	1,148	1,276	1,399	1,523

MW Reductions (Summer Impacts)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Residential	3	13	22	31	41	50	59	64	69	74
Commercial (non-Load Response)	6	25	44	63	82	101	120	138	157	176
Industrial (non-Load Response)	2	6	11	16	20	25	30	35	39	44
Total non-Load Mgt	11	44	77	110	143	175	208	237	265	294
Load Response	132	132	132	132	132	132	132	132	132	132
Total MW Reductions (Summer Impacts)	143	176	209	242	275	307	340	369	397	426

MW Reductions (Winter Impacts)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Residential	7	30	52	75	97	119	142	145	147	149
Commercial (non-Load Response)	5	18	32	46	59	73	87	101	114	128
Industrial (non-Load Response)	1	5	8	11	15	18	22	25	29	32
Total non-Load Mgt	13	53	92	132	172	211	250	271	290	308
Load Response	132	132	132	132	132	132	132	132	132	132
Total MW Reductions (Winter Impacts)	145	185	224	264	304	343	382	403	422	440

Chapter 4: TRANSMISSION PLANNING AND RELIABILITY

Chapter Highlights

- ISO-NE is responsible for developing and maintaining a process that creates a regional system plan that identifies transmission system infrastructure needs.
- Transmission plays a key role in facilitating a competitive wholesale marketplace.
- CL&P transmission facilities must be designed, operated and maintained in accordance with the reliability standards set by NERC, the Northeast Power Coordinating Council ("NPCC") and ISO-NE.
- ISO-NE has responsibility to meet reliability standards set by NERC and NPCC for planning and operating the New England grid. CL&P's planning and operations must also meet federal reliability standards and the reliability requirements of the ISO-NE.

4.1 The Restructured World

In New England, restructuring meant that utility companies were for the most part obligated to sell their generation. Generation ownership thus was transferred to regional or national energy providers who were to operate generation in a competitive market. Utilities, however, retained the obligation to procure energy supply for those customers who did not choose to purchase their energy from a competitive supplier.

Centralized decision-making by electric utility companies no longer determines electricity production. Instead, competitive market forces and new participants control when and where electricity is produced and how it is produced with respect to fuel type and production unit capability (i.e., base load, intermediate, fast-start).

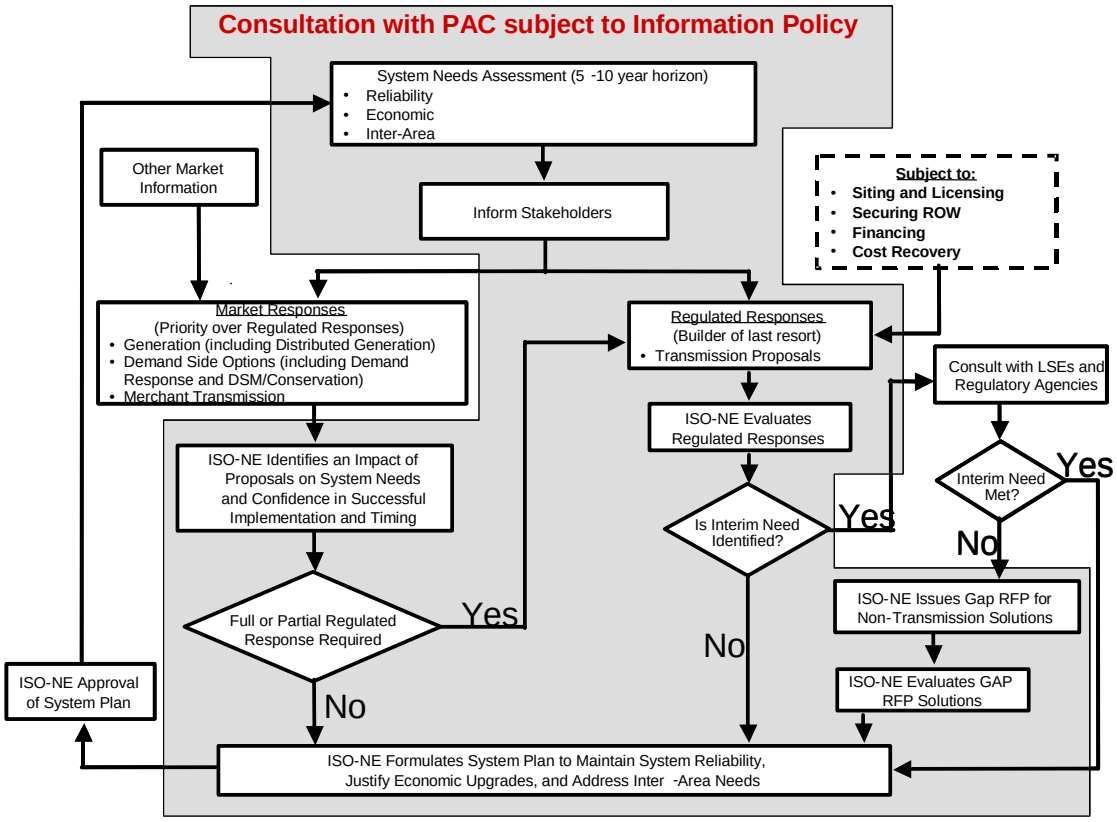
The introduction of competition into the previously integrated electric industry altered the focus of transmission system planning. Local transmission systems built in the past to serve customer load from utility-owned generation within a limited geographic area are now expected to serve the same customer load from remote merchant generation. Transmission systems must now be able to operate reliably with less reliance on local generation.

In 2001, FERC required the New England Power Pool ("NEPOOL") to cede responsibility for the system planning process to ISO-NE. As the regional transmission organization ("RTO"), ISO-NE now determines transmission needs and approves solutions.

4.2 Transmission Planning in the Restructured World

Diagram 4-1, on the next page, depicts the ISO-NE regional system planning process flow that exists under today's RTO structure. The diagram shows a process in which ISO-NE solicits alternative solutions to New England reliability problems which they have identified by a system needs assessment process. ISO-NE also determines which regulated transmission projects will address system reliability and economic efficiency needs that are not resolved by market responses. Market responses which materialize subsequent to ISO-NE's project proposals may then alter the scope of any regulated plans ISO-NE develops.

Diagram 4-1



PAC = Planning Advisory Committee
LSE = Load Serving Entity

Transmission system planning is now more complex than before restructuring as plans must consider generation market variables including:

- Stalled merchant generator projects
- Bankruptcies of large generating companies
- Deactivations or retirements of aging generators
- Potential for retirements of generators due to environmental or economic reasons
- Generators which, due to constraints on the transmission system, have petitioned ISO-NE for RMR agreements to help ensure continued reliable operation of the power system during peak-load periods

The transmission planning process must be dynamic and sufficiently flexible in the face of these factors to meet increasing demands to transfer power from remote resources to load centers. In 1995, NERC described the planning process as follows:

Planning is the process by which changes and additions to the bulk electric system are determined. The interconnected electric systems must be able to accommodate a wide range of system conditions and contingencies - continuously varying customer demands, differing amounts and patterns of electrical generation as determined by availability and costs, and various planned and unplanned outages of the transmission facilities. This process strives to develop systems that will provide desired capability and performance

in a cost-effective manner, while reliably supplying the electrical demands of customers and satisfying the business needs of electric system owners.[1]

Maintaining the reliability of the power supply and delivery system is necessary to ensure a robust competitive marketplace for electricity, satisfy customer demands and expectations with regard to service reliability, and protect the health, welfare and safety of the public.

The Connecticut transmission system is part of the larger NERC Eastern Interconnection and thus subject to the interdependencies of generation, load and transmission in neighboring electric systems. NERC recognizes that the actual planning and construction of new transmission facilities has become more complex.

In 1997, NERC stated the following:

The new competitive electricity environment is fostering an increased demand for transmission service. With this focus on transmission and its ability to support competitive electric power transfers, all users of the interconnected transmission systems must understand the electrical limitations of the transmission systems and the capability of these systems to reliably support a wide variety of transfers.
The future challenge will be to plan and operate transmission systems that provide the requested electric power transfers while maintaining overall system reliability. All electric utilities, transmission providers, electricity suppliers, purchasers, marketers, brokers, and society at large benefit from having reliable interconnected bulk electric systems. To ensure that these benefits continue, all industry participants must recognize the importance of planning these systems in a manner that promotes reliability.[2]

NERC's mission is to ensure that the bulk electric system in North America is reliable, adequate, and secure. Since its formation in 1968, NERC has operated successfully as a self-regulatory organization, relying on reciprocity, peer pressure, and the mutual self-interest of all those involved in the electric system. Through this voluntary approach, NERC has helped to make the North American bulk electric system the most reliable system in the world. NERC membership comprises ten regional reliability councils that account for virtually all the electricity supplied in the United States, Canada and Mexico. On April 1, 2005, NERC adopted a comprehensive set of reliability standards for the bulk power system. These reliability standards incorporate the existing NERC standards and compliance requirements into an integrated and comprehensive set of measurable reliability standards. The new standards apply to all entities that play a role in maintaining the reliability of the bulk electric system in the United States and Canada.

4.3 National Reliability Standards Will Soon Be Mandatory

The Energy Policy Act of 2005 required FERC to designate an entity to provide for a system of mandatory, enforceable reliability standards under FERC's oversight. This action is part of a transition from a voluntary to a mandatory system of reliability standards for the bulk-power system. In July 2006, FERC designated NERC as the nation's Electric Reliability Organization ("ERO"). The expectation of the ERO is to improve the reliability

[1] Planning Of The Bulk Electric Systems, North American Electric Reliability Council, Coordinated Planning Task Force of the Engineering Committee, May 1995
[2] Planning Standards, North American Electric Reliability Council, September 1997

of the bulk-power system by proactively preventing situations that can lead to blackouts such as that which occurred in August 2003.

In October 2006, FERC issued a proposed rule on mandatory reliability standards as developed by NERC. FERC believes these standards, with the necessary modifications, will form the basis to develop and maintain the reliability of the North American bulk-power system. FERC is expected to approve the standards in 2007 when they become mandatory with financial penalties for the users, owners or operators of the bulk-power system who fail to comply with the standards.

Chapter 5: TRANSMISSION SYSTEM NEEDS

Chapter Highlights

- CL&P's transmission facilities are an integral part of the transmission system it shares with the rest of New England.
- CL&P is currently engaged in many projects that will reinforce Connecticut's transmission system.
- To reliably and economically serve its electric load, CL&P needs to strengthen its 345-kV ties with Massachusetts and Rhode Island.

5.1 Background on CL&P's Transmission System

Transmission lines collectively form the infrastructure that is an interstate electric "highway system," moving electric energy from where it is produced to where it is used. In New England, moving electric energy is achieved primarily by the interconnected 345-kV regional bulk power system. The 345-kV transmission ties to neighboring utilities and control areas and expansion of the high voltage networks enables CL&P to meet its customers' peak demands. In addition, CL&P's transmission grid is used to support reliable, economical and continuous service to intra-state customers. Operating this system at 345-kV allows for the efficient transfer of bulk power within and outside of the New England control area. This integrated grid enables CL&P to efficiently transmit power throughout its franchise service territory and share in the reliability benefits of parallel transmission paths.

The total mileage of CL&P's existing transmission circuits in service in Connecticut at the end of 2006 is comprised of:

- 413.1 circuit-miles of 345-kV lines (includes 11.9 circuit-miles of underground cable)
- 5.8 circuit-miles of 138-kV lines (all as underwater cable)
- 1,179.2 circuit-miles of 115-kV lines (includes 50.5 circuit-miles of underground cable)
- 99.5 circuit-miles of 69-kV lines (includes 2.8 miles of underground cable)

These transmission circuits supply power to 103 bulk power substations in the CL&P service territory.

5.2 Transmission System

Connecticut's most pressing transmission system need has been to increase the capability of the system to transport power into SWCT, where nearly half of the state's load is located. The system constraints for this area have affected both the CL&P and the UI service territories. Recent siting approvals of several major projects in SWCT will substantially address this need. CL&P anticipates that all of these projects will be in service by the end of 2009.

Connecticut's next transmission concern for electric system reliability is to increase the state's ability to import power from the New England grid.

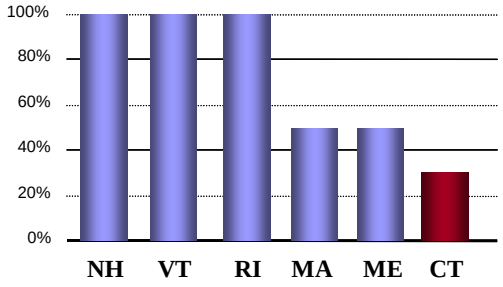
Connecticut Has Limited Power-Import Capability

Connecticut imports are limited to approximately 2,500 MWs - about 30 percent of the state's peak load of approximately 7,400 MWs.

Consequently, at least 70 percent of the electricity needed to serve customer peak demand must be generated in Connecticut.

Following the upgrades associated with the NEEWS projects, the Connecticut import capability will increase to almost 45%.

Percentage of Peak Load that Could Be Served by Transmission Imports



Note: Chart uses approximate values based on known interface limits.

Increasing the state's ability to import power will benefit customers in two ways. First, it will strengthen system reliability by broadening the base of power supply available to meet customer demand. Second, it will have a favorable impact on cost, because the same broadened base of supply should reduce the instances of RMR contracts and other charges that are related to transmission system limitations.

Part of an Interstate System

CL&P's transmission system is part of the interconnected New England transmission network. Transmission lines across New England and outside of the region are interconnected to form a transmission network, sometimes called a "grid" or "system". The transmission grid serves multiple purposes, all of which work together to enhance reliability. CL&P and other electric utilities design the transmission grid to withstand national, regional and company-specified contingencies, so that electric power is transmitted reliably, safely and economically throughout the interconnected grid.

CL&P's 345-kV system enables the movement of power from large central generating stations, such as Lake Road, Middletown 4 and the Millstone Nuclear Power Station, throughout Connecticut and over three interstate transmission tie-lines to and from neighboring utilities. These tie-lines provide connections with National Grid in Rhode Island, with the Western Massachusetts Electric Company ("WMECO"), and with Consolidated Edison in New York.

CL&P's transmission network also includes forty-one lower capacity transmission ties to neighboring utilities, all operating at voltages between 69-kV and 138-kV. These tie lines include: one with National Grid in Rhode Island, one with Long Island Power Authority, one with Central Hudson in New York, thirteen with Connecticut Municipal Electric Energy Cooperative, Inc. ("CMEEC"), twenty with UI, and five with the WMECO.

The CL&P transmission system, with its many tie lines to neighboring utilities, provides paths for power to move freely over the New England transmission grid. Power can flow in any direction, depending on generation dispatch, load patterns, and the configuration of the transmission system.

The transmission grid enables Connecticut to rely on out-of-state generation to help serve customer load. The transmission tie lines enable CL&P and neighboring electric systems access to economic generation, increased reliability during low and high load periods, and the ability to follow transmission and generation emergencies.

Substations and System Loops

CL&P currently has ten major bulk-power substations where the 345- and 115-kV transmission networks interconnect - Montville, Card, Manchester, Southington, Frost Bridge, North Bloomfield, Norwalk, Killingly, Haddam, and Plumtree. These ten substations enable bulk power from the large central generation stations and power imported over the four 345-kV transmission tie lines to be delivered to CL&P's 115-kV system.

The 115-kV transmission system loops around high load density areas in central and SWCT, and also connects the load centers in the eastern and northwestern parts of the state. The major 115-kV loop through western and SWCT ties the 345-kV interconnections at Southington and Norwalk to the 115-kV loop in the south. Overall this system transmits power from central stations, transmission tie lines and bulk power substations to distribution step-down substations supplying local area systems.

5.3 Overall Connecticut Assessment

During the summer of 2006, Connecticut (including CL&P, UI and CMEEC) experienced a peak demand of approximately 7,400 MWs. In-state generation capacity is about 7,300 MWs, and Connecticut can reliably import about 2,500 MWs of power.

It is becoming increasingly likely that generator or transmission outages and the potential retirement of aging and uneconomic generation will produce the situation in which in-state generation and transmission imports cannot meet the growing summer peak power demands.

The need for major southern New England transmission reinforcements was first identified by ISO-NE in their 2005 Regional System Plan. In 2006, ISO-NE, Northeast Utilities, and National Grid completed the identification of the New England East - West Solution Projects as follows:

- **Interstate Reliability Project**
  A new 345-kV transmission line connecting National Grid's service territory in Massachusetts and Rhode Island with CL&P's service territory would, when combined with the upgrades shown below, increase the east-west power transfer capability across New England. While an exact route is not currently defined, this new line is expected to tie National Grid's Milbury Substation in Massachusetts to CL&P's Card St. Substation in Lebanon.

- **Greater Springfield Reliability Project**
  New and modified 115-kV and new 345-kV transmission facilities, including a new 345-kV transmission line connecting Connecticut and western Massachusetts would address reliability problems in the Springfield, Massachusetts area. The new 345-kV facilities are expected to connect the WMECO's Agawam Substation with CL&P's North Bloomfield Substation in Bloomfield.

- **Central Connecticut Reliability Project**
  New and modified 115-kV and new 345-kV transmission facilities would address reliability problems associated with the increased transfer of power from eastern Connecticut to western and southwestern Connecticut. The currently planned connection points for a new 345-kV transmission line are North Bloomfield Substation in Bloomfield and Frost Bridge Substation in Watertown.

- **Rhode Island Reliability Project**
  New and modified 115-kV and new 345-kV transmission facilities would address reliability problems associated with Rhode Island's limited access to the 345-kV system and over-dependence on local generation. These facilities would be constructed by National Grid.

The ISO-New England technical approval process is scheduled to be completed in 2007. CL&P expects the aggregate of the Southern New England transmission reinforcements to significantly increase the transmission import capability into Connecticut with estimates ranging from 1,100-1,700 MW. Collectively, the reinforcement projects will be referred to as the New England East-West Solution. The siting of these facilities in each of the three states as required is scheduled to begin in 2008.

CL&P's service territory is sub-divided into six areas for the purpose of assessing the reliability of the CL&P transmission system. A description of the regions and a summary of the future transmission needs in each area are discussed below.

5.4 Southwest Connecticut Area

The largest load area within the CL&P transmission system is the fifty-four town SWCT area including all of UI's service territory. This area, which is essentially west of Interstate 91 and south of Interstate 84, accounts for approximately half of the peak load in the state of Connecticut and is one of the fastest growing and economically vital areas of the state. Until the completion of the Bethel – Norwalk 345-kV transmission line in the Fall of 2006, this area was primarily served by 115-kV transmission lines which have reached the limit of their ability to reliably and economically support the projected load in this area.

Southwest Connecticut Reliability Projects

A study by ISO-NE, CL&P, and UI proposed a comprehensive long-range solution to the multitude of problems identified in the SWCT area. The plan identified the need to construct a 345-kV loop to integrate the SWCT area into the New England 345-kV bulk power electric transmission grid.

Bethel-Norwalk Project

The first phase of the long-range plan was the construction of a 345-kV line from Plumtree Substation, in Bethel, to the Norwalk Substation, located in Norwalk. This new 345-kV transmission line was placed in-service in the Fall 2006. The Bethel – Norwalk Project increased the power-import capability to the Norwalk – Stamford sub-area by approximately 200 MW.

Glenbrook-Norwalk Cable Project

In Docket No. 292, the Connecticut Siting Council approved the construction of two new 115-kV underground transmission lines between the Norwalk Substation, in Norwalk, and the Glenbrook Substation, in Stamford. This project will effectively bring the reliability benefits of the new 345-kV transmission loop to the large load center in Stamford. The project is presently under construction and is scheduled to be in-service in 2008.

Middletown-Norwalk Project

The second phase of the planned upgrades is the construction of a 345-kV transmission line from the Middletown area to Norwalk. In Docket No. 272, the Connecticut Siting Council approved a combination of overhead and underground design types for the 345-kV line between Middletown and Norwalk. A new 345-kV switching station will be constructed at Beseck Junction, in Wallingford. The existing 345-kV Millstone-Southington line will be reconfigured so that the line section from Millstone is extended west from Oxbow Junction to Beseck Switching Station and the Southington leg of this line will be extended east from Chestnut Junction to the 345-kV Scovill Rock Switching Station. The Oxbow Junction-to-Chestnut Junction segment of the line will be deenergized. In addition, the existing 345-kV Southington-Haddam Neck line will be looped south from Black Pond Junction to Beseck Switching Station, establishing a Southington-to-Beseck circuit and a Beseck-to-Haddam Neck circuit.

Southwest from the new Beseck Switching Station the project includes the construction of approximately 33.4 miles of new overhead 345-kV transmission line which terminates at the new East Devon Substation, in Milford. Between East Devon and the new Singer Substation in Bridgeport, two 8.0-mile circuits of 345-kV XLPE cables will be built. The final leg of 345-kV transmission from Singer Substation to Norwalk Substation will be built of two 15.4-mile circuits of 345-kV XLPE cables. Two additional 345-kV to 115-kV interconnections will be built, one in Milford and one in Bridgeport. The proposed project also includes upgrades to a number of 115-kV lines, and modifications of the interconnecting facilities for Milford Power and Bridgeport Energy.

This project is scheduled to be in-service in 2009.

Other Significant Southwest Connecticut Projects Entering Construction

In Petition No. 702, the Connecticut Siting Council approved a rebuild of the 115-kV transmission line between Triangle Substation, in Danbury, and the Plumtree Substation, in Bethel, consolidating three existing circuits into two. The transmission configuration in this area is primarily radial in nature and does not provide integrated service to other regions. The load in this area has grown to the point where transmission outages may cause thermal overloads and voltage collapse. The project is presently under construction and is scheduled to be in-service in 2007.

Long Island Cable Replacement Project

In Docket No. 224, the Connecticut Siting Council approved the replacement of the existing 138-kV submarine cable from Norwalk Harbor to Northport on Long Island, New York. Construction is expected to be completed by the end of 2008.

Other Southwest Connecticut Projects Under Consideration

CL&P is considering future possible upgrades to 115-kV transmission lines in the Frost Bridge to Devon and Plumtree corridors.

5.5 Manchester-Barbour Hill Area

The Manchester-Barbour Hill area includes part of Manchester, the towns located north and east of Manchester, and the towns of Suffield and Windsor Locks. It is primarily supplied by two radial 115-kV transmission lines from Manchester substation.

The rapid load growth along the Interstate 91 and Interstate 84 corridors especially in Manchester and South Windsor, adjacent to the Buckland Hills Mall area, is causing an urgent need to upgrade the bulk substation and transmission system at the Barbour Hill Substation in South Windsor. In the near term, CL&P is proposing to address the reliability needs of the area with the installation of a 345/115-kV autotransformer at Barbour Hill Substation. The project is scheduled to be in-service in 2008.

In the longer term, CL&P is also considering upgrades to the existing 115-kV transmission lines between the Manchester and the Barbour Hill substations.

5.6 Eastern Connecticut Area

The Eastern Connecticut area extends from the Rhode Island border in a westerly direction for about twenty miles and northerly from Long Island Sound to Massachusetts. The area is served by both CL&P and CMEEC.

Eastern Connecticut has experienced load growth along the Interstate 95 corridor and from the Foxwoods and Mohegan Sun casinos.

The 115-kV sources in the area are three 345/115-kV autotransformer substations - Montville Substation, in Montville, Card Substation, in Lebanon and Killingly Substation in Killingly. Local generation is also available to serve customer load demands.

CL&P is evaluating the added reliability benefits of rebuilding and converting the existing 69-kV transmission lines in the area to 115 kV. This could include new transmission facilities to improve service reliability to the greater Mystic area and to the United States Naval Submarine Base located in New London.

5.7 Middletown Area

The Middletown area consists of a five to ten mile wide band east and west of the Connecticut River from Glastonbury to Old Lyme. The westerly section consists of the area included in a triangle that runs from Middletown to Old Saybrook and back to the easterly part of Meriden.

The recently completed 345-kV to 115-kV interconnection facilities at Haddam Substation provides another source helping to serve the area's load. Additionally, transmission reinforcements may be needed in the area.

In addition, the reconductoring of the 115-kV transmission line between the Manchester Substation and the Hopewell Substation in Glastonbury (CSC Petition No. 737) is under construction and is scheduled to be in-service in 2007.

5.8 Greater Hartford Area

The Greater Hartford Area stretches north to the Massachusetts border, and is nestled in the middle of the Northwestern, Manchester/Barbour Hill, Middletown, Eastern and Southwestern Connecticut areas.

CL&P is evaluating transmission reinforcement projects including the construction of several 115-kV transmission lines in the area to improve reliability and address growing demand.

In addition, to improve reliability in the New Britain area, CL&P is considering the need to convert the existing 69-kV facilities at Black Rock Substation to 115 kV.

5.9 Northwestern Connecticut Area

The northwestern portion of the state is presently supplied by four 115-kV transmission lines.

In the Torrington, Salisbury, and North Canaan area, CL&P is evaluating the need to convert the existing 69-kV transmission system to 115-kV operation (two of the lines were pre-built for future 115-kV operation under Petition No. 26 before the Connecticut Siting Council). An alternative being considered is to install a second 115/69-kV autotransformer at the Torrington Terminal Substation.

In addition, CL&P is evaluating the need for a new 115-kV transmission line into the area from the Frost Bridge Substation in Watertown.

5.10 Underground Transmission and Cost

As CL&P builds new transmission, more of the system is going underground. In this past year, 6.4 miles of existing 115-kV overhead transmission line was replaced by ten miles of underground 115-kV transmission cables, as part of CL&P's Bethel-Norwalk Project. Under this project, approximately twelve miles of parallel 345-kV underground cables entered service as part of a new 20.4-mile long 345-kV circuit. As part of the Middletown-Norwalk Project now in construction, CL&P's new transmission facilities will include approximately forty-five circuit miles of underground 345-kV cables, and one mile of overhead 115-kV lines will be replaced by underground 115-kV cables. Finally, two new 115-kV underground cable circuits, each almost nine miles long, are under construction as part of the Glenbrook Cables Project. At the conclusion of these projects, the underground circuit-mile component of CL&P's transmission system will have increased from forty-eight miles in 2005 to seventy miles in 2006 to one hundred thirty-four miles in 2009.

As the Connecticut Siting Council knows from its 2006 Investigation into the Life-Cycle Costs of Electric Transmission Lines (see Final Report dated October 31, 2006), the first and life-cycle costs of underground 115- and 345-kV transmission line are several times higher than the cost of an equal length overhead transmission line when sufficient right-of-way already exists to accommodate the overhead line. In a regional cost allocation decision dated September 22, 2006, ISO-NE determined that $117.4 million of the estimated $357.2 million Bethel-Norwalk project cost would not be eligible for regional cost recovery after finding that an all-overhead 345-kV line costing $117.4 million less was feasible and practical to build, even though some new right-of-way was needed. Consequently, Connecticut's electric customers must pay for all of this extra transmission project cost rather than the typical practice of sharing the costs across all of New England. To the extent that future transmission projects include more costly underground line sections, including the cost of associated system equipment upgrades and changes, where it was feasible and practical to build an overhead transmission line, Connecticut should anticipate a similar cost-allocation decision by ISO-NE.

Transmission dockets in recent years have established that the electrical characteristics and other attributes of underground transmission lines make such lines difficult to incorporate within the existing transmission system, especially at 345 kV. System reliability issues are created by the underground line differences which are not always feasible or inexpensive to manage. Public concern over the magnetic fields that surround power transmission lines has been a driver for public pressures to underground new transmission lines; however, underground transmission lines also produce magnetic fields in publicly accessible locations.

Chapter 6: CL&P's TRANSMISSION PROJECTS

CL&P's transmission projects are summarized in Tables 6-1 through 6-3, below. During the forecast period, additional transmission projects beyond those listed may be justifiable to enhance reliability or provide efficient means to transmit electricity.

The estimated in-service dates ("ISD") for new transmission facilities listed in the tables may vary through time as the needs of the system change.

Table 6-1 Transmission Circuit Segments Approved by the Connecticut Siting Council

Table 6-2 Other Planned Transmission Circuits

Table 6-3 Substation Projects – 69 kV and above

Table 6-1

Connecticut Light and Power Company

Transmission Circuit Segments Approved by the Connecticut Siting Council

(As of January 1, 2007)

From		To		Area	Voltage kV	Length of Circuit (miles)	Project Type	Proposed ISD
Substation	**City or Town**	**Substation**	**City or Town**					
Manchester Substation	Manchester	Hopewell Substation	Glastonbury	Middletown	115	7.0	Reconductor	2007
Plumtree Substation	Bethel	Triangle Substation	Danbury	Southwest	115	1.8	Rebuild Circuit #1	2007
Plumtree Substation	Bethel	Triangle Substation	Danbury	Southwest	115	1.8	Rebuild Circuit #2	2007
Norwalk Harbor Substation	Norwalk	Northport Substation	Northport N.Y.	Norwalk/ Stamford	138	5.8	Replace Cable	2008
Norwalk Substation	Norwalk	Glenbrook Substation	Stamford	Norwalk/ Stamford	115	8.7	New Underground Cable Circuit #1	2008
Norwalk Substation	Norwalk	Glenbrook Substation	Stamford	Norwalk/ Stamford	115	8.7	New Underground Cable Circuit #2	2008
East Devon Substation	Milford	Singer (UI) Substation	Bridgeport	Southwest	345	2.4	New Underground Cable Circuit #1	2009
East Devon Substation	Milford	Singer (UI) Substation	Bridgeport	Southwest	345	2.4	New Underground Cable Circuit #2	2009
Norwalk Substation	Norwalk	Singer (UI) Substation	Bridgeport	Southwest	345	15.4	New Underground Cable Circuit #1	2009
Norwalk Substation	Norwalk	Singer (UI) Substation	Bridgeport	Southwest	345	15.4	New Underground Cable Circuit #2	2009
Devon Substation	Milford	Wallingford (CMEEC) Substation	Wallingford	Southwest	115	24.1	Rebuild a portion of CL&P's 1640 Circuit	2009
Devon Substation	Milford	June St. (UI) Substation	Woodbridge	Southwest	115	13.4	Rebuild a portion of CL&P's 1685 Circuit	2009
North Haven (UI) Substation	North Haven	Branford Substation	Branford	Southwest	115	1.2	Rebuild a portion of CL&P's 1655 Circuit	2009
East Devon Substation	Milford	Devon Substation	Milford	Southwest	115	1.3	New Circuit #1	2009
East Devon Substation	Milford	Devon Substation	Milford	Southwest	115	1.3	New Circuit #2	2009
E. Meriden Substation	Meriden	N. Wallingford (CMEEC) Substation	Wallingford	Southwest	115	2.0	Rebuild a portion of CL&P's 1466 Circuit	2009
Southington Substation	Southington	June Street (UI) Substation	Woodbridge	Southwest	115	11.5	Rebuild a portion of CL&P's 1610 Circuit	2009

Table 6-1

Connecticut Light and Power Company

Transmission Circuit Segments Approved by the Connecticut Siting Council

(As of January 1, 2007)

From		To		Area	Voltage kV	Length of Circuit (miles)	Project Type	Proposed ISD
Substation	**City or Town**	**Substation**	**City or Town**					
Devon Substation	Milford	Devon Switching Station(UI)	Milford	Southwest	115	0.1	Rebuild CL&P's portion of 1780 Circuit	2009
Devon Substation	Milford	Devon Switching Station(UI)	Milford	Southwest	115	0.1	Rebuild CL&P's portion of 1790 Circuit	2009
Devon Substation	Milford	Beacon Falls Substation	Beacon Falls	Southwest	115	3.8	Rebuild a portion of 1570 Circuit	2009
Bunker Hill Substation	Waterbury	Beacon Falls Substation	Beacon Falls	Southwest	115	3.8	Rebuild a portion of 1575 Circuit	2009
Devon Substation	Milford	Southington Substation	Southington	Southwest	115	22.5	Remove a portion of 1690 Circuit	2009
Scovill Rock Substation	Middletown	Chestnut Junction	Middletown	Middletown	345	2.6	New	2009
Oxbow Junction	Haddam	Beseck Switching Station	Wallingford	Middletown	345	8.0	New	2009
Black Pond Junction	Middlefield	Beseck Switching Station	Wallingford	Middletown	345	2.8	New Circuit #1	2009
Black Pond Junction	Middlefield	Beseck Switching Station	Wallingford	Middletown	345	2.8	New Circuit #2	2009
Beseck Switching Station	Wallingford	East Devon Substation	Milford	Middletown	345	33.4	New	2009
Haddam Substation	Haddam	East Meriden Substation	Meriden	Middletown	115	8.4	Rebuild a portion of 1975 Circuit	2009

Table 6-2

Connecticut Light and Power Company

Other Planned Transmission Circuits

(As of January 1, 2007)

From		To		Area	Voltage kV	Length of Circuit (miles)	Project Type	Proposed ISD
Substation	**City or Town**	**Substation**	**City or Town**					
Card Substation	Lebanon	Lake Road Substation	Killingly	Eastern	345	TBD	New	TBD
Lake Road Substation	Killingly	West Farnum Substation (RI)	CT/RI State line	Eastern	345	TBD	New	TBD
Millstone Substation	Waterford	Manchester Substation	Manchester	Eastern	345	TBD	Upgrade a portion of 310 Circuit	TBD
Card Substation	Lebanon	Manchester Substation	Manchester	Eastern	345	TBD	Upgrade a portion of 368 Circuit	TBD
Lake Road Substation	Killingly	Killingly Substation	Killingly	Eastern	115	1.0	New Circuit #1	TBD
Lake Road Substation	Killingly	Killingly Substation	Killingly	Eastern	115	1.0	New Circuit #2	TBD
Card Substation	Lebanon	Wawecus Junction	Bozrah	Eastern	115	12.7	Rebuild	TBD
Tunnel Substation	Lisbon	Ledyard Junction	Ledyard	Eastern	69	8.5	Rebuild to 115kV	TBD
Ledyard Junction	Ledyard	Gales Ferry Substation	Ledyard	Eastern	69	1.6	Rebuild to 115kV	TBD
Gales Ferry Substation	Ledyard	Montville Substation	Montville	Eastern	69	2.4	Rebuild to 115kV	TBD
Ledyard Junction	Ledyard	Buddington(CMEEC) Substation	Groton	Eastern	69	4.7	Rebuild to 115kV	TBD
Oxbow Junction	Haddam	Beseck Junction	Wallingford	Southwest	115	14.7	Upgrade	TBD
Colony Substation	Wallingford	No.Wallingford (CMEEC) Substation	Wallingford	Southwest	115	2.4	Upgrade	TBD
Frost Bridge Substation	Watertown	Bunker Hill Substation	Waterbury	Southwest	115	3.9	Rebuild	TBD
Frost Bridge Substation	Watertown	Walnut Junction	Thomaston	Northwest	115	6.4	New	TBD

Table 6-2

Connecticut Light and Power Company

Other Planned Transmission Circuits

(As of January 1, 2007)

From		To		Area	Voltage kV	Length of Circuit (miles)	Project Type	Proposed ISD
Substation	**City or Town**	**Substation**	**City or Town**					
Frost Bridge Substation	Watertown	Campville Substation	Harwinton	Northwest	115	10.3	Rebuild	TBD
North Bloomfield Substation	Bloomfield	Agawam Substation (MA)	CT/MA State Line	Greater Hartford	345	TBD	New	TBD
North Bloomfield Substation	Bloomfield	Frost Bridge Substation	Watertown	Greater Hartford	345	TBD	New	TBD
East Hartford Substation	East Hartford	South Meadow Substation	Hartford	Greater Hartford	115	TBD	Reconductor a portion of 1786 Circuit	TBD
Manchester Substation	Manchester	East Hartford Substation	East Hartford	Greater Hartford	115	TBD	New Underground Cable	TBD
Northwest Hartford Substation	Hartford	Southwest Hartford Substation	Hartford	Greater Hartford	115	TBD	New Underground Cable	TBD
Southwest Hartford Substation	Hartford	South Meadow Substation	Hartford	Greater Hartford	115	TBD	New Underground Cable	TBD
North Bloomfield Substation	Bloomfield	Southwick Substation (MA)	CT/MA State Line	Greater Hartford	115	TBD	Modify	TBD
North Bloomfield Substation	Bloomfield	South Agawam Substation (MA)	CT/MA State Line	Greater Hartford	115	TBD	Modify 1821 Circuit	TBD
North Bloomfield Substation	Bloomfield	South Agawam Substation (MA)	CT/MA State Line	Greater Hartford	115	TBD	Modify 1836 Circuit	TBD
Manchester Substation	Manchester	Scovill Rock Substation	Middletown	Middletown	345	TBD	Rebuild a portion of the 353 Circuit	TBD
East Meriden Substation	Meriden	No.Wallingford (CMEEC) Substation	Wallingford	Middletown	115	TBD	Reconductor remaining portion of 1466 Circuit	TBD
Schwab Junction	Wallingford	Colony (CMEEC) Substation	Wallingford	Middletown	115	TBD	Upgrade	TBD
Manchester Substation	Manchester	Barbour Hill Substation	South Windsor	Manchester/ Barbour Hill	115	TBD	Upgrade	TBD
Norwalk Harbor Substation	Norwalk	Glenbrook Substation	Stamford	Norwalk-Stamford	115	TBD	New Underground Cable	TBD

Table 6-3

Connecticut Light and Power Company

Substation Projects - Rated 69 kV and Above

Substation	City or Town	Area	Voltage (kV)	Project Type	Proposed ISD
Kleen Substation	Middletown	Eastern	345	New	TBD
Barbour Hill Substation	South Windsor	Manchester/ Barbour Hill	115	Modified	2007
Triangle Substation	Danbury	Southwest	115	Modified	2007
Middle River Substation	Danbury	Southwest	115	Modified	2007
Plumtree Substation	Bethel	Southwest	115	Modified	2007
Wilton Substation	Wilton	Southwest	115	New	2008
Norwalk Substation	Norwalk	Southwest	115	Modified	2008
Glenbrook Substation	Stamford	Southwest	115	Modified	2008
Norwalk Harbor Substation	Norwalk	Southwest	138/115	Modified	2008
Flax Hill Substation	Norwalk	Southwest	115	Modified	2008
Oxford Substation	Oxford	Southwest	115	New	2008
Cedar Heights Substation	Stamford	Southwest	115	Modified	2008
Barbour Hill Substation	South Windsor	Manchester/ Barbour Hill	345/115	Modified	2008
Enfield Substation	Enfield	Manchester/ Barbour Hill	115	Modified	2008
Cos Cob Substation	Stamford	Southwest	115	Modified	2009
Devon Substation	Milford	Southwest	115	Modified	2009
East Devon Substation	Milford	Southwest	345/115	New	2009

Table 6-3

Connecticut Light and Power Company

Substation Projects - Rated 69 kV and Above

Substation	City or Town	Area	Voltage (kV)	Project Type	Proposed ISD
Norwalk Substation	Norwalk	Southwest	345	Modified	2009
Beseck Switching Substation	Wallingford	Southwest	345	Modified	2009
Card Substation	Lebanon	Eastern	345	Modified	2009
Millstone Substation	Waterford	Eastern	345	Modified	2009
Stepstone Substation	Guilford	Middletown	115	New	2009
Windsor Substation	Windsor	Greater Hartford	115	New	2009
North Bloomfield Substation	Bloomfield	Greater Hartford	115	Modified	2009
Waterford Substation	Waterford	Eastern	115	New	2010
Haddam Substation	Haddam	Eastern	345/115	Modified	TBD
Millstone Substation	Waterford	Eastern	345	Modified	TBD
Card Substation	Lebanon	Eastern	345	Modified	TBD
Lake Road Substation	Killingly	Eastern	345	Modified	TBD
Willimantic Road Switching Substation	Willimantic	Eastern	345	New	TBD
Killingly Substation	Killingly	Eastern	345	Modified	TBD
Glenbrook Substation	Stamford	Southwest	115	Modified	TBD
Norwalk Harbor Substation	Norwalk	Southwest	115	Modified	TBD
Frost Bridge Substation	Watertown	Southwest	345	Modified	TBD

Table 6-3

Connecticut Light and Power Company

Substation Projects - Rated 69 kV and Above

Substation	City or Town	Area	Voltage (kV)	Project Type	Proposed ISD
North Bloomfield Substation	Bloomfield	Greater Hartford	345	Modified	TBD
East Hartford Substation	East Hartford	Greater Hartford	115	Modified	TBD
Northwest Hartford Substation	Hartford	Greater Hartford	115	Modified	TBD
Southwest Hartford Substation	Hartford	Greater Hartford	115	Modified	TBD
South Meadow Substation	Hartford	Greater Hartford	115	Modified	TBD
Riverside Drive Substation	East Hartford	Greater Hartford	115	Modified	TBD
Manchester Substation	Manchester	Manchester/ Barbour Hill	345	Modified	TBD
Westport Substation	Westport	Norwalk/ Stamford	115	New	TBD
Goshen Substation	Goshen	Northwest	115	New	TBD
Bunker Hill Substation	Waterbury	Southwest	115	Modified	TBD