Review of the Ten Year Forecast of Connecticut Electric Loads and Resources 2005-2014

Connecticut Siting Council

The Connecticut Siting Council (Council), formerly known as the Power Facility Evaluation Council, was established in 1971 to balance the need for adequate and reliable public services at the lowest reasonable cost to consumers while protecting the environment and the ecology of Connecticut. The Council is part of the executive branch of the State of Connecticut and derives its operating revenues from application fees and assessments charged to the applicants. The Council meets most often to review energy and telecommunications matters, typically every two to four weeks.

Pursuant to CGS § 16-50i, electric facilities subject to Council review include electric transmission lines of a design capacity of sixty-nine kilovolts or more, including associated equipment but not including a transmission line tap, as defined in subsection (e) of this section; any electric generating or storage facility using any fuel, including nuclear materials, including associated equipment for furnishing electricity but not including an emergency generating device, as defined in subsection (f) of this section or a facility (i) owned and operated by a private power producer, as defined in section 16-243b, (ii) which is a qualifying small power production facility or a qualifying cogeneration facility under the Public Utility Regulatory Policies Act of 1978, as amended, or a facility determined by the council to be primarily for a producer's own use, and (iii) which has, in the case of a facility utilizing renewable energy sources, a generating capacity of one megawatt of electricity or less and, in the case of a facility utilizing cogeneration technology, a generating capacity of twenty-five megawatts of electricity or less; and any electric substation or switchyard designed to change or regulate the voltage of electricity at sixty-nine kilovolts or more or to connect two or more electric circuits at such voltage, which substation or switchyard may have a substantial adverse environmental effect, as determined by the council established under section 16-50j, and other facilities which may have a substantial adverse environmental effect as the council may, by regulation, prescribe.

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Introduction

Pursuant to Connecticut General Statutes (CGS) § 16-50r$_1$, the Connecticut Siting Council (Council) annually reviews the forecasts of electric loads and resources in the State of Connecticut.

By March 1, each year, all Connecticut electric transmission/distribution companies and electric generators with an output of greater than one megawatt are required to provide detailed figures to the Council, either estimated or actual, on energy use and peak loads for the five preceding years and peak loads, resources, and margins for the ten upcoming years. Any current plans to build new generating plants or transmission/distribution lines, put new ones into service, upgrade existing ones (including plans to bury lines, as mandated by law), must also be stated. In addition, the Council examines the forecast from the Independent System Operator for New England (ISO-NE).

After gathering this information, the Council invites discussion at a public hearing, and, utilizing all those inputs, issues a final report.

December 9, 2005

Citizens of Connecticut:

It is with great pleasure that I provide you the 2005 Connecticut Siting Council's Review of the Ten Year Forecast of Connecticut Electric Loads and Resources. This report compiles and analyzes load growth forecasts of the State's electric utilities and plans to meet the demand for energy through the year 2014.

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

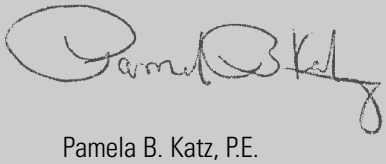
- A tabulation of estimated peak loads, resources and margins for each year;
- data on energy use and peak loads for the five preceding calendar years;
- a list of existing generating facilities in service;
- a list of scheduled generating facilities for which property has been acquired, for which certificates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

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

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

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

Very truly yours,



Pamela B. Katz, P.E.
Chairman

ENERGY CONSUMPTION GROWTH

The state's electric transmission/distribution utilities, The Connecticut Light and Power Company (CL&P), The United Illuminating Company (UI), and the Connecticut Municipal Electric Energy Cooperative (CMEEC) predict the total annual electric energy requirements for the state throughout the forecast period to grow from 34,037 GWh_2 in 2005 to 37,538 GWh during 2014. This results in a statewide average annual compound growth rate of 1.1 percent. CL&P projects an average annual compound growth rate of 1.2 percent throughout the forecast period. CMEEC projects a 0.70 percent average annual compound growth rate, and UI projects a 0.66 percent average annual compound growth rate. The forecast of the state's electrical energy requirements is depicted in Figure 1.

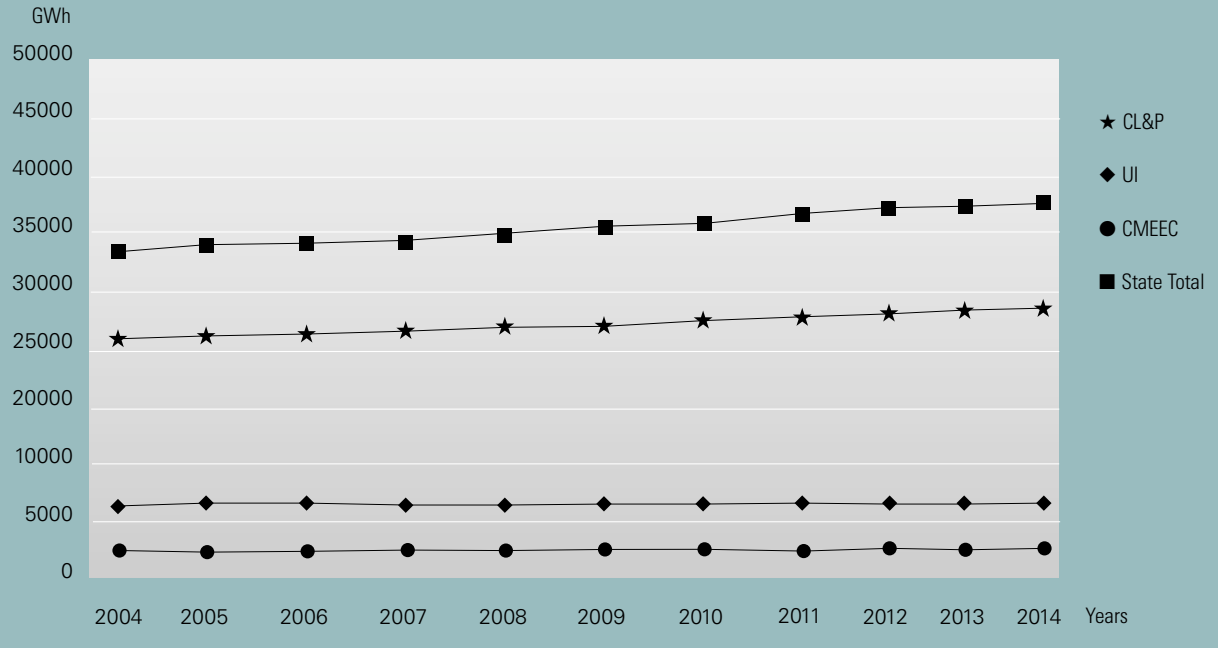
Forecasting is used to decrease the risk of a mismatch between supply and demand. The demand for electricity can be affected by weather, economic conditions, customers' usage patterns, and improvements in efficiency, including conservation. The supply of electricity can be affected by private entities' interest in constructing new generation, the operating condition of older generating plants, shutdown of generating plants for scheduled maintenance or repairs, and limitations in the transmission system.

Historically, Connecticut's increasing electricity consumption over the long term is largely attributable to the number of new and larger homes, an active economy... and perhaps the largest demand—central air-conditioning.

There are inherent risks in both under and over-forecasting electric demand. Under-forecasting demand for electricity could result in insufficient generation, transmission, and distribution facilities, which could result in blackouts, brownouts, and other service problems. Alternatively, over-forecasting could result in excessive generation, over-designed transmission, and the like, which could lead to economic penalties. Nonetheless, future electric supply and demand is difficult to predict.

Historically, Connecticut's increasing electricity consumption over the long term is largely attributable to the number of new and larger homes, an active economy, the growing use of electric appliances or office machines, computers, and —perhaps the largest demand—central air-conditioning.

Figure 1. Connecticut Electric Utilities' Projected Energy Requirements



GROWTH IN PEAK LOADS

Figure 2 depicts the actual and projected loads[3] from year 2000 through 2014[4]. Retrospectively, the Connecticut non-coincident summer peak load[5] in 2004 was 6,364 MW, which is a 7.1 percent decrease from the previous high in 2002 of 6,851 MW and a 3.6 percent decrease from the year 2003 peak load of 6,604 MW. ("Non-coincident" means that the peaks for the three utilities may not necessarily occur on the same day of the year, but nevertheless are combined in Figure 2 and the results would not be materially different.) Also, the unusual high in 2002 was largely due to weather.

Connecticut's electric utilities estimate that the total peak load, under normal weather conditions, will be 6,757 MW in 2005. Looking ahead, this number is expected to grow to 7,553 MW in 2014.

The CL&P peak load data in Figure 2 are based on a 50/50 scenario, which means that the peak load has a 50% chance of being exceeded in a given year.

ISO-NE is the organization that oversees New England's bulk power and transmission, administers the region's wholesale electric market, and manages regional planning processes for electric transmission. It receives forecasts from the Connecticut utilities, but prepares its own forecasts for Connecticut, the other New England States, and the region as a whole.

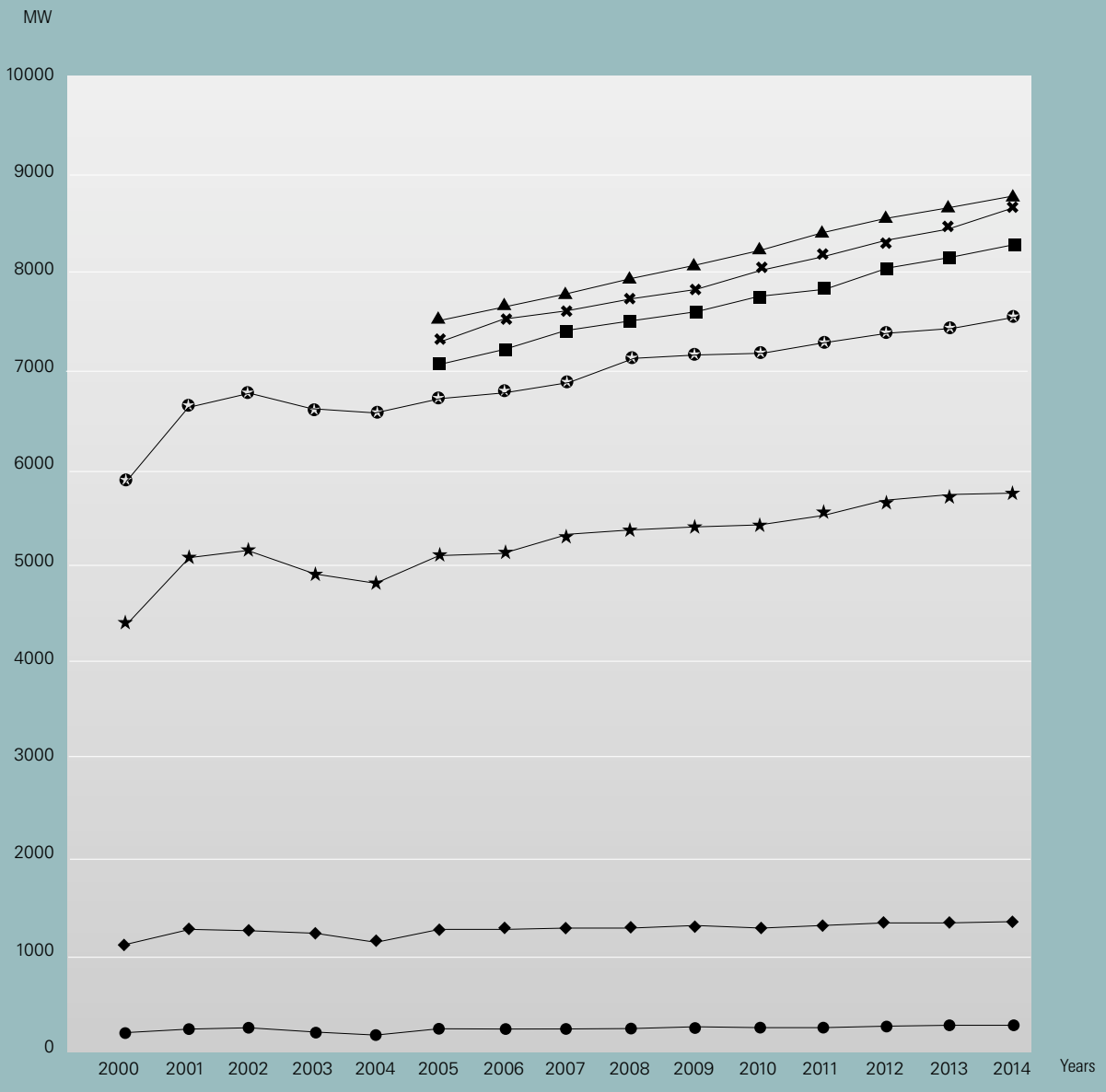
Also using a 50/50 analysis, ISO-NE predicts that the total Connecticut peak load will grow from a projected 7,055 MW in 2005 to 8,225 MW in 2014. In the 90/10 scenario (meaning the peak load has only a 10 percent chance of being exceeded), ISO-NE predicts that the summer peak load will grow from 7,510 MW in 2005 to 8,750 MW in 2014.

Connecticut's electric utilities estimate that the total peak load, under normal weather conditions, will be 6,757 MW in 2005. Looking ahead, this number is expected to grow to 7,553 MW in 2014.

The Connecticut utilities' projected (future) data (except for the extreme weather scenario) are weather-normalized. This means that the data are based on average historical weather conditions over an approximately 30-year time period. For example, CL&P's forecast model assumes a mean daily temperature of 83 degrees Fahrenheit (F) for a summer peak day based on average peak temperatures from 1972-2001. For the extreme weather scenario, CL&P's projected loads are based on a mean daily temperature of 88 degrees F on a peak day. CL&P's extreme weather forecast is approximately a 99/1 scenario, i.e. the forecast peak would have less than a one percent chance of being exceeded. However, this assumes the same economic and other non-weather assumptions as the 50/50 scenario.

As depicted in Figure 2, the ISO-NE 90/10 forecast essentially represents the worst-case scenario of all the Connecticut electric forecasts. This forecast is used for facility planning purposes so as to ensure that the electric system is designed to handle unusually high demand peaks. (The ISO-NE forecast data is obtained from ISO-NE's 2005 Regional System Plan dated October 20, 2005.) For example, on July 27, 2005, Connecticut set a peak load record of 7,135 MW: this greatly exceeded the utilities' normal weather forecast of 6,757 MW and ISO-NE's 50/50 forecast peak of 7,055 MW. However, this peak did not exceed the ISO-NE 90/10 forecast peak of 7,510 MW. Accordingly, in Table 1 of this report (see page 13), the Council has included the ISO-NE 90/10 peak load forecast to provide the most conservative comparison of resources versus load.

Figure 2. State and Utility Peak Demand by Year



✖ CT Utilities Peak Extreme Weather						7471	7624	7722	7829	7949	8105	8256	8425	8583	8741
✪ CT Utilities Peak w/Conservation	5896	6795	6851	6604	6364	6757	6842	6950	7026	7113	7161	7279	7374	7464	7553
★ CL&P Peak	4433	5126	5183	4980	4818	5116	5181	5274	5338	5412	5438	5546	5632	5711	5789
◆ UI Peak	1153	1318	1300	1274	1201	1284	1297	1305	1313	1321	1329	1337	1345	1353	1362
● CMEEC Peak	310	351	368	350	345	357	364	371	375	380	394	396	397	400	402
■ ISO-NE 50/50 Forecast Peak						7055	7220	7320	7450	7575	7725	7875	8030	8125	8225
▲ ISO-NE 90/10 Forecast Peak						7510	7675	7795	7930	8065	8210	8375	8535	8645	8750

CONSERVATION AND LOAD MANAGEMENT

In 1998, the Connecticut Legislature created the Energy Conservation and Management Board (ECMB) to guide the state's electric distribution companies in the development and implementation of an annual plan—which is submitted for approval by the Department of Public Utility Control (DPUC)—for cost-effective energy conservation programs pursuant to CGS § 16-245m. This legislation also created the Connecticut Conservation and Load Management (C&LM) Fund. The C&LM Fund supports energy efficiency, and increased productivity; it also helps to reduce the peak electric demand in the state, especially in southwest Connecticut. (Until recently, the C&LM Fund has applied to publicly-traded electric distribution companies only. However, with the passage of Public Act 05-01, C&LM has been recently expanded to include municipal electric utilities.)

In 2004, CL&P and UI customers contributed $72,892,662 to the C&LM Fund via a surcharge on their electric bills. The energy savings resulting from C&LM programs in 2004 was 291 GWh. According to the ECMB's annual report to the legislature dated March 1, 2005, this results in savings of $32 million in 2004, assuming an average price of $0.11 per kWh. This is roughly equivalent to the electric consumption of 37,000 homes in one year.

C&LM also reduces air pollution by reducing demand for electric generation. The ECMB estimates that carbon dioxide emissions were reduced by approximately 180,290 tons in 2004 due to reduced electrical consumption resulting from C&LM. Carbon dioxide is believed to be a "greenhouse gas" associated with global warming. In addition, C&LM reduced emissions of pollutants such as sulfur oxides and nitrogen oxides in 2004 by 303 tons and 112 tons, respectively.

The C&LM Fund is projected to reduce the peak summer demand by approximately 447 MW in 2005 and 324 MW in 2014 in CL&P's service area. This is equivalent to the output of a moderately-sized power plant. The forecast submitted by CL&P on March 1, 2005 was based on the assumption that C&LM programs would cease in five years. However, the revised forecast received September 15, 2005 assumes that C&LM would continue for the entire forecast period. This forecast data is used in Figures 1 and 2.

The C&LM Fund is projected to reduce the peak summer demand by approximately 447 MW in 2005 and 324 MW in 2014 in CL&P's service area. This is equivalent to the output of a moderately-sized power plant.

The C&LM Fund contributions of UI are projected to reduce the peak summer demand by approximately 5 MW in 2005 and 3.1 MW in 2014. (UI's forecast assumes C&LM would continue throughout the forecast period.) This results in a statewide total projected peak load reduction of 452 MW in 2005 and 327.1 MW in 2014. However, despite new investment in C&LM, its contribution to the total peak load reduction is expected to drop annually from 2005 to 2014, as existing measures reach the end of their projected lives.

The Council recognizes that ECMB programs are not the only drivers of electric energy efficiency in Connecticut and not even the most important. 2004 and 2005 legislation has required efficiency improvements in a wide range of electric machinery, including air-conditioning, and the state's Renewable Portfolio Standards (see page 14), while not mandating energy efficiency directly, certainly recommend it.

Overall, however, a market economy itself promotes energy efficiency. If Connecticut were to require today the same number of generating plants per unit of economic output that were required 50 years ago, then, ignoring fuel constraints, we would see a plant in every municipality—or more. Instead, economic output has steadily outpaced the rate of growth in energy demand or supply. Put another way, energy efficiency has always been the most persistent, predictable—and peaceful—way of ratcheting up economic prosperity.

SUPPLY RESOURCES

The Council anticipates that the state's supply resources will be adequate to meet demand in the near term under normal weather conditions assuming the availability of all units and no loss of existing generation due to retirement. However, taking the most conservative forecast (ISO-NE's 90/10 estimate), Connecticut faces a significant generation capacity shortage throughout the forecast period.

In addition, some subregions such as southwest Connecticut and, to a lesser extent, eastern Connecticut are threatened with supply deficiencies and operating problems due to insufficient transmission and inadequate resources within the region. To address these transmission deficiencies, two large transmission projects, Docket No. 217 Bethel – Norwalk 345-kV line and Docket 272 Middletown – Norwalk 345-kV line, as well as a 345-kV/115-kV substation project in the Killingly/Putnam area, have been approved by the Council and are now or soon will be under construction.

If a major failure in serving base load were to happen—for instance, if Millstone nuclear units were to go offline—Connecticut's electric generating and transmission/distribution companies would institute the following plan:

- operate all available generating units to their reasonable limits;
- maximize the import of electricity from adjacent states;
- explore possible interruption of service with certain industrial and commercial customers;
- maximize the use of customer-owned generators; and
- implement public awareness efforts for conservation and load shifting, including voluntary reductions and/or shifting consumption to off-peak hours.

Although such response mechanisms have been helpful in the past, it is vitally important for resources to be strategically located on the grid to ensure supply, both technically and economically. Some generating plants that were called upon to generate at their maximum capacity in the past may not be able to do so in the future because of age, transmission constraints, fuel restrictions (such as natural gas availability during periods of extreme demand), or environmental concerns (such as air emission regulations).

Connecticut's newest generating plant is Milford Power, which was activated in 2004. It is fueled with natural gas, and has a summer power output[6] of approximately 492 MW. In 2001, a natural gas-fired generating plant in Wallingford was activated. This plant has a summer power output of approximately 215 MW. In 2002, the Lake Road Power Station in Killingly was activated. That also is natural gas-fired, and it has a summer power output of approximately 700 MW. Three additional generating facilities: NRG in Meriden (544 MW); Towantic Energy in Oxford (512 MW); and Kleen Energy in Middletown (520 MW) have been approved, but construction has only begun at the Meriden plant. Their in-service dates are not known and thus have been estimated on Table 1 (page 13), assuming a three-year lead time.

Southwest Connecticut is threatened with supply deficiencies and operating problems due to insufficient transmission and inadequate resources within the region. To address these transmission deficiencies, two large transmission projects, Docket No. 217 Bethel – Norwalk 345-kV line and Docket 272 Middletown – Norwalk 345-kV line, have been approved by the Council and are now or soon will be under construction.

Nuclear Powered Generation

Nuclear plants use nuclear fission (a reaction in which uranium atoms split apart) to produce heat, which in turn generates steam: 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 carbon dioxide, sulfur dioxide, nitrogen oxides, mercury, and carbon monoxide. Another advantage to nuclear power is that it runs on domestic fuel, reducing dependence on foreign oil. 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 2,037 MW of summer capacity, approximately 30.1 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).

Following these retirements, Dominion Nuclear Connecticut Inc. (Dominion), Millstone's owner, recently increased the power outputs of Units 2 and 3 via an upgrade to the low pressure turbine rotors, so that the nominal design electric rating for Unit 2 went from 870 MW to 883.5 MW, and Unit 3 went from 1153.6 MW to 1156.5 MW. Thus, the total power output for these units increased by 16.4 MW without any rise in fuel consumption.

Dominion submitted its license renewal applications to the Nuclear Regulatory Commission (NRC) on January 22, 2004. The NRC is currently reviewing them, and has issued a draft Environmental Impact Statement and a draft Safety Evaluation Report. It is anticipated that the NRC will complete its review in 2006. Renewed operating licenses would permit Unit 2 and Unit 3 to operate until 2035 and 2045, respectively.

Coal Powered Generation

Connecticut currently has two coal-fired electric generating facilities contributing 553 MW, or approximately 8.2 percent of the state's current capacity. The AES Thames facility, located in Montville, runs on domestic coal and generates approximately 181 MW. The Bridgeport Harbor #3 facility runs on imported coal and has a power output of approximately 372 MW. 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, burning coal to make electricity causes air pollution by emitting pollutants such as sulfur dioxide, carbon monoxide, and mercury. In addition, carbon dioxide emissions can contribute to global warming.

Petroleum Powered Generation

Connecticut currently has 25 oil-fired electric generating facilities contributing 2,477 MW, or 36.6 percent of the state's current capacity. This takes into account the deactivation of Devon 8 and Devon 7 in Milford, which resulted in a total loss of approximately 212 MW of generation. Devon 8, which had a summer SCC rating of approximately 107 MW, was deactivated on June 7, 2004. Devon 7, which had a summer SCC rating of approximately 105 MW, was deactivated on October 1, 2004. Both Devon 7 and 8 are now considered deactivated reserve. Furthermore, because the industry generally rates the service life of oil-fired units to be 40 years, some additional units may face retirement during the forecast period. This could further reduce the already tight generation capacity in Connecticut unless the loss is replaced by a sufficient number of new natural gas-fired units. Figures 2a and 2b depict the existing and projected generation fuel mix for Connecticut, assuming the effects of possible

retirement of oil-fired generating units at least 40 years of age or older. In addition, Table 1 (see page 13) includes the hypothetical loss of Connecticut's resource capacity due to the retirement of oil-fired units 40 years of age or older. (However, the Council does note that NRG, the largest owner of oil-fired generation in Connecticut, currently has no plans to retire any of its oil-fired units during the forecast period.)

New oil-fired generation is not expected in the near future, due to market volatility and mounting oil prices. In particular, the price of crude oil has recently exceeded $70 per barrel this year. With approximately 60% of the nation's oil being imported, petroleum supply and prices are highly vulnerable to disruptions and instabilities in supplier countries.

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 totaling approximately 882 MW have the capacity 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 given fuel.

* Lake Road generating plant is not included in the fuel mix. See page 19.

Figure 2A. 2005 Fuel Mix

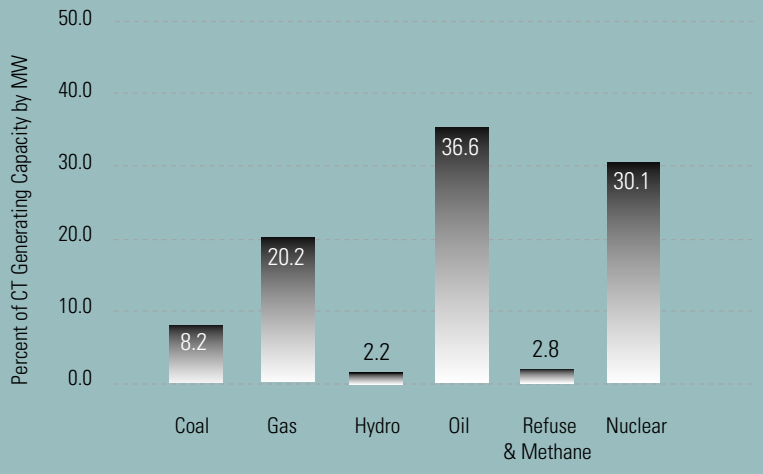
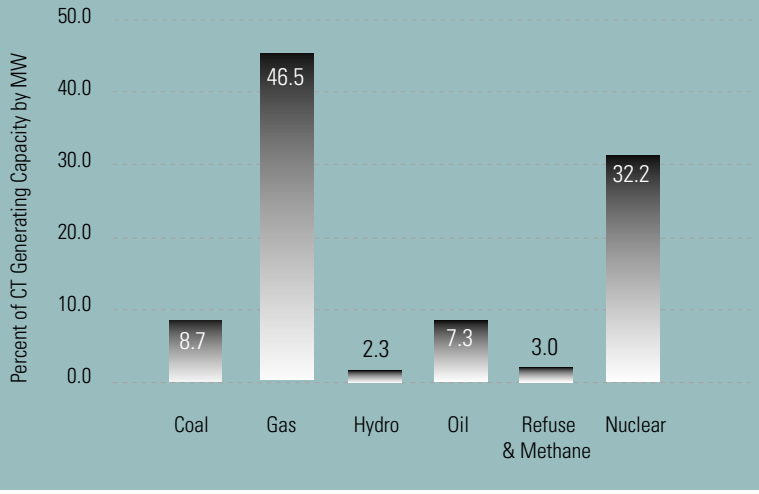


Figure 2B. 2014 Projected Fuel Mix



Natural Gas Powered Generation

Connecticut currently has 14 natural gas-fired generating units contributing a total of 1,368 MW, or 20.2 percent of the state's generating capacity. (Lake Road is not included in this total. See page 19.) This includes recent additions such as the Milford Power facility, with a total summer seasonal claimed capability (SCC) rating of 492 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 cleaner emissions. 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.

In the event of severely cold weather, unusually high demand for natural gas to heat buildings can coincide with high demand for natural gas to generate electricity. At such times, some generating plants may experience either a forced outage due to pipeline capacity limitations, or an "economic curtailment", a situation in which it is not economical to generate electricity, given the higher natural gas fuel costs at that time. During economic curtailments, some units have the ability to switch to oil. Connecticut currently has eight natural gas-fired generating plants, totaling approximately 701 MW, that can switch to oil (not including Lake Road).

In the regional planning document (the 2004 Regional Transmission Expansion Plan, or RTEP04), ISO-NE has recognized the problems with natural gas generation during unusually cold weather, and taken steps to address it. Specifically, RTEP04 establishes an Electric/Gas Operations Committee to improve near-term operations planning and maintenance coordination for both electric and gas pipeline systems, in anticipation of cold snap conditions. Further, RTEP04 develops a new Operating Procedure for cold snap periods that eliminates or cancels "economic outage"; promotes switching to alternative fuels for dual-fueled units; and modifies the unit commitment process to enhance coordination between the electric and gas market nomination timelines.

Hydroelectric Power Generation

Connecticut's hydroelectric generation consists of 28 facilities contributing approximately 148 MW, or 2.2 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 have the potential for black start capability[7]. 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, however, is a lack of suitable sites.

Northeast Generation Company (NGC) received its license renewal order from the Federal Energy Regulatory Commission (FERC) on June 23, 2004, which extended the licensing of the Falls Village, Bulls Bridge, Shepaug, Stevenson, and Rocky River hydroelectric facilities to June 23, 2044. (These five facilities have a combined summer rating of approximately 117 MW). Management plans are used by FERC to fine tune re-licensing orders. NGC is awaiting FERC approval of its Debris, Critical Habitats, and Historic Places Management Plans, as well as other plans.

The Scotland hydroelectric facility's license expires on October 5, 2012. (This is the earliest expiration date of the NGC hydroelectric facilities.) No re-licensing activities are underway for Scotland. The Scotland facility has a summer rating of 1.67 MW, and is located in the town of Windham.

Solid Waste Power Generation

Connecticut currently has approximately 184 MW of solid waste-fueled generation, approximately 2.7% 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, supply disruptions—significant advantages over fossil fuels. In addition, the combustion of solid waste produces relatively low levels of greenhouse gas, and reduces the amount of space needed for landfills.

Recently passed federal energy legislation includes certain incentives to support the development and expansion of waste-to-energy facilities. Specifically, Title XIII of the Energy Tax Incentives Act of 2005 extends desirable tax-credit provisions until December 31, 2007. Also, an ongoing state policy initiative being administered by the Connecticut Clean Energy Fund and the DPUC—"Project 100"—already has sparked interest among developers of innovative biomass facilities fueled at least in part by waste wood from construction.

Miscellaneous Small Generation

Approximately 108 MW of electricity is generated by 59 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 10 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 installation of additional privately-owned generation is expected, but only by entities that view self-generation as a benefit.

OTHER GENERATION TECHNOLOGIES

Fuel Cells

A fuel cell consumes hydrogen and oxygen and produces electricity, with water as a waste product. Fuel cells also can be designed to run on natural gas. They have the advantages of negligible air emissions, low noise, and reliable operation. Their waste heat can be used for other purposes to further increase overall efficiency. For example, they can pre-heat domestic hot water, provide hydronic (hot water) heating or operate an absorption air conditioning system.

Fuel cells generate direct current (DC) electricity. However, inverters can be added that convert DC current to alternating current (AC), the main type of current that flows through the transmission and distribution system.

Pursuant to CGS §16-50k(a), the Council has the legislative charge to review all fuel cell proposals. As such, the Council has reviewed and approved several fuel cell installations for various uses throughout Connecticut. For example, on April 19, 2005 the Council approved Petition No. 707 for a five kilowatt (kW) fuel cell to be used as a backup generator for a cellular telecommunications facility. Also, on May 11, 2005, the Council approved Petition No. 711 for a 250-kW fuel cell to supply power to meet some of an industrial building's base electric load.

Fuel cells cost more per kilowatt than other generation technologies, so they are usually limited in size. Nevertheless, fuel cells are well suited for backup generation, supplemental base-load generation for buildings, and distributed generation. The Council strongly encourages the use of fuel cell technology.

OTHER RESOURCES THAT SUPPORT CONNECTICUT'S DEMAND

Import Capability

As noted in Table 1, Connecticut has the ability to import a total of approximately 2,200 to 2,300 MW of electricity from outside the state without compromising grid voltage and system operating stability. Having this import capability is especially important during periods of peak demand or when a large base-load generating facility, such as Millstone is unavailable. However, the Council cautions that this current amount of import capacity may not necessarily be available in its entirety for the entire forecast period, due to electric system limitations in bordering states.

MARKET RULES AFFECTING SUPPLY

Installed capacity market

Under restructuring, independent electric generators bid their supply of electricity into the grid via the regional wholesale electricity market, which is governed and operated by ISO-NE. However, transmission constraints (see later sections) can result in generating capacity not being able to operate in a given region, or not being able to deliver electricity to a given region. According to RTEP04, the current Installed Capacity market (ICAP) does not recognize the differences in the value of capacity based on location. For example, a resource located in a congested area or one with high load growth would receive the same capacity compensation as a resource located in a non-congested zone or one with sufficient capacity. Also, prices in the single ICAP market have a tendency to become unstable around the point at which generation capacity is just sufficient to meet resource planning minimums. The uncertainty and instability in capacity-market prices have discouraged investment in new and existing capacity.

To address the issues relative to the single ICAP market, FERC is considering the implementation of a Locational Installed Capacity (LICAP) market. LICAP would differentiate the value of resources based on their location. The intent of LICAP is to improve price stability and encourage investments in new and existing capacity in congested areas. The Council notes that the FERC has delayed the implementation of LICAP until no earlier than October 1, 2006.

At the July 14, 2005 forecast hearing, the Council announced that there would be a continuation of the hearing at a future date and specifically requested that ISO-NE provide a witness to respond to questions relative to LICAP at that hearing.

That continued hearing was held on September 1, 2005, however, ISO-NE provided only its load forecaster as a witness. Despite the Council's request, no witness was provided to answer LICAP questions. As such, the Council was unable to sufficiently explore the issue of LICAP in order to provide useful analysis of this topic for this report.

Prices in the single ICAP market have a tendency to become unstable around the point at which generation capacity is just sufficient to meet resource planning minimums.

Table 1. Part A: CT Resource Balance (based on Table 4.8 of ISO-NE's 2005 RSP)

Capacity Situation	2006	2007	2008	2009	2010	2011	2012	2013	2014
(units are in megawatts)									
ISO-NE 90/10 Load	7675	7795	7930	8065	8210	8375	8535	8645	8750
Reserves (largest unit)	1200	1200	1200	1200	1200	1200	1200	1200	1200
Total Capacity Req'd	8875	8995	9130	9265	9410	9575	9735	9845	9950
Existing Capacity*	6779	6779	6779	6779	6779	6779	6779	6779	6779
Assumed Unavailable Capacity	483	483	483	483	483	483	483	483	483
Total Net Capacity	6296	6296	6296	6296	6296	6296	6296	6296	6296
Current Import Limit	2300	2300	2300	2300	2300	2300	2300	2300	2300
Total Available Resources	8596	8596	8596	8596	8596	8596	8596	8596	8596
Available Surplus/Deficiency	-279	-399	-534	-669	-814	-979	-1139	-1249	-1354
Southern NE Reinforcement Proj.	0	0	0	0	0	0	1000	1000	1000
SWCT RFP Awards	250	256	256	0	0	0	0	0	0
Available Surplus/Deficiency••	-29	-143	-278	-669	-814	-979	-139	-249	-354
Connecticut Siting Council Assumptions:									
Possible Retirement of Oil									
Fired Generation	-912	-944	-959	-1046	-1195	-1602	-1617	-2017	-2017
(those 40 years old or older)									
Approved Generation not currently under const.									
Meriden			544	544	544	544	544	544	544
Middletown			520	520	520	520	520	520	520
Oxford			512	512	512	512	512	512	512
Net Surplus/Deficiency	-941	-1087	339	-139	-433	-1005	-180	-690	-795

* This is the capacity as reported in ISO-NE's 2005 RSP dated October 20, 2005.

•• This represent the projected shortage of capacity required to meet the ISO-NE 90/10 forecast peaks.

Electric Restructuring

In 1998, Public Act 98-28, "An Act Concerning Electric Restructuring" (Act) instituted historic changes to the electric system in Connecticut. Its primary provision permitted customers of Connecticut's two private investor-owned electric utilities, CL&P and UI, to choose their retail electric suppliers as of January 1, 2000. The law also allowed a municipal electric utility to engage in competitive generation supply if it reciprocally opened its service territory to other competitive retail suppliers. State-licensed independent retail generation suppliers were allowed to compete for customers. The overall intent was that competition would lower prices for electricity, foster technological innovation, and boost supply options, while at the same time improving environmental quality.

Pursuant to the Act, the DPUC established and completed procedures for "unbundling" generation from the transmission and distribution components of electric utility service. In the process, the DPUC developed individual non-bypassable line item charges that fund energy conservation programs, investments in renewable energy technologies, and the system benefit charge, which support consumer education and public policy, and provides assistance to utility workers and municipalities impacted by restructuring.

While the market-based provisions of the Act have already been executed, including the divestiture of generating plants and consumer choice of a generation supplier, continued monitoring of the electric supply markets is necessary to ensure the development of an open competitive market.

The vast majority of Connecticut customers are still being served through the two utilities' generation service arrangement, formerly called the "Standard Offer", now called the "Transitional Standard Offer." Relatively few customers have chosen an alternative electric supplier. Market conditions and minimal consumer awareness or interest may be the reasons. The standard offer rate, which the Act capped at ten percent below 1996 base rates, expired on December 31, 2003. Before this transpired, however, the legislature passed Public Act 03-135, which established the new "Transitional Standard Offer", effectively capping rates at their 1996 base rate level for three more years, through December 31, 2006, buffering consumers against potential price volatility.

Under restructuring, the electric system planning process and forecasting have become more complex, challenged by prevailing market conditions and changing system requirements.

Renewable Portfolio Standards

As well as capping rates for electricity, Public Act 03-135 revised the 1998 restructuring law on 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. The formula that dictates their use is complicated (see Figure 3), but the bottom line is that RPS should encourage a greater supply of electricity from more diverse sources, both goals that the Council supports.

Figure 3 depicts the required percentages for Class I_8 and Class II_9 renewable energy sources through 2010.

Figure 3. RPS Percentages

Renewable Portfolio Standards		
Effective Date	Minimum Class I	Addt'l Percentage Percentage of Class I or II
1/1/2004	1 percent	3 percent
1/1/2005	1.5 percent	3 percent
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

Source: PA 03-135

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. Three of PA 05-1's provisions most relevant for 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[10], grid-side distributed resources[11], new generation facilities, including expanded or repowered generation, and 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[12]; make efficient use of existing sites and supply infrastructure; and serve the long-term interests of ratepayers.

PA 05-1 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, as amended by this act.

PA 05-1 also creates a new Municipal Energy Conservation and Load Management Fund. This would be funded by an assessment of certain number of mills[13] per kilowatt-hour of metered firm electric retail sales within the municipal electric utility service area.

Finally, PA 05-1 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 resources[14], a newly-defined group of resources focusing on combined heat and power systems[15] 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.

COUNCIL APPROVED GENERATION

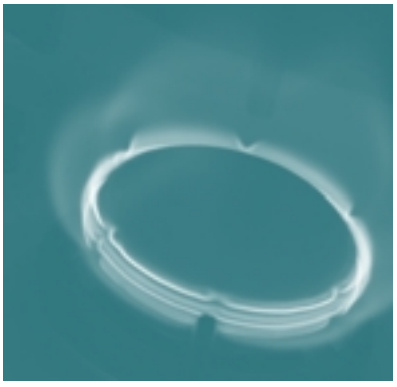
New Natural Gas-fired Generation

Under Connecticut's restructured electric system, the Council has approved seven natural gas-fired electric generating facilities. These are listed below with their respective nominal power outputs[16] and operating status:

- 520 MW Bridgeport Energy LLC project in Bridgeport became operational in August of 1998.
- 544 MW Milford Power Company, LLC f/k/a/ PDC-El Paso, LLC project in Milford became fully operational in May 2004.
- 544 MW NRG Northeast Generating LLC project in Meriden was approved by the Council on April 27, 1999 and has until April 27, 2006 to complete construction.
- 792 MW Lake Road Generating Company, L.P. project in Killingly became fully operational May 2002.
- 512 MW Towantic Energy LLC project in Oxford was approved by the Council on June 23, 1999. Construction has not yet begun, and its Certificate of Environmental Compatibility and Public Need (Certificate) expires on June 26, 2006.
- 250 MW Wallingford PPL project in Wallingford became operational July 2001.
- 520 MW Kleen Energy Systems, LLC project in Middletown was approved by the Council on March 25, 2003. Construction has not yet begun, and its Certificate expires on November 21, 2006.

The total nominal capacity of these plants is 3,682 MW. However, currently, only 2,106 MW or 57 percent of the approved capacity is now operating. Most of the delays are project-specific, but all the projects are experiencing financial vulnerability due to uncertain market conditions.

In 2003, as the process of electric restructuring continued, the legislature reconstituted the Connecticut Energy Advisory Board (CEAB), and charged it to perform a variety of functions related to energy infrastructure planning statewide[17].



TRANSMISSION SYSTEM

Transmission is the backbone of the electric system, the part that carries large amounts of electricity long distances efficiently by using high voltage. In Connecticut, electric lines with a voltage of 69 kilovolts (kV) or more are considered transmission lines. Distribution lines are generally below 69-kV. They are the lines that come down our streets to connect[18] with even lower-voltage lines feeding each residence or business.

The state's electric transmission system contains approximately: 398 circuit miles of 345-kV transmission; 1,300 circuit miles of 115-kV transmission; 5.8 miles of 138-kV transmission; and 97 circuit miles of 69-kV transmission. (These figures refer to AC transmission. The Cross Sound Cable is not counted because it is DC [see below].) Connecticut's electric transmission system is depicted on the centerfold map. 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.

TRANSMISSION SYSTEM

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.

The three interstate 345-kV ties are approximately 35 to 40 years old and were designed when loads were considerably smaller than today. Given the present size of the loads and the future projected loads, it is likely that these ties will have to be supplemented in the not too distant future. The Council notes, for instance, that a new future 345-kV transmission line is proposed to connect Card Substation in Lebanon to the Lake Road Substation in Killingly, continuing from there to the West Farnum Road Substation in Rhode Island.

Another important interstate tie is the Cross Sound Cable. Connecticut's only significant DC transmission line, it goes underwater from New Haven, Connecticut to Brookhaven, New York. It has a 330 MW capacity.

Having been under dispute for environmental reasons before and during its construction, the Cross Sound Cable was deactivated almost as soon as it was built, but it was reactivated during the August 2003 blackout on an emergency basis, and currently operates pursuant to a settlement agreement among the Long Island Power Authority (LIPA), the Connecticut Department of Environmental Protection, DPUC, CL&P, and the Cross Sound Cable Company, LLC.

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 referred to as Southwest Connecticut (SWCT), including 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 have reached the limit of their ability to support the area's current and projected loads reliably and economically.

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 has increasingly had to look to transmission, rather than generation, to meet its needs.

After studying the problems in SWCT and the Norwalk-Stamford Sub-Area, 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.

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 has increasingly had to look to transmission, rather than generation, to meet its needs.

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 currently underway and is expected to be complete by year-end 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: currently, Development and Management Plans are being discussed with the affected municipalities and they will soon be submitted for Council review. Construction is anticipated to begin in the first quarter of 2006 and finish by year-end 2009.

To help address the needs of SWCT in the interim, ISO-NE has issued RFP awards for several temporary emergency generators, and has instituted new demand response programs to reduce load. ISO-NE planners estimate that, per their 90/10 forecast, these emergency actions prevented a 130-MW shortfall in SWCT for 2004, and will mitigate further gaps gradually worsening to 270 MW by 2007. As depicted in Table 1 (see page 13), the ISO-NE RFP award measures are assumed to remain in place through approximately 2008, according to ISO-NE 2005 Regional System Plan (RSP).

Pursuant to these RFP awards, the Council has reviewed and approved several emergency generators for SWCT. For example, on May 19, 2004, the Council ruled favorably on the proposed installation of four 2 MW diesel generators in Wallingford under Petition No. 672. Also, the Council also ruled favorably on the proposed installation of three 2 MW diesel generators in East Norwalk under Petition No. 676. Figure 4 depicts ISO-NE's Quick Start Capacity schedule for SWCT pursuant to its RFP awards.

Figure 4. ISO-NE RFP Awards for SWCT

Figure 4	ISO-NE	Quick-Start	Capacity	for SWCT
Technology	2004 Summer MW	2005 Summer MW	2006 Summer MW	2007 Summer MW
On-Peak Conservation	1	4	5	5
Emergency Generation	94	153	154	154
Load Reduction	21	53	74	74
Combined Energy and Load Reduction	3	12	22	27
Total	119	222	255	260

Source: Docket F-2004 exhibit: ISO New England RFP results table

Lake Road Generating Facility

Currently, the Lake Road generating facility (approximately 700 MW summer rating) in Killingly is not counted towards Connecticut's generation capacity. The reason is that only one 345-kV line connects the plant with the rest of the state's 345-kV transmission system. If this line were to go down, the plant would be disconnected from Connecticut's 345-kV transmission system.

Southern New England Transmission Reinforcement (SNETR)

SNETR is a regional plan intended to meet the need for increased transmission into Connecticut. It is currently under review by a team including ISO-NE, the National Grid, and Northeast Utilities. One option is a 345-kV transmission line from the Worcester, Massachusetts area to Card Street Substation. The line would travel from Massachusetts into Rhode Island, then follow an existing right-of-way from the Sherman Road Substation in north central Rhode Island to Lake Road Substation in Connecticut, and finally on to Card Street Substation. The project would maximize the value of Lake Road to Connecticut while increasing Connecticut's import capability. The estimated in-service date for the proposed line, based on ISO-NE's 2005 RSP, is 2011. Considering that this option offers both increased import capacity from New England, and greater access to generation capacity in-state, ISO–NE estimates that it could bring 1000 MW into Connecticut in 2012. This estimate is reflected in Table 1, on page 13.

SUBSTATIONS AND SWITCHYARDS

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 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.

In addition, as depicted in Figure 5, as many as ten new substations are planned for the next four years to address other high load areas within the state. Some of the substations are associated with the 345-kV transmission projects in SWCT. Eight additional substations are being considered, with the estimated in-service dates to be determined.

Figure 5. Substation and Switching Station Projects

Planned Substation Projects	Est. In-Service Date	Company
Install a new 345-kV Kleen Switching Station in Middletown	TBD_{19}	CL&P
Install a new 345-kV South Kensington Switching Station in Berlin	TBD_{20}	CL&P
Expand the existing 345-kV Long Mountain Switching Station in New Milford	2005	CL&P
Expand the existing 115-kV Haddam Substation in Haddam	2005	CL&P
Install a new 345-kV Haddam Substation in Haddam	2005	CL&P
Install a new 115-kV Shunock Substation in North Stonington	2005	CL&P
Expand the existing 345-kV Plumtree Substation in Bethel	2006	CL&P
Install a new 345-kV Norwalk Substation in Norwalk	2006	CL&P
Install a new 345-kV/115-kV Killingly Substation in Killingly	2006	CL&P
Expand the existing 115-kV Triangle Substation in Danbury	2007	CL&P
Expand the existing 138-kV/115-kV Norwalk Harbor Substation In Norwalk	2007	CL&P
Install a new 115-kV Wilton Substation in Wilton	2007	CL&P
Install a new 115-kV Stepstone Substation in Guilford	2007	CL&P
Install a new 115-kV Trumbull Substation in Trumbull	2007	UI
Addition of 115-kV circuit breakers at Elmwest Substation in West Haven	2007	UI
Modify the existing 115-kV Norwalk Substation in Norwalk	2008	CL&P
Install a new 345-kV Barbour Hill Substation in South Windsor	2008	CL&P
Expand the existing 115-kV Glenbrook Substation in Stamford	2008	CL&P
Install a new 345-kV/115-kV East Devon Substation in Milford	2009	CL&P
Expand the existing 115-kV Norwalk Substation in Norwalk	2009	CL&P
Modify the existing 115-kV Devon Substation in Milford	2009	CL&P
Install a new 345-kV Beseck Switching Station in Wallingford	2009	CL&P
Expand the existing 345-kV Scovill Rock Switching Station in Middletown	2009	CL&P
Install a new 345-kV Singer Substation in Bridgeport	2009	UI
Addition of a circuit breaker and bus at Pequonnock Substation in Bridgeport	2009	UI
Install a new 115-kV Southport Substation in Fairfield	TBD	UI
Expand the existing 115-kV Glenbrook Substation in Stamford	TBD	CL&P
Expand the existing 115-kV Norwalk Harbor Substation in Norwalk	TBD	CL&P
Expand the existing 345-kV Card Substation in Lebanon	TBD	CL&P
Install a new 115-kV Jack's Hill Substation in Oxford	TBD	CL&P
Install a new 115-kV Windsor Substation in Windsor	TBD	CL&P
Install a new 115-kV West Southington Substation in Southington	TBD	CL&P
Install a new 115-kV South Cheshire Substation in Cheshire	TBD	CL&P
Install a new 115-kV Goshen Substation in Goshen	TBD	CL&P
Install a new 115-kV Bradley Substation in Middletown	TBD	CL&P
Install a new 115-kV Walnut Hill Substation in the Salem area	TBD	CL&P

RESOURCE PLANNING

Because of the development of new transmission as well as new substation/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. These issues must be considered along with environmental concerns including electric and magnetic fields, aesthetics and the availability of suitable sites.

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 on the centerfold map of energy infrastructure, the Council continues to assess the existing electric system to maintain and improve reliability. Further, the Council notes the CEAB's legislated mandate for stimulating alternatives to 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, 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's forecast review has considered Connecticut's electric energy future for the next ten years and concludes that supplies are expected to meet demand under normal weather conditions in the near term assuming no losses of generation due to retirement. However, under the more stringent ISO-NE "90/10" forecast, Connecticut faces a significant shortage of supply, even including the three approved generating facilities not yet constructed and/or completed. Much needs to be done to assure the electric system's long-term reliability.

Issues that warrant attention in the future include:

- maintain sufficient emergency generation and demand response in SWCT until long term transmission upgrades are completed;
- facilitate the addition of new generation in Connecticut, and address delays in construction of approved generation;
- be proactive regarding the deactivation/retirement of older generating facilities in the context of electric system needs;
- avoid excessive reliance on any one fossil fuel for generation; and
- encourage innovations.

1. CGS §16-50r states, "(a) Every person engaged in electric transmission services, as defined in section 16-1, electric generation services, as defined in said section, or electric distribution services, as defined in said section generating electric power in the state utilizing a generating facility with a capacity greater than one megawatt, shall, annually, on or before March first, file a report on a forecast of loads and resources which may consist of an update of the previous year's report with the council for its review. The report shall cover the ten-year forecast period beginning with the year of the report. Upon request, the report shall be made available to the public. The report shall include, as applicable: (1) A tabulation of estimated peak loads, resources and margins for each year; (2) data on energy use and peak loads for the five preceding calendar years; (3) a list of existing generating facilities in service; (4) a list of scheduled generating facilities for which property has been acquired, for which certificates have been issued and for which certificate applications have been filed; (5) a list of planned generating units at plant locations for which property has been acquired, or at plant locations not yet acquired, that will be needed to provide estimated additional electrical requirements, and the location of such facilities; (6) a list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed; (7) a description of the steps taken to upgrade existing facilities and to eliminate overhead transmission and distribution lines in accordance with the regulations and standards described in section 16-50t; and (8) for each private power producer having a facility generating more than one megawatt and from whom the person furnishing the report has purchased electricity during the preceding calendar year, a statement including the name, location, size and type of generating facility, the fuel consumed by the facility and the by-product of the consumption. Confidential, proprietary or trade secret information provided under this section may be submitted under a duly granted protective order. The council may adopt regulations, in accordance with the provisions of chapter 54, that specify the expected filing requirements for persons that transmit electric power in the state, electric distribution companies, and persons that generate electric power in the state utilizing a generating facility with a capacity of greater than one megawatt. Until such regulations are adopted, persons that transmit electric power in the state shall file reports pursuant to this section that include the information requested in subdivisions (6) and (7) of this subsection; electric distribution companies in the state shall file reports pursuant to this section that include the information requested in subdivisions (1), (2), (7) and (8) of this subsection; persons that generate electric power in the state utilizing a generating facility with a capacity greater than one megawatt shall file reports pursuant to this section that include the information requested in subdivisions (3), (4), (5) and (8) of this subsection. The council shall hold a public hearing on such filed forecast reports annually. The council shall conduct a review in an executive session of any confidential, proprietary or trade secret information submitted under a protective order during such a hearing. At least one session of such hearing shall be held after six-thirty p.m. Upon reviewing such forecast reports, the council may issue its own report assessing the overall status of loads and resources in the state. If the council issues such a report, it shall be made available to the public and shall be furnished to each member of the joint standing committee of the General Assembly having cognizance of matters relating to energy and technology, any other member of the General Assembly making a written request to the council for the report and such other state and municipal bodies as the council may designate."

2. Household electric energy consumption is generally stated in kilowatt-hours, which is the equivalent of operating a one-thousand watt load (ten light bulbs of 100 watts each, for example) for one hour. On a statewide scale, a larger unit called a gigawatt-hour is used. One gigawatt-hour (GWh) is the equivalent of operating a one billion watt load for an hour.

3. Electric load can be thought of as the rate at which electricity is consumed. In utility forecasting and planning, electric loads are generally rated in megawatts. One megawatt (MW) represents an electric load of one million watts. This is the equivalent of operating 10,000 light bulbs of 100 watts each simultaneously.

4. The ten-year forecast period is from 2005 through 2014. However, Figure 2 includes past peak loads from the year 2000 to give the reader a longer term picture of the past electric loads.

5. Electric loads vary with time depending on demand. Utility forecasting considers the peak load, which is the highest load experienced during the year.

6. The electric power outputs for generating plants have both a summer and winter rating, referred to as seasonal claimed capability (SCC). SCC ratings are the maximum dependable load-carrying ability, expressed in megawatts, of a generating unit or units, excluding the capacity required for the power station's own use. SCC ratings are computed per ISO-NE's rule "M-20" for installed capacity

and correspond to the power generating capacities at 20 degrees F and 90 degrees F ambient temperatures for the winter and summer ratings, respectively. The SCC for a given generating facility that may be claimed by the New England Power Pool must be verified by conducting a claimed capacity audit. Generally, fossil-fueled plants have a higher SCC rating in the winter than the summer.

7. Black start capability (BSC) is the ability of a generating station to start and commence generation without any outside source of electricity. (For example, a power plant with BSC may have its own on-site diesel generators that can start under battery power and then produce electricity in order to start the main generating units.) ISO-NE audits BSC and determines which plants would require BSC. Certain hydroelectric plants inherently have this capability due to the natural water flow and their design. Currently, existing generating plants that have black start capability include: Stevenson Hydro plant; Rocky River Hydro plant; Tunnel Jet Turbine; South Meadows Jet Turbine; Middletown #10; Montville #10 and #11; Franklin Drive #10; Torrington Terminal #10; Branford #10; and PPL Wallingford. In the event of a major blackout, units without black start capability that have been shut down are dependent on outside grid power to restart.

8. Class I renewable energy sources are defined as follows: "(A) energy derived from solar power, wind power, a fuel cell, methane gas from landfills, ocean thermal power, wave or tidal power, low emission advanced renewable energy conversion technologies, a run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the river flow, and began operation after the effective date of this section, or a biomass facility, including, but not limited to, a biomass gasification plant that utilizes land clearing debris, tree stumps or other biomass that regenerates or the use of which will not result in a depletion of resources, provided such biomass is cultivated and harvested in a sustainable manner and the average emission rate for such facility is equal to or less than .075 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter except that energy derived from a biomass facility with a capacity of less than five hundred kilowatts that began construction before July 1, 2003, may be considered a Class I renewable energy source, provided such biomass is cultivated and harvested in a sustainable manner, or (B) any electrical generation, including distributed generation, generated from a Class I renewable energy source."

9. Class II renewable energy sources are defined under PA 03-135 as "energy derived from a trash-to-energy facility, a biomass facility that began operation before July 1, 1998, provided the average emission rate for such facility is equal to or less than 0.2 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter, or a run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the riverflow, and began operation prior to the effective date of this section."

10. Customer-side distributed resources are defined under PA 05-1 as "the generation of electricity from a unit with a rating of not more than sixty-five megawatts on the premises of a retail end user within the transmission and distribution system including, but not limited to, fuel cells, photovoltaic systems or small wind turbines, or a reduction in demand for electricity on the premises of a retain end user in the distribution system through methods of conservation and load management, including, but not limited to, peak reduction systems and demand response systems."

11. Grid-side distributed resources are defined under PA 05-1 as "the generation of electricity from a unit with a rating of not more than sixty-five megawatts that is connected to the transmission or distribution system, which units may include, but are not limited to, units used primarily to generate electricity to meet peak demand."

12. Federally mandated congestion charges are defined under PA 05-1 as "any cost approved by the Federal Energy Regulatory Commission as part of New England Standard Market Design including, but not limited to, locational marginal pricing, locational installed capacity payments, any cost approved by the Department of Public Utility Control to reduce federally mandated congestion charges in accordance with this section, sections 16-99ss, 16-32f, 16-50i, 16-50k, 16-50x, 16-244c, 16-244e, 16-245m, and 16-245n, as amended by this act, and sections 8 to 17, inclusive, and 20 and 21 of this act and reliability must run contracts."

13. The rate schedule is 1.0 mills on and after January 1, 2006; 1.3 mills on and after January 1, 2007; 1.6 mills on and after January 1, 2008; 1.9 mills on and after January 1, 2009; 2.2 mills on and after January 1, 2010; and 2.5 mills on and after January 1, 2011.

14. Class III renewable energy sources are defined under PA 05-1 as "the electricity output from combined heat and power systems with an operating efficiency level of no less than fifty percent that are part of customer-side distributed resources developed at commercial and industrial facilities in this state on or after January 1, 2006, or the electricity savings created at commercial and industrial facilities in this state from conservation and load management programs begun on or after January 1, 2006."

15. Combined heat and power systems are defined under PA 05-1 as "a system that produces, from a single source, both electric power and thermal energy used in any process that results in an aggregate reduction in electricity use."

16. The nominal power outputs are those reported in their respective applications to the Council. The actual power outputs of active plants vary seasonally. See Appendix A.

17. CGS § 16a-3(b) states that "The Board shall, (1) prepare an annual report pursuant to section 17 of this act; (2) represent the state in regional energy system planning processes conducted by the regional independent system operator, as defined in section 16-1; (3) encourage representatives from the municipalities that are affected by a proposed project of regional significance to participate in regional energy system planning processes conducted by the regional independent system operator; (4) issue a request-for-proposal in accordance with subsections (b) and (c) of section 19 of this act; (5) evaluate the proposals received pursuant to the request-for-proposal in accordance with subsection (f) of section 19 of this act; (6) participate in a forecast proceeding conducted pursuant to subsection (a) of section 16-50r; and participate in a life-cycle proceeding conducted pursuant to subsection (b) of section 16-50r."

18. The distribution lines connect to the wires supplying a home or business via a transformer. The transformer drops the voltage from the distribution level to that required by the end user.

19. The Kleen Energy Switching Station associated with the proposed Kleen Energy Plant has been delayed because construction of the plant has not commenced at this time.

20. The South Kensington 345-kV Switching Station associated with the proposed Meriden Power generating plant has been delayed because construction of the plant is not complete.

The members of the Council for energy and telecommunications matters are the following:

• Pamela B. Katz, P.E. is the chair of the agency and is appointed by the governor. Ms. Katz is an environmental and safety consultant; professional engineer; certified safety professional; licensed environmental professional; former selectman, former conservation commission chairman and present planning commissioner – Town of Simsbury; former board member of Connecticut Resource Recovery Authority; and former board member of Farmington Valley Health District.

• Colin C. Tait, Esq., is the vice-chair of the agency and is appointed by the governor. Professor Tait is a law professor at the University of Connecticut Law School (teaching environmental and energy law); president of Norfolk Land Trust; past chairman, planning and zoning commissions, Towns of New Hartford and Colebrook; past member, Colebrook inland wetland agency, Norfolk planning and zoning; and past member of the Appalachian Trail Conference Board of Managers.

• Gerald J. Heffernan is the designee for Chairman Donald W. Downes of the Department of Public Utility Control. Mr. Heffernan is the current chairman of the Naugatuck Valley Revolving Loan Committee; member of the board of directors of Catholic Family Services; former supervisor of the Department of Public Utility Control's management audit unit (for approximately 20 years); and former tax commissioner (1975-1979).

• Brian Emerick is the designee for the commissioner of the Department of Environmental Protection (DEP). Mr. Emerick is a supervising environmental analyst at DEP. Mr. Emerick has been employed by DEP for approximately 26 years.

• Dr. Barbara Currier Bell is appointed by the speaker of the house. Dr. Bell is a member of the Milford inland wetlands commission; member of the mayor's clean energy task force in Milford; environmental columnist for the Milford Mirror; former board member, Woodlands Coalition; former professor (english and humanities) at Wesleyan University, Middletown, CT; former referee for environmental ethics; past president and co-founder, National Coalition of Independent Scholars.

• Daniel P. Lynch is appointed by the president pro tempore of the senate. Mr. Lynch is chairman of the board of Cash Can Inc.; vice president of Redemption Unlimited; treasurer of the Connecticut Redemption Association; consultant to the LHR International Trading, LLC; volunteer consultant to the Nutmeg State Games; and former member of the Connecticut Siting Council (1988-1995.)

• Philip T. Ashton is a member with utility experience appointed by the governor. Mr. Ashton is a retired chairman, president and CEO of Yankee Energy System; former vice president, transmission and distribution, Northeast Utilities; professional engineer (Massachusetts and formerly Connecticut); chairman, Meriden Flood Control Implementation Agency; director and past chapter chairman, American Red Cross-Greater Hartford Chapter; former chairman, Meriden Planning Commission; advisor on energy to the U.S. trade representative; former chairman, New England Gas Association; former director, American Gas Association; and former vice president, Power Engineering Society of the Institute of Electrical and Electronic Engineers (IEEE).

• Edward J. Wilensky is a member appointed by the governor with experience in ecology. Mr. Wilensky is a former mayor of the Town of Wolcott (1983-1999); past chairman of Bristol Resource Recovery Authority; past chairman of Central Naugatuck Valley Council of governments; past vice chairman of Connecticut Conference of Municipalities; former member of governor's task force on aquifer management; former member of board of directors for Tunxis Recycling Operating Committee; former chairman of Wolcott planning and zoning commission; and former member of board of directors for Connecticut Interlocal Risk Management Agency (CIRMA).

• James J. Murphy, Jr. is appointed by the governor. Attorney Murphy is counsel at the law firm Berberick, Murphy & Whitty, P.C.; former state senator, 19th district; former State Assistant Prosecutor, 10th Circuit Court; former State of Connecticut criminal justice commission chairman; former board of directors member, Eastern Connecticut Chamber of Commerce; chairman, Stonington board of education; exalted ruler of the Norwich Lodge of Elks; and W.W. Backus Hospital incorporator.

Appendix A. Existing Generation facilities as of September, 2005

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
AES Thames	AES Thames, Inc.	Montville	Coal/Oil	181.00	182.15	12/1/1989
Aetna Capitol District	Capitol District Energy Ctr.	Hartford	Gas/Oil	51.69	57.77	11/1/1988
Bantam #1	NGC	Litchfield	Hydro	0.06	0.32	1/1/1905
Branford #10	NRG	Branford	Oil	15.84	20.95	1/1/1969
Bridgeport Energy	Bridgeport Energy LLC	Bridgeport	Gas	451.22	530.46	8/1/1998
Bridgeport Harbor #2	PSEG Power, LLC	Bridgeport	Oil	130.50	147.51	8/1/1961
Bridgeport Harbor #3	PSEG Power, LLC	Bridgeport	Coal/Oil	372.21	370.37	8/1/1968
Bridgeport Harbor #4	PSEG Power, LLC	Bridgeport	Oil	9.92	14.72	10/1/1967
Bridgeport Resco	CRRA	Bridgeport	Refuse	58.52	58.74	4/1/1988
Bristol RRF	Ogden Martin Systems-CT	Bristol	Refuse/Oil	13.20	12.74	5/1/1988
Bulls Bridge #1- #6	NGC	New Milford	Hydro	8.40	8.40	1/1/1903
Dexter	Alstom	Windsor Locks	Gas/Oil	38.00	39.00	5/1/1990
Colebrook	MDC	Colebrook	Hydro	1.37	1.37	3/1/1988
Cos Cob #10	NRG	Greenwich	Oil	17.88	22.78	9/1/1969
Cos Cob #11	NRG	Greenwich	Oil	18.24	23.23	1/1/1969
Cos Cob #12	NRG	Greenwich	Oil	18.44	23.34	1/1/1969
Dayville Pond	Summit Hydro Power	Killingly	Hydro	0.06	0.06	3/1/1995
Derby Dam	McCallum Enterprises	Shelton	Hydro	7.05	7.05	3/1/1989
Devon #7	NRG	Milford	Oil/Gas	0.00	0.00	1/1/1956
Devon #11	NRG	Milford	Gas/Oil	29.58	39.10	10/1/1996
Devon #12	NRG	Milford	Gas/Oil	29.24	38.45	10/1/1996
Devon #13	NRG	Milford	Gas/Oil	30.76	39.76	10/1/1996
Devon #14	NRG	Milford	Gas/Oil	29.75	40.33	10/1/1996
Exeter	Oxford Energy, Inc.	Sterling	Tires/Oil	24.17	25.66	12/1/1991
Falls Village #1- #3	NGC	Canaan	Hydro	8.97	11.00	1/1/1914
Franklin Drive #10	NRG	Torrington	Oil	15.42	20.53	11/1/1968
Glen Falls	Summit Hydro Power	Plainfield	Hydro	0.10	0.10	3/1/1998
Goodwin Dam	MDC	Hartland	Hydro	2.06	2.06	2/1/1986
Hartford Landfill	CRRA	Hartford	Methane	2.53	2.53	8/1/1998
Kinneytown A	Kinneytown Hydro Co.	Ansonia	Hydro	0.25	0.25	3/1/1988
Kinneytown B	Kinneytown Hydro Co.	Seymour	Hydro	0.65	0.65	11/1/1986
Lake Road #1	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.14	267.76	7/1/2001
Lake Road #2	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.80	268.43	11/1/2001

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Lake Road #3	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	235.05	273.27	5/1/2002
Lisbon RRF	Riley Energy Systems	Lisbon	Refuse	12.96	13.04	1/1/1996
Mechanicsville	Saywatt Hydro Associates	Thompson	Hydro	0.10	0.10	9/1/1995
Middletown #2	NRG	Middletown	Oil/Gas	117.00	120.00	1/1/1958
Middletown #3	NRG	Middletown	Oil/Gas	236.00	245.00	1/1/1964
Middletown #4	NRG	Middletown	Oil	400.00	402.00	6/1/1973
Middletown #10	NRG	Middletown	Oil	17.12	22.02	1/1/1966
Milford Power #1	Milford Power Company, LLC	Milford	Gas/Oil	239.00	267.24	2/12/2004
Milford Power #2	Milford Power Company, LLC	Milford	Gas/Oil	253.09	287.63	6/1/2004
Millstone #2	Dominion Nuclear CT, Inc.	Waterford	Nuclear	882.14	881.96	12/1/1975
Millstone #3	Dominion Nuclear CT, Inc.	Waterford	Nuclear	1155.00	1155.48	4/1/1986
Montville #5	NRG	Montville	Oil/Gas	81.00	81.59	1/1/1954
Montville #6	NRG	Montville	Oil	407.40	409.91	7/1/1971
Montville #10 & #11	NRG	Montville	Oil	5.30	5.35	1/1/1967
New Haven Harbor #1	PSEG Power, LLC	New Haven	Oil/Gas	447.89	454.64	8/1/1975
New Milford Landfill	Vermont Electric Power Co.	New Milford	Methane/Oil	2.44	2.44	8/1/1991
Norwalk Harbor #1	NRG	Norwalk	Oil	162.00	164.00	1/1/1960
Norwalk Harbor #2	NRG	Norwalk	Oil	168.00	172.00	1/1/1963
Norwalk Harbor #10 (3)	NRG	Norwalk	Oil	11.93	17.13	10/1/1996
Norwich 2nd St. /Greenville Dam	CMEEC	Norwich	Hydro	0.95	0.95	10/1/1998
Norwich 10th St.	CMEEC	Norwich	Hydro	0.76	1.17	1/1/1966
Norwich Jet	CMEEC	Norwich	Oil	15.26	18.80	9/1/1972
Pinchbeck	William Pinchbeck, Inc.	Guilford	Wood	0.01	0.01	7/1/1987
PPL Wallingford Unit #1	PPL EnergyPlus, LLC	Wallingford	Gas	43.50	48.95	8/1/2001
PPL Wallingford Unit #2	PPL EnergyPlus, LLC	Wallingford	Gas	41.37	52.37	8/1/2001
PPL Wallingford Unit #3	PPL EnergyPlus, LLC	Wallingford	Gas	43.53	48.43	8/1/2001
PPL Wallingford Unit #4	PPL EnergyPlus, LLC	Wallingford	Gas	44.51	49.79	8/1/2001
PPL Wallingford Unit #5	PPL EnergyPlus, LLC	Wallingford	Gas	42.57	53.57	8/1/2001
Preston RRF	SCRRF	Preston	Refuse/Oil	16.01	16.95	1/1/1992
Putnam	Putnam Hydropower, Inc.	Putnam	Hydro	0.58	0.58	10/1/1987
Quinebaug	Quinebaug Associates LLC	Killingly	Hydro	0.96	2.81	9/1/1990
Rainbow Dam	Farmington River Power Co.	Windsor	Hydro	8.20	8.20	1/1/1980
Robertsville #1- #2	NGC	Colebrook	Hydro	0.34	0.62	1/1/1924

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Rocky Glen/ Sandy Hook Hydro	Rocky Glen Hydro LP	Newtown	Hydro	0.04	0.04	4/1/1989
Rocky River	NGC	New Milford	Hydro-pump strg.	29.35	6.11	1/1/1928
Scotland #1	NGC	Windham	Hydro	1.67	2.20	1/1/1937
Shepaug #1	NGC	Southbury	Hydro	41.51	42.56	1/1/1955
South Meadow #5	CRRA	Hartford	Refuse	25.60	29.23	11/1/1987
South Meadow #6	CRRA	Hartford	Refuse	27.11	30.45	11/1/1987
South Meadow #11	NGC	Hartford	Oil	35.78	46.92	8/1/1970
South Meadow #12	NGC	Hartford	Oil	37.70	47.87	8/1/1970
South Meadow #13	NGC	Hartford	Oil	38.32	47.92	8/1/1970
South Meadow #14	NGC	Hartford	Oil	37.35	47.35	8/1/1970
Stevenson #1- #4	NGC	Monroe	Hydro	28.31	28.90	1/1/1919
Taftville #1- #5	NGC	Norwich	Hydro	2.03	2.03	1/1/1906
Torrington Terminal #10	NRG	Torrington	Oil	17.12	21.00	8/1/1967
Toutant	Toutant Hydro Power, Inc.	Putnam	Hydro	0.16	0.16	2/1/1994
Tunnel #1- #2	NGC	Preston	Hydro	1.25	2.10	1/1/1919
Tunnel #10	NGC	Preston	Oil	15.89	20.76	1/1/1969
Wallingford RRF	CRRA	Wallingford	Refuse/Oil	6.35	6.90	3/1/1989
Willimantic #1	Willimantic Power Corp.	Willimantic	Hydro	0.42	0.42	6/1/1990
Willimantic #2	Willimantic Power Corp.	Willimantic	Hydro	0.39	0.39	6/1/1990
Wyre Wynd	Summit Hydro Power	Griswold	Hydro	1.80	1.80	4/1/1997
Seasonal Claimed Capability of coal fired plants				553.21	552.52	
Seasonal Claimed Capability of natural gas fired plants				1367.81	1592.85	
Seasonal Claimed Capability of oil fired plants				2477.30	2617.33	
Seasonal Claimed Capability of hydroelectric plants				147.79	132.40	
Seasonal Claimed Capability of methane fired plants				4.97	4.97	
Seasonal Claimed Capability of nuclear plants				2037.14	2037.44	
Seasonal Claimed Capability of refuse fueled plants (inc. tires)				183.92	193.70	
Seasonal Claimed Capability of wood fired plants				0.01	0.01	
Total Seasonal Claimed Capability available for dispatch to the grid.				6772.15	7131.22	

(Lake Road is excluded from the total.)

Facility (self generation)	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Connecticut Valley Hospital	State of Connecticut	Middletown	Oil	2.05	2.05	5/9/1999
Fairfield Hills Hospital	Fairfield Hills Hospital	Newtown	Oil	3.95	3.95	5/9/1999
Federal Paper Board	Federal Paper Board	Sprague	Oil	9.00	9.00	5/9/1999
Fishers Island Elec. Co.	Fishers Island Elec. Co.	Groton	Oil	1.10	1.10	1/1/1965
Groton Sub Base	U.S. Navy	Groton	Oil/Gas	18.50	18.50	1/1/1966
Loctite	Loctite	Rocky Hill	Gas	1.18	1.18	4/1/1994
Norwalk Hospital	Norwalk Hospital	Norwalk	Gas	2.36	2.36	1/1/1992
Norwich State Hospital	Norwich State Hospital	Norwich	Oil	2.00	2.00	5/9/1999
Pfizer #1	Pfizer	Groton	Oil	32.50	32.50	1/1/1948
Pratt & Whitney	UTC	E. Hartford	Gas	23.80	23.80	4/1/1992
Pratt & Whitney	UTC	Middletown	Oil	1.00	1.00	5/9/1999
Smurfit-Stone Container Co.	Smurfit-Stone Container Co.	Montville	Refuse	2.00	2.00	9/1/1989
Southbury Training School	State of Connecticut	Southbury	Oil	1.50	1.50	5/9/1999
Total Natural Gas Fired Generation less than 1 MW each				4.41	4.41	
Total Propane Fired Generation less than 1 MW each				0.03	0.03	
Total Hydroelectric Generation less than 1 MW each				1.94	1.94	
Total Methane Fueled Generation less than 1 MW each				0.13	0.13	
Total Solar (photovoltaic) Generation less than 1 MW each				0.15	0.15	
Total Wind Powered Generation less than 1 MW each				0.05	0.05	
Generation retained by facility				107.65	107.65	
Total MWs of generation in Connecticut.				6879.80	7238.87	

Appendix A. Existing Generation facilities as of September, 2005, by Fuel type

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
AES Thames	AES Thames, Inc.	Montville	Coal/Oil	181.00	182.15	12/1/1989
Bridgeport Harbor #3	PSEG Power, LLC	Bridgeport	Coal/Oil	372.21	370.37	8/1/1968
Bridgeport Energy	Bridgeport Energy LLC	Bridgeport	Gas	451.22	530.46	8/1/1998
PPL Wallingford Unit #1	PPL EnergyPlus, LLC	Wallingford	Gas	43.50	48.95	8/1/2001
PPL Wallingford Unit #2	PPL EnergyPlus, LLC	Wallingford	Gas	41.37	52.37	8/1/2001
PPL Wallingford Unit #3	PPL EnergyPlus, LLC	Wallingford	Gas	43.53	48.43	8/1/2001
PPL Wallingford Unit #4	PPL EnergyPlus, LLC	Wallingford	Gas	44.51	49.79	8/1/2001
PPL Wallingford Unit #5	PPL EnergyPlus, LLC	Wallingford	Gas	42.57	53.57	8/1/2001
Aetna Capitol District	Capitol District Energy Ctr.	Hartford	Gas/Oil	51.69	57.77	11/1/1988
Dexter	Alstom	Windsor Locks	Gas/Oil	38.00	39.00	5/1/1990
Devon #11	NRG	Milford	Gas/Oil	29.58	39.10	10/1/1996
Devon #12	NRG	Milford	Gas/Oil	29.24	38.45	10/1/1996
Devon #13	NRG	Milford	Gas/Oil	30.76	39.76	10/1/1996
Devon #14	NRG	Milford	Gas/Oil	29.75	40.33	10/1/1996
Lake Road #1	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.14	267.76	7/1/2001
Lake Road #2	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	232.80	268.43	11/1/2001
Lake Road #3	Lake Road Generating Co., L.P.	Killingly	Gas/Oil	235.05	273.27	5/1/2002
Milford Power #1	Milford Power Company, LLC	Milford	Gas/Oil	239.00	267.24	2/12/2004
Milford Power #2	Milford Power Company, LLC	Milford	Gas/Oil	253.09	287.63	6/1/2004
Bantam #1	NGC	Litchfield	Hydro	0.06	0.32	1/1/1905
Bulls Bridge #1- #6	NGC	New Milford	Hydro	8.40	8.40	1/1/1903
Colebrook	MDC	Colebrook	Hydro	1.37	1.37	3/1/1988
Dayville Pond	Summit Hydro Power	Killingly	Hydro	0.06	0.06	3/1/1995
Derby Dam	McCallum Enterprises	Shelton	Hydro	7.05	7.05	3/1/1989
Falls Village #1- #3	NGC	Canaan	Hydro	8.97	11.00	1/1/1914
Glen Falls	Summit Hydro Power	Plainfield	Hydro	0.10	0.10	3/1/1998
Goodwin Dam	MDC	Hartland	Hydro	2.06	2.06	2/1/1986
Kinneytown A	Kinneytown Hydro Co.	Ansonia	Hydro	0.25	0.25	3/1/1988
Kinneytown B	Kinneytown Hydro Co.	Seymour	Hydro	0.65	0.65	11/1/1986
Mechanicsville	Saywatt Hydro Associates	Thompson	Hydro	0.10	0.10	9/1/1995
Norwich 2nd St./ Greenville Dam	CMEEC	Norwich	Hydro	0.95	0.95	10/1/98

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Norwich 10th St.	CMEEC	Norwich	Hydro	0.76	1.17	1/1/1966
Putnam	Putnam Hydropower, Inc.	Putnam	Hydro	0.58	0.58	10/1/1987
Quinebaug	Quinebaug Associates LLC	Killingly	Hydro	0.96	2.81	9/1/1990
Rainbow Dam	Farmington River Power Co.	Windsor	Hydro	8.20	8.20	1/1/1980
Robertsville #1- #2	NGC	Colebrook	Hydro	0.34	0.62	1/1/1924
Rocky Glen/Sandy Hook Hydro	Rocky Glen Hydro LP	Newtown	Hydro	0.04	0.04	4/1/1989
Rocky River	NGC	New Milford	Hydro-pump strg.	29.35	6.11	1/1/1928
Scotland #1	NGC	Windham	Hydro	1.67	2.20	1/1/1937
Shepaug #1	NGC	Southbury	Hydro	41.51	42.56	1/1/1955
Stevenson #1- #4	NGC	Monroe	Hydro	28.31	28.90	1/1/1919
Taftville #1- #5	NGC	Norwich	Hydro	2.03	2.03	1/1/2006
Toutant	Toutant Hydro Power, Inc.	Putnam	Hydro	0.16	0.16	2/1/1994
Tunnel #1- #2	NGC	Preston	Hydro	1.25	2.10	1/1/1919
Willimantic #1	Willimantic Power Corp.	Willimantic	Hydro	0.42	0.42	6/1/1990
Willimantic #2	Willimantic Power Corp.	Willimantic	Hydro	0.39	0.39	6/1/1990
Wyre Wynd	Summit Hydro Power	Griswold	Hydro	1.80	1.80	4/1/1997
Hartford Landfill	CRRA	Hartford	Methane	2.53	2.53	8/1/1998
New Milford Landfill	Vermont Electric Power Co.	New Milford	Methane /Oil	2.44	2.44	8/1/1991
Millstone #2	Dominion Nuclear CT, Inc.	Waterford	Nuclear	882.14	881.96	12/1/1975
Millstone #3	Dominion Nuclear CT, Inc.	Waterford	Nuclear	1155.00	1155.48	4/1/1986
Branford #10	NRG	Branford	Oil	15.84	20.95	1/1/1969
Bridgeport Harbor #2	PSEG Power, LLC	Bridgeport	Oil	130.50	147.51	8/1/1961
Bridgeport Harbor #4	PSEG Power, LLC	Bridgeport	Oil	9.92	14.72	10/1/1967
Cos Cob #10	NRG	Greenwich	Oil	17.88	22.78	9/1/1969
Cos Cob #11	NRG	Greenwich	Oil	18.24	23.23	1/1/1969
Cos Cob #12	NRG	Greenwich	Oil	18.44	23.34	1/1/1969
Franklin Drive #10	NRG	Torrington	Oil	15.42	20.53	1/1/1968
Middletown #4	NRG	Middletown	Oil	400.00	402.00	6/1/1973
Middletown #10	NRG	Middletown	Oil	17.12	22.02	1/1/1966
Montville #6	NRG	Montville	Oil	407.40	409.91	7/1/1971
Montville #10 & #11	NRG	Montville	Oil	5.30	5.35	1/1/1967

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Norwalk Harbor #1	NRG	Norwalk	Oil	162.00	164.00	1/1/1960
Norwalk Harbor #2	NRG	Norwalk	Oil	168.00	172.00	1/1/1963
Norwalk Harbor #10 (3)	NRG	Norwalk	Oil	11.93	17.13	10/1/1996
Norwich Jet	CMEEC	Norwich	Oil	15.26	18.80	9/1/1972
South Meadow #11	NGC	Hartford	Oil	35.78	46.92	8/1/1970
South Meadow #12	NGC	Hartford	Oil	37.70	47.87	8/1/1970
South Meadow #13	NGC	Hartford	Oil	38.32	47.92	8/1/1970
South Meadow #14	NGC	Hartford	Oil	37.35	47.35	8/1/1970
Torrington Terminal #10	NRG	Torrington	Oil	17.12	21.00	8/1/1967
Tunnel #10	NGC	Preston	Oil	15.89	20.76	1/1/1969
Devon #7	NRG	Milford	Oil/Gas	0.00	0.00	1/1/1956
Middletown #2	NRG	Middletown	Oil/Gas	117.00	120.00	1/1/1958
Middletown #3	NRG	Middletown	Oil/Gas	236.00	245.00	1/1/1964
Montville #5	NRG	Montville	Oil/Gas	81.00	81.59	1/1/1954
New Haven Harbor #1	PSEG Power, LLC	New Haven	Oil/Gas	447.89	454.64	8/1/1975
Bridgeport Resco	CRRA	Bridgeport	Refuse	58.52	58.74	4/1/1988
Bristol RRF	Ogden Martin Systems-CT	Bristol	Refuse/Oil	13.20	12.74	5/1/1988
Lisbon RRF	Riley Energy Systems	Lisbon	Refuse	12.96	13.04	1/1/1996
South Meadow #5	CRRA	Hartford	Refuse	25.60	29.23	11/1/1987
South Meadow #6	CRRA	Hartford	Refuse	27.11	30.45	11/1/1987
Preston RRF	SCRRF	Preston	Refuse/Oil	16.01	16.95	1/1/1992
Wallingford RRF	CRRA	Wallingford	Refuse/Oil	6.35	6.90	3/1/1989
Exeter	Oxford Energy, Inc.	Sterling	Tires/Oil	24.17	25.66	12/1/1991
Pinchbeck	William Pinchbeck, Inc.	Guilford	Wood	0.01	0.01	7/1/1987
Total Seasonal Claimed Capability available for dispatch to the grid.				6772.15	7131.22	

(Lake Road is excluded from the total.)

Facility	Owner	Town	Fuel	Summer Rating	Winter Rating	In-Service Date
Loctite	Loctite	Rocky Hill	Gas	1.18	1.18	4/1/1994
Norwalk Hospital	Norwalk Hospital	Norwalk	Gas	2.36	2.36	1/1/1992
Pratt & Whitney	UTC	E. Hartford	Gas	23.80	23.80	4/1/1992
Connecticut Valley Hospital	State of Connecticut	Middletown	Oil	2.05	2.05	5/9/1999
Fairfield Hills Hospital	Fairfield Hills Hospital	Newtown	Oil	3.95	3.95	5/9/1999
Federal Paper Board	Federal Paper Board	Sprague	Oil	9.00	9.00	5/9/1999
Fishers Island Elec. Co.	Fishers Island Elec. Co.	Groton	Oil	1.10	1.10	1/1/1965
Norwich State Hospital	Norwich State Hospital	Norwich	Oil	2.00	2.00	5/9/1999
Pfizer #1	Pfizer	Groton	Oil	32.50	32.50	1/1/1948
Pratt & Whitney	UTC	Middletown	Oil	1.00	1.00	5/9/1999
Southbury Training School	State of Connecticut	Southbury	Oil	1.50	1.50	5/9/1999
Groton Sub Base	U.S. Navy	Groton	Oil/Gas	18.50	18.50	1/1/1966
Smurfit-Stone Container Co.	Smurfit-Stone Container Co.	Montville	Refuse	2.00	2.00	9/1/1989
Total Natural Gas Fired Generation less than 1 MW each				4.41	4.41	
Total Propane Fired Generation less than 1 MW each				0.03	0.03	
Total Hydroelectric Generation less than 1 MW each				1.94	1.94	
Total Methane Fueled Generation less than 1 MW each				0.13	0.13	
Total Solar (photovoltaic) Generation less than 1 MW each				0.15	0.15	
Total Wind Powered Generation less than 1 MW each				0.05	0.05	
Generation retained by facility				107.65	107.65	
Total MWs of generation in Connecticut.				6879.80	7238.87	

Appendix B Planned Transmission Lines in Connecticut

Planned Transmission Lines in Connecticut	Length (miles)	Voltage (kV)	Expected Date to be In Service
Plumtree S/S, Bethel - Norwalk S/S, Norwalk (new) (Docket No. 217)	8.6	345	2006
Plumtree S/S, Bethel - Norwalk S/S, Norwalk (new) (Docket No. 217)	11.8	345	2006
Plumtree S/S, Bethel - Norwalk S/S, Norwalk (reconfigure 1470/1565 lines) (Docket No. 217)	1.3	115	2006
Plumtree S/S, Bethel - Norwalk S/S, Norwalk (reconfigure 1470/1565 lines) (Docket No. 217)	10.0	115	2006
Norwalk Harbor Station, Norwalk - Northport Station, Northport, NY (replace) (Docket No. 224)	5.8	138	2007
East Devon S/S, Milford - Singer S/S, Bridgeport (new substations and line) (Docket No. 272)	3.1	345	2009
Singer S/S, Bridgeport - Norwalk S/S, Norwalk (new substation and line) (Docket No. 272)	15.5	345	2009
Plumtree S/S, Bethel - Triangle S/S, Danbury (rebuild)	1.8	115	2007
Plumtree S/S, Bethel - Triangle S/S, Danbury (rebuild)	1.8	115	2007
Devon S/S, Milford - Wallingford Station, Wallingford #1640 line (rebuild portion of line) (Docket No. 272)	27	115	2009
Devon S/S, Milford - June St. S/S, Woodbridge #1685 line (rebuild portion of line) (Docket No. 272)	13.4	115	2009
North Haven S/S, North Haven - Wallingford Station, Wallingford #1630 line (rebuild portion of line) (Docket No. 272)	0.3	115	2009
North Haven S/S, North Haven - Branford S/S, Branford #1655 line (rebuild portion of line) (Docket No. 272)	1.3	115	2009
East Devon S/S, Milford - Devon S/S, Milford (new) (Docket No. 272)	1.3	115	2009
East Meriden S/S, Meriden - North Wallingford S/S, Wallingford #1466 line (rebuild portion of line) (Docket No. 272)	1.4	115	2009
June St. S/S, Woodbridge - Southington S/S, Southington #1610 line (rebuild portion of line) (Docket No. 272)	10.5	115	2009
Devon S/S, Milford - Devon Switching Station, Milford (rebuild) (Docket No. 272)	0.1	115	2009
Devon S/S, Milford - Devon Switching Station, Milford (rebuild) (Docket No. 272)	0.1	115	2009
Southington S/S, Southington - Wallingford S/S, Wallingford #1208 line (rebuild portion of line) (Docket No. 272)	2.9	115	2009
Devon S/S, Milford - Derby Junction, Shelton - Beacon Falls, S/S, Beacon Falls #1570 line (reconductor portion of line) (Docket No. 272)	3.8	115	2009
Bunker Hill S/S, Waterbury - Baldwin Junction, Waterbury - Beacon Falls S/S, Beacon Falls #1575 line (reconductor. portion of line) (Docket No. 272)	3.8	115	2009
Devon S/S, Milford - Lucchini Junction, Meriden - Southington S/S, Southington #1690 line (remove portion of line) (Docket No. 272)	23.9	115	2009
Scovill Rock S/S, Middletown - Chestnut Junction, Middletown (new) (Docket No. 272)	2.6	345	2009
Oxbow Junction, Haddam - Beseck S/S, Wallingford (new switchyard and line) (Docket No. 272)	7.0	345	2009
Black Pond Junction, Middlefield - Beseck S/S, Wallingford (new switchyard and line) (Docket No. 272)	2.8	345	2009

Planned Transmission Lines in Connecticut	Length (miles)	Voltage (kV)	Expected Date to be In Service
Black Pond Junction, Middlefield - Beseck S/S, Wallingford (new switchyard and line) (Docket No. 272)	2.8	345	2009
Beseck S/S, Wallingford - East Devon S/S, Milford (new switchyard, substation and line) Docket No. 272)	33.4	345	2009
Haddam S/S - East Meriden S/S, Meriden #1975 line (rebuild portion of line) (Docket No. 272)	8.4	115	2009
Norwalk S/S, Norwalk - Glenbrook S/S, Stamford circuit #1 (new) (Docket No. 292)	8.7	115	2008
Norwalk S/S, Norwalk - Glenbrook S/S, Stamford circuit #2 (new) (Docket No. 292)	8.7	115	2008
Tunnel S/S, Preston - Ledyard Junction, Ledyard (rebuild & upgrade to 115-kV)	8.5	69	TBD
Ledyard Junction, Ledyard - Gales Ferry S/S, Ledyard (upgrade to 115-kV)	1.6	69	TBD
Gales Ferry S/S, Ledyard - Montville Station, Montville (upgrade to 115-kV)	2.4	69	TBD
Ledyard Junction, Ledyard - Buddington S/S, Groton (upgrade to 115-kV)	4.7	69	TBD
Card S/S, Lebanon - Wawacus Junction, Bozrah (rebuild)	12.7	115	TBD
Card S/S, Lebanon - Lake Road Station, Killingly (new)	29.2	345	TBD
Lake Road Station, Killingly - West Farnum Road S/S, R.I. (new)	7.6	345	TBD
Norwalk Harbor Station, Norwalk - Glenbrook S/S, Stamford (new)	9.2	115	TBD
South End S/S, Stamford - Tomac S/S, Greenwich #1750 line (reconductor portion of line)	0.4	115	TBD
Manchester S/S, Manchester - Hopewell S/S, Glastonbury (reconductor)	7.0	115	2006
East Meriden S/S, Meriden - North Wallingford S/S, Wallingford #1466 line (reconductor portion of line)	0.5	115	TBD
Schwab Junction, Wallingford - Colony S/S, Wallingford (new)	1.5	115	TBD
Manchester S/S, Manchester - Barbour Hill S/S, South Windsor (rebuild)	7.5	115	TBD
Southington S/S, Southington - Schwab Junction, Wallingford (unbundle/rebuild)	6.3	115	TBD
Oxbow Jct., Haddam - Beseck Jct., Wallingford (unbundle/rebuild)	14.7	115	TBD
Colony S/S, Wallingford North Wallingford S/S (unbundle)	2.4	115	TBD
Frost Bridge S/S, Watertown - Bunker Hill S/S, Waterbury	3.9	115	TBD
Frost Bridge S/S, Watertown - Walnut Jct., Thomaston (new)	6.4	115	TBD
Frost Bridge S/S, Watertown - Campville S/S, Harwinton (rebuild)	10.3	115	TBD

COUNCIL STAFF BIOGRAPHY

The members of the Council staff are as follows:

S. Derek Phelps is executive director of the Council. He has served for the past four years. Mr. Phelps holds a bachelor's degree in public administration from the University of Connecticut and a master's degree in e-media communications from Quinnipiac University. He is a former deputy commissioner and also worked in the private sector in various matters involving public utilities.

Robert K. Erling (Supervising Siting Analyst) has been employed by the Council for over 20 years. Mr. Erling has a bachelor of science degree from the University of Connecticut in natural resource conservation. He was previously employed by the Department of Environmental Protection.

Fred O. Cunliffe (Siting Analyst II) has been employed by the Council for approximately 17 years. Mr. Cunliffe earned a bachelor of science degree studying wildlife biology at the University of Massachusetts, Amherst. He previously served as a research assistant with the Department of Environmental Protection.

Christina M. Lepage (Siting Analyst I) has been employed by the Council for five years. Ms. Lepage holds a bachelor of science degree in environmental science from Marist College and a master of science degree in environmental science from the University of New Haven.

Robert D. Mercier (Siting Analyst I) has been employed by the Council for four years. Mr. Mercier holds a bachelor of arts degree with a concentration in environmental science from Central Connecticut State University. Prior to employment with the Council, he was employed as an environmental consultant specializing in hazardous materials assessment and remediation.

C. David Martin (Siting Analyst I) has been employed by the Council for three years. He holds a bachelor of arts degree from Bates College and a masters in urban planning from Michigan State University. Mr. Martin has previously worked for the Central Connecticut Regional Planning Agency, as a town planner for a Connecticut municipality, and the Connecticut Resources Recovery Authority.

Michael A. Perrone (Siting Analyst I) has been employed by the Council for two years. Mr. Perrone holds a bachelor of science degree in mechanical engineering from the University of New Haven. He was previously employed as an engineer at the Connecticut Department of Public Utility Control.

Lisa A. Fontaine is an administrative assistant. She has been employed by the Council for 5 years and holds an associate of science degree.

Carriann Mulcahy (secretary) has been employed by the Council for two years. Ms. Mulcahy was previously employed by Central Connecticut State University. Her past experience also includes employment at the federal and municipal level.

Adriana C. Popa (clerk typist) is a recent addition to the Council staff. Ms. Popa holds an undergraduate degree in library science from Transilvania University of Brasov and a bachelor of arts degree from Charter Oak College. Ms. Popa was previously employed as an executive assistant by a Connecticut based energy services company.

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