

# MUNICIPAL LIGHT PLANT

## CONCORD MUNICIPAL LIGHT PLANT

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*Municipal Light Plant Board*  
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Concord Municipal Light Plant (CMLP) is a community-owned electric utility, created for and by the citizens of Concord in 1898. The goal then, as now, was to provide reliable and reasonably priced service in a responsive and thoughtful manner. 2015 has been a worthy addition to Concord Light's history.

The Town Manager appoints a five member, volunteer advisory Light Board comprised of local residents. The Board meets monthly to discuss topics such as rates, power supply and renewable energy options.

CMLP operates as a completely self-sustaining, non-profit, Enterprise Fund within the Town government. No property tax money is required or used to operate the Light Plant. All operating expenses including electricity purchases, capital investments, and debt service are paid by the Light Plant customers. In addition, the Light Plant contributes to the Town's operating budget via a Payment-in-Lieu-of Taxes (PILOT). For 2015, this formula based payment was \$472,400.

### *Power Supply*

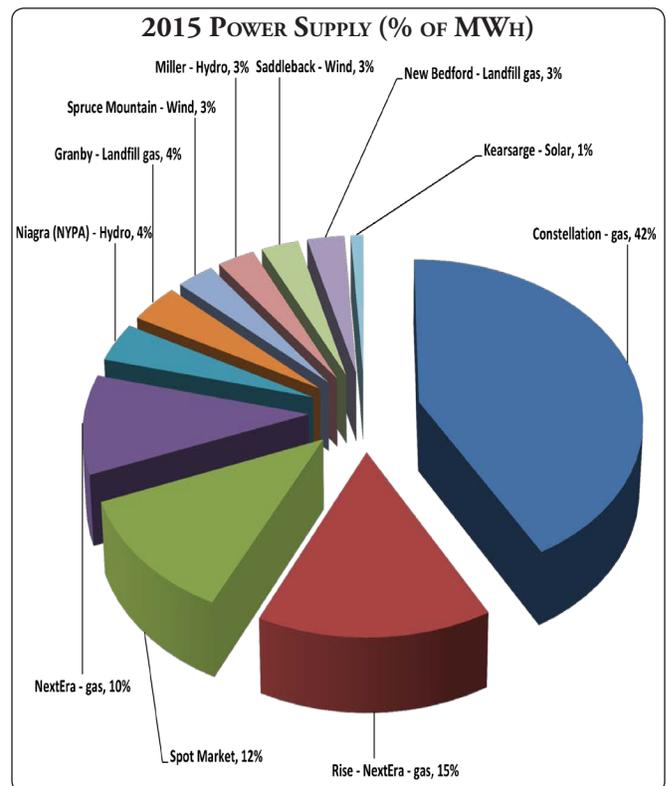
After the creation of Concord Light in 1898, the Town's electricity was provided by a coal fired plant located at Keyes Road. By the late 1920's, the Town had outgrown the capacity of the plant, and decided to retire the plant and purchase all of its electricity from the Boston Edison Company (now NSTAR). In 2002, NSTAR sold their generating facilities as part of the federal utility deregulation initiative. As a result, Concord Light entered into a seven and a half year contract with Constellation Power Source (parent of Baltimore Gas & Electric).

At the conclusion of the Constellation contract in

2009, no energy suppliers were offering contracts at reasonable prices due to the growing risk arising from the wide fluctuations in the cost of natural gas. For Concord, the alternative was the development of a power supply portfolio from multiple sources under a power supply strategy that best suited our community's needs. The power supply selection strategy included the following tenets:

- Diversified fuels and energy supply sources
- Short and long term agreements to mitigate risk
- Peaking and base load supply sources to match needs
- Inclusion of cost competitive renewable energy sources
- Competitive bids for partial energy agreements on a rotating basis to minimize differences between our cost of power and current markets.

As a result, Concord Light has developed a diverse power supply portfolio as illustrated in the chart below, with a wide variety of suppliers and resources.



It should be noted that energy from NYPA (hydro), Miller (hydro), Granby (landfill gas), Spruce Mt. (wind), Saddleback (wind), New Bedford (landfill gas) and Kearsarge (solar) are all renewable sources and represented nearly 21% of all wholesale energy purchased in 2015. Concord Light will continue to seek out renewable energy opportunities along with other economic and reliable supplies of wholesale energy in an effort to provide the most beneficial energy mix for its customers.

#### *Electric Rates*

The Light Plant completed a Cost of Service Study to accomplish three goals; the first being to determine the cost of the existing rate classes. The second goal was to decrease the number of rates without eliminating the discounts offered to specific customer classes. The third goal was to reformat the billing items within the rates to reflect the individual cost of service within each rate. The study identified the cost of service levels for each rate class based on the cost from the 2014 operating budget. The next step was to examine the existing rates and determine what rates could be consolidated, with the goal of reducing the number of rates. Based on the results in the study, the Light Board restructured the rates and reformatted the billing line items with each of the rate classes.

#### *Energy Conservation*

Concord Light continues to provide a variety of energy conservation services to its customers, including rebates and energy audits for residential and commercial customers.

#### *Residential Energy Efficiency Rebates*

Concord Light provided residential customers with over \$32,900 in rebates for weatherizing electrically heated homes, and for purchasing energy efficient appliances, lighting and central air conditioning (AC) systems.

#### *Commercial Energy Efficiency Rebates*

Twelve business customers installed or upgraded to more efficient lighting, and received a total of \$49,700 in rebates through Concord Light High Efficiency Lighting Program. These lighting projects are projected to reduce electrical demand by 82 kW and electricity consumption by 177,000 kWh per year.

One of the twelve customers, Trinity Episcopal Church, received a rebate through Concord Light's new commercial lighting rebate program for new construction/major renovations, launched in 2015. The new program offers a rebate to customers who install lighting that is more efficient than required by code in new buildings or build-outs of existing space. Because commercial lighting equipment lasts about 13 years, installing more energy efficient lighting from the beginning reduces building operating costs for years to come.

#### *Cost Effectiveness Test for Energy Efficiency Programs*

Concord Light developed a new cost effectiveness test to measure whether the ratepayer benefits of an energy efficiency program outweigh the program costs. The new test looks at capacity, transmission and energy cost savings that Concord Light experiences when customers install energy efficient equipment, as well as at the avoided societal cost of carbon dioxide emissions. When avoided costs exceed the expense of operating a program, the program is more likely to be in the best interests of our ratepayers. Going forward, Concord Light plans to apply its cost effectiveness test to existing energy efficiency programs, as we revise them, and to new energy efficiency programs, as we develop them. The test results will help guide the evolution of our energy efficiency program portfolio.

#### *Solar Photovoltaic (PV) Rebates*

Eighty-seven PV systems with an overall capacity of 332 kW were installed by Concord Light residential and commercial customers. Concord Light contributed over \$48,900 in rebates towards the installation of these systems. There are now a total of 240 residential and commercial PV customers in Concord with a combined output of 2.3 megawatts.

### COMMUNITY SERVICE

#### *Hands-On Energy Education for Concord Public School Students*

Concord Light employees met with each of the twelve 3rd grade classes in the Concord Public Schools to talk about how electricity is made, how it gets to their homes, and how Concord Light line workers do their job. As part of the interactive lesson, students got the chance to make some electricity by riding a bicycle

generator, create circuits to operate fans and pinwheels, and touch a real solar panel – the same type of panel that provides some of the electricity used by the Willard School. This is the third year in which these presentations were conducted for the Concord Elementary Schools. Jan Aceti, Concord Light Energy Conservation Coordinator, is behind the program's success with support from Concord Light's engineers, line workers, electrician and custodian.

#### *Annual Holiday Tree Lighting*

Concord Light line crew decorated trees with energy-efficient LED lighting for the holidays in the West Concord business district and at Monument Square.

#### *Hugh Cargill Trust*

Concord Light contributed \$17,000 to assist eligible Town residents pay their electric bills.

#### *Residential Rate Assistance*

Concord Light began its Residential Rate Assistance program in 2006 to help Concord residents in financial need. Eligible customers are able to lower their bills by as much as 50%. As of December 2015, there were 196 Concord households enrolled in this program.

### OPERATIONS

#### *Street Light Upgrade*

As part of the Concord Light initiative to upgrade all of the decorative lighting in Concord Center, crews installed 64 new decorative LED fixtures. These fixtures are more energy efficient and are intended to be maintenance free.

#### *Tree Trimming*

To prevent dangerous situations, Concord Light trims trees regularly and on a rotating basis. In 2015, 60% of the electrical distribution system was trimmed. This included clearing branches from the power lines and occasionally removing a dead or unhealthy tree. The main purpose for this work is to protect the electrical distribution system and to provide reliable service to our customers.

#### *Overhead to Underground Electrical Distribution Conversions*

Concord Light staff designed, installed and converted the overhead electrical distribution system to un-

derground on the following streets: Beharrell Street, Willow Street, Union Street, Fielding Street, and Whittemore Street. The newly installed underground distribution system will increase reliability.



*CMLP lineworkers hard at work.*

#### *Substation 479 Voltage Upgrade*

Concord Light Substation 479 Conversion Project began in 2013 and is aimed at converting the remaining section of the Town's electrical distribution system from the antiquated 4,000 Volt system to the current 13,800 Volt system. In March, CMLP finished the upgrade. Along with the completion of this project comes the retirement of the Town's oldest substation. It was replaced by new state-of-the-art equipment and new tree-resistant overhead conductors ultimately resulting in greater reliability and operational functionality. The scope of this project spanned about a third of Concord's geographic area and directly benefited approximately 1,300 homes and businesses.

#### *Telecommunications*

2015 was the first full year of operation for CMLP Broadband Service. The year has been marked by significant growth and successful execution of the plan. CMLP launched Broadband service in March 2014, after 2013 Annual Town Meeting had approved Article 48 to authorize borrowing to fund startup expenses. The article provided a mechanism to fund expansion of telecommunications service offerings, while ensuring that the expenses are repaid exclusively by current and future telecommunication revenue.

Demand for the service has been strong, and despite some delays due to the extremely difficult winter, the

growth in the install base met the goals set out in the business plan. In 2014 Concord Light Broadband had been installed at 189 business and residences. One year later that number has grown to over 450. Revenues in 2015 exceeded \$350,000, more than double 2014. Operating costs are in line with expectations and Concord Light Broadband service is generating sufficient operating income to fund continued growth in 2016.



*Telecommunications staff from left: Mark Howell, Carl Anderson, Tom Power, Bill Underhill.*

Concord Light Broadband has increased speeds for all customers in November 2015. Residential service speeds increased between 33 and 66 percent without a price increase. This improvement was across the board, all customers received it automatically, not just new customers. Residential service up to 200 Mbps is now available in Concord. This technically superior offering is implemented with fully symmetrical bandwidth (matching upload and download speed). Concord Light Broadband continues to offer straightforward pricing without teaser or introductory rates with hidden increases down the road. Concord Light Broadband answers calls for assistance 24 hours a day, seven days a week. The fiber-to-the-home installation includes an optional integrated Wi-Fi and is competitively priced. Information about the offering is on the Town's website at [www.concordma.gov/broadband](http://www.concordma.gov/broadband).

The ability to cost effectively deploy advanced secure telecommunications to municipal facilities is a benefit of having in-house telecommunications operations. In support of municipal services, the telecommunication staff, working with Town IT staff, added fiber

optic connections and expanded the availability of free Wi-Fi at the Concord Public Library, Beede Center, the Town House, and soon the Harvey Wheeler Community Center.

CMLP continues to lease "dark fiber" as well. The lease agreements provide fiber connections to telecommunication providers or businesses who wish to gain local access in Concord. CMLP earns revenue from the fiber leases, the customers benefit from faster, less-expensive installations and access to advanced telecommunication services.

## COMPREHENSIVE SUSTAINABLE ENERGY COMMITTEE

Alan Whitney, Chair  
 Gordon Brockway  
 Jill Appel  
 Sue Felshin  
 William Lehr  
 Gilda Gussin  
 Bradley Hubbard-Nelson  
 Anne Moore

### *CSEC Charter and Goals*

The Comprehensive Sustainable Energy Committee was established in 2007 to assist the Town in identifying, designing, and implementing programs and projects for fostering energy conservation, energy efficiency, and renewable-energy generation in the Town, as well as to track and report on the financial and environmental impacts of such programs. Programs should address all forms of energy use, including electricity, natural gas, heating oil, and transportation fuels, as well as renewable energy such as solar, encompassing all Town sectors: municipal, Town Schools, business (including non-profit), and residential.

This report summarizes goals and activities of CSEC, highlighting impacts to energy-use conservation and efficiency, sustainable practices, and dollar savings, as well as CSEC direction for the future.

### *Green Communities*

Having been designated by the State as a 'Green Community', Concord is working towards the goal of reducing annual municipal energy usage by 20% during the 5-year period FY12-FY16 (calculated from a base year of FY11). To date, Concord has received \$476,000 in State funding for major projects,

of which \$244,000 was a competitive grant award initiated and written by CSEC. Major projects include replacement of aging boilers at both Peabody and Sanborn schools, the HVAC system at Hunt Gymnasium, and the dehumidification system at the Beede Center; other projects have included lighting upgrades and weatherization/insulation at a number of town facilities. Savings as a result of these projects amounts to an estimated \$230,000 annually.

Though progress has been encouraging, the Green Community projects have netted only about a 6% annual savings based on the Green Communities metric. The major reason for this seemingly small savings rests partially on the fact that, since 2008, Concord has been aggressively working to lower its energy consumption, addressing much of the 'low-hanging fruit' before the FY11 Green Communities base-comparison year. Thankfully, the state is understanding of this fact (which is also the case with a number of other towns in the State) and continues to be supportive of Concord's 'Green Communities' status.

A significant fraction of 'easy stuff' towards Town energy-reduction goals has now been done. Making significantly more progress will require renewed and sustained willpower and allocation of resources, whether they be at the local, state or federal level.

#### *Green Your Heat Project*

Natural gas customers in Concord are eligible for the state's MassSAVE program, which provides free energy audits, followed by generous rebates (75% of homeowner's cost up to first \$2,000 spent) to residents who weatherize their homes. CSEC sought to create a similar program for residents who heat with oil, propane, electricity, or wood and are therefore not covered by MassSAVE. To do so, CSEC wrote and received a State grant for \$145,000, augmented by \$75,000 in Town funds, to create the Green Your Heat (GYH) program. This program provides weatherization (insulation, air-sealing, and programmable thermostats) rebates to homeowners, covering 50% of the homeowners' costs up to the first \$1,000 spent.

In the first 10 months of the program, over 400 residents contacted the program, resulting in more than 60 weatherization installations, primarily in oil-heat-

ed homes. Unexpectedly, but welcome, over the same period MassSAVE recorded markedly increased participation in Concord despite no change in advertising, perhaps due to the immediate referral by GYH of natural gas users to MassSAVE!



71 GYH projects have been completed, resulting in estimated savings of over 9,000 gallons of heating oil and over 7,000 kWh of electricity per year. This is equivalent to over 100 tons of avoided CO2 emissions (or ~240,000 miles driven in a typical passenger car!). CSEC is proud of this successful program and plans to build on it by providing other grant-based programs to help Concord residents improve their carbon footprints.

#### *Sawyer Trust Fund*

In 2009, \$1.7M was gifted to the Town to establish the Sawyer Trust Fund to be used to fund energy-efficiency projects in Concord municipal facilities. Since that time, CSEC has worked with Town officials to fund more than \$1.5M in energy-efficiency projects, including the 48kW solar-panel array on Willard School, an improved dehumidification system for the Beede Center, and conversion of lighting in buildings and streetlights to LEDs. As a result of these investments, Concord now realizes an annual savings of ~\$130,000, plus an annual income of ~\$15,000 from renewable-energy credits ('SRECs') for energy generated by the Willard School solar-panel array.

#### *Community Impact*

The impact of projects funded by the Sawyer Trust Fund, along with more than \$600,000 from State

grants awarded to Concord through CSEC-initiated proposals to support Green Your Heat and Green Communities programs, and contributions to the Concord Solar Challenge that installed 1.3MW of solar-generation capability on Concord homes, can be summarized as follows:

- \$2,300,000 in one-time revenue to Concord
- ~\$360,000 annual savings to the Town
- ~\$580,000 annual savings to Concord residents
- ~3,000,000 lbs of CO2 emissions avoided annually (equivalent to CO2 absorption capacity of ~15,000 mature trees)

*Looking to the Future Partnership with Tufts University Mechanical Engineering Department*

As part of an effort to better understand the role that air-sourced heat pumps might play in creating a greener Concord, CSEC developed a successful partnership with Tufts University Mechanical Engineering Department to help develop better modeling of real-world use of heat pumps for greener residential heating compared to both fossil fuels and direct-electric heating. As part of the project, the Tufts students involved in the project came to Concord to give a well-received public presentation on the results of their work. There is interest both within CSEC and at Tufts in continuing this win-win relationship that

benefits Concord green energy usage goals and helps students further their education; further discussions with Tufts faculty are continuing to identify potential additional fruitful areas for collaboration.

*Future CSEC Goals and Initiatives*

As part of its strategic vision, CSEC is exploring additional avenues through which the goals of the CSEC charge can be achieved. A couple of areas that appear promising are:

Town vehicle purchasing and usage: Both the annual cost and CO2 footprint associated with Town vehicles has been steadily rising over the past several years for reasons that are not well understood; ongoing discussions with the Town Manager are centered around possible updating of both vehicle purchasing guidelines and vehicle usage policies.

Collaboration with other area towns in setting goals and developing programs to meet sustainability goals: The Hanscom Area Towns Committee (HATS) is an alliance of the towns of Concord, Lincoln, Lexington and Bedford dedicated to addressing matters of common concern. Through HATS, there is considerable interest in developing collaborative/coordinated programs to address areas of common concern, among which sustainable energy practice is rising to a position at or near the top of the list.