



February 24, 2017

Mr. Robert Stein, Chairman  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

Dear Chairman Stein:

The Connecticut Municipal Electric Energy Cooperative (CMEEC) herewith submits an original and fifteen (15) copies to the Connecticut Siting Council of our Forecast of Electric Loads and Resources for 2017-2026 Report as required by Section 16-50R of the Connecticut General Statutes.

Should you require any additional information, please advise us.

Very truly yours,

CONNECTICUT MUNICIPAL ELECTRIC  
ENERGY COOPERATIVE

A handwritten signature in dark ink, appearing to read "DR Rankin", is written over the printed name.

Drew Rankin  
Chief Executive Officer

CJC/

Enclosures

cc: Service List

FORECAST OF ELECTRIC LOADS AND RESOURCES 2017-2026

March 1, 2017

Connecticut Municipal Electric Energy Cooperative  
30 Stott Avenue  
Norwich, Connecticut 06360

## **Introduction and Background**

The Connecticut Municipal Electric Energy Cooperative ("CMEEC") is a not-for-profit joint-action power supply agency empowered to finance, plan, acquire, construct, operate, repair, extend, or improve electric generation and transmission facilities and sell power at wholesale and other markets to serve the needs of the Connecticut municipal electric utilities ("MEUs") and other electric utility systems and customers.

The CMEEC Member utilities (collectively, the "Members") are (1) Norwalk's Third Taxing District Electrical Department ("East Norwalk"), (2) Groton Utilities ("Groton"), (3) Jewett City Department of Public Utilities ("Jewett City"), (4) Norwich Public Utilities ("Norwich"), (5) South Norwalk Electric & Water ("South Norwalk"), and (6) Bozrah Power & Light Company ("Bozrah"). The Mohegan Tribal Utility Authority ("MTUA") is also a full-requirements wholesale customer of CMEEC. The loads of the CMEEC Members, and the MTUA are represented on an integrated, single-system basis for purposes of ISO-New England ("ISO-NE") operations.

The joint power supply established by CMEEC is intended to meet the diversified power supply needs of all of CMEEC's Members and customers. CMEEC's mission is to meet these requirements reliably and at the lowest possible cost over the long-term. Today, CMEEC's portfolio consists of CMEEC and member-owned generation, unit entitlement contracts, long-term contracts, intermediate and short-term system contracts, financial instruments, and ISO New England (ISO-NE) market purchases.

The enclosed forecast for 2017-2026 shows negative load growth for CMEEC's Members/customers in Connecticut. CMEEC's projections for the 2017-2026 period reflect an average compound growth rate of -0.64% for total system energy requirements and 0.58% for annual summer coincident peak demand. Consumption levels in the residential, small general service and large general service markets declined in 2016 from 2015 levels. Weather impacts and the loss of significant load in the biological science clusters has also slowed growth significantly. A new hotel at the Mohegan Tribal Utility Authority came on line in November 2016. There is still some uncertainty about the pace of additional development at the Mohegan Tribal Utility Authority. The new Norwalk data base center CyrusOne previously known as Cervalis came on-line in December 2013. The new data center still has the potential for significant load growth and is fed by the newly constructed Fitch Street substation located in East Norwalk. However, the anticipated load growth from this customer has not yet been realized. There has also been some negative impacts on the Groton Utilities load due to the installation of rooftop solar at the U.S. Submarine Navy housing complex.

Future growth is further modulated by reductions in usage rates resulting from the conservation programs planned and implemented by the municipal electric distribution utilities (MEUs). These programs remain very active and are popular with all sectors of MEU end users. The long-term forecasts of electric demand and the energy of the CMEEC Member and customer utilities are the primary tools used to ascertain future CMEEC power needs. When the primary individual forecasts are combined, the result is a CMEEC system-wide energy, peak demand and capacity requirements forecast, which is filed with the Council herein and also used to make

power supply decisions.

The new Fitch Substation in East Norwalk is expected to meet the needs of that community for several decades and the similar SNEW South Norwalk 115 kV to 13.8 kV SONO substation which opened in 2014 likewise sets the stage for meeting future load growth with improved reliability over the previous 27.6 kV supply system. Corresponding with this major supply route change SNEW has upgraded its distribution system to 13.8 kV, reducing losses and improving distribution level reliability. With respect to grid related issues, CMEEC participates in NEPOOL studies which include delivery capability review for MEU points of receipt. A current such study is the Southeastern Connecticut Area Study, which looks out to 2022.

### **Conservation and Load Management**

The MEU's, for which CMEEC reports, continued delivery of cost effective Conservation and Load Management ("C&LM") programs to customers in 2016. CMEEC, on behalf of the MEUs, for which is reports, worked with the members of the Energy Efficiency Board ("EEB") pursuant to Conn. Gen. Stat. Section 7-233y, in implementing additional and ongoing programs to reduce customer electricity usage and peak demand. The C&LM Plan measures the overall impact of electricity conservation programs on customer energy usage and peak demand.

In 2016, the MEUs, for which CMEEC reports (and including prior years, as noted below), provided a fully implemented portfolio of energy-efficiency initiatives, including:

- Performing comprehensive energy audits and weatherization of 430 homes;
- Distributing over 25,000 compact fluorescent lamps, bringing the total to over 1,350,000 since program inception in 2006;
- Promotion/purchase of over 20 ENERGY STAR appliances through the mail-In Appliance Rebate Program;
- Participation in the Cool Choice HVAC Rebate program by more than 140 residential and commercial customers;
- Providing energy-efficiency assessments and incentives for nearly 200 commercial and industrial customer projects (e.g. custom equipment replacement, lighting retrofits); and
- Serving more than 3,700 customers in total.

MEU CL&M efforts during 2016 resulted in a 0.462 MW in coincident summer peak demand reduction and more than 4,484 MWh in annual energy savings, at a cost of about \$0.04 per lifetime kWh. MEU commercial and industrial customers received over \$900,000 in incentives for installing energy-efficiency measures in their facilities. Residential customers received over \$530,000 in incentives. These efforts will continue through 2017 and beyond.

The following material and tables are in the specific itemized requirements of Sec.16-50r of the General Statutes and provided on behalf of CMEEC and its Members and customers. Items (1) through (8) listed below correspond to the numbers included in that section.

- (1) Provide a tabulation of estimated peak loads, resources and margins for each year (of the forecast period):

Table I shows forecasted energy and demand for the period as well as data on summer and winter peak demands. Table II reflects the forecasted annual peak demands for the 2017-2026 periods for both the 50/50 forecast as well as the 90/10 extreme condition forecast.

CMEEC is a participant in ISO NE and meets its net power needs through the ISO-NE market system. CMEEC also maintains power and related resources delivered to the Markets. Market resources over the forecast period include NYPA and Hydro Quebec ICAP credits (20 - 30 MW), Conservation & Load Response ICAP Credits (5 MW), A.L. Pierce (75 – 95 MW), Norwich Jet (15 - 18 MW). CMEEC maintains distributed generator resources (40-50 MW) to help attain local reliability goals.

- (2) Provide data on energy use and peak loads for the five preceding calendar years:

Historical aggregated energy use and peak loads for the six-member CMEEC system and the Mohegan Tribal Utility Authority (MTUA), are provided in Table III.

- (3) Provide a list of existing generating facilities in service:

Generating facilities owned by CMEEC and CMEEC Members are listed in Table IV. The mix of existing generating facilities and system power agreements that serve the CMEEC system are listed in Table V. Anticipated retirement dates of CMEEC and Member generating facilities are listed in Table VI.

- (4) Provide 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:

CMEEC executed a lease in 2014 with the United States Navy for use of an approximately 1 acre federally owned site located at the Naval Submarine Base in Groton. CMEEC is currently developing a generating facility in the range of 8 MW utilizing yet-to-be-determined technology. All necessary applications have yet to be filed but are expected to be filed during calendar year 2017.

- (5) Provide 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 electric requirements:

There are no planned CMEEC owned generating units responsive to this question.

CMEEC has entered into five Power Purchase Agreements (“PPAs”) with an independent developer for the development, design, construction and operation of solar photo-voltaic (“PV”) array electric generating facilities at five separate locations in the service areas of CMEEC’s Members and customers and interconnecting with the Members’ electric distribution systems. These facilities follow the business model of a community solar

garden and range in size from approximately 2.5 to 6 MWs in capacity depending on location. The commercial operation date of these projects is anticipated to occur over the next 1-2 years, following completion of permitting, development and construction activities. Under the PPAs, the developer is responsible for the development, construction and operation of the projects. CMEEEC, under the PPAs, is the purchaser of the electric products produced by the projects.

- (6) Provide a list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed.

There are no planned transmission lines.

- (7) Provide 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.

Several projects are recently completed, underway or in various stages of completion in the CMEEEC Member service territories, which are summarized below.

**South Norwalk (SNEW)** has completed (except for non-functional items such as a final report to the Siting Council) and placed into service a new 115 kV to 13.8kV distribution substation connected to a new Eversource Energy PTF station. The new SNEW station replaced two unreliable 27.6 kV sub-transmission feeders owned by the former Connecticut Light & Power (CL&P). The new distribution substation, feeder breakers and switch gear replaces a 70 year old 27.6 kV to 13.8 kV and a 27.6 kV to 4.16 kV substation, including all existing station switchgear. The old station is out of service and is in the process of being decommissioned. The new station necessitated the conversion of SNEW's existing 4.16 kV overhead distribution system to 13.8 kV. The purpose of the new station is to increase reliability and efficiency. SNEW has re-sized all distribution transformers. SNEW is currently replacing existing distribution system primary switches, resizing transformers, balancing loads on the distribution system and adding additional distribution system protection equipment to further improve system reliability. The new station provides additional capacity for future system load expansion.

**East Norwalk (TTD)** put in service a new PTF level substation in December 2013 (Fitch 47R) which is the subject of CSC DN 426. The project has been completed in accordance with the CT Siting Council and the City of Norwalk Planning and Zoning Commission. This project addresses reliability and replaces aging portions of the distribution system which posed unacceptable risks to TTD. In addition, it allows for TTD to satisfy additional load growth within their system and eliminates two underground supply cables owned by Eversource which were originally installed in 1946. These cables have been repaired continuously as a result of system faults. TTD is currently developing a 5-Phase SCADA system which will monitor and control TTD's transmission and distribution substations. This system will ensure compliance with

NERC/NE-ISO regulations.

**Norwich Department of Public Utilities (NPU)** continues to upgrade its 4.8kV distribution system to 13.8kV to increase efficiency by reducing system losses and to improve reliability through better voltage conditions and newer equipment.

All NPU substations, generating stations and several distribution switches are monitored and controlled 24/7 via a Supervisory Control and Data Acquisition (SCADA) system in NPU's control room. All stations have been moved to NPU's fiber optic network for more reliable communication and monitoring.

In 2016 the primary and back-up transmission protection relays for the 1000 line at Bean Hill Substation were upgraded from mechanical to solid state relays, allowing more input to the SCADA system and better monitoring of transmission assets.

The Greeneville Dam and Occum Dam fish passages operated successfully during 2016. NPU continued to work closely with DEEP on fish passages, eel passages, pit tagging program and shad trucking to promote the migration of shad to new spawning grounds. Occum Dam continues to pass American Shad and NPU in conjunction with DEEP will continually monitor its performance. NPU's Greeneville and Occum Dams are certified by the Low Impact Hydro Institute (LIHI) and continue to accrue renewable energy certificates (RECs).

In 2016, NPU successfully deployed approximately 600 electric meters onto its AMI System for a total of 18,050 operational AMI meters. NPU is planning to complete the remaining 3,159 electric meters in 2017/2018.

**Jewett City Department of Public Utilities (JCDPU)** is continuing the upgrading of its distribution network in an intended development of long-range system expansion and as part of this effort, any business or residential expansion would involve underground cable installation. All of JCDPU customers are now served through smart meters. Jewett City is almost finished with the overhaul of their backup substation and this work will go towards increasing the reliability within their service territory.

**Groton Utilities** installed 3,325 feet of underground primary and secondary cables that provides electric power to a housing complex on Military Highway in Groton CT. In addition, numerous underground services to residential customers have been installed throughout the year in the prior two years. Groton Utilities preferred construction standard is to place all power distribution facilities underground.

Groton Utilities and Bozrah have deployed about 15,000 electric meters onto its AMI System.

**Bozrah Light and Power** installed seven (7) underground services throughout the year in the prior two years. Bozrah's preferred construction method is to place all power distribution facilities underground.

- (8) For each private power producer having a facility generating more than one (1) megawatt, and from whom CMEEC has purchased electricity during the preceding calendar year, provide 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:

Generally, the customers in CMEEC Members service areas who have generating capacity greater than 1 MW retain the power for ongoing internal utilization and/or load management. Table VII summarizes major on-site generation capability at customer locations within the municipal service territories. CMEEC does not have formal arrangements in place to purchase power from those facilities at this time. Many of these customers, however, are asked to generate power and/or shed load during high load or emergency conditions as defined in NEPOOL's Operating Procedure #4.

**TABLE I**  
**CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE**  
**10-YEAR FORECAST OF MEMBER AND CUSTOMER ENERGY REQUIREMENTS AND CMEEC PEAK DEMAND**  
**2017-2026**

YEAR	Groton. MWh	Norwich. MWh	Jewett City MWh	East Norwalk MWh	South Norwalk MWh	Bozrah MWh	Air Gas. MWh	Mohegan Tribal Utility Authority MWh	CyrusOne MWh	Systems Energy Requirements Met by CMEEC MWh [1]	CMEEC Summer Coincident Demand MWh [2]	CMEEC Winter Coincident Demand MWh [2]	Load Factor %
2016	438,676	322,448	23,855	61,705	92,881	45,637	163,980	133,199	2,341	1,284,722	230,78	199,65	63.4
2017	422,472	320,240	23,391	60,983	91,440	44,349	166,214	141,476	1,920	1,272,487	231,35	206,82	62.8
2018	419,549	317,396	23,307	60,410	90,228	44,134	166,240	140,267	1,946	1,263,478	227,89	206,29	63.3
2019	415,933	315,401	23,105	60,096	89,983	43,805	166,431	139,607	1,970	1,256,332	227,32	205,33	63.1
2020	413,794	313,232	22,942	59,649	89,283	43,479	166,295	138,602	2,003	1,249,280	226,29	204,23	62.8
2021	410,941	310,928	22,795	59,211	88,573	43,193	166,322	137,658	2,032	1,241,653	224,49	203,06	63.1
2022	408,450	309,043	22,656	58,852	88,036	42,931	165,314	136,823	2,020	1,234,125	223,13	201,83	63.1
2023	405,973	307,169	22,519	58,495	87,503	42,671	164,312	135,993	2,007	1,226,642	221,78	200,61	63.1
2024	403,512	305,307	22,382	58,140	86,972	42,412	163,315	135,169	1,995	1,219,205	220,43	199,39	63.0
2025	401,065	303,456	22,247	57,788	86,445	42,155	162,325	134,349	1,983	1,211,813	219,09	198,18	63.1
2026	398,633	301,616	22,112	57,438	85,921	41,899	161,341	133,535	1,971	1,204,466	217,77	196,98	63.1
AACGR % increase 2016 - 2026	-0.95	-0.67	-0.76	-0.71	-0.78	-0.85	-0.16	0.03	-1.70	-0.64	-0.58	-0.13	

[1] Totals are the sum of kilowatthours rounded to the nearest megawatthour (MWh).

[2] The forecasted CMEEC coincident peak demands were computed by summing the Groton, Norwich Jewett City, East Norwalk, South Norwalk, Bozrah, Air Gas, the Mohegan Tribal Utility Authority and CyrusOne noncoincident peak demands and multiplying by an average historical coincidence factor.

TABLE II

March 2017

**CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE (CMEEC)**

**SUMMARY OF CMEEC PEAK FORECASTS (1)**

<u>Year</u>	<u>50/50 Peak Forecast</u>	<u>90/10 Peak Forecast</u>
2017	231.35	247.95
2018	227.89	244.25
2019	227.32	243.64
2020	226.29	242.54
2021	224.49	240.61
2022	223.13	239.16
2023	221.78	237.71
2024	220.43	236.27
2025	219.09	234.85
2026	217.77	233.43

(1) CMEEC developed its extreme weather forecast peak values by using the CMEEC summer peak forecast and applying an extreme weather scenario to arrive at the 90/10 forecast.

TABLE III

March 2017

**CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE (CMEEC)**

**HISTORICAL ENERGY USE AND PEAK LOAD  
2012-2016**

<u>Year</u>	<u>CMEEC Coincident Peak Load (MW) [1]</u>	<u>CMEEC Energy (MWh) [1]</u>
2012	237.17	1,349,955
2013	238.23	1,363,827
2014	230.68	1,342,017
2015	219.85	1,329,950
2016	230.77	1,284,722

[1] Reflects CMEEC Members, including Bozrah Light & Power, who became a Member in January of 2016. Bozrah values are also reflected for 2012 – 2015. In addition, these values include the Mohegan Tribal Utility Authority (MTUA) and Airgas, an interruptible customer located in Bozrah, CT.

TABLE IV

## CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE (CMEEC)

EXISTING GENERATION FACILITIES OWNED BY  
CMEEC AND ITS MEMBERS

As of March 1, 2017

<u>Generating Facility</u>	<u>Winter Rating (MW)</u>	<u>Summer Rating (MW)</u>
Norwich Combustion Turbine (Oil-Fired) [1]	18.800	15.255
Pierce Generating Unit (Oil/Gas-Fired) [2]	97.000	77.500
Norwich Waste Water Treatment (Oil-Fired)	2.00	2.00
Norden 1 (Oil-Fired)	2.00	2.00
Norden 2 (Oil-Fired)	2.00	2.00
Norden 3 (Oil-Fired)	2.00	2.00
Norwich Second Street (Hydro)	[3]	[3]
Norwich Tenth Street (Hydro)	[3]	[3]
Norwich Occum (Hydro)	[3]	[3]

[1] Represents CMEEC current joint-ownership share. The full capability of the Norwich combustion turbine unit is under contract to CMEEC.

[2] Represents CMEEC current sole ownership share. The full capability of the Pierce generating unit is under contract to CMEEC.

[3] Winter and summer ratings are based on average river flow conditions. The nameplate rating for the Second Street hydro station is 0.95 MW. The nameplate rating for the Tenth Street hydro station is 1.00 MW. The nameplate rating for the Occum hydro station is 0.80 MW. These hydro units remain a resource of the Norwich Department of Public Utilities. The generations of these hydro units are used by Norwich to directly offset Norwich load.

TABLE V

As of March 1, 2017

**MIX OF EXISTING GENERATION - CMEEC RESOURCES**

<u>Unit Designation</u>	<u>In-Service Date</u>	<u>Net Winter Capacity (In MW) [1]</u>	<u>CMEEC Share (MW)</u>	<u>Net Summer Capacity (In MW) [2]</u>	<u>CMEEC Share (MW)</u>	<u>CMEEC Percent of Unit (%)</u>
<u>Long-Term System &amp; Asset Contracts [3]</u>						
Base System Purchase		72.00	72.00	60.00	60.00	
On-Peak System Purchase		17.00	17.00	16.00	16.00	
<b>Total System Contracts</b>		<b>89.00</b>	<b>89.00</b>	<b>76.00</b>	<b>76.00</b>	
<u>Municipal Generation</u>						
Norwich Combustion Turbine	1972	18.80	18.80	15.25	15.25	100.00
Norwich Waste Water Treatment	2008	2.00	2.00	2.00	2.00	100.00
Pierce Generation Unit	2007	97.00	97.00	77.50	77.50	100.00
Norden 1	2009	2.00	2.00	2.00	2.00	100.00
Norden 2	2009	2.00	2.00	2.00	2.00	100.00
Norden 3	2009	2.00	2.00	2.00	2.00	100.00
<b>Total Municipal Generation</b>		<b>123.80</b>	<b>123.80</b>	<b>100.75</b>	<b>100.75</b>	
<b>TOTAL CMEEC CAPACITY RESOURCES</b>			<b>212.80</b>		<b>176.75</b>	
<u>Other Resources</u>						
Community Solar Gardens [7]			15.00		15.00	NA
NYPA Hydro (Firm & Peaking) [4]			13.20		13.20	NA
Short-Term Purchases [5]			Varies		Varies	NA
CMEEC's Microgen Units [6]			50.00		50.00	

[1] Represents NEPOOL Winter Maximum Claimed Capability.

[2] Represents NEPOOL Summer Maximum Claimed Capability.

[3] System Purchases, Contract Purchases & Unit Entitlement Purchases from several counterparties.

[4] Represents maximum hourly contract deliveries to CMEEC. New York Power Authority (NYPA) hydro purchases began July 1, 1985. Energy contributions from NYPA are considered to be firm contracts and used to reduce electric requirements thereby reducing CMEEC Capability Responsibility in NEPOOL.

[5] The MW amounts shown for Short-Term Purchases vary from month to month from 0 MW to 25 MW through December 2017.

[6] Represents the CMEEC MicroGen Units which are currently commercially operating. Seven (7) 2.50 MW units are located in Groton, two (2) 2.50 MW units are located in Norwich, one (1) 2.50 MW unit is located in Jewett City, two (2) 2.50 MW units are located in Lebanon, CT, four (4) 2.50 MW units are located at the Mohegan Tribal Utility Authority and (4) 2.5 MW units located at Backus Hospital in Norwich. These resources will be used for demand reduction purposes and are not anticipated to be enrolled in the ISO New England markets.

TABLE VI  
CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE

March 2017

**Anticipated Unit Retirement Dates**

**Retirement Date**

**Conventional Hydro**

Norwich Tenth Street Hydro	Not Scheduled
Norwich Second Street Hydro	Not Scheduled
Norwich Occum Hydro	Not Scheduled

**Peaking**

Norwich Combustion Turbine	Not Scheduled
Pierce Generating Unit	Not Scheduled
Norwich Waste Water Treatment	Not Scheduled
Norden 1	Not Scheduled
Norden 2	Not Scheduled
Norden 3	Not Scheduled

Table VII

**Connecticut Municipal Electric Energy Cooperative (CMEEC)**

**COGENERATION & SMALL POWER PRODUCTION FACILITIES  
GREATER THAN 1 MW IN TOTAL SIZE [1]**

March 2017

<u>Facility Name</u>	<u>Facility Type</u>	<u>Facility Location</u>	<u>No. Of Units</u>	<u>Prime Mover</u>	<u>Type Fuel</u>	<u>Summer &amp; Winter Capacity</u>	<u>Years Installed</u>
Pfizer, Inc.	Cogeneration	Groton CT	4	Steam Turbine	Turbine Fuel	35,500 kW	1950, 1993 2001 &  & 1993 2009
U.S. Naval Sub Base	Cogeneration	Groton CT	1	Steam Turbine	Duel Fuel	5,000 kW	1996
			2	Diesel Engine	#2 oil	750 kW	2015
						[2]	

[1] The customer retains power from each of these facilities.

[2] This diesel generator is used to provide black start capability.