Municipal Light Plant

Concord Municipal Light Plant

David G. Wood, Director

Concord Light 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. 2012 has been a worthy addition to Concord Light's history.

Municipal Light Board from left: Jim Terry, Jr.; Judy Walpole, Hugh Lauer, Chair; Bob Kusik, Gary Clayton

The Town Manager appoints a five member advisory Light Board made up of citizens. Current Light Board members include Hugh Lauer (Chair), Robert Kusik, Jim Terry, Judy Walpole and Gary Clayton. The Board meets monthly to discuss topics such as rates, power supply and renewable energy options. The Board encourages customers to attend.

The Concord Municipal Light Plant 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, capital investments, and debt service are paid from electric revenues. In addition, the Light Plant contributes to the Town via a Payment-in-Lieu-of Taxes (PILOT). For 2012 this formula based-payment was $385,000; this is the equivalent of the property taxes that would be paid by an equivalent, but non-municipal, electric utility.

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 the spring of 2002, NSTAR having sold all of their generating facilities as part of deregulation, Concord Light signed a seven and a half year, all requirements contract with Constellation Power Source (parent of Baltimore Gas & Electric).

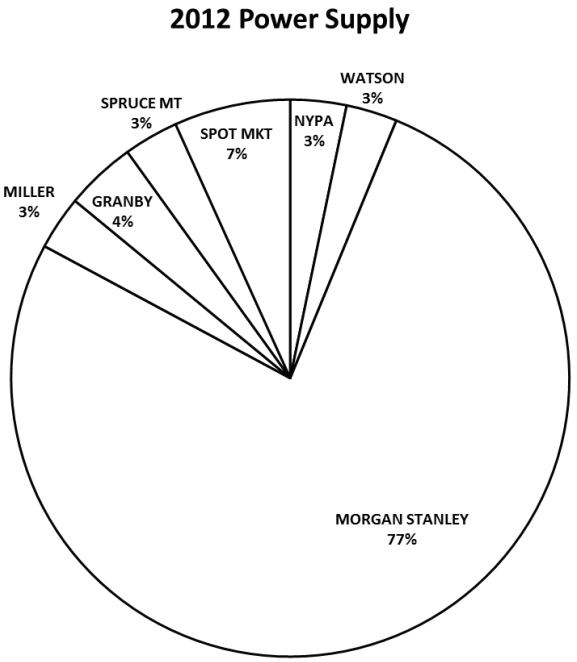
At the conclusion of the Constellation contract in the fall of 2009, none of the energy suppliers were offering all requirements contracts at reasonable prices due to the growing risk of load following, fixed rate contracts resulting from the wide fluctuations in the cost of natural gas. The alternative was the development of a power supply portfolio from multiple sources under a power supply strategy that best suited the needs of Concord. The power supply selection strategy included the following tenets:

- Diversified energy supply sources and fuel diversity
- 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.

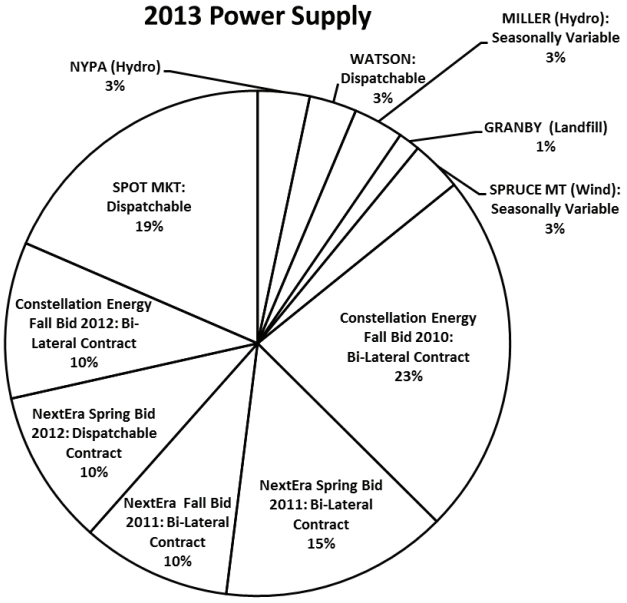
As Concord Light began creating the supply portfolio in 2009, a major purchase was required initially to provide the electric needs of Concord while the portfolio was being crafted. A major energy bid, approximately two thirds of total energy requirements, was offered to the major suppliers for a three year period ending December 31, 2012. The successful bid was received from Morgan Stanley.

At the close of 2012, Concord Light's power supply portfolio mirrors the above strategy and is depicted by the following chart. It should be noted that energy from NYPA (hydro), Miller (hydro), Granby (land fill gas) and Spruce Mt. (wind) are all renewable sources and

represent over 12% of all wholesale energy purchased in 2012.



With the expiration of the Morgan Stanley at the end of 2012, the power supply portfolio will change considerably with the addition of a series of three-year wholesale energy contracts and one ten-year energy and capacity contract. Energy bids between 2010 - 2012 proved to have favorable pricing, and will reduce the cost of energy by 10%.



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.

Energy Conservation

Concord Light continues to provide a variety of energy conservation services to its customers.

Energy Audits

In 2012, seventy-three households received home energy audits sponsored by Concord Light. In addition, six business customers were provided with energy audits on a cost-shared basis.

Concord Light follows up with each of its residential and commercial audit customers, providing information resources that they may need to implement the auditor's recommendations, and collecting data as to which recommendations they carry out. In March, 2012, Concord Light's data compilation effort indicated that 2011's residential audit customers had carried out energy efficiency measures projected to save 450 million BTUs per year, about 5% more than 2010's audit customers.

Thermal Leak Detectors

Thirty-six customers borrowed hand-held thermal leak detectors from Concord Light. They used the detectors to identify air leaks and insufficient or missing insulation in their homes.

Residential Energy Efficiency Rebates

Concord Light provided residential customers with almost $49,000 in rebates for weatherizing electrically heated homes, and for purchasing energy efficient appliances, lighting and central air conditioning (AC) systems. Concord Light also revamped its central AC rebate program in order to keep pace with advances in the air conditioning system market, and to make it more affordable for its customers to install highly efficient systems. The changes are scheduled to take effect at the beginning of 2013.

Commercial Energy Efficiency Rebates

In June 2012, Concord Light launched its new High Efficiency Lighting Program for businesses and, since then, has approved $95,000 in rebates for thirteen commercial lighting upgrade projects that are projected to reduce electrical demand by 200 kW, and electricity

consumption by more than 1.1 million kWh per year. Three of the thirteen projects were completed in 2012, with projected demand reduction of 37 kW and over 100,000 kWhs of projected reduction in annual electricity consumption. In addition to rebates, the High Efficiency Lighting Program offers a turnkey service option to businesses that wish to use it. At no cost, pre-qualified contractors will assess a business's existing lighting system and prepare recommendations, an installation quote and an electricity cost savings estimate. If the business decides to move forward with the lighting upgrade, the contractor will complete the rebate paperwork, and install the lighting at the price quoted.

In 2012, Concord Light also provided its business customers with $4,300 in energy efficient appliance rebates.

Solar Photovoltaic (PV) Rebates

Nineteen PV systems with an overall capacity of 137 kW AC were installed by Concord Light's residential and commercial customers in 2012. Concord Light contributed almost $56,000 in rebates towards the installation of these systems. The 2012 installations bring the total number of solar PV systems in Town to thirty-eight, for a total installed capacity of 406 kW AC.

Willard Elementary School Solar PV System

The Town-owned solar PV system on the roof of the Willard School, installed in September of 2010, completed its second year of operation in 2012, generating 61,210 kilowatt hours of electricity, or about 9% of the school's total electricity needs. In its first two years of operation, the system generated 112,577 kWh, enough to power a Concord home with median electricity usage for almost fourteen years. Due to negligible snow cover during the 2011-2012 winter, the system generated 8% more electricity than it was expected to produce in its second year. By reducing the school's need for electricity generated by burning fossil fuels, the PV system has prevented 58 tons of carbon dioxide from entering the atmosphere since September 2010. The free, renewable electricity generated by the system has saved the Concord Public Schools over $13,000 in electricity costs, and has earned over $40,000 in Solar Renewable Energy Credits for the Town since the system began operation.

In 2012, Concord Light coordinated a transition to a new Data Acquisition Service (DAS) provider for the Willard PV system. The DAS provider maintains a website for use by the school community and Concord Light in monitoring the performance of the Willard's PV system. The DAS provider also reports the system's electricity production to the Massachusetts Clean Energy Center so that the Town may receive Solar Renewable Energy Credits. The transition to the new DAS provider keeps these services affordable for the School Department and the Town.

Smart Grid

The final work on the 110-mile fiber optic network throughout Town was completed at the end of April. Within weeks, CMLP fielded numerous calls from communication utilities looking to leverage Concord's new asset for telecommunication services. Over the last several months the Town has been reviewing these requests and analyzing the potential benefits for the Town. At the time of this report, the Town has entered into one dark fiber lease agreement to provide redundant fiber access to Emerson Hospital. Concord is currently reviewing similar proposals to help stimulate local business and Town services.

The Light Department's deployment of the smart grid infrastructure reached majority completion in October. Due to the cutting edge nature of the technology, we continue to make adjustments to the equipment layout as we learn the impact that foliage and topography have on the system. As we progress with the network improvements Concord Light continues to develop ideas for load management using the smart grid infrastructure to reduce peak demand with minimal impact on residents, while reducing power and transmissions costs for the Town. Concord Light is currently converting load management customers' electric thermal storage heating (ETS heating) and electric water heaters to the smart grid's wireless, fiber-based system. Concord Light has installed street lights per the new street light policy, and new controllers designed to augment the Smart Grid system have been installed on these lights. In 2013, Concord Light looks to establish a street lighting control policy based on the findings from the professional review of the Town's outdoor lighting policy. Once conversion of existing load management customers is complete and street light controls are in place, CMLP will then be able to start recording energy savings made possible from the smart grid system.

To supplement the existing load control initiatives, a pilot program using smart grid to control volunteers' central air conditioning that was planned for summer 2012 was further delayed due to technical problems with the smart grid thermostats and complications with the installation process on older homes. Additionally a new electric rate was approved by the Light Board in June, 2011 for off-peak charging of electric vehicles, and a time-of-use rate designed for the same purpose was recently approved by the Light Board. As of this writing, Concord Light has six (6) electric vehicle residential customers with charging stations, and plans to install a Town-owned charging station by early Spring.

Community Service

Presentations on Energy Conservation Resources
Concord Light staff spoke at Concord Rotary Club's and the Concord Business Partnership's meetings, providing members with a description of the energy conservation services, rebates and information resources available to them from Concord Light and other area utilities.

Concord Light participates in Solar Fair
Concord Light staff, contractors and volunteers participated in the Solar Fair held by the Comprehensive Sustainable Energy Committee. Staff talked with Fair attendees about Concord Light's current and future solar PV programs, and presented a display of energy efficient lighting. Concord Light's home energy audit provider, ECHO, along with Concord residents who have improved the energy performance of their home as a result of home energy audit recommendations, were available to talk with attendees about home energy efficiency.

Tracking Energy Consumption
Concord Light prepared a report on the annual amounts of electricity, natural gas, heating oil and propane consumed in Town government buildings from 2008 through June 2012, to help building managers assess their progress towards Town government's goal of reducing its energy use by 20% of 2008 levels by 2015. Concord Light also prepared energy consumption updates for building managers each quarter.

Senior Lunch at the Harvey Wheeler Center
Concord Light provided lunch, and employees served lunch to 65 seniors at the Harvey Wheeler Center in October.

Customer Newsletter
The customer newsletter was redesigned to better reflect Concord Light's commitment to energy conservation and sustainability. The newsletter includes new features such as community news, quick tips, and local service. Concord News is printed on new environmentally-friendly paper which contains 100% post-consumer fiber, is manufactured using biogas energy, processed chlorine free, and certified EcoLogo and FSC Recycled.

Annual holiday tree lighting
Concord Light line crew decorated with energy-efficient LED lighting for the holidays in the West Concord, Thoreau St., and Concord Center business districts.

Beede Swim & Fitness Center
Concord Light is working with the Comprehensive Sustainable Energy Committee to analyze the cost effectiveness of several options to reduce the Center's electricity costs by installing a solar photovoltaic system on the roof.

e-Smart Kids
Through Concord Light's webpages, children, parents, and teachers can go to e-Smart Kids Games & Activities where there are two interactive, fun, and educational sites where kids can learn about electricity and how to use energy responsibly and safely.

Minute Man Arc
Minute Man Arc is a human services agency offering programs and job coaching for people with developmental and intellectual disabilities. Concord Light has partnered with Minute Man Arc for more than twenty years and employs a team of Minute Man workers to stuff and mail utility bills and newsletters.

Salvation Army's Good Neighbor Energy Fund
Concord Light partners with the Salvation Army and collects donations for the Good Neighbor Energy Fund (GNEF). The fund is an annual effort to help local families in temporary financial crisis to pay their energy bills. Concord Light staff members also serve on the GNEF board to oversee the fund management and assist with fund administration.

Hugh Cargill Trust

Concord Light contributed $14,000 to the Hugh Cargill Trust which helps eligible Town residents with emergency assistance to 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 November, there were 138 Concord households enrolled in this program.

A large uprooted tree on Coolidge Rd. caused this utility pole to snap. Crews had to remove the tree, set a new utility pole, and replace all of the overhead wires before power could be restored.

Operations

The weather again challenged the integrity of Concord's electrical infrastructure. CMLP's continued investments in underground conversions and tree trimming certainly proved their worth as Superstorm Sandy passed through Town. While many communities were without power for weeks, CMLP's underground areas were unaffected and allowed lineworkers to focus restoration efforts on the overhead areas that were. CMLP had nearly a dozen broken poles and countless downed wires. In total, approximately 50% of the Town was affected by this historic storm, with the final customer coming back online three days after the storm's peak. Due to the extent of the damage, CMLP received aid from three other Massachusetts municipal utilities: Groton Light, Hingham Light and Mansfield Light which experienced limited damage at home and were able to send their hard-working crews to help Concord. Their assistance was invaluable and we thank them for heeding the call.

In an effort to further enhance Concord's system reliability, CMLP has devoted substantial resources to upgrading the antiquated overhead systems south of Route 2 with steel supported cable and tree resistant wire as part of the a system upgrade from 4,000 Volts to 13,800 Volts. These changes will make the overhead facilities in these neighborhoods much more resilient to tree damage and ice loading while also distributing electricity more efficiently. Crews are currently working along Central Street, Pine Street and the adjoining neighborhoods in an effort to have that section of Concord completely upgraded in early January. From there, crews can move along Old Marlboro Rd., Williams Rd. and the side streets encountered along the way. This project will proceed throughout 2013 with an expected completion date at the end of 2014.

In 2013, CMLP will continue to invest in reliability improvements. A major project that will carry over from 2012 is the expansion of the Forest Ridge Substation. In order to meet Concord's increasing electrical demand, CMLP has contracted with an engineering firm to design and install two new 115,000 volt transformers to supply the entire Town. The design work was completed in 2012 and the construction work is targeted to begin in the Spring of 2013 with upgrades to the switchgear followed by the transformer installation in the Fall. Additionally, to supplement the capacity needs of the Town, CMLP will be entering into a contract for a utility scale solar array on the Landfill. We are currently working through contract negotiations with the potential vendors, but we know the array will be capable of supplying a minimum of 1 Megawatt of power and possibly up to 3 Megawatts.

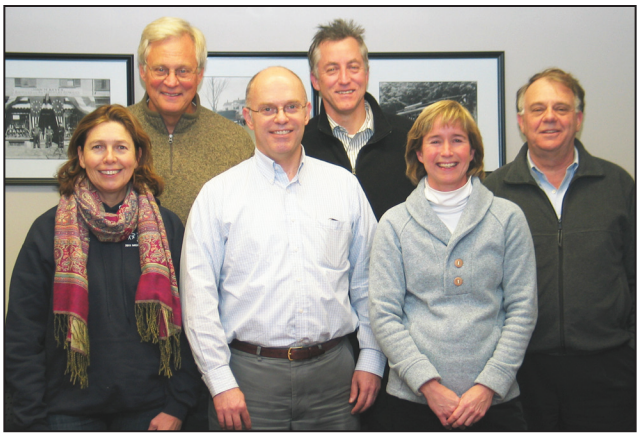
In conjunction with the aforementioned projects, we will continue to underground areas of Town that have conduit installed from previous years. CMLP will be commissioning its first electric vehicle charging station in the West Concord commuter parking lot.

Construction Activity

Construction achievements for 2012 include:

- Designed and achieved majority completion for the 4,000 volt to 13,800 volt system upgrades along Central St. and the surrounding neighborhoods.
- Completed the underground conversion of Laurel St. and Walden Terrace.
- Completed the installation of street light controls on the lights not utilized for intersections or sharp curves.
- Completed redesign work for circuit 219-H15 which included new cable routing and underground conversions to support the additional load generated by the Concord Mews apartment complex.
- Completed designs for expansion of warehouse space at the CMLP Operations Building to account for additional fiber inventory and storage for more equipment in a protected space to prevent theft

Comprehensive Sustainable Energy Committee



from left: Gayle Chatlosh, Charles Parker, Gordon Brockway, Chair; Anthony Butler, Jill Appel, Mark Myles. Not pictured: Nick Pappas

The Comprehensive Sustainable Energy Committee's primary goal is to communicate and implement the principals expressed by the voters of Concord in support of energy sustainability. Toward this end, the committee promoted energy efficiency and solar energy in the municipal, residential and commercial segments.

In 2010, the Selectmen and Town Manager set a goal of achieving a 20% reduction in energy consumption in municipal buildings by 2015, a goal that has been facilitated by a generous bequest to the Town by the Sawyer Trust. The Comprehensive Sustainable Energy Committee continued to help the Town to achieve its energy goals by recommending projects to be funded by the Trust. By early 2013, the Committee expects to acquire enough energy efficiency data to complete a meaningful measurement against a 2008 benchmark.

Sawyer Trust funded projects that were initiated by the committee in collaboration with Town staff include a new, high efficiency natural gas heating system at the Harvey Wheeler Community Center, energy efficient LED lighting with sensors at the Public Safety Building, energy efficient LED lighting at the lower floor and outside the Hunt Gym, new controls for the gas heating systems in the CPW equipment sheds, and significant improvements at the Beede Swim and Fitness Center. Because the Beede accounts for nearly half of the Town's municipal building energy consumption, not including schools or libraries, CSEC has prioritized improvements in Beede efficiency. Two noteworthy projects were completed that will make sizeable differences in Beede's energy consumption include controls for the swimming pool filtration pumps and computer-controlled LED lighting for the pool natatorium. The latter are expected to reduce pool lighting power consumption by 70-80%. In 2013, the Committee will work with staff to determine whether to replace the dehumidification system, which is the building's largest single electricity consumer.

The Committee has two goals in the municipal segment. The first is to make the Town more energy efficient, save money, and reduce the carbon footprint of the Town's municipal operations. The second goal is to develop a success story of establishing a long-term strategy, developing a baseline, and meeting an energy reduction target. The Committee plans to measure actual results and compare these to the 2008 baseline. The results will be used to demonstrate to others in the residential and commercial segments that they can make the same progress.

In the residential segment, progress has been made toward improving heating efficiencies. The Committee has updated its whitepaper on heating systems (see