



Municipal Light Plants in Massachusetts: Spotlight on Clean Energy Initiatives

Cammy Peterson Neal Duffy Alison Henry Kate Ito

Produced with support from the Barr Foundation

Contents

Introduction	2
Background.....	4
Legislative History.....	5
Clean Energy and Munis.....	6
Clean Energy Funding Mechanisms and Innovations.....	7
Spotlight: Holyoke Gas & Electric (HG&E).....	9
Spotlight: Wellesley Municipal Light Plant (WMLP).....	10
Spotlight: Littleton Electric Light Department (LELD)	11
Lessons Learned and Recommendations.....	12
Conclusions.....	14
Works Cited	15

Introduction

41 municipal light plants,¹ often referred to as municipal utilities or “munis,” serve all or part of 50 communities in Massachusetts (see Figure 1 and Table 1), and deliver 13% of the electricity in the state (MMWEC 2014a & MA DOER). Unlike private investor-owned utilities (IOUs), munis are community-owned and exempt from many of the state’s regulatory requirements. As such, munis are largely responsible for initiating and operating any renewable energy and energy efficiency programs within their territories. This white paper aims to provide an overview of the legislative history and operational practices of munis as the context for a discussion of the clean energy initiatives that are offered to their customers. Spotlights on the Massachusetts Municipal Wholesale Electric Company (MMWEC) and munis in Holyoke, Wellesley, and Littleton and Boxborough provide a lens through which to examine a sampling of clean energy initiatives, to highlight lessons learned, and to suggest potential future opportunities.

¹ 40 traditional municipal light plants service Massachusetts communities. MassDevelopment operates the 41st, serving Devens, a mixed-use community that was originally Fort Devens, a U.S. Army base.

Figure 1: Map of Municipalities in Massachusetts Served by Municipal Light Plants

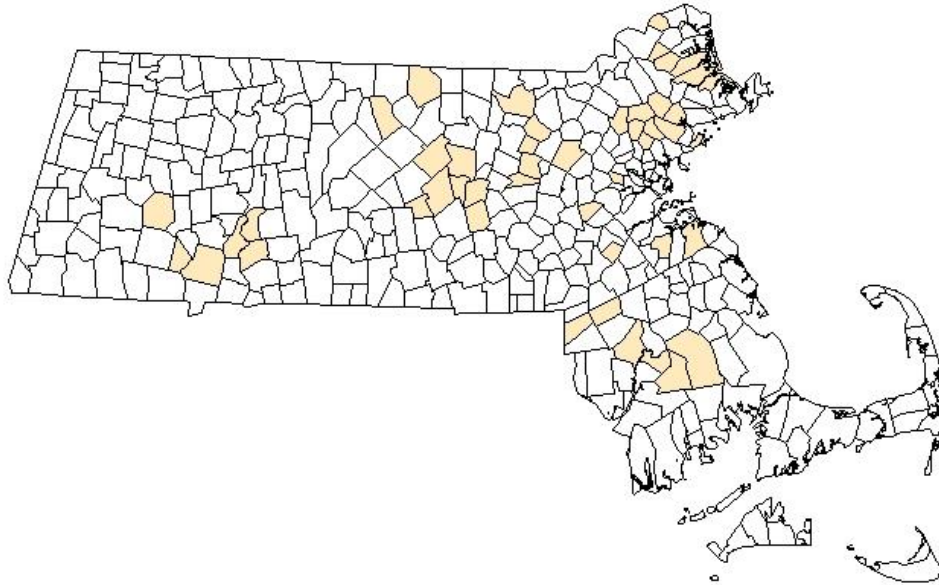


Table 1: 41 Massachusetts Municipal Light Plants²

Ashburnham Municipal Light Department	Merrimac Light Department
Belmont Municipal Light Department	Middleborough Gas and Electric Department
Boylston Municipal Light Department	Middleton Municipal Electric Department
Braintree Electric Light Department	North Attleborough Electric Department
Chester Municipal Light Department	Norwood Municipal Light Department
Chicopee Municipal Lighting Plant	Paxton Municipal Light Department
Concord Municipal Light Plant	Peabody Municipal Light Plant
Danvers Electric Division	Princeton Municipal Light Department
Georgetown Municipal Light Department	Reading Municipal Light Department
Groton Electric Light Department	Rowley Municipal Lighting Plant
Groveland Municipal Light Plant	Russell Municipal Light Department
Hingham Municipal Lighting Plant	Shrewsbury Electric & Cable Operations
Holden Municipal Light Department	South Hadley Electric Light Department
Holyoke Gas & Electric Department	Sterling Municipal Light Department
Hudson Light and Power Department	Taunton Municipal Lighting Plant
Hull Municipal Light Department	Templeton Municipal Light & Water Plant
Ipswich Municipal Light Department	Wakefield Municipal Gas & Light Department
Littleton Electric Light & Water Department	Wellesley Municipal Light Plant
Mansfield Municipal Electric Department	West Boylston Municipal Light Plant
Marblehead Municipal Light Department	Westfield Gas & Electric
Mass Development/Devens Utility	

² Source: MA DOER. <http://www.mass.gov/eea/energy-utilities-clean-tech/electric-power/massachusetts-municipally-owned-electric-utilities.html>

Background

Municipal light plants differ from investor-owned utilities in several fundamental ways, and one outcome of these differences is that munis are generally able to keep costs lower. Because they are non-profit, publicly-owned entities, munis are not obligated to make a profit for investors, only to provide service to their customers. Moreover, munis purchase power on the wholesale market and provide distribution and billing services exclusively to customers in their service areas. This allows for targeted, customized service to a small, finite region. Conversely, IOUs generally serve many more customers across a much larger geographic area and must manage the wide array of needs that accompany this scope and diversity.

Another significant reason munis in Massachusetts can keep costs down is they are not required to purchase a portion of their electricity supply from qualified renewable sources. The Massachusetts Renewable Portfolio Standard (RPS) is a mandatory requirement for all IOUs operating within the state. The RPS began as an obligation of 1% in 2003, has grown to 11% in 2016, and will increase by 1% annually with no end-date identified (EOEEA, 2016). If electricity suppliers do not meet their RPS requirements, they then must pay Alternative Compliance Payments (ACP) to the state.

The non-profit community-owned model also offers munis the opportunity to provide their customers with a large degree of control and input into utility investment policies, decisions, services, and service levels (DOER, 2010). While this governance structure is common among the munis, the autonomy to develop a customized suite of services in a relatively small utility territory also makes each one unique. Munis are supported in their autonomy by three main muni membership organizations that provide technical assistance and guidance: the Municipal Electric Association of Massachusetts (MEAM), the Massachusetts Municipal Wholesale Electric Company (MMWEC), and Energy New England (ENE).

MEAM is a professional association founded in 1953 whose membership includes 40 of the 41 munis³ in the state. It assists members with the technical, accounting, financial, purchasing, and legal services particular to the operation of municipal electric utilities in Massachusetts (MEAM, 2014). With 20 muni members, MMWEC was established in 1969 with a stated goal to provide its customers with low-cost and reliable electricity. In 1976, MMWEC became a non-profit public corporation and political subdivision of Massachusetts. With the legislative authority to issue tax-exempt revenue bonds to finance energy facilities, MMWEC streamlines the power procurement process for its member munis so they can finance ownership interests in energy facilities collectively rather than individually. MMWEC owns approximately 750 MW of generating capacity in various New England power plants. MMWEC also operates energy efficiency programs for muni customers and provides them with both power portfolio, financial, and risk management services and representation in the wholesale electricity market.

ENE was formed in 1998 to provide services ranging from management and procurement to assistance in the efficient use of energy and water. ENE has a stated commitment to conservation, optimization, and environmental stewardship. ENE is a muni cooperative owned by six munis, five in Massachusetts and one in Connecticut. These are Braintree, Concord, Hingham, Taunton, Wellesley, and the Connecticut Municipal Electric Energy Cooperative (Energy New England, LLC, 2012).

³ Devens is not part of MEAM.

Legislative History

Chapter 370: An Act to Enable Cities and Towns to Manufacture and Distribute Gas and Electricity authorized establishment of municipal utilities in 1891. By the early 20th century, 40 munis had been established in Massachusetts under Chapter 370 (see Figure 1, Table 1). The only muni established since this time occurred in Devens in 1996 after the closing of Fort Devens, under *Chapter 498: An Act Creating the Devens Enterprise Commission* (1993), and is operated by MassDevelopment.⁴

In their early years, most munis purchased electricity through retail contracts with IOUs because it was too expensive for individual munis to build power plants capable of meeting their needs. This changed in the 1960s. The Shrewsbury Electric Light Plant filed a complaint with the Federal Power Commission that eventually resulted in *New England Power Company, et. al. v. Federal Power Commission, et. al.* The resultant U.S. Court of Appeals 1st Circuit decision established municipal systems as utilities in their own right.⁵ This determination allowed munis to purchase power directly from wholesale suppliers. Concurrently, New England's electric utility industry was also evolving. In 1971, the IOUs created the New England Power Pool (NEPOOL), which coordinates the production and delivery of electricity throughout the region (MMWEC, 2014c). Eventually, after a series of court decisions in their favor, munis secured their rights to participate in NEPOOL and develop their own power supply (Tuohey, 2016).⁶

In 1997, the Electric Industry Restructuring Act deregulated IOUs in Massachusetts with the goal of reducing energy prices and providing customers with their choice of retail electricity supplier (DOER, 2012). While this deregulation did not apply to munis, Section 197 of the Acts of 1997, referring to Municipal Lighting Plant Cooperatives, did (MA Legislature, 2015). It allowed municipalities to aggregate electricity purchases for their public buildings and interested residential, commercial, and industrial customers. One example of this type of arrangement has been coordinated by ENE, which works to facilitate operating efficiencies in the power supply and perform retail account management for all of its customers (Energy New England, LLC, 2012). Another is the Berkshire Wind Power Cooperative Corporation, comprised of MMWEC and 14 of its member munis. The Cooperative owns and operates a 15 MW wind farm, which was built as a response to customer interest in renewable energy. It is the second largest operating wind farm in Massachusetts and generates enough electricity to serve 6,000 homes throughout the 14 muni territories (Berkshire Wind Power Co-Op, 2015a).

Under Massachusetts General Law (MGL) Chapter 164, Section 43, a process exists by which a town can establish a new municipal light plant. It not only requires that the muni purchase all distribution equipment from the incumbent IOU at a "fair price," but also mandates that approval be obtained from that IOU (MA Legislature, 2015). In the early 2000s, a group of Lexington residents interested in establishing a muni formed the Massachusetts Alliance for Municipal Electric Choice (MAMEC), an organized movement seeking to change the law. This volunteer group eventually gained the support of 109 municipalities and some non-governmental organizations for a proposed bill that would amend MGL Chapter 164, Section 43, and require IOUs to sell their assets when new munis were undergoing formation. This bill has been active every legislative session for the past 14 years and has failed to pass each year. As a result, with the unique exception of Devens, no new munis have been established since 1926. During the 2015-2016

⁴ Devens Enterprise Commission. <http://www.devensec.com/ch498/dec49812.html>

⁵ NEPCO v. FRC. <https://law.resource.org/pub/us/case/reporter/F2/349/349.F2d.258.6434.html>

⁶ While some munis own electric generation and transmission resources, all but four receive their gas service from IOUs (EEOEA 2015).

legislative session, legislators re-filed the bill for the 8th time,⁷ after which it was referred to the Joint Committee on Telecommunications, Utilities, and Energy. As of the writing of this paper, it too had not passed.

Another challenge potentially hindering the formation of new munis includes current federal tax law. The law precludes a municipality from purchasing assets of an IOU with tax-exempt general obligation bonds. The Massachusetts Department of Energy Resources (DOER) further elaborates that the purchase, sale, consolidation, or merger of a utility and its properties could necessitate approval by two-thirds of its shareholders (DOER, 2010).

Clean Energy and Munis

In Massachusetts, munis are exempt from many of the clean energy mandates required of IOUs, such as the state renewable portfolio standard (RPS) (MA Legislature, 2015a). Accordingly, they are also not eligible for many of the funds raised via these requirements. For example, the same 1997 law that deregulated IOUs also created a Renewable Energy Trust Fund. Administered by the Massachusetts Clean Energy Center (MassCEC), the fund is supported by a non-bypassable surcharge of \$0.0005 per kWh on the electricity bills of IOU customers. Munis can opt into the fund if they agree to the same provisions that apply to IOUs, though few have done so. The fund provides grants, energy production credits, and rebates to customers (US EPA, 2014).

One reason that the majority of munis do not contribute to the fund is that they prefer to maintain complete control of their costs and initiatives. However, munis that do not contribute to the fund are ineligible for many of the benefits that it confers, such as the option for its member municipalities to become a DOER Designated Green Community. The DOER Green Communities Designation and Grant Program awards funding to finance energy efficiency and renewable energy policies and projects at the local level. Municipalities in muni territories are ineligible for this funding unless the muni has opted into the Renewable Energy Trust Fund, or, as of 2012, the community identifies a customer in the municipality who receives services from an IOU. To date, 5 munis have signed agreements to participate in the Renewable Trust Fund,⁸ and a handful of others have taken advantage of the latter option, including Concord and Littleton.

Another funding source for IOUs that is generally not available to munis originates from the Regional Greenhouse Gas Initiative (RGGI). RGGI is a cooperative effort among Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont to cap and reduce power sector carbon dioxide (CO₂) emissions. IOUs and munis alike pay into RGGI, and Massachusetts uses its CO₂ allowance to advance Energy Efficiency Investment Plans that are delivered via the State's Mass Save⁹ and Green Communities programs. Within this structure, munis are not eligible for Mass Save or designated Green Communities grant funding, with the exceptions outlined above, unless they agree to the same overarching regulations by which the IOUs are governed.

In 2014, the state offered a grant program for the specific purpose of enabling munis to utilize RGGI funding. Subscription to the grant program, however, was relatively low. This is likely because it required munis to participate in state-administered tracking and reporting requirements. DOER awarded \$1.8

⁷ H2866 in the 2015-2016 legislative session, the bill was introduced by Representative Stephen DiNatale of Fitchburg.

⁸ Ashburnham, Holden, Holyoke, Russell, and Templeton: www.masscec.com/municipal-lighting-plant-communities

⁹ Mass Save is an energy savings programs for homeowners and renters. It provides energy tips and information about free home energy assessments, energy-saving products, and loans, rebates, and other incentives for energy-saving home improvements. (Mass Save, 2015)

million in grants to 11 munis as well as MMWEC to expand energy efficiency programs serving their customers, primarily funding customer rebate programs. Funding was also used to retrofit street and building lights with high-efficiency LED bulbs, to support residential and commercial energy audits and rebates, and to work toward modernizing the utilities. For example, Westfield Gas and Electric Department (WG&E) was awarded \$235,000 to upgrade the pumps in its wastewater treatment plant, retrofit lighting at Westfield State University, support residential energy audits and rebates for energy efficient technology, and continue to upgrade its gas and electric facilities (MassLive, 2014). Outside of this one-time state-funded grant program, munis and the associated municipalities must generally use or raise their own funds to offer renewable energy or energy efficiency services to customers.

Clean Energy Funding Mechanisms and Innovations

Muni funding mechanisms for clean energy programs vary greatly, as does the level at which munis offer programs. Some examples of how munis fund these programs include implementing a small surcharge on their customer's bills, generally known as a system benefits charge (SBC), or establishing a voluntary "Green Choice" program. An SBC is a small fee placed on customer bills in order to collect funds that are then used to finance measures such as energy efficiency and renewable energy initiatives or energy efficient appliance and retrofit rebate programs. For example, the Concord Municipal Light Plant charges a 0.52% SBC in the form of a Conservation and Renewable Energy Service (CARES) surcharge on utility bills. The funds collected are utilized to provide financial assistance to customers wishing to install energy efficient appliances and renewable energy technologies in their homes (Town of Concord, 2015).

A voluntary "Green Choice" program allows customers to opt in to pay a higher rate in order to add renewable energy to the supply pool. These additional funds are often used to finance distributed generation projects that are owned by the muni and feed its power mix (Aki, 2012). Wellesley Municipal Light Plant's (WMLP) Power to Choose program is an example of a "Green Choice" program. This program is described in the section below, "Spotlight: Wellesley Municipal Light Plant (WMLP)."

Innovations such as time of day and time of use rates, the collection and reporting of real-time data to customers, and peak demand notification programs may also be gaining popularity. In 2009, The Marblehead Municipal Light Department (MMLD) was awarded \$1.35 million through the federal American Recovery and Reinvestment Act (ARRA). The award served to replace 10,500 residential and commercial meters with "smart meters" that monitor and upload energy data every 15 minutes to an online energy-management program. This gives customers more control over their energy usage, enabling them to curb high energy costs during periods of peak demand. Demand response programs such as this can decrease electricity consumption during those periods, which, in turn, improves the stability of the grid (Nexgrid, 2013).

The Reading Municipal Light Department (RMLD) began a voluntary peak electricity demand notification program in 2015 for their commercial and municipal customers who already have interval or smart meters. Such customers are high energy users so their demand is tracked incrementally because of the larger impact they can have on the overall capacity of the system. As the supplier, RMLD is assessed capacity and transmission charges by the power generators for the proportion of the demand for which these customers account. The charges are determined during the hour of peak demand on the New England electric grid each year. If RMLD can lower its share of demand on the New England grid during the peak hour, the fees it accrues for the following year will decrease, saving the muni money.

To support the new voluntary program, RMLD provided a usage and demand profile analysis to their customers, highlighting strategies for demand reduction as well as access to an online demand management platform that would provide real-time data. Customers received a per kilowatt credit for any reductions made below their projected demand. After the first year, RMLD achieved an estimated 1.1 MW reduction during the peak demand hour, paying out approximately \$54,000 to 8 of its largest customers. North Reading High School achieved the largest load reduction – about 320 kW, or 63%, of its electric load – and received over \$14,000 as compensation (RMLD, 2016). In this way, such programs can incentivize customers to think more strategically about energy use to decrease costs. Moreover, they also can have greenhouse gas reduction benefits by lowering the need for power from the plants generating electricity from the dirtiest sources, many of which are called online during periods of peak demand.

Spotlight: Massachusetts Municipal Wholesale Electric Company (MMWEC)

The Massachusetts Municipal Wholesale Electric Company (MMWEC) was established in 1969 to provide financial and strategic assistance to municipal light plants. It currently has 20 member munis and 28 power supply project participants. While these groups are not mutually exclusive, some MMWEC members are not power supply participants and vice versa. The 20 member munis receive power supply, financial, and risk management services from MMWEC, and the 28 power supply project participants own shares in electric power supply projects that are financed, owned, and sometimes operated as well, by MMWEC (Tuohy, 2016).

MMWEC's Emerging Technologies and Distributed Generation team, formerly known as the Green Team, supports clean energy initiatives. Since 2009, this team has assisted munis in applying for over \$60 million in federal energy grants, with more than \$20 million awarded (MMWEC 2014d). Focusing now on emerging technologies and distributed generation, the team is working to identify and assist munis in implementing battery storage, community solar, resiliency, microgrid, and other projects that demonstrate the changing dynamics of electricity supply and demand.

In addition to this team, MMWEC also has an energy efficiency division that offers two core programs, one for residential and the other for commercial and industrial (C&I) customers. The Home Energy Loss Prevention Service (HELPS) Program offers residential customers free energy audits and rebates on high-efficiency central A/C, heat pumps, appliances, and other measures recommended in the audit. It also assists homeowners with solar PV installations. The Green Opportunity (GO) Program offers C&I customers energy audits, rebates, and assistance implementing energy efficiency measures (MMWEC 2014e). The program is customized for each muni and, depending on budget considerations and level of commitment, can include a prescriptive HVAC and lighting program, a new construction and major renovation program, or a custom retrofit program.

The Ipswich Municipal Light Department (IMLD) provides an illustration of the GO Program in action. IMLD offers all of the programs available under GO, and in June 2012, completed a successful custom retrofit project with DJ Fabricators, a metal fabrication company in Ipswich. In September 2011, DJ Fabricators approached the Ipswich GO team regarding a potential upgrade to the company's compressed air equipment. The GO team reviewed the measure and made recommendations on the best equipment to

install. The total cost of the compressed air retrofit was \$14,035 with a payback period of 2.4 years. As the IMLD GO Program funds up to 50% of energy efficiency initiatives, capped at \$10,000, the muni was able to offer \$7,018 to DJ Fabricators (MMWEC, 2014f).

Spotlight: Holyoke Gas & Electric (HG&E)

The City of Holyoke, located in Western Massachusetts, has a population of over 40,000, and Holyoke Gas & Electric (HG&E) provides gas, electric, and telecom services to over 18,000 customers (HG&E, 2016). Over 92% of HG&E's electricity comes from non-fossil fuel sources (HG&E 2015). As part of this portfolio, HG&E owns and operates the Holyoke Hydroelectric Project, a large hydropower system that produces 45 MW of energy on average, rising to 79 to 80 MW at peak times (LaRose, 2015). Since purchasing the Holyoke Hydro System in 2001, HG&E has made significant improvements to the facility's infrastructure for the passage and protection of migrating anadromous fish, like Atlantic Salmon, that use the waterways. These improvements included the installation of an inflatable rubber dam to replace wooden flashboards and the construction of an upstream fish passage facility at Hadley Falls Station (Kleinschmidt, 2006).

In order to receive funding for clean energy projects, HG&E began paying into the Renewable Energy Trust fund in 2009 through an additional \$0.0005/kWh Renewable Energy Charge in each rate class (HG&E, 2010). This has enabled the City of Holyoke to become a DOER Green Community and HG&E to fund green initiatives. The initiatives have sought to expand HG&E's clean energy portfolio and offer customers environmentally-responsible programs, such as free energy audits for residents and businesses and financing programs for energy saving upgrades. Currently, HG&E has 6.3 MW of installed solar capacity, including three projects that serve approximately 1060 residents, or 6% of homes, and the muni is pursuing additional solar and energy storage technologies. The solar projects are funded by private developers with which HG&E has signed 20-year power purchase agreements (PPAs). Through the PPA arrangement, the developer team owns and maintains the installations and receives the solar renewable energy credits (SRECs) generated. HG&E has agreed to purchase all of the power produced from the facilities at rates below those of the wholesale power market (HG&E, 2015c).

HG&E is also participating in an innovative public-private partnership with Sparkplug Power, an energy storage company in Somerville, Massachusetts, and The University of Massachusetts Amherst to reduce residential energy use and cost at times of peak demand. The program received a \$125,000 Demonstration of Energy & Efficiency Developments (DEED) grant from the American Public Power Association (APPA) in March 2013 and a \$150,000 InnovateMass grant from MassCEC in April 2014 (LaRose, 2015). For this demonstration project, HG&E is installing home energy storage systems that will charge lithium batteries during periods of low energy demand. HG&E will then be able to control whether energy is pulled from the batteries, or the grid, or both, potentially providing some system relief for the muni during periods of peak demand (MassCEC, 2014).

In 2010, the City of Holyoke received a DOER Green Communities Designation grant of \$321,221 to convert traffic and street lights as well as parking lot lights at 12 schools to high-efficiency LEDs and to purchase Big Belly solar trash receptacles (DOER, 2015). Of this amount, HG&E received \$168,000 to convert the 4,000 streetlights that they owned and operated to LED lights. By 2014, all 4,000 streetlights were retrofit with LEDs, saving the city 60%, or over \$100,000, in lighting costs annually (HG&E, 2015b).

For residents or businesses interested in energy savings, HG&E further offers an Energy Conservation Program for customers that have completed one of HG&E's no-cost energy audits. Financial assistance

programs are offered at a 0% interest rate repayable over a period of up to five years. Residential and commercial customers are eligible for up to \$5,000 in loans for energy efficiency improvements and up to \$10,000 for solar installations. Commercial clients are required to seek prior HG&E approval if more funds are needed (LaRose, 2015). At the beginning of each year, HG&E makes \$1 to \$1.5 million available to the loan program, and, due to high demand, it usually runs out by October or November of each year. This program is a revolving fund, whereby the savings garnered from the measures implemented help to fund future loans (LaRose, 2015).

Spotlight: Wellesley Municipal Light Plant (WMLP)

A town of nearly 28,000 residents in the Greater Boston region, Wellesley is served by and owns the Wellesley Municipal Light Plant (WMLP). As WMLP fully controls its budget and services, it has been able to roll out a number of innovative programs and support the town in taking progressive action. For example, Wellesley converted 540 of the town's streetlights from metal halide to LED without having to buy those lights back from the utility, a process that can often be arduous. This project saves the town approximately \$30,000 per year (Joyce, 2014).

In 2009, the Town of Wellesley prioritized energy issues at its annual Town Meeting through the creation of an official Sustainable Energy Committee. The Sustainable Energy Committee, which intentionally includes a WMLP member, has set quantitative goals toward which the Town and WMLP have worked. This has provided a platform from which WMLP can show leadership in renewable energy and energy efficiency. A few of the muni's energy efficiency strategies have included:

- Power to Choose – WMLP and the Sustainable Energy Committee offer a volunteer renewable energy program to electricity customers to offset their fossil fuel usage. Participating customers choose to pay \$.04 more per kWh and can offset anywhere from 10% to 100% of their use. Currently, 11% of Wellesley households have signed up for the program, which is the highest participation rate in the state and third highest level in the country (US EPA, 2015; Town of Wellesley, 2015).
- Power to Save – WMLP and National Grid partnered to offer 400 Wellesley homeowners a no-cost home energy assessment. From July 2013 to June 2016, 314 home energy assessments had been completed (Newark, 2016).

The success of WMLP's "Power to Choose" program has been due largely to the local volunteer team, Sustainable Wellesley, and participation from the surrounding colleges of Babson College, Wellesley College, and MassBay Community College. For instance, Babson College students have worked with WMLP to create media campaigns and an elementary school curriculum (US EPA, 2012). WMLP also partnered with parent-teacher organizations in schools and distributed "Power to Choose" lawn signs and magnetic bumper stickers to participants (US EPA, 2012). The Sustainable Wellesley volunteer team further facilitates community engagement by organizing local events on sustainability and sharing news with the community through a weekly newsletter. With this support, the Town of Wellesley exceeded EPA's Green Power Community (GPC) purchase requirements and became the first town in Massachusetts to earn the GPC designation in 2012, also receiving the award for "Innovative Green Power Program of the Year."

Spotlight: Littleton Electric Light Department (LELD)

The Littleton Electric Light Department (LELD) serves approximately 14,000 people in the towns of Littleton and Boxborough. LELD reports to a five-person elected board of residents and historically has offered some of the lowest electricity rates in the state, as shown in Figure 2 below.

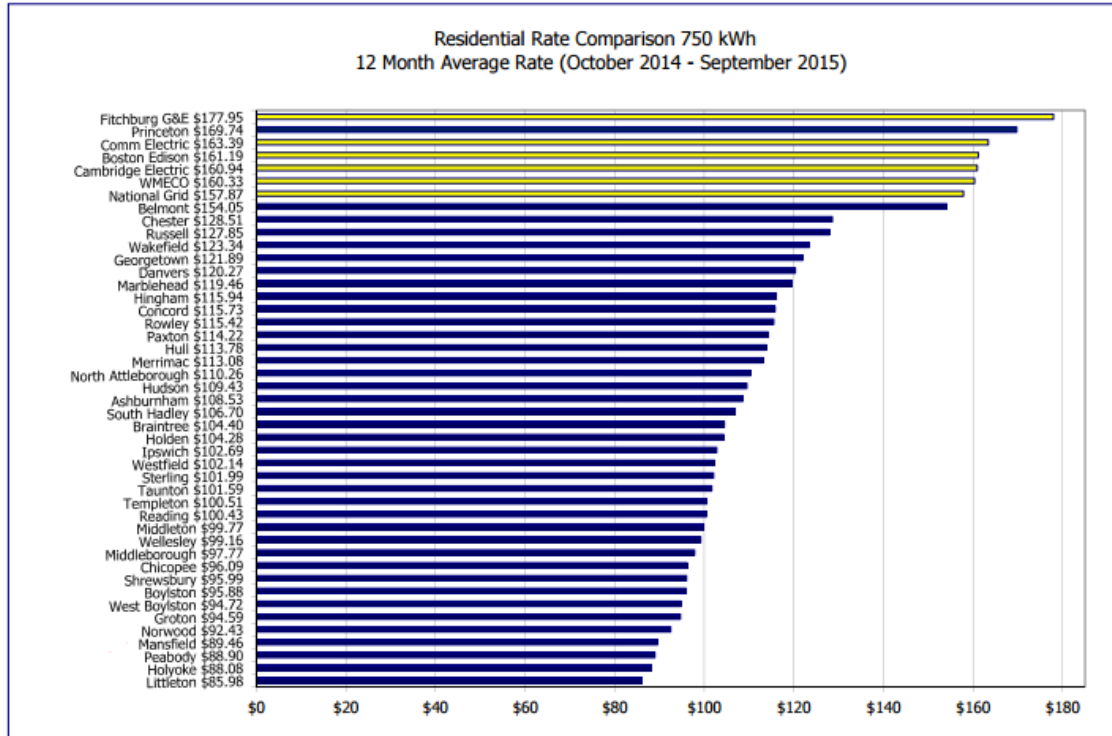


Figure 2: Comparison of Average Residential Monthly Electricity Rate (October 2014-September 2015)¹⁰

In October 2015, LELD launched a new program called “Green Rewards” to serve the energy efficiency needs of its customers and work to alleviate customer concerns regarding ineligibility for state programs like Mass Save. Under the Green Rewards program, customers can receive free energy audits and a credit of 20% off of project costs on their electric bills – up to \$300 per year – if the recommended “smart home improvements” are made (LELD, 2015). These energy conservation measures include upgrading windows and doors to energy efficient models and adding insulation to ceilings, walls, and pipes. The Green Rewards program also offers discounts on up to 12 LED light bulbs per year, four low-flow water fixtures per year, and up to a \$50 rebate for the purchase of ENERGY STAR® appliances (LELD 2015).

Between October and December of 2015, LELD performed approximately 50 energy audits, which is almost double the typical number of audits performed during a similar period before the Green Rewards program launched (Lawler, 2015). In addition to home energy audits, LELD offers a solar net metering program. Net metering enables the muni to purchase the excess energy generated by a solar installation that is fed back into the grid. LELD’s net metering program was launched four years ago when LELD carved out 1% of its peak load for net metering. When the program was nearly fully subscribed, LELD redeveloped the rate to 3% of its peak load – 2% commercial and 1% residential – in April 2015 (Lawler, 2015). In 2015, the solar cap per residential customer to connect to LELD’s distribution network was either 8 kW or the customer’s previous year’s energy use, whichever was lower (LELD 2015a).

¹⁰ MMWEC (https://www.mansfieldelectric.com/files/documents/mainarticles/Res_Rate_102015.pdf)

LELD's net metering program provided the Boxborough Energy Committee the platform to initiate a community solar project, similar to Solarize Mass, that offered a tiered pricing system for residents and businesses for the installation of solar panels. Once the Littleton Sustainability Committee joined the initiative, it became known as "LittleBoxSolar," and four committee members from the two towns were designated the solar coaches for the program (Rambacher, 2015). In October 2015, the Boxborough Energy Committee and the Littleton Sustainability Committee partnered with Clean Energy New England for the installation, permitting, construction, and interconnection of small-scale solar installations for residents and businesses within LELD. By the end of 2015, the program had generated 247 kW of electricity, with 35 systems contracted and 11 systems already generating electricity. Customers who had not signed up for the program were still able to participate at standard pricing until LELD's total cap for solar installations in the utility territory of 460 kW was met.

For future initiatives, residents will be able to purchase solar panels that LELD is installing on its new storage facility. This will be an option for those who cannot or choose not to install solar panels on their own property (Lawler, 2015). The total system is expected to generate between 250 kW and 500 kW.

Lessons Learned and Recommendations

Like the communities they serve, each municipal light plant is unique, and when it comes to implementing clean energy initiatives, each has different priorities, goals, approaches, and challenges. The relative autonomy from the regulatory requirements imposed on IOUs in conjunction with the smaller size and scale of munis allow them a level of flexibility that can be optimized to advance clean energy and climate initiatives. Because munis are tasked with developing their own programs and initiatives without requirements to drive them or the economies of scale that IOUs can often exploit, however, challenges can exist in fostering the will or expertise to establish or operate these programs.

Despite their individuality, munis do share common goals and can learn from one another to develop best practices for cultivating successful renewable energy and energy efficiency programs. In addition to the practice of increased communication and knowledge sharing among munis, municipal light plants would be well served to value the involvement of interested third parties; participate directly in community energy efforts; plug into local, state, and federal programs; and consider the cost-benefit impacts of greater clean energy and climate programming, both by learning from win-win examples in other munis and accounting for the social benefits of cleaner air, reduced greenhouse gas emissions, and a customer base that feels listened and responded to.

- **Optimize access to and support from research and educational institutions and private entities**

Munis should explore mutually beneficial partnerships with innovative third-parties. Holyoke Gas and Electric is conveniently placed near universities and research groups that are interested in clean energy demonstrations. This access to entities that can manage and fund new energy projects has increased HG&E's growth in renewable energy supply and clean energy programming. Similarly, the Wellesley Municipal Light Plant is located near multiple colleges that often help to support and raise awareness for clean energy initiatives in the town as part of curricular or extracurricular activities. While both of these examples exploit geographic proximity, it should not be deemed a requirement. HG&E also teamed successfully with Somerville's cleantech start-up company, Sparkplug Power. Munis farther afield from willing research and educational partners should remember that many similar institutions and private entities operate throughout Massachusetts that would likely be excited to collaborate; munis should look both within and beyond their own neighborhoods for such opportunities.

- **Leverage community and volunteer involvement to promote and advance clean energy**

Local volunteer groups and committees that focus on clean energy and sustainability in a community can prompt and accelerate growth of renewable energy campaigns. A great example is the LittleBoxSolar program in Boxborough and Littleton. While such groups often take the lead on community clean energy efforts in IOU territories as well, the impact on utility programming and incentives can be even more direct and tangible due to the local control and relationships that exist in muni territories. This opportunity should be seized on by both local groups as well as munis who wish to look to community champions to help advance a clean energy program model.

- **Find avenues to participate directly in community clean energy efforts**

Munis should consider formal partnerships with local energy committees and commissions as well in order to institutionalize the utility's commitment to improving local energy programming while also creating direct two-way communication channels. In Wellesley, one of the seven members of the Sustainable Energy Committee is appointed by the Municipal Light Board. Policies like this foster a consistent dialogue between the community and muni, and increase the chances for collaborative and impactful programs.

- **Utilize existing programs offered by other organizations**

By taking advantage of the programs offered within muni network groups as well as state and federal agencies, munis can plug into economies of scale, sources of funding, and knowledge sharing. MMWEC recognized this need when it developed its Emerging Technologies and Distributed Generation Team to help member munis navigate the world of available state and federal programs. The HELPS and GO initiatives enable munis to offer useful programs that are customizable without having to recreate the wheel. ENE and Berkshire Wind Power Cooperative offer member munis the ability to be responsive to environmental requests from customers while still streamlining their processes and creating efficiencies.

- **Provide leadership through innovative programming**

Because of their autonomy and small scale, munis can develop and implement innovative programs more easily than many IOUs can. Holyoke Gas and Electric's 0% interest home energy loan revolving fund is one such example as is Reading Municipal Light Department's Peak Electricity Demand program. Munis should not only make the effort to lead in the clean energy space, but also to share their experiences with other munis to engender broader impacts.

- **Reconsider clean energy's place in the bottom line**

The HG&E case study demonstrates that munis can successfully participate in state-run programs like Mass Save and Green Communities while still offering low rates (See Figure 2). Moreover, Littleton's low prices have withstood net metering initiatives, and Wellesley and Reading's have endured progressive clean energy programming as well. Federal, state, and cooperative programs as well as those established independently can produce solid environmental results, and in many cases, customers may be willing to pay more in order to reap clean energy and climate benefits.

Conclusions

A unique opportunity in the 1890s created a constellation of 40 municipal electric utilities in Massachusetts that function largely outside the realm of regulatory oversight by which the state governs IOUs. Though no new munis, with the exception of Devens, have been established for nearly 90 years, those that exist have constructed their own unique infrastructure through member organizations and, more recently, cooperatives. Within this patchwork landscape, the munis operate autonomously. While they all share the promise of low-cost power, their programming and, in particular, their clean energy efforts can vary significantly.

The success of clean energy initiatives in munis can depend largely on community and third-party involvement, which can expedite and expand a muni's energy portfolio. In order to balance keeping costs low and investing in clean energy, munis must be innovative and thorough in their investments. The win-win opportunities for muni and customer alike can include deferred utility investments, reduced demand, resiliency, and pricing that is more fully responsive to various goals, including social responsibility, community initiatives, and climate change mitigation and preparedness.

However one views a muni's independence, it is important to note that each muni can seize the opportunity to support and implement clean energy programs. If they leverage some advantages, such as greater local control, smaller service areas, smaller pools of data, and greater nimbleness, munis can pursue pioneering strategies in renewable energy and energy efficiency, individually or collectively, while also maintaining a solid bottom line. In this way, munis are poised to lead. Munis have the potential to act as proving grounds for cutting-edge clean energy programming and to serve as exciting demonstrations of what the 'utility of the future' could be.

Works Cited

- APPA. 2012. *Residential Customers Served by Public Power Utilities*.
<http://www.publicpower.org/files/PDFs/ResidentialCustomersServedbyPublicPowerUtilities.pdf>.
- APPA. 2013. DEED Expands Scholarship Offerings.
<http://www.publicpower.org/Media/magazine/ArticleDetail.cfm?ItemNumber=38734>
- Berkshire Wind Power Co-op. 2015. "Who We Are."
http://www.berkshirewindcoop.org/Who_We_Are.html
- Berkshire Wind Power Co-Op. 2015a. "Berkshire Wind Power Facts."
<http://www.berkshirewindcoop.org/documents/DedicationFactSheetsPublisher.pdf>.
- Chapter 270: An Act to Enable Cities and Towns to Manufacture and Distribute Gas and Electricity. 1891.
- CEL. 2015. "<http://www.celd.com/index.php?page=residential-conservation-services>"
- CEL. 2015a. "<http://www.celd.com/index.php?page=led-streetlight-replacement-project>"
- Devens Enterprise Commission. 2016. <http://www.devensec.com/ch498/dec49812.html>
- DOER. 2010. Municipal Utility Study. Technical Report.
<http://www.massmunichochoice.org/resources/DOER-Municipal-Utility-Report-1-28-10.pdf>
- DOER. 2012. "2000 Market Monitor: Electric Industry Restructuring."
<http://www.mass.gov/eea/docs/doer/electric-deregulation/mm3.pdf>
- DOER. 2015. "Map Summary Green Communities." <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/map-summary-green-communities.pdf>.
- EOEEA. 2015. "List of Local Distribution Companies." <http://www.mass.gov/eea/energy-utilities-clean-tech/natural-gas-utility/natural-gas-market-data/list-of-local-distribution-companies.html>
- EOEEA. 2016. "RPS and APS Program Summaries." <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html>
- Energy New England, LLC. 2012. "About Us." <http://www.energynewengland.com/About.aspx>.
- HG&E. 2010. "2010 Annual Report."
<http://www.hged.com/files/about/pdf/folder/2010AnnualReport.pdf>
- HG&E. 2015. "Mission and Vision." <http://www.hged.com/about/mission-vision/default.aspx>
- HG&E. 2015a. "Hadley Station Hydro Project." <http://www.hged.com/community-environment/green%20initiative/hydro/default.aspx>
- HG&E. 2015b. "LED Street Lights". <http://www.hged.com/customers/services/lighting/led-street-lights.aspx>
- HG&E. 2015c. "Solar Initiatives". <http://www.hged.com/community-environment/green%20initiative/solar-output.aspx>
- HG&E. 2015d. "What is Hydro Power." <http://www.hged.com/community-environment/green%20initiative/hydro/what-is-hydro-power.aspx>
- HG&E. 2016. <http://www.hged.com/about/about-electric/default.aspx>
- Joyce, Richard. 2014. Wellesley Municipal Light Plant.
- Kleinschmidt. 2006. "FISH PASSAGE AT HADLEY FALLS: PAST, PRESENT, AND FUTURE"
http://www.kleinschmidtgroup.com/files/4814/1052/6563/Fish_Passage_at_Hadley_Falls_-_Past_Present_and_Future_-_HydroVision_Paper.pdf
- LaRose, Sarah. 2015. Holyoke Gas & Electric.
- Lawler, Nick. 2015. Littleton Electric Light Department.
- LELD. 2015. "Green Rewards: Conserve & Save with LELWD." <http://www.lelwd.com/greenrewards/>
- LELD. 2015a. "Interconnection Standards for Small Residential Systems 0 - 10 kW AC Systems."
http://www.lelwd.com/wp-content/uploads/2015/09/Interconnection_Standards_-_Solar_-0-10kW.pdf
- Lisowski, Jim. 2015. Chicopee Electric Light.
- LittleBoxSolar. 2015. "FAQ's." <http://www.littleboxsolar.com/faqs.html>
- LittleBoxSolar. 2015a. "Boxborough Littleton Solar Initiative." <http://www.littleboxsolar.com/>
- Ma Legislature. 2015. "Session Laws: Acts of 1997, Chapter 164."
<https://malegislature.gov/Laws/SessionLaws/Acts/1997/Chapter164>

Ma Legislature. 2015a. "General Laws, Division of Energy Resources: Section 11F Renewable energy portfolio standard for retail electricity suppliers."
<https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F>

Massachusetts Alliance for Municipal Electric Choice. 2015. "Massachusetts Alliance for Municipal Electric Choice." <http://www.massmunichoice.org>

MassCEC. 2014. "MassCEC Announces Winners of 2014 InnovateMass Program."
<http://www.masscec.com/news/masscec-announces-winners-2014-innovatemas-program>

MA DOER. <http://www.mass.gov/eea/energy-utilities-clean-tech/electric-power/massachusetts-municipally-owned-electric-utilities.html>

MassLive. 2014. "State grant promotes Westfield Gas and Electric Department energy conservation programs."
http://www.masslive.com/news/index.ssf/2014/07/state_grant_promotes_westfield.html

Mass Save. 2015. "Mass Save Energy Saving Programs." <http://www.masssave.com/about-mass-save>.

Mass Save. 2015a. "Home Energy Assessments." <http://www.masssave.com/en/residential/home-energy-assessments/how-to-participate/residents-1-to-4-units>

Mass Save. 2015b. "Central AC/Heat Pump and QIV Rebates"
<http://www.masssave.com/en/residential/offers/13-coolsmart>

MEAM. 2014. "MEAM." <http://www.meam-ces.org/>.

MMWEC. 2014a. "Why Public Power." <http://www.mmwec.org/why-public-power.html>.

MMWEC. 2014b. "Who We Are." http://www.mmwec.org/Who_We_Are.html.

MMWEC. 2014c. "MMWEC History." <http://www.mmwec.org/mmwec-history.html>.

MMWEC. 2014d. "The Green Team". <http://www.mmwec.org/the-green-team.html>

MMWEC. 2014e. "Energy Efficiency". <http://www.mmwec.org/energy-efficiency.html>

MMWEC. 2014f. "MMWEC Green Opportunity Energy Efficiency."
http://www.mmwecgoprogram.org/documents/GO/GO_prg_descript_casestudies_1.pdf

Mortenson. 2015. <http://www.mortenson.com/solar/projects/chicopee-solar-and-rehoboth-solar#>

Office of Energy & Renewable Energy. 2015. <http://energy.gov/eere/femp/energy-incentive-programs-massachusetts>

NEPCO v. FRC. <https://law.resource.org/pub/us/case/reporter/F2/349/349.F2d.258.6434.html>

Newark, Suzanne. 2016. Wellesley Municipal Light Plant

Nexgrid. 2013. "During Heat Waves, Marblehead's Smart Meters Prove Their Worth."
<http://www.nexgrid.net/story.asp?nid=36>

NOVA. 2015. "Saving the Sun."

Rambacher, Sarah. 2015. Littleton Sustainability Committee.

RMLD. 2016. Reading Municipal Light Department. "RMLD PDR 2016 Lunch and Learn"

Seattle City Light. 2013. "Renewable Energy." <http://www.seattle.gov/light/green/greenpower/>.

Town of Concord. "Light Fund Highlights."
http://www.concordnet.org/pages/concordma_finance/books/FY16EntBB/03%20Light%20Fund.pdf

Town of Wellesley Sustainable Energy Committee, Sagewell. 2014. "Power to Choose."
<http://www.sagewell.com/power-to-choose/index.php>.

Tuohey, David. 2016. MMWEC

US Census. 2014. "<http://quickfacts.census.gov/qfd/states/25/2513660.html>"

US EPA. 2012. <http://www3.epa.gov/greenpower/awards/winners2012.htm#well>

US EPA. 2014. "Massachusetts Renewable Energy Trust Fund."
<http://www.epa.gov/chp/policies/incentives/mamassachusettsrenewableenergytrustfund.html>.

US EPA. 2015. "Green Power Communities."
<http://www3.epa.gov/greenpower/communities/index.htm#list>.

Wellesley Municipal Light Plant. 2014. "Wellesley Municipal Light Plant."
http://www.wellesleyma.gov/pages/wellesleyma_wmlp/index.