Docket F-2008
Draft Report
July 10, 2008

Introduction

The Connecticut Siting Council (Council) is a state agency and part of the Executive Branch of state government. The Council is charged with the review and permitting of certain utility projects including most electric generators, as well as any transmission lines, substations, and switching stations that operate at 69,000 volts and higher.

The Council is a nine-member body consisting of: five members appointed by the Governor; one designee of the Commissioner of the Department of Public Utility Control; one designee of the Commissioner of the Department of Environmental Protection; one member appointed by the Speaker of the House; and one member appointed by the Senate Pro Tempore. The Council is assisted by nine full-time staff members.

In addition to electrical energy projects, the Council also has jurisdiction over certain wireless telecommunications facilities (e.g. cellular and PCS towers) and certain hazardous waste facilities. The Council meets most often regarding energy and telecommunications matters, typically every two or three weeks.

Given the Council's familiarity with electric energy infrastructure projects located in our state, the Council is also charged with the annual review of the forecast of Connecticut electric loads and resources pursuant to Connecticut General Statutes §16-50r(a). Under this section, any entity responsible for the transmission or distribution of electricity in Connecticut and/or the generation of electricity in Connecticut at an output of one megawatt or greater, is required to file a report with the Council each year by March 1.

These reports must contain the peak loads, resources, and margins for the past five years (i.e. 2003 through 2007) and projected peak loads, resources, and margins for ten year forecast period, including the current year (i.e. 2008-2017).

Forecasting

Electrical load can be thought of as the rate at which electric energy is consumed. The unit of load is a Watt which is one joule of energy per second. However, utility companies serve loads on a much larger scale, so the unit of megawatt (MW) or one million watts is used. A 1 MW load would be the equivalent of operating 10,000 light bulbs of 100 Watts each simultaneously. Put another way, 1 MW could serve between 300 and 1,000 homes, depending on the actual load or demand.

Loads increase as more electrical devices are in use. Generally, the higher the loads, the more it stresses the electrical infrastructure. Higher loads result in more generators having to run and run at higher outputs. Transmission lines must carry more current to

the various substations. On the substation level, the transformers must carry more load, and finally the distribution feeders must carry more current to feed the end users. In order to maintain reliability and predict when infrastructure must be added, upgraded, and replaced to adequately serve the customers, it is essential to have a meaningful and reasonably accurate estimate of future loads. The process of calculating these future load projections, is called load forecasting.

Utility forecasting by Connecticut utilities is broken down by service area. Each of the three transmission/distribution companies in Connecticut has a particular service area. The United Illuminating Company (UI) serves 17 municipalities in the New Haven area near the coast from Fairfield to North Branford and north to Hamden. The Connecticut Municipal Electric Energy Cooperative (CMEEC) collectively serves all of the municipal utilities in Connecticut, namely the cities of Groton and Norwich; the Borough of Jewett City; the Second (South Norwalk) and Third (East Norwalk) Taxing Districts of the City of Norwalk; the towns of Wallingford, and Groton and; the Mohegan Tribal Utility Authority. The largest transmission/distribution company is The Connecticut Light and Power Company (CL&P). CL&P serves all of the remaining municipalities in Connecticut. Collectively, the sum CL&P, UI, and CMEEC loads approximately equals the Connecticut load.

ISO-New England Inc. (ISO-NE) operates the grid in New England and oversees the wholesale electric market in this region. ISO-NE produces a regional forecast for New England, as well as individual forecasts for each of the New England states, including Connecticut. While not specifically required by statute, in order to provide a more comprehensive review and analysis, the Council also reviews the forecast of the regional grid operator. ISO-NE's forecast is reviewed in parallel with the sum of the CL&P, UI, and CMEEC forecasts.

Load

In utility forecasting, it is the peak load or highest load experience during the year that is the most important to consider because it represents the worst-case scenario for the electric system. Connecticut generally experiences its peak load (i.e. highest load of the year) during a summer day. This is because air conditioning is generally one of the largest loads in many homes and businesses in the state.

While significant loads are experienced during the winter, they are generally less than summer peaks in the state because many residents and businesses use natural gas or oil rather than electric heat to heat their homes. While natural gas or oil furnaces still often require electricity to operate, the electric load is much less than if electric resistance were the heat source. Conversely, in other areas heavily dependent on electric heat such as the Canadian province of Quebec, a winter peak load can result.

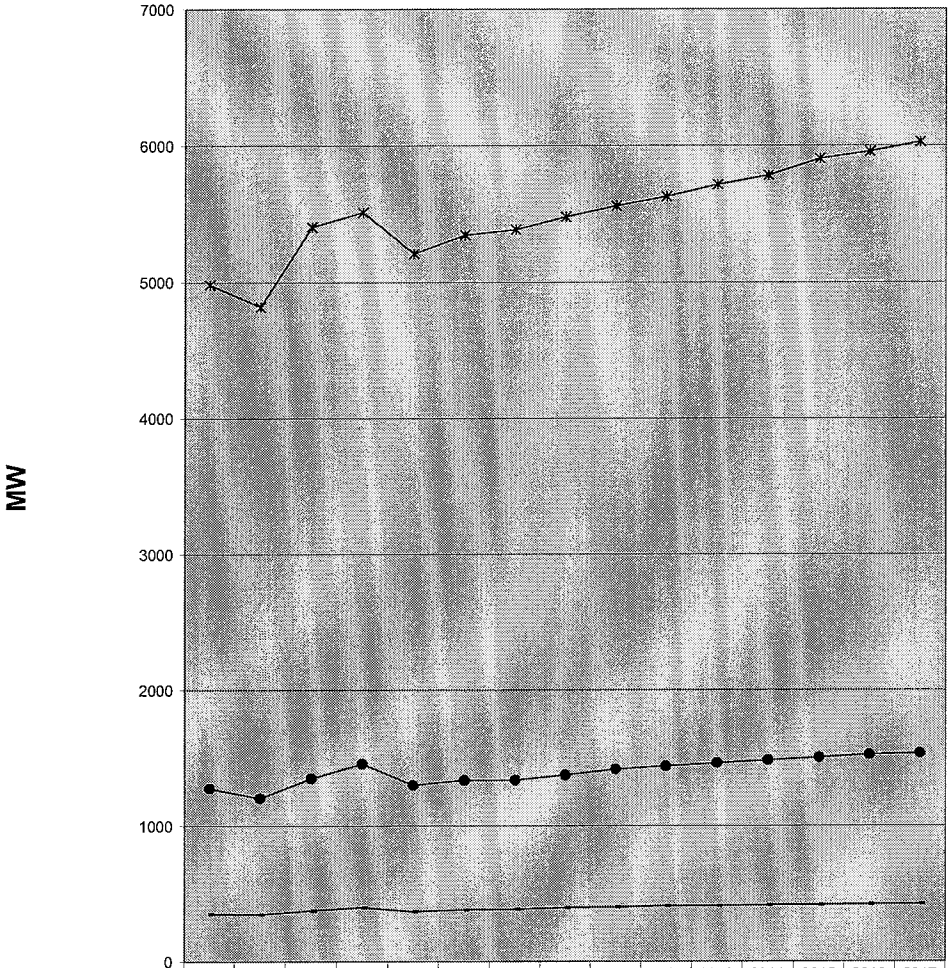
While peak loads depend on many factors such as customer usage, demographics, conservation efforts, economic conditions, etc., perhaps the most important factor is weather, specifically the temperature. Higher temperatures generally result in more

frequent use of air conditioning and the units will work harder and consume more electricity. Also, higher humidity can exacerbate the situation as it can make it feel hotter than it actually is (sometimes called the heat index) and further encourage air conditioning use.

In consideration of these weather effects, the Connecticut transmission/distribution companies provide a forecast based on "normal weather" or assumed temperatures consistent with approximately the past 30 years of meteorological data. This is also referred to as the 50/50 forecast, which means that, in a given year, the probability that the projected peak load would be exceeded is 50 percent. There is a 50 percent probability that the actual peak load would be less than predicted.

CL&P predicts in its normal weather forecast, a peak load of 5,345 MW in its service area in 2008. This load is expected to grow during forecast period at an annual compound growth rate (ACGR) of 1.34 percent, reaching 6,026 MW in 2017. UI predicts in its normal weather forecast, a peak load of 1,335 MW in its service area in 2008. This load is expected to grow during the forecast period at an ACGR of 1.55 percent, reaching 1,533 in 2017. CMEEC predicts in its normal weather forecast, a peak load of 379 MW in its service area in 2008. This load is expected to grow during the forecast period at an ACGR of 1.23 percent, reaching 423 MW in 2017. (A very small amount of CMEEC load is the result of providing service to Fisher's Island, New York via a connection to a substation in Groton, Connecticut. The peak load is on the order of 1 MW and thus considered negligible.) The state utilities' 50/50 summer peak loads are depicted in Figure 1a.

Figure 1a: Utility Peak Loads in MW



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
CL&P Peak	4980	4818	5402	5512	5209	5345	5384	5479	5557	5626	5714	5782	5905	5955	6026
UI Peak	1274	1201	1346	1456	1298	1335	1335	1372	1415	1438	1460	1481	1501	1523	1533
CMEEC Peak	350	345	372	398	367	379	382	394	400	408	410	413	417	420	423

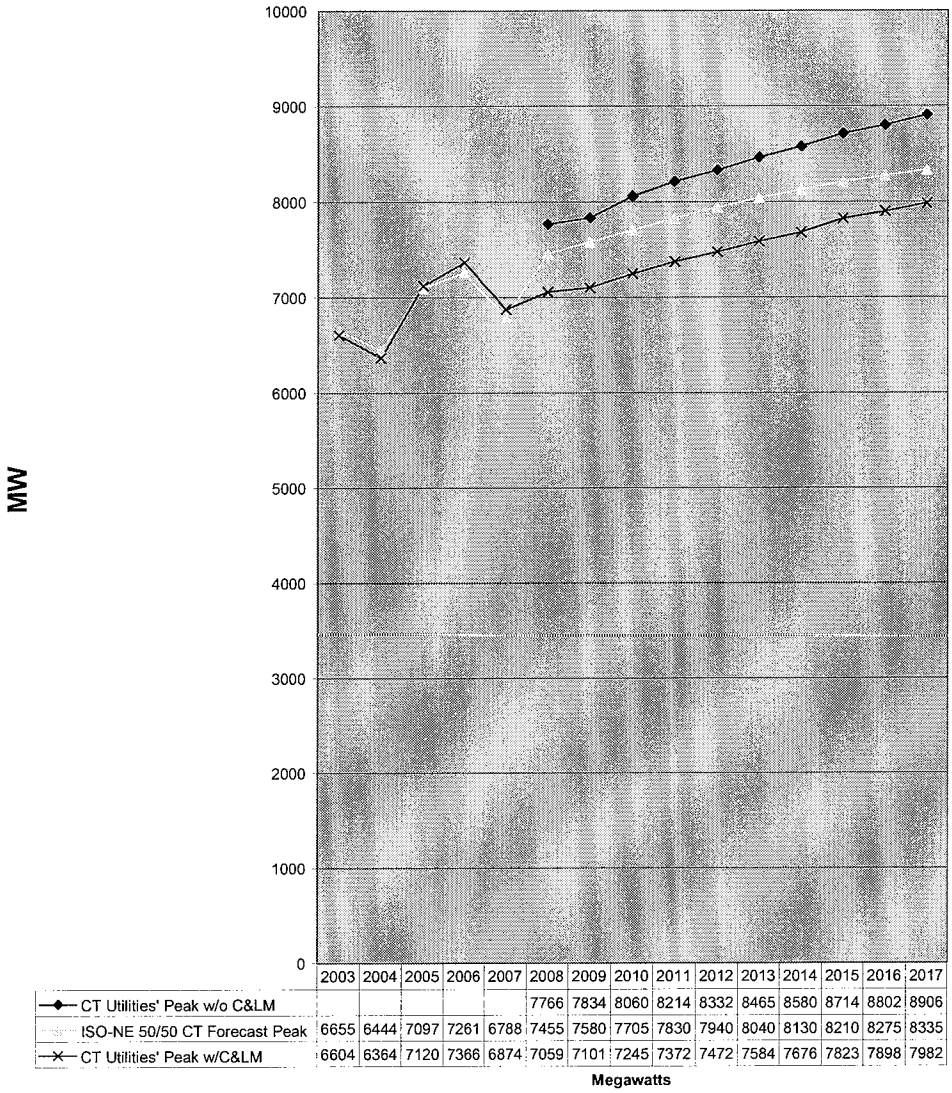
Megawatts

The sum of the three utilities' forecasts results in an approximate statewide peak load of 7,059 MW in 2008. This load is expected to grow at an ACGR of 1.37 percent and reach 7,982 MW by year 2017. The statewide ACGR is a weighed average of three utilities' ACGRs. Since CL&P has the largest service area in Connecticut, and its customers are the dominant source of load in the state, it is not surprising that the statewide ACGR of 1.37 percent is comparable to CL&P's ACGR of 1.34 percent. (See Figure 1b.)

The Council notes that the sum of three utilities' forecasts is an approximation of the Connecticut peak load because all three utilities may not necessarily experience their peaks on the same hour and/or same day. This is because customer usage patterns and peak temperatures may vary statewide. Thus, adding the three utilities' forecasts may slightly overstate the peak load in the state, but the error is generally considered small.

ISO-NE predicts, in its 50/50 forecast for Connecticut, a peak load of 7,455 MW in 2008. This peak load is expected to grow at an ACGR of 1.25 percent and reach 8,335 MW by year 2017. The ISO-NE 50/50 forecast exceeds the sum of the utilities' forecasts each year by an average of 429 MW. This is due to a difference in how conservation and load management (C&LM) and distributed generation (DG) are treated. (These topics will be discussed in later sections.) Generally, ISO-NE considers C&LM and DG to be capacity resources (i.e. sources like generation) and the CT utilities' consider them to be reductions in load. Thus, the forecasts differ by approximately the sum of the C&LM and DG effects. See ISO-NE and state utilities' forecasts in Figure 1b.

Figure 1b: 50/50 Forecasts in MW



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
CT Utilities' Peak w/o C&LM						7766	7834	8060	8214	8332	8465	8580	8714	8802	8906
ISO-NE 50/50 CT Forecast Peak	6655	6444	7097	7261	6788	7455	7580	7705	7830	7940	8040	8130	8210	8275	8335
CT Utilities' Peak w/C&LM	6604	6364	7120	7366	6874	7059	7101	7245	7372	7472	7584	7676	7823	7898	7982

CL&P and UI also provide an "extreme weather" forecast which provides projected loads assuming that the weather is unusually hot. CMEEC does not produce an extreme weather forecast. Thus, CMEEC's normal weather load is included in the sum of the utilities' extreme weather predictions. Given that CMEEC's load is small relative to the state load, the results are not materially different. The sum of the utilities' forecast for

extreme weather results in a peak load of 7,682 MW in 2008. This peak load is predicted to grow at an ACGR of 1.73 percent, reaching 8,964 in 2017.

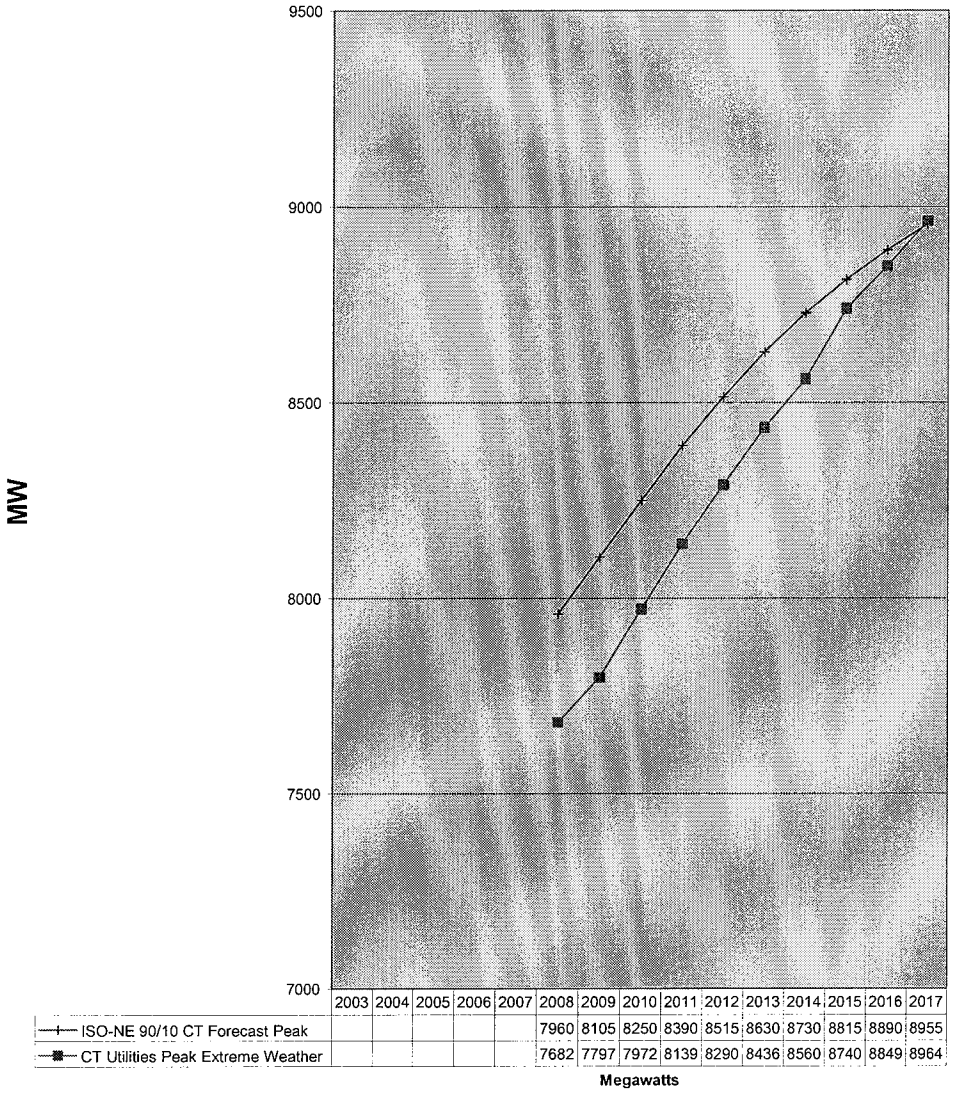
ISO-NE also produces a 90/10 forecast which is separate from the utilities' forecasts. The ISO-NE 90/10 forecast is used by the Connecticut utilities and ISO-NE for utility infrastructure planning, including transmission and generation.

A 90/10 forecast means that there is only a 10 percent chance that the projected peak load would be exceeded in a given year. In other words, odds are 90 percent that it would not be exceeded in a given year.

It represents a worst-case analysis for the state because it is essential to be conservative in the utility planning process. While over-forecasting can have economic penalties due to excessive and/or unnecessary expenditures on infrastructure, the consequences of under-forecasting are potentially more serious as it could result in outages. Therefore, the Council's analysis in this report will be based on the ISO-NE 90/10 forecast.

Specifically, ISO-NE's 90/10 forecast has a projected (worst-case) peak load of 7,960 MW in 2008. This load is expected to grow at an ACGR of 1.32 percent and reach 8,955 by 2017. See ISO-NE's 90/10 forecast and the state utilities' extreme weather forecasts in Figure 1c.

Figure 1c: Extreme Weather and 90/10 Forecasts in MW



Energy

Energy consumption is essentially load multiplied by time. Put another way, if electric load were plotted on the vertical axis of a graph and time is on the horizontal axis, the energy consumption would be the area between the load curve and the horizontal axis. Accordingly, the units of energy are represented in Watt-hours. On a household scale,

kilowatt-hours (or 1,000 watt-hours) is used. On a statewide scale, the utilities use gigawatt-hours (GWh) which is equal to one billion watt-hours.

While load represents a snapshot of time (usually recorded hourly by utilities) and provides the instantaneous rate of electric consumption, energy is the total work done by the electricity. For example, a 100-watt light bulb consumes electricity at a rate of 100 Watts. If the bulb were on for ten hours, the total energy consumed is 1,000 Watt-hours or 1 Kilowatt-hour. Whereas, a larger load, such as a 1,500 Watt electric heater would only have to run for 40 minutes (2/3 of a hour) to consume 1 kilowatt-hour of energy. A household or business electric meter essentially records the sum of the kilowatt-hours of all loads that operated on the premises for the billing period.

The three transmission/distribution utilities maintain records of energy consumption in their service area. It is generally the sum of the customers' consumption, the utilities internal consumption, and losses in the system. The sum of the three utilities energy consumption, like load, approximates the electric energy consumption in Connecticut. Since energy consumption is not based on an instant (or a particular hour) of time, whether the utilities experience their peak loads at the same time is immaterial in the case.

CL&P predicts that the total electric energy consumption in its service area will be 25,171 GWh in 2008. This number is expected to grow at a ACGR of 0.3 percent and reach 25,860 GWh by 2017.

UI predicts that the total electric energy consumption in its service area will be 6,192 GWh in 2008. UI's projections result in a ACGR of -1.1 percent. That is, UI's electric energy consumption is expected to decline at a ACGR of 1.1 percent and reach 5,582 GWh by 2017.

CMEEC predicts that the total electric energy consumption in its service area will be 2,028 GWh in 2008. This number is expected to grow at a modest ACGR of 0.76 percent and reach 2,171 by 2017.

Taken together, this data result in a statewide electric energy consumption of approximately 33,391 GWh in 2008. This number is expected to grow at a (weighted) ACGR of 0.074 percent and reach 33,613 GWh by 2017.

On the surface, this essentially flat growth in energy consumption may seem counterintuitive and even inconsistent given the 1.37 percent ACGR of electric load growth in the state. Actually, it is not. It is the result of changing customer behavior in response to higher electric rates.

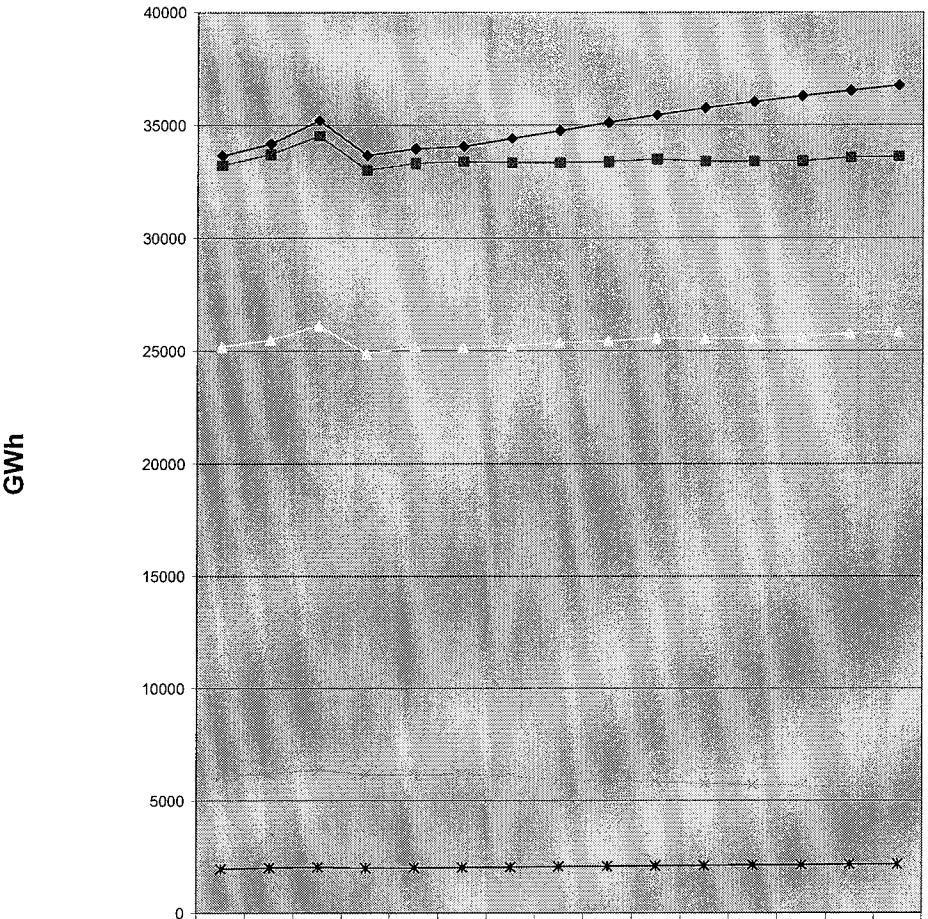
It appears that customers are conserving electricity where possible to reduce their electric bills, thus resulting in essentially flat or even declining (in the case of UI's territory) electric energy consumption. However, demand for air conditioning during the hottest days (and hours) of the year appears to remain strong. Customers appear willing to

operate their air conditioning to remain comfortable during those periods of hot weather which contributes to growing peak loads. However, they have a growing tendency to reduce consumption and seek to conserve at other times when possible, thus lowering overall electric energy consumption.

As is the case with electric load, ISO-NE also provides electric energy consumption data for Connecticut. The projected (future) data differ from the sum of the utilities projections because of the different forecasting models used. The past (historical) data differs slightly because the Connecticut control area as defined by ISO-NE may not exactly coincide with geographical Connecticut as considered by the utilities.

Specifically, ISO-NE predicts electric energy consumption in Connecticut to be 34,050 GWh in 2008. This number is expected to grow at a CAGR of 0.85 percent and reach 36,755 GWh. Figure 2 depicts the energy requirement forecasts.

Figure 2: State and Utility Energy Requirements in GWh



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ISO-NE Energy	33647	34171	35202	33656	33948	34050	34410	34760	35120	35450	35755	36030	36285	36525	36755
CT Utilities' Energy	33217	33706	34519	33005	33314	33391	33342	33354	33380	33494	33404	33405	33410	33579	33613
CL&P Energy	25190	25496	26119	24871	25185	25171	25215	25375	25434	25571	25544	25581	25617	25792	25860
UI Energy	6071	6205	6360	6149	6119	6192	6092	5921	5872	5825	5750	5699	5653	5631	5582
CMEEC Energy	1956	2005	2040	1985	2010	2028	2035	2058	2074	2098	2110	2125	2140	2156	2171

Gigawatt-Hours (GWh)

Conservation and Load Management (C&LM)

The Connecticut Energy Conservation Management Board (ECMB) was created by the Legislature in 1998 to advise and assist the state's utility companies in developing and implementing cost-effective conservation programs to meet Connecticut's changing and growing energy needs.

With the approval of the Department of Public Utility Control (DPUC), the ECMB also guides the distribution of the Connecticut Energy Efficiency Fund (CEEF). The CEEF is a fund raised to support energy efficiency programs and initiatives via a surcharge on customer electric bills.

These programs are implemented and administered by CL&P and UI, who are also accountable for the attainment of established performance goals approved by the DPUC and ECMB, including the reduction in overall energy consumption and the reduction of stress on Connecticut's transmission lines. CMEEC has a separate program for energy efficiency which, like CL&P and UI, results in peak load reduction and overall energy consumption reduction.

The ECMB submits an annual report to the legislature regarding energy efficiency programs in Connecticut. In the ECMB report dated March 1, 2008, the ECMB notes that the CEEF programs (for CL&P and UI) resulted in an energy savings of 355 million kWh or 355 GWh. As a result of CEEF programs administered during the time period of 2000-2007, ECMB estimates that 31 billion kWh or 31,000 GWh will be saved during the lifetime of the energy efficiency measures.

Assuming an average electric price of 18.01 cents per kWh, this is equal to a savings of $63.9 million annually and a lifetime savings of $776.8 million for businesses and residences throughout Connecticut.

CL&P reports a projected load reduction of 223 MW in 2008 due to C&LM. This number is expected to grow to 532 MW by 2017. UI reports a projected load reduction of 10 MW in 2008. This number is expected to grow to 167 MW by 2017. CMEEC reports a projected load reduction of 1.8 MW in 2008. This number is expected to grow to 14.4 MW by 2017.

[**COMMENT** – The CL&P load reduction figures cited in the draft include historical and projected reductions, while the UI figures include projected reductions only. The revised figures shown above in tracked changes are found in Table 3-1, p. 16, of the CL&P 2008 Forecast of Loads and Resources. In addition, "statewide peak load reduction" amount in the following paragraph, and the amounts used in Figure 3 below, also need to be corrected to reflect projected CLM load reductions only.]

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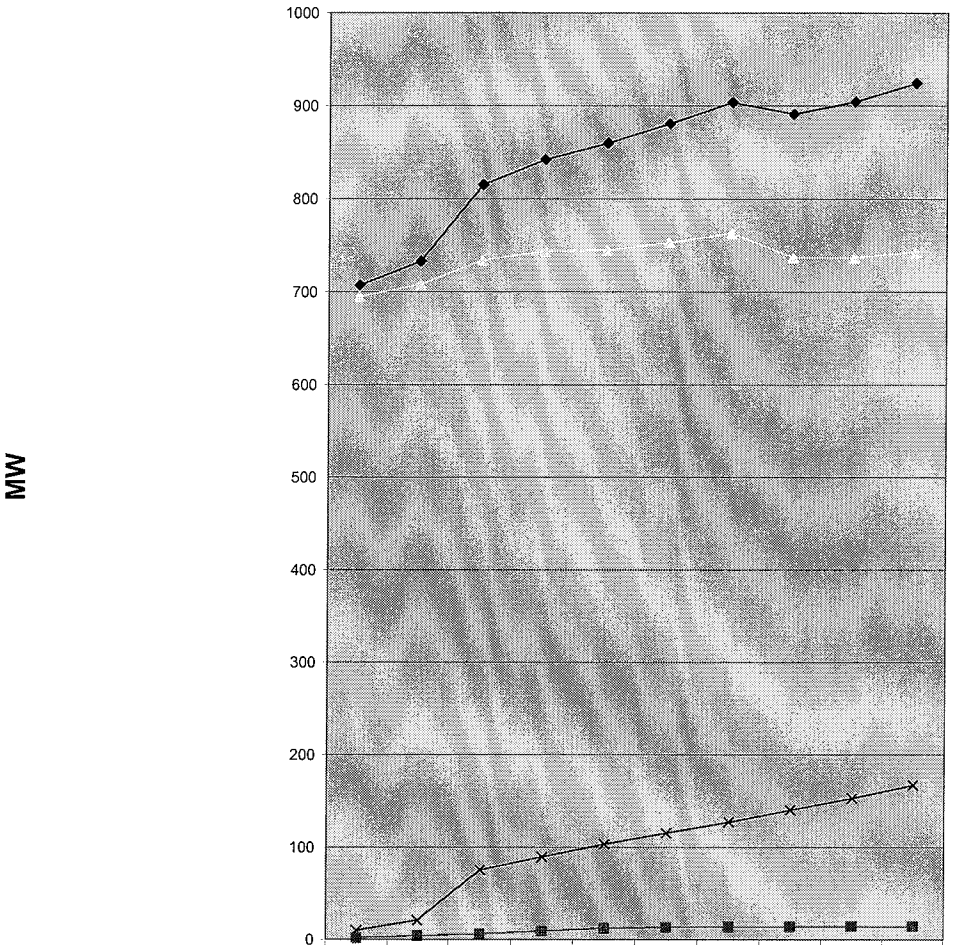
Collectively, the statewide peak load reduction due to C&LM is projected to be 706.8 [See Comment above] MW in 2008. This cumulative load reduction is projected to increase annually with a CAGR of 3.0 percent and reach 924.4 MW by 2017, the end of the forecast period. The magnitude of this reduction in load is on the order of the output of the (792 MW nominal) Lake Road Generating facility in Killingly. Figure 3 depicts the projected annual peak load reduction by utility throughout the forecast period.

Figure 3: C&LM Load Reductions



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
CT Utilities' C&LM Load Reduction	706.8	732.9	815.3	842.2	860	881.1	903.8	891.2	904.3	924.4
CL&P C&LM Load Reduction	695	708	734	744	745	753	763	737	737	743
UI C&LM Load Reduction	10	21	75	89	103	115	127	140	153	167
CMEEC C&LM Load Reduction	1.8	3.9	6.3	9.2	12	13.1	13.8	14.2	14.3	14.4

Megawatts

The Council believes that energy efficiency and programs like CEEF are an extremely important part of Connecticut's electric energy strategy. Increased efficiency allows the state's electric needs to be met, in part, without the additional pollution caused by new generating facilities. Reductions in peak load due to increased efficiency can also increase the life of existing utility infrastructure, such as transmission lines and substation

equipment (transformers, distribution feeders, etc.). Energy efficiency also reduces federal congestion costs and the costs of new generation. The supply side of the equation will be examined next.

Supply Resources

The Council anticipates that the state's supply resources will be adequate to meet demand during the forecast period, even assuming the most conservative forecast (ISO-NE's 90/10 estimate). Several significant generation projects have been approved by the Council and are expected to be brought online within the next few years.

The 620 MW Kleen Energy facility in Middletown is a natural gas-fired (with oil backup) combined cycle generating facility. The plant was approved by the Council in Docket No. 225. This plant was later selected in a request for proposal (RFP) by DPUC as a project that would significantly reduce federally mandated congestion charges. The plant is currently under construction. It is reflected in the load/resource balance table based on an estimated in-service date of late 2009.

On June 5, 2008, the Council approved the Bridgeport Energy II (BEII) project. This is a 350 MW simple cycle natural gas-fired generating plant with ultra low sulfur fuel oil as the backup fuel. This was the subject of Petition No. 841. The plant will be located at the site of the existing 442 MW (summer rating) Bridgeport Energy facility. The BEII project was later selected by the DPUC as a peaking facility. The project is expected to be complete by the end of 2010. Accordingly, it is reflected in the load/resource balance in Table 2.

[**COMMENT** – In Docket No. 08-01-01, the DPUC also selected the following peaker projects: a 188MW facility proposed by GenConn Energy LLC to be located in Milford; and a 130 MW facility proposed by PSEG in New Haven. The Council should include these facilities in its discussion of Supply Resources, in Table 1 below, and in the Conclusion of this report],

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Project 150

Per CGS § 16-244c as amended, the electric distribution companies are required to submit to the DPUC for its approval long-term power purchase agreements from Class I renewable energy projects that receive funding from the CEEF. On or after October 1, 2007 and until September 30, 2008 such agreements shall be comprised of not less than a total allocated between CL&P and UI, of 125 megawatts. On or after October 1, 2008, such agreements shall be comprised of not less than a total, allocated between CL&P and UI, of 150 megawatts. Several of these projects have already been the subject of Council review and approval. Others are still under Council review. Estimated in-service dates are included below in Table 1 for Project 150 projects that have already been approved by the Council. See later sections on renewable generation projects. Table 1 depicts the Project 150 renewable projects.

Table 1: Renewable Generation Projects Selected in Project 150					
Project	*Location*	*Project MW*	*Contract MW*	*Est. In-service Date*	*Council Review Status*
Watertown Renewable Power, LLC	Watertown	30	15	11/1/2010	Approved
DFC-ERG Milford Project	Milford	9	9	12/1/2008	Approved
South Norwalk Electric Works	South Norwalk	32.5	30	TBD	Not Rec'd
Plainfield Renewable Energy	Plainfield	37.5	30	7/1/2009	Approved
Clearview Renewable Energy, LLC	Bozrah	30	30	TBD	Under Review
Stamford Hospital Fuel Cell CHP	Stamford	4.8	4.8	TBD	Not Rec'd
Clearview East Canaan Energy, LLC	North Canaan	3	3	TBD	Not Rec'd
Waterbury Hospital Fuel Cell CHP	Waterbury	2.4	2.4	TBD	Not Rec'd
Contingent Project:					
Triangle Fuel Cell Project	Danbury	21	21	TBD	Not Rec'd

Source: 2008 CL&P Forecast and Council Records

Waterside Power

On June 20, 2006, Waterside Power, LLC (Waterside) submitted a petition (Petition No. 772) to the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to the existing temporary 69.2 MW oil-fired peaking project located at 17 Amelia Place in Stamford, CT. Waterside was also selected as part of an RFP issued by the DPUC. See the section titled "An Act Concerning Energy Independence." On May 8, 2008, the Council approved Waterside as a permanent, rather than temporary generating facility. Waterside's power output is included in Appendix A.

Plainfield Renewable Energy

On August 14, 2006, Plainfield Renewable Energy LLC submitted a petition (Petition No. 784) to the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the proposed construction, maintenance, and operation of a 37.5 MW wood biomass fueled electric generating facility in the Town of Plainfield. This project was approved on June 7, 2007. This power plant will be a Class I renewable resource, will provide additional generation to Connecticut, and will help meet part of the statutory requirement that a certain percentage

of our power come from renewable resources. See the later section titled "Renewable Portfolio Standards."

Kimberly Clark Corporation – New Milford

On May 15, 2007, the Kimberly Clark Corporation (KCC) submitted a petition (Petition No. 813) to the Council for a declaratory ruling that no Certificate is required for the proposed construction, maintenance, and operation of a 34 MW natural gas-fired generating facility in New Milford. Approximately 17 MW output would be consumed by KCC, and the remaining 17 MW would be fed into the electric grid. This project was approved by the Council on June 12, 2007.

Ansonia Generation LLC – Ansonia

On May 13, 2007, Ansonia Generation LLC submitted a petition (Petition No. 805) to the Council for a declaratory ruling that no Certificate is required for the proposed construction, maintenance, and operation of a 58.4 MW combined heat and power natural gas-fired generating facility. The project is eligible for a customer-side distributed generation capital grant pursuant to a DPUC determination that the project would help minimize federally mandated congestion charges. This project was approved by the Council on July 26, 2007.

Connecticut Jet Power, LLC – Cos Cob, Greenwich

On May 15, 2007, Connecticut Jet Power, LLC submitted a petition (Petition No. 812) to the Council for a declaratory ruling that no Certificate is required for the proposed construction, maintenance, and operation of two 20 MW oil-fired combustion turbines in Greenwich. There is currently approximately 60 MW of existing generating capacity at this site. With this project, an additional 40 MW would be available for use by the electric grid. This project was approved by the Council on July 26, 2007. This facility is complete and in service.

DFC-ERG Milford, LLC – Milford

On September 4, 2007, DFC-ERG Milford, LLC (DFC-ERG) submitted a petition (Petition No. 828) for a declaratory ruling that no Certificate is required for the proposed installation of a 9 MW fuel cell. This project includes three 2.4 MW fuel cell units and a turbo-expander generator powered by the waste heat which would generate an additional 1.8 MW of electricity. This project is part of Project 150 and perhaps the largest fuel cell project in the state. The Council approved this project on October 4, 2007.

Waterbury Generation, LLC – Waterbury

On October 5, 2007, Waterbury Generation, LLC (WatGen), submitted a petition (Petition No. 831) for a declaratory ruling that no Certificate is required for the proposed

construction, maintenance, and operation of a 96 MW combustion turbine peaking facility. This facility would be fueled by natural gas, with ultra-low sulfur fuel oil as the backup fuel. This project was selected by the DPUC because it would improve the reliability of the electric system and reduce federally mandated congestion charges. This project was approved by the Council on April 10, 2008.

Watertown Renewable Power, LLC – Watertown

On November 14, 2007, Watertown Renewable Power, LLC (WRP) submitted a petition (Petition No. 834) for a declaratory ruling that no Certificate is required for the proposed construction, maintenance, and operation of a 30 MW biomass gasification-fueled electric generating facility. The facility would burn clean chipped wood waste, and would operate as a baseload facility. This project was approved by the Council on April 24, 2008. The Council is awaiting a Development and Management Plan (D&M Plan) which contains the final construction details and site plans. This project is part of Project 150. See Table 1.

Devon Power LLC – Milford

On December 21, 2007, Devon Power LLC (DPLLC) submitted a petition (Petition No. 843) for a declaratory ruling that no Certificate is required for the proposed construction, maintenance, and operation of four 50 MW electric generating facilities at the existing Devon Station. These units would replace the decommissioned Devon 7 and 8 units. These new units would be considered Devon 15 through 18. These units would be capable of operating on natural gas or ultra-low sulfur fuel oil. This project was approved by the Council on January 24, 2008.

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Load/Resource Balance

Table 2 contains a tabulation of resources vs. peak loads. The ISO-NE 90/10 forecast is applied in this table because it is the forecast used for transmissionplanning purposes. The largest reserve requirement is 1,200 MW which is approximately the size of the largest generator, Millstone 3. In the event that Millstone 3 or any significantly sized smaller unit is off-line, reserves must be available to compensate for that loss.

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Assumed unavailable generation is a typical amount of power plants off-line for maintenance purposes. The supply resources are based on the total existing generation in Connecticut listed in Appendix A. Appendix A contains data from the July 2008 Seasonal Claimed Capability report from ISO-NE. Approved generation projects (not yet constructed and/or complete yet) are also included in Table 2. In-service dates for these facilities are estimates and may be subject to change.

[COMMENT – The ISO-NE 90/10 load forecast used in Table 2 below does not include projected values for Demand Resources. It should be noted that ISO-NE treats Demand Resources as a resource rather than a load reduction.]

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Table 2: MW Balance

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
90/10 Load	7960	8105	8250	8390	8515	8630	8730	8815	8890	8955
Reserve	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Load + Reserve	9160	9305	9450	9590	9715	9830	9930	10015	10090	10155
Existing Generation	6912	6912	6912	6912	6912	6912	6912	6912	6912	6912
Est.Unavail. Generation	501	501	501	501	501	501	501	501	501	501
Available Generation	6411	6411	6411	6411	6411	6411	6411	6411	6411	6411
Max. Import	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
Total Avail. Resources	8911	8911	8911	8911	8911	8911	8911	8911	8911	8911
Surplus/Deficiency	**-249**	**-394**	**-539**	**-679**	**-804**	**-919**	**1019**	**-1104**	**-1179**	**-1244**
SWCT RFP	248	248	0	0	0	0	0	0	0	0
Project 150			150	150	150	150	150	150	150	150
Kimberly Clark	17	17	17	17	17	17	17	17	17	17
Cos Cob	40	40	40	40	40	40	40	40	40	40
Middletown			620	620	620	620	620	620	620	620
Waterbury		96	96	96	96	96	96	96	96	96
Ansonia		58	58	58	58	58	58	58	58	58
Bridgeport Energy II				350	350	350	350	350	350	350
NRG Devon			200	200	200	200	200	200	200	200
Surplus/Deficiency	**56**	**65**	**642**	**852**	**727**	**612**	**512**	**427**	**352**	**287**
NEEWS	0	0	0	0	0	1100	1100	1100	1100	1100
Ameresco		5	5	5	5	5	5	5	5	5
Millstone Uprate		80	80	80	80	80	80	80	80	80
Surplus/Deficiency	**56**	**150**	**727**	**937**	**812**	**1797**	**1697**	**1612**	**1537**	**1472**

Existing Generation

Nuclear Powered Generation

Nuclear plants use nuclear fission (a reaction in which uranium atoms split apart) to produce heat, which in turn generates steam, and the steam pressure operates the turbines

that spin the generators. Since no step in the process involves combustion (burning), nuclear plants essentially produce electricity with "zero-air emissions." Pollutants commonly emitted from fossil-fueled plants are avoided, such as sulfur dioxide, nitrogen oxides, mercury, and carbon monoxide. Nuclear plants also do not emit carbon dioxide, which is a significant advantage regarding efforts to curb greenhouse gas emissions. However, issues remain with regard to security, the short and long-term storage of nuclear waste, and cost.

Connecticut currently has two operational nuclear electric generating units (Millstone Unit 2 and Unit 3) contributing a total of 2,014 MW of summer capacity, approximately 29.1 percent of the state's generating capacity. (The Millstone facility is the largest generating facility in Connecticut by power output.) Previously, nuclear power supplied approximately 45 percent of Connecticut's electricity. However, this capacity has been reduced by the retirement of the Connecticut Yankee plant in Haddam Neck (December 1996) and Millstone Unit 1 (July 1998).

Dominion Nuclear Connecticut Inc. (Dominion), Millstone's owner, submitted its license renewal applications to the United States Nuclear Regulatory Commission (NRC) on January 22, 2004. On November 28, 2005, the NRC announced that it had renewed the operating licenses of Unit 2 and Unit 3 for an additional 20 years. With this renewal, the operating license for Unit 2 is extended to July 31, 2035 and the operating license for Unit 3 is extended to November 25, 2045.

Most recently, on July 16, 2007, Dominion filed an application with the NRC for a capacity up-rate of approximately 80 megawatts on Millstone Unit 3. The increase in output could be delivered as early as the end of 2008. This will provide more capacity to Connecticut and the region. This up-rate is reflected in Table 2, with an estimated in-service date of 2009.

Coal Powered Generation

Connecticut currently has two coal-fired electric generating facilities contributing 564 MW, or approximately 8.2 percent of the state's current capacity. The AES Thames facility, located in Montville, currently burns domestic coal and generates approximately 181 MW. The AES Thames facility is technically a cogeneration facility because, besides generating electricity for the grid, it also provides process steam to the Jefferson Smurfit-Stone Container Corporation.

The other coal-fired generating facility in Connecticut is the Bridgeport Harbor #3 facility located in Bridgeport. This facility burns imported coal and has a summer power output of approximately 383 MW.

While both of these facilities are listed as coal/oil in Appendix A, the Council notes that these are not dual-fuel facilities and cannot operate on oil alone. Oil is used to help ignite the coal initially to start the plant.

In general, using coal as fuel has the advantages of an abundant domestic supply (US reserves are projected to last more than 250 years), and an existing rail infrastructure to transport the coal. However, despite the advantages of domestic coal, generators sometimes find imported coal more economical to use. Cost savings are realized by using low sulfur imported coal versus indigenous coal requiring more emissions control efforts.

In conventional coal-fired plants, coal is pulverized into a dust and burned to heat steam for operating the turbines. However, burning coal to make electricity causes air pollution. Pollutants emitted include sulfur dioxide, carbon monoxide, and mercury. Coal-fired power plants have a relatively high carbon dioxide emissions level in relation to other generation fuel supplies. Carbon dioxide emissions are believed to contribute to global warming. In response to these concerns, Connecticut has committed to reduce carbon dioxide emissions through the Regional Greenhouse Gas Initiative (RGGI).

One alternative to conventional coal-fired generation is "clean coal technology." This is a complex process in which gaseous fuel (such as carbon monoxide) is extracted from coal and then burned in a gas turbine engine. The result is higher efficiency and significant lower air pollution than conventional coal-fired power plants.

Petroleum Powered Generation

Connecticut currently has 34 oil-fired electric generating facilities contributing 2,656 MW, or 38.4 percent of the state's current capacity. This takes into account the reactivation of Devon 10 (14 MW) on June 29, 2006.

Both Devon 7 and 8 are considered decommissioned. These units are expected to be replaced by Devon 15 through 18. (See earlier section titled Devon Power LLC – Milford.) This repowering project will result in higher efficiency, lower emissions, and will replace the approximately 200 MW of capacity lost when Devon 7 and 8 were taken out of service.

Additional oil-fired generation is not likely in the near future, due to market volatility and mounting oil prices. (However, replacement and/or repowering of existing aging units may occur.) In particular, the price of crude oil has recently set a record peak in excess $140 per barrel this year, up approximately 46 percent this year alone.

Moreover, oil-fired generation presents environmental problems, particularly related to the sulfur content of the oil, and may face tighter air-emissions standards in the near-term, such as regulation of carbon dioxide emissions. Some of the oil-fired generating facilities in Connecticut are dual-fueled, meaning that they can switch to natural gas if necessary. Currently, four active plants in Connecticut (Middletown #2 and #3; Montville #5; and New Haven Harbor #1) totaling approximately 882 MW have the ability to change from oil to gas. The Council believes that dual-fuel capability is an important part of diversifying the fuel mix for electric generation and avoiding overdependence on a particular fuel.

[COMMENT – The Council may also wish to note that each of the peaking generation projects selected by the DPUC in its June 25, 2008 decision in Docket No. 08-01-01 will have natural gas as their primary fuel, with oil as a back-up fuel. The units are also expected to utilize oil in the winter.]

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Natural Gas Powered Generation

Connecticut currently has 14 natural gas-fired generating units (not including Lake Road) contributing a total of 1,352 MW, or 19.6 percent of the state's generating capacity. This includes additions such as the Milford Power facility, with a total summer rating of 489 MW.

Natural gas-fired electric generating facilities are preferred over those burning coal or oil primarily because of higher efficiency, lower initial cost per kW, and lower air pollution. Natural gas generating facilities also have the advantage of being linked directly to their fuel source via a pipeline.

Some natural gas generating plants, such as Bridgeport Energy, Milford Power and Lake Road, are combined-cycle. Added to the primary cycle, in which gas turbines turn the generators to make electricity, is a second cycle, in which waste heat from the first process is used to generate steam: steam pressure then drives another turbine that generates even more electricity. Thus, a combined-cycle plant is highly efficient. However, the tradeoffs are higher initial costs and increased space requirements for the extra generating unit.

The Towantic power plant in Oxford and the NRG facility in Meriden were approved by the Council, but have been subject to project-specific delays. Thus, the completion dates are unclear at this time. Accordingly, they are not included in Table 2 to be conservative.

Hydroelectric Power Generation

Connecticut's hydroelectric generation consists of 28 facilities contributing approximately 138 MW, or 2.0 percent of the state's current generating capacity. Hydroelectric generating facilities use a domestic, largely renewable energy source, emit zero air pollutants, and have a long operating life. Also, some hydro units have black start capability. However, hydroelectric units divert river flows from worthwhile public uses, such as recreation and irrigation, and can disrupt fish and wildlife. The main obstacle to the development of additional hydroelectric generation in Connecticut is a lack of suitable sites.

FirstLight Hydro Generating Company (FLHGC) f/k/a Northeast Generation Company, Connecticut's largest provider of hydroelectric power owns the following hydroelectric facilities: Bantam, Bulls Bridge, Falls Village, Roberstville, Scotland, Stevenson,

Taftville, Tunnel 1-2, Rocky River, and Tunnel 10. Table 3 shows the status of the Federal Energy Regulatory Commission (FERC) licenses for FLHGC's facilities.

Table 3

Generating Facility	Status of FERC License
Bantam 1	Not FERC Relicensed
Bulls Bridge 1-6	40 year license issued on June 23, 2004
Falls Village 1-3	40 year license issued on June 23, 2004
Robertsville 1-2	Not FERC Relicensed
Scotland 1	License expires August 31, 2012. Re-licensing to begin in 2007.
Shepaug 1	40 year license issued on June 23, 2004
Stevenson 1-4	40 year license issued on June 23, 2004
Taftville 1-5	Not FERC Relicensed
Tunnel 1-2	Not FERC Relicensed
Rocky River	40 year license issued on June 23, 2004

Solid Waste Power Generation

Connecticut currently has approximately 184 MW of solid waste-fueled generation, approximately 2.7 percent of the state's generation capacity. The Exeter generating plant in Sterling burns used tires, and has a summer rating of approximately 24 MW. The remaining 160 MW of solid waste-fueled generation includes: Bridgeport Resco; Bristol Resource Recovery Facility (RRF); Lisbon RRF; Preston RRF; Wallingford RRF; and the Connecticut Resource Recovery Agency South Meadows 5 and 6 facilities. Solid waste has the advantage of being a renewable, locally supplied fuel and it contributes to Connecticut's fuel diversity. It is not affected by market price volatility, nor supply disruptions—significant advantages over fossil fuels. In addition, the combustion of solid waste produces relatively low levels of greenhouse gases, and reduces the amount of space needed for landfills.

Recently passed energy legislation encourages the development and expansion of waste-to-energy facilities. Trash to energy plants are considered a Class II renewable resource, which could count toward the Renewable Portfolio Standards. See later section titled "Renewable Portfolio Standards."

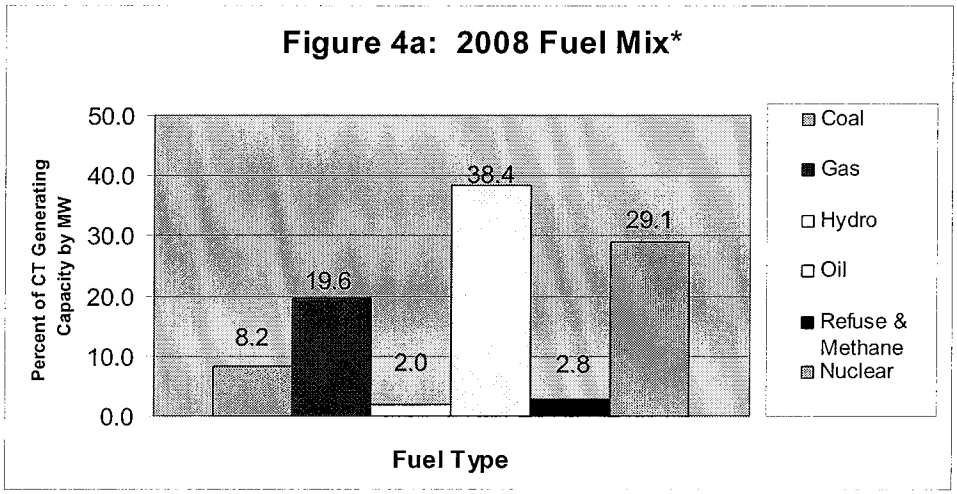
Miscellaneous Small Generation

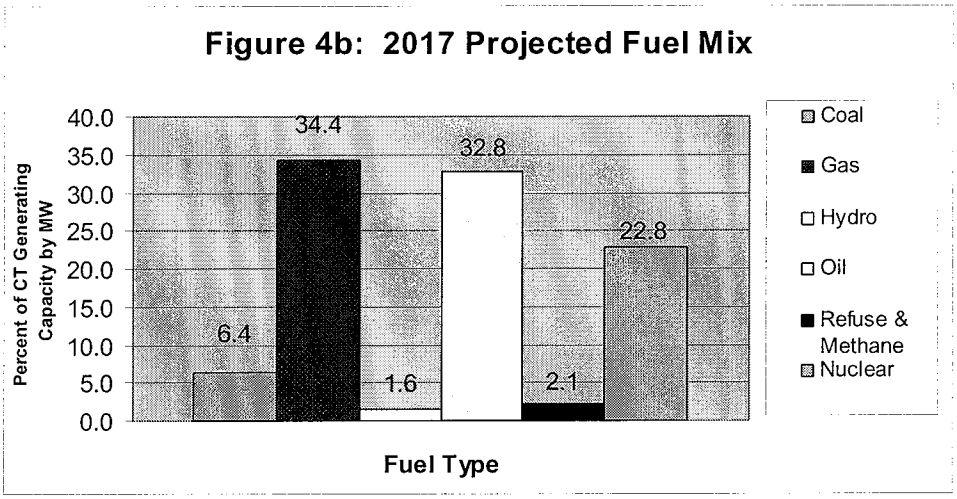
Approximately 134 MW of electricity is generated by 67 independent entities in Connecticut such as schools, businesses, homes, etc. This portion of generation is not credited to the state's capability to meet demand because ISO-NE does not control its dispatch. However, these privately-owned units do serve to reduce the net load on the grid, particularly during periods of peak demand. They range from 5 kW to 32.5 MW in size and are fueled primarily by natural gas, with several others using oil, solid waste, hydro, solar, wind, landfill gas (essentially methane), and propane. The newest significant addition to this category is the 24.9 MW cogeneration facility at the University of Connecticut. This unit was put into service in August 2005.

Under Public Act 05-01, An Act Concerning Energy Independence, financial and other incentive mechanisms were put in place to encourage the amount of installed distributed generation and combined heat and power in Connecticut. The Department of Public Utility Control has approved numerous grant applications for distributed generation projects. So while more small distributed generation is expected, it is not clear at this time how many of these projects will actually be constructed.

Fuel Mix

Based on existing generation and future (approved) generation projected in Table 1, the estimated fuel mix (by MW) is provided below for 2008 and also 2017, the end of the forecast period. Retirement of older oil-fired generation is not included in this mix (consistent with the utilities' Integrated Resource Plan) because it is not clear how many units, if any would be retired during the forecast period. Furthermore, a retirement (or decommission) of a unit does not necessarily result in a net loss of MW because it is possible that the unit may be repowered or replaced. See Figure 4a and 4b below.





* Lake Road generating plant is not included in Figures 4a or 4b because it is electrically more part of Rhode Island than Connecticut.

Import Capacity

Connecticut can reliably import approximately 1,500 MW to 2,500 MW of power from the neighboring states of New York, Rhode Island, and Massachusetts. 2,500 MW is considered the maximum and best-case scenario at this time.

Connecticut has one 345-kV tie with each bordering state. The 345-kV tie from New York can carry 18 percent of our import capacity. The 345-kV tie from Rhode Island can carry 31 percent of our import capacity. The 345-kV tie from Massachusetts can carry about 32 percent of our import capacity. This results in 81 percent of our imports being carried on this high capacity lines. The remaining power is carried via 115-kV connections with our neighboring states.

Under this current configuration, Connecticut can only import about 30 percent of our peak demand. CL&P is developing a transmission upgrade plan that would increase the state's import capacity to approximately 45 percent of our peak demand in order to increase reliability and further reduce the need for reliability must run (RMR) contracts due to transmission constraints. This plan is called the New England East – West Solution (NEEWS). See Transmission section.

Market Rules Affecting Supply

Forward Capacity Market

Pursuant to a settlement agreement filed with FERC on March 6, 2006, an ISO-NE press release noted it would introduce a new Forward Capacity Market (FCM) under which ISO-NE would project the needs of the power system three years in advance, then hold an

annual auction to purchase power resources to satisfy those needs. New generating plants would be allowed to bid in on the same basis as existing ones, a rule that would favor alternative fuels, and, for the first time, demand response resources could bid in a form of capacity supply. Various supplemental rules would provide penalties for generators who fail to fulfill their auction commitments, and also ensure that large and small generators are treated on par.

The ISO-NE FCM rules needed to conduct the first forward capacity auction (FCA) were approved by the FERC during 2007. In the first auction, 39,155 MW of new and existing demand and supply resources competed to provide the 32,305 MW needed for New England reliability for the twelve month period: June 2010 through May 2011. The auction consisted of eight rounds over a three-day period.

Legislation Affecting Supply

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An Act Concerning Energy Independence

On July 21, 2005, Public Act 05-1 (PA 05-1), "An Act Concerning Energy Independence", was approved. Its purpose is to boost electric supply through a combination of innovative means, with the incentive being relief from congestion charges, that is, charges imposed by FERC on Connecticut rate-payers in locations where demand is especially high and supply is especially low. PA 05-1 provisions that are most relevant to the Council's forecast review are discussed below.

PA 05-1 requires the DPUC to solicit proposals for reducing congestion costs during 2006-2010. Proposals can be submitted for customer-side distributed resources, grid-side distributed resources, new generation facilities, including expanded or repowered generation, and conservation or energy efficiency agreements. Successful proposals will receive contracts for no more than 15 years for the purchase of electric capacity rights. DPUC is instructed to prefer proposals that cause the greatest aggregate reduction in federally mandated congestion charges; make efficient use of existing sites and supply infrastructure; and serve the long-term interests of ratepayers.

PA 05-1 also required the DPUC to issue an RFP soliciting new or additional generation or conservation to mitigate electric demand and rates in the state. In response to the RFP issued on September 15, 2006, 80 project bid registration packages from 45 different entities were received, representing more than 8,000 MW of capacity from a full spectrum of resources, including generation, demand-side reduction, conservation and energy efficiency technologies. On April 23, 2007, the DPUC announced that it had selected four winning bidders whose projects total 787 MW. The portfolio of projects consists of: a 620 MW gas-fired combined cycle baseload plant in Middletown offered by Kleen Energy; a 66 MW oil-fired peaking facility located in Stamford offered by Waterside Power; a 96 MW gas-fired peaking facility in Waterbury offered by Waterbury Power; and a 5 MW statewide energy efficiency project offered by Ameresco. These upcoming projects are reflected in Table 2.

PA 05-1 further requires the electric utilities to submit Time-of-Use (TOU) rate plans to the DPUC, by October 2005, that provide for a combination of mandatory and voluntary rates, including peak, shoulder, off-peak and seasonal rates, and additionally, optional interruptible/ load response rates for certain commercial and industrial customers.

PA 05-1 also creates a new municipal conservation and load management program in 2006, requiring municipal electric utilities to assess a 1.0 mill per kilowatt-hour sold, with the charge increasing to 2.5 mills by January 1, 2011. The money goes into a special non-lapsing fund held by CMEEC, which must develop an annual conservation plan for member utilities.

An Act Concerning Electricity and Energy Efficiency

On June 4, 2007, Public Act 07-242, An Act Concerning Electricity and Energy Efficiency (PA 07-242) became effective. PA 07-242 requires development of electric utility planning for procuring energy efficiency and other clean energy resources such as renewables. PA 07-242 also creates a first time home heating oil conservation program managed by a board of home heating oil dealers, environmental and consumer interests reporting annually to the Energy Conservation Management Board. Energy efficiency standards for appliances are also created in the PA 07-242. PA 07-242 requires that the state auction 100% of allowances from the RGGI program and use most of the proceeds to fund cost-effective energy efficiency, demand response, and renewables, with a small percentage of the proceeds being used to support administration of the program and climate policy development.

To facilitate the siting of electric generation, PA 07-242 permits the Council to approve by declaratory ruling:

- the construction of a facility solely for the purpose of generating electricity, other than an electric generating facility that uses nuclear materials or coal as a fuel, at a site where an electric generating facility operated prior to July 1, 2004;
- the construction or location of any fuel cell—unless the Council finds a substantial environmental effect—or of any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than 65 megawatts, so long as such the project meets the air quality standards of the Department of Environmental Protection;
- the siting of temporary generation solicited by DPUC pursuant to section 16-19ss of this act.

Renewable Portfolio Standards

PA 07-242 also revised Public Act 03-135 regarding the Connecticut Renewable Portfolio Standards (RPS) and required retail electric suppliers to ensure that a certain minimum percentage of their electricity comes from renewable energy sources.

Legislation has divided renewable fuels into two classes, depending roughly how much pollution they cause, and their sustainability. Under PA 07-242, these percentages have been revised with a target of 20 percent renewable energy sources by 2020.

Table 4 depicts the required percentages for Class I and Class II renewable energy sources through 2020.

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Table 4	Renewable Portfolio Standards	
Effective Date	*Minimum Class I Percentage*	*Addt'l Percentage of Class I or II*
1/1/2006	2 percent	3 percent
1/1/2007	3.5 percent	3 percent
1/1/2008	5 percent	3 percent
1/1/2009	6 percent	3 percent
1/1/2010	7 percent	3 percent
1/1/2011	8 percent	3 percent
1/1/2012	9 percent	3 percent
1/1/2013	10 percent	3 percent
1/1/2014	11 percent	3 percent
1/1/2015	12.5 percent	3 percent
1/1/2016	14 percent	3 percent
1/1/2017	15.5 percent	3 percent
1/1/2018	17 percent	3 percent
1/1/2019	19.5 percent	3 percent
1/1/2020	20 percent	3 percent
Source: PA 07-242		

According to PA 07-242, Section 40, an electric supplier or electric distribution company may satisfy the RPS requirements by purchasing certificates issued by the New England Power Pool Generation Information System provided the certificates are for Class I or Class II renewables generated within ISO-NE's territory (i.e. New England) or energy imported into ISO-NE's territory. For those renewable energy certificates under contract to serve end-use customers in the state on or before October 1, 2006, the electric supplier or distribution company may participate in a renewable trading program within said jurisdictions by the Department of Public Utility Control or purchase eligible renewable electricity and associated attributes from residential customers who are net producers.

PA 07-242 requires electric distribution companies and electric suppliers, on or after January 1, 2007, to demonstrate that no less than one percent of the total output of the suppliers or the standard service of an electric distribution company is obtained from Class III sources, a newly-defined group of resources focusing on combined heat and power systems and C&LM. On January 1, 2008, this percentage increases to 2 percent. For January 1 of years 2009 and 2010, the percentages are 3 and 4 percent, respectively.

PA 07-242 also restructures the Connecticut Energy Advisory Board (Board) and requires that the Board work with the electric distribution companies to review and approve a resource assessment and procurement plan. The Board will also be required to conduct studies on how to integrate and coordinate the state's energy entities and achieve the state's greenhouse gas goals as well as evaluate the efficacy of the state's efficiency program delivery.

Pursuant to PA 07-242, CL&P and UI along with their consultant, The Brattle Group, submitted an integrated resource plan (IRP) for Connecticut to the Board, dated January 1, 2008. The IRP concludes that Connecticut will not need to add new capacity to meet loss of load expectation capacity reliability needs under a wide range of possible futures for the next ten years.

This conclusion is based on certain assumptions, including the following:

- the IRP does not forecast any retirements of existing generation units;
- the IRP forecasts continued funding of C&LM initiatives at current levels;
- new resources contracted by the DPUC in certain recent dockets enter service as planned;
- 280 MW of peaking units are added to meet second contingency operating concerns; and
- the NEEWS project is included.

The IRP is subject to final review and approval by DPUC.

Finally, PA 07-242 is expected to benefit Connecticut by resulting in increased energy efficiency, reduced pollution, and additional electric generation powered by renewable energy sources. However, it is not clear at this time how many megawatts of this renewable-fueled electricity (under RPS) will be generated in Connecticut and how many will be imported in order to meet these requirements.

Transmission System

Transmission is the "backbone" of the electric system as it transports large amounts of electricity long distances efficiently by using high voltage. High voltages are used to minimize power loss. Since the losses are proportional to the square of the current[18], and since, in general, the higher the voltage, the lesser current required, high voltages lead to more efficient power delivery.

In Connecticut, electric lines with a voltage of 69 kilovolts (kV) or more are considered transmission lines. Distribution lines are those below 69-kV. They are the lines that come down our streets to connect (via a transformer) with even lower-voltage lines feeding each residence or business.

The state's electric transmission system contains approximately: 413.1 circuit miles of 345-kV transmission; 1,300 circuit miles of 115-kV transmission; 5.8 miles of 138-kV

transmission; and 99.5 circuit miles of 69-kV transmission. (These figures refer to AC transmission. The Cross Sound Cable is not counted because it is DC.) Appendix B shows planned new transmission, reconductoring, or upgrading of existing lines to meet load growth and/or system operability needs.

The majority of Connecticut's electric transmission, as noted above, is 115-kV. CL&P's remaining AC transmission is rated between 69-kV and 138-kV. The 138-kV transmission line connects Norwalk, Connecticut to Long Island via an underwater cable. In addition, CL&P has 13 ties (connections) with CMEEC, twenty with UI, and nine interstate connections. Of these interstate connections, one tie is with National Grid in Rhode Island; one tie is with Central Hudson in New York state; and five ties are with the Western Massachusetts Electric Company (WMECO) in Massachusetts.

The CL&P 345-kV transmission system transmits power from large central generating stations such as Millstone, Lake Road, and Middletown #4 via four 345-kV transmission ties with neighboring utilities. This includes one tie with UI, as well as three ties that cross the state line to connect with: National Grid in Rhode Island, WMECO in Massachusetts, and Consolidated Edison in New York State.

Electric Transmission in Southwest Connecticut

The most critical and constrained transmission area in the state, as well as New England, is a 54 town region is referred to as Southwest Connecticut (SWCT). This includes almost all of UI's service territory. This area is essentially west of Interstate 91 and south of Interstate 84. It accounts for approximately one-half the state's peak load, and is one of the fastest growing and economically vital areas of the state. The 115-kV lines that serve SWCT reached the limit of their ability to support the area's current and projected loads reliably and economically.

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Within SWCT, a critical sub-area is called the Norwalk-Stamford Sub-Area. Historically, Norwalk and Stamford have relied on local generation. Since generation has become less predictable, given electric restructuring, and given the age of generating plants around Norwalk and Stamford, the Norwalk-Stamford Sub-Area had to look at transmission, rather than generation, to meet its needs.

ISO-NE, CL&P, and UI devised a plan to supplement the existing 115-kV transmission lines with a new 345-kV "loop" though SWCT that would integrate the area better with the 345-kV system in the rest of the state and New England, and provide electricity more efficiently.

The first phase of this proposed upgrade (known as "Phase One"), involves the construction of a 345-kV transmission line from Plumtree Substation in Bethel to the Norwalk Substation in Norwalk. The Phase One proposal was the subject of Council Docket No. 217, approved by the Council on July 14, 2003. Construction is complete, and the line was activated in October 2006.

The second phase of the upgrade (known as "Phase Two") was the subject of Council Docket No. 272. This proposal includes the construction of a 345-kV transmission line from Middletown to Norwalk Substation. This project was approved by the Council on April 7, 2005. Construction began in 2006 and is expected to finish in 2009. Deleted: by year-end

Glenbrook-Norwalk Cable Project

In Docket No. 292, the Council approved the construction of two new 115-kV underground transmission cables 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.

Electric Transmission in Northeast Connecticut

Lake Road Generating Facility

Currently, the three-unit Lake Road Generating Facility (Lake Road) in Killingly (which is approximately 693 MW) is not counted towards Connecticut's generation capacity. Lake Road has one 345-kV transmission line (#330 circuit) connecting it to Card Substation in Lebanon and another 345-kV transmission line (#347 circuit) connecting it to Sherman Road Substation in Rhode Island. Transmission lines can be out of service for several reasons such as a fault (i.e. short circuit) or a lighting strike. The loss of a line can have significant consequences. Specifically, under the original configuration, the loss of #330 circuit would completely isolate Lake Road from Connecticut. For that reason, Lake Road has not been considered a Connecticut resource.

In 2006, CL&P completed the construction of the Killingly Substation. (See Substations and Switching Stations Section). This substation is located between the Lake Road Substation and the Sherman Road Substation. As a result, the Killingly Substation separates the #347 circuit into two lines. The line from Lake Road to Killingly Substation is now called the #3348 circuit and the line from Lake Road to Sherman Road is called the #347 circuit.

The SPS was then modified to protect Lake Road units by tripping them off in the event of the loss and restoration of the #3348 and #347 circuit. Tripping the Lake Road units following a fault of the #330 circuit is no longer required due to the system configuration.

The Killingly Substation connects the 345-kV system to the 115-kV system. Therefore, some power generated by Lake Road can flow through the #3348 circuit to Killingly Substation and then enter Connecticut via the 115-kV system. However, given that the Lake Road units would trip in the event of the loss of the #3348 and #347 circuits, Lake Road is still not considered a Connecticut resource. This is because while the connection to the 115-kV system may still exist, tripped units provide no power to the grid. Even under normal operating conditions with all transmission lines in service, the system

cannot support all of Lake Road's capacity being fed into the 115-kV system via Killingly Substation.

A study was performed which determined that Unit 2 of Lake Road may be counted as Connecticut capacity, if certain system upgrades and modifications are made. The SPS would have to be removed for Unit 2. Terminal equipment upgrades would be necessary on existing 115-kV tie lines between Massachusetts and Connecticut due to the interdependencies that exist between the major tie lines in Connecticut. A new SPS would be needed to trip all Lake Road Units following the loss of both the #347 and #330 circuits.

Finally, the construction of an additional 345-kV transmission line between Sherman Road and Card Substation could allow all of Lake Road's capacity to become Connecticut's capacity. This is being studied as part of the New England East – West Solution which will be discussed next.

New England East – West Solution

In 2006, National Grid and CL&P identified a transmission upgrade project known as the New England East – West Solution (NEEWS). NEEWS would include a new 345-kV transmission line connecting National Grid's service territory in Massachusetts and Rhode Island with CL&P's service territory to 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 Millbury Substation in Massachusetts to CL&P's Card Street Substation in Lebanon.

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NEEWS also includes new and modified 115-kV and new 345-kV transmission facilities, including a new 345-kV transmission line connecting Connecticut and western Massachusetts to address reliability problems in the Springfield, Massachusetts area. The new 345-kV facilities are expected to connect the Western Massachusetts Electric Company's (WMECO) Agawam Substation with CL&P's North Bloomfield Substation in Bloomfield.

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New and modified 115-kV and new 345-kV transmission facilities would address reliability problems associated with the transfer of power from eastern Connecticut to western and southern Connecticut also as part of the NEEWS project. The currently planned connection points for a new 345-kV transmission line are North Bloomfield Substation in Bloomfield and Frost Bridge Substation in Watertown.

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 transmission system and over-dependence on local generation. This portion of the NEEWS project would be located inside Rhode Island and would be constructed by National Grid.

The ISO-NE technical approval process is scheduled to be completed in 2008. CL&P expects the aggregate of the Southern New England transmission reinforcements to significantly increase the import capacity into Connecticut, with estimates ranging from 1,100 MW to 1,700 MW. (Table 2 assumes 1,100 MW to be conservative.) It is anticipated that the application(s) for this project will be submitted to the Council later in 2008.

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Substations and Switching Stations

An electric substation is an area or group of equipment containing switches, circuit breakers, buses, and transformers for switching power circuits and to transform power from one voltage to another or from one system to another. For example, to connect the 345-kV transmission system with the 115-kV transmission system, a substation containing transformer(s) that convert 345-kV to 115-kV is required. An example is the Killingly 2G Substation, which is discussed below.

On May 11, 2005, the Council approved the Northeast Connecticut Reliability Project as Docket No. 302. This project includes the construction of a new 345-kV/115-kV substation (known as Killingly 2G Substation) on CL&P property straddling the Killingly/Putnam town line. The new substation will connect to an existing overhead 345-kV transmission line, then use that source to feed into two existing overhead 115-kV transmission lines. This project is expected to alleviate transmission capacity constraints and improve electric system reliability in this region of the state. This project is currently in service.

Another type of substation that is very common is one that connects to the transmission system and supplies the distribution system. For example, the input might be 115-kV transmission and the output might be 13.8-kV distribution. The Council recently approved this type of substation in the Town of Guilford in Docket No. 326.

Another type of substation would be used to connect a generator to the grid. Generators often have an output voltage that is less than the transmission voltage. Thus, the generator's output voltage has to be raised to the transmission voltage before the power generated can be fed into the grid. Lastly, a switching station is a facility where transmission lines are connected without power transformers.

As depicted in Table 5, as many as 15 new substations are planned for the next seven years to address high load areas within the state. Some of the substations are associated with the 345-kV transmission projects in SWCT. Others are associated with local load growth. Other additional substations are being considered, with the estimated in-service dates to be determined.

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Table 5: Planned Substation Projects	Est. In-Service Date	Com
Install the new 115/13.8 kV Wilton Substation in Wilton	2008	CL&P
Modify the existing 115 kV Norwalk Substation in Norwalk	2008	CL&P
Modify the existing 115 kV Glenbrook Substation in Stamford	2008	CL&P

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Modify the existing 138/115 kV Norwalk Harbor Substation in Norwalk	2008	CL&P
Modify the existing 115 kV Flax Hill Substation in Norwalk	2008	CL&P
Install the new 115 kV Oxford Substation in Oxford	2008	CL&P
Modify the existing 115 kV Cedar Heights Substation in Stamford	2008	CL&P
Modify the existing 345/115 kV Barbour Hill Substation in South Windsor	2008	CL&P
Modify the existing 115 kV Enfield Substation in Enfield	2008	CL&P
Install the new 115/13.8 kV Trumbull Substation in Trumbull	2008	UI
Modify the existing 115 kV Cos Cob Substation in Greenwich	2009	CL&P
Modify the existing 115 kV Devon Substation in Milford	2009	CL&P
Install the new 345/115 kV East Devon Substation in Milford	2009	CL&P
Modify the existing 345 kV Southington Substation in Southington	2009	CL&P
Modify the existing 115 kV Mystic Substation in Mystic	2009	CL&P
Modify the existing 115 kV North Bloomfield Substation in Bloomfield	2009	CL&P
Modify the existing 345 kV Norwalk Substation in Norwalk	2009	CL&P
Modify the existing 345 kV Beseck Switching Substation in Wallingford	2009	CL&P
Modify the existing 345 kV Card Substation in Lebanon	2009	CL&P
Modify the existing 345 KV Millstone Substation in Waterford	2009	CL&P
Install the new 115 kV Stepstone Substation in Guilford	2009	CL&P
Install the new 115 kV Rood Avenue Substation in Windsor	2009	CL&P
Modify the existing 115 kV Glenbrook Substation in Stamford	2009	CL&P
Modify the existing 345 kV Long Mountain Substation in New Milford	2009	CL&P
Install the new 345/115 kV Singer Substation in Bridgeport	2009	UI
Install the new 115 kV Waterford Substation in Waterford	2010	CL&P
Install the new 345 kV Kleen Substation in Middletown	2010	CL&P
Modify the existing 115 kV Waterside Substation in Stamford	2010	CL&P
Install a new 115 kV substation in Shelton	2010	UI
Install a new 115 kV substation in New Haven	2010	UI
Install a new 115/27.6 kV Metro-North Substation	2010	UI
Modify the existing 115 kV Scitico Substation in Enfield	2011	CL&P
Rebuild the existing Grand Avenue 115 kV Switching Station	2012	UI
Naugatuck Valley Reliability improvement Project (115 kV)	2012	UI
Pequonnock Fault Duty Mitigation Project (115 kV)	2012	UI
Install a new 115 kV substation in Fairfield	2012	UI
Install a new 115 kV substation in Orange	2013	UI
Install a new 115 kV substation in Hamden	2014	UI
Install a new 115 kV substation in North Branford	2014	UI
Install a new 115 kV substation in New Haven	2015	UI
Modify the existing 115 kV Bunker Hill Substation in Waterbury	TBD	CL&P
Modify the existing 345 kV Millstone Substation in Waterford	TBD	CL&P
Modify the existing 345 kV Card Substation in Lebanon	TBD	CL&P
Modify the existing 345 kV Lake Road Substation in Killingly	TBD	CL&P
Modify the existing 345 kV Frost Bridge Substation in Watertown	TBD	CL&P
Modify the existing 345 kV North Bloomfield Substation in Bloomfield	TBD	CL&P
Modify the existing 115 kV Glenbrook Substation in Stamford	TBD	CL&P
Modify the existing 115 kV Torrington Terminal Substation in Torrington	TBD	CL&P
Modify the existing 115 kV Montville Substation in Montville	TBD	CL&P
Modify the existing 115 kV Peaceable Substation in Redding	TBD	CL&P
Modify the existing 115 kV Cedar Heights Substation in Stamford	TBD	CL&P
Modify the existing 345 kV Manchester Substation in Manchester	TBD	CL&P
Modify the existing 115 kV Waterside Substation in Stamford	TBD	CL&P
Install the new 115 kV Sherwood Substation in Westport	TBD	CL&P

Because new transmission lines or new substation and switching facilities may 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. In addition to anticipating these technical questions, the companies must deal with concerns about electric and magnetic fields, aesthetics, and environmental impacts as they evaluate suitable sites.

Resource Planning

The Council fully endorses and participates in initiatives to maintain electric reliability, including programs such as C&LM, resource modeling, and transmission planning. The need to coordinate these efforts has substantially increased as growing demand has stressed existing resources; at the same time, because of electric restructuring, the overall task of matching supply to demand has become more complex. Rate pressures, congestion management, targeted demand side programs, regional transfers, and scarce locations for siting facilities are only a few of the issues that are making the Council's decisions difficult and critical.

As depicted in Appendix B, the Council continues to assess the existing electric system to maintain and improve reliability. Further, the Council notes the Board's legislated mandate for stimulating alternatives to certain proposed electric facilities that come before the Council. Such alternatives may include new transmission technologies, generation using renewable fuels, distributed generation, wholesale and retail market strategies, CEEF, and combinations thereof. The Council encourages innovation. In order for regulators to work well, they must look at multiple scenarios, and consider diverse solutions. The future never sits still.

Conclusion

This Council has considered Connecticut's electric energy future for the next ten years and concludes that supplies are expected to meet demand, even under the more stringent ISO-NE "90/10" forecast. Very significant progress has been made to address a previous shortage of electric generation in the state. Several generation projects have been approved by the Council; others are currently under Council review or will be filed with the Council in the near term.

The most significant gains in generating capacity will be associated with the upcoming 620 MW Kleen Energy power plant in Middletown and the 350 MW Bridgeport Energy II facility in Bridgeport. Along with other smaller projects, this results in over 1,000 additional megawatts for the state.
[COMMENT – Please see comment above with respect to the projects selected by the DPUC in Docket No. 08-01-01]

Significant improvements to our transmission system are complete and/or underway. The Phase I transmission upgrade is complete, and Phase II is under construction. The NEEWS project, soon to be filed with Council, is intended to address regional reliability needs and expected to increase electric supply in Connecticut via additional import capacity. Additional generation fueled by renewable resources as well as increased efficiency in homes and businesses are expected to result from the Act Concerning Electricity and Energy Efficiency.

Issues that warrant attention in the future include:

- maintain sufficient emergency generation and demand response in SWCT until the Phase II transmission upgrade is completed;
- consider additional interstate transmission resources that will allow additional transfer capability into Connecticut for additional reliability and to help meet RPS requirements;
- consider clarity, transparency and a longer forecast period in relation to operating reserve requirements;
- be proactive regarding the deactivation/retirement of older generating facilities in the context of electric system needs and consider replacement/repowering of such facilities where feasible;
- encourage conservation and demand response;
- avoid excessive reliance on any one fossil fuel for generation; and
- encourage innovations.