April 30, 2018

VIA EMAIL and FIRST CLASS MAIL

Judith Judson, Chairperson
Massachusetts Energy Efficiency Advisory Council
c/o Department of Energy Resources
100 Cambridge Street, Suite 1020
Boston, Massachusetts 02114

Dear Chairperson Judson:

As you may recall, the City of Lowell plans to assume the responsibility for managing electric energy efficiency programs for the benefit of its customers through its established municipal aggregation plan. Accordingly, consistent with established procedural timelines, attached please find the City of Lowell’s Proposal to Serve as Program Administrator for the upcoming three-year cycle.

This Proposal focuses primarily on topics of particular concern in Lowell. As stated in the Proposal, the City hopes that its greater familiarity and connection to its citizens and businesses will secure benefits, particularly for “hard-to-reach” customer segments. Importantly, Lowell does not expect to make material changes around many established programs and hopes that National Grid will continue to play an important role pursuant to mutually acceptable contractual arrangements. The City believes that this collaborative approach would secure the greatest overall benefit for citizens and businesses.

We will continue to pursue any further approvals and looks forward to participating in finalization of a complementary plan for Lowell through the EEAC process.

Thank you for your consideration.

Sincerely,

Eileen M. Donoghue
City Manager

EMD/ns
Attachment
cc: Rachel Graham Evans, Deputy General Counsel, DOER

City of Lowell Proposal
to Serve as Program Administrator
for Mass Save© 2019-2021

April 30, 2018
Section 1: Lowell as a Program Administrator

The City of Lowell has a long history of thinking deeply about the needs of our residents, businesses, and industries and identifying creative, ambitious, and impactful outcomes that leverage and enhance existing programs and initiatives to the benefit of our City. We have multiple sustainability, energy efficiency, and renewable energy initiatives underway (or already completed) under the City’s leadership. Building upon our momentum and our legacy of success, in April of 2018, our City Council unanimously voted (with one member absent) to “authorize the City Manager to initiate the process to amend its municipal aggregation plan so as to become responsible for the design and implementation of energy efficiency programs.”

By serving as the energy efficiency Program Administrator for Lowell, the City seeks to work collaboratively with the Massachusetts Department of Energy Resources, Massachusetts Energy Efficiency Advisory Council, National Grid, and a range of implementation contractors currently delivering Mass Save® programs to:

- **Leverage** and enhance the existing programs in innovative and community-centered ways that increase participation by Lowell residents, businesses, and industries in ratepayer-funded energy efficiency programs
- **Improve** the design and delivery of the programs so they are tailored to the specific demographics of Lowell with new and creative approaches that increase penetration for low-income residents, multifamily renters, and those who do not speak English as their primary language
- **Enhance** participation of larger institutions by providing enhanced incentives to help them achieve energy and climate change-related goals and metrics
- **Create** a workforce development program that allows for training and empowerment opportunities for local businesses and workers. This green collar workforce would enhance the delivery of efficiency programs by allowing neighbors to help neighbors
- **Leverage** existing resources and networks available to us as a City to enhance energy efficiency outcomes
- **Ensure** that Lowell ratepayer funds provide measureable benefits for Lowell

Lowell is the nation’s first successfully planned industrial community, with a long history of innovation and optimization of community, state, and federal resources for the betterment of our residents, businesses, and industries. The City is a diverse urban community initially built around the extensive industrial mill complexes along the Merrimack River. Although the mills have been repurposed since its founding, they stand as a link to the past history of innovation and utilization of community resources. The City of Lowell wants to bring this same spirit to the role of energy efficiency Program Administrator for our City for the upcoming Mass Save® program being developed for 2019-2021.

Since its founding, Lowell has been ethnically diverse, a tradition that continues to this day. From the Irish fleeing the potato famine to the Cambodian immigrants of today, a promise of a better life has brought people here for nearly 200 years. A strong motivator for Lowell’s plan to become the Program

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1 Lowell City Council, Energy Efficiency Program Administrator Resolution, April 24, 2018. The executed resolution is presented in Attachment 1 of this proposal.
Administrator for Mass Save® programs in our City is to help fulfill this promise by enhancing the design and delivery of the programs to ensure they reach and serve the diverse populations of Lowell.

Section 2: Why Should Lowell Augment Energy Efficiency Programming?

There are three reasons that Lowell is convinced that it rather than the existing Program Administrators (PAs) can better control its own energy future:

1. Lowell is different.
2. Lowell has been underserved by statewide programming.
3. The City is the best delivery agent to deliver programs that conform to the priorities established for Mass Save® program planning and delivery during 2019-2021.

2.1. Lowell is Different

The demographics of the City of Lowell are fundamentally different than those from the Commonwealth of Massachusetts on many dimensions that affect the delivery of efficiency programs.

- The poverty rate in Lowell is nearly twice the rate in Massachusetts statewide: 19.6% versus 10.4%.
- Per capita income in Lowell is 37% lower than per capita income in Massachusetts: $24,946 versus $39,771.
- Median household income in Lowell is 26% lower than median household income in Massachusetts: $55,383 versus $75,297.
- Compared to Massachusetts, nearly twice as many residents in Lowell speak a language other than English at home: 43.7% versus 23.7%.
- The rate of residents born outside of the US is 68% higher in Lowell compared to Massachusetts: 27.8% versus 16.5%.
- The percentage of non-white residents of Lowell is twice that of Massachusetts: 41.2% versus 20.7%.

Each of those demographic characteristics makes the population of residents harder to reach through traditional energy efficiency program approaches. The population demographics call for higher levels of engagement and trust than can be offered by standardized statewide offerings. The Lowell demographics epitomize the characteristics of hard to reach populations that the Commonwealth has been discussing in the planning process for the 2019-2021 statewide energy efficiency plan.

In addition, housing characteristics in Lowell are significantly different from those of Massachusetts.

- The percent of residents who rent in Lowell is more than 50% higher than in Massachusetts: 58% versus 38%.
- The percent of multifamily homes of 5 or more units is 70% higher in Lowell than in Massachusetts: 36% versus 21%.
- The percent of small multifamily (2-4 units) in Lowell is significantly higher than in Massachusetts: 27% versus 21%.

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2 American Community Survey (DP05, 2012-2016), and Census Reporter.
The percent of single-family units in Lowell is significantly different from Massachusetts as a whole: 37% versus 58%.

The difficulties of reaching multifamily buildings and rental properties with statewide programming make this sector another hard to reach group. The programming to reach the owners of these buildings has to be different. Both population demographics and housing characteristics combine to make Lowell residents and businesses easy to categorize as hard to reach. That category of utility customers has been identified in multiple workshops of the Massachusetts Energy Efficiency Advisory Council (EEAC) as a necessary target for extra effort in 2019-2021. An analysis of Mass Save® data recently completed by the Applied Economics Clinic also bears out the disproportionate benefits of efficiency by income and race.

2.2. Lowell Has Been Underserved by Statewide Programming

An analysis of publicly available data from www.masssavedata.com provides a picture of underservice for those years for which City-level data are available. Data for electric use, savings, and incentives for each of 2013, 2014, and 2015 at the City and Commonwealth level were compiled in order to compare statewide data with City-level data. Results are presented in Table 1.

Table 1: Electricity usage, savings, and incentives for Lowell and Massachusetts, 2013-2015, by major customer class.

<table>
<thead>
<tr>
<th></th>
<th>Lowell</th>
<th>Massachusetts</th>
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</thead>
<tbody>
<tr>
<td>Residential and Low-Income</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual MWh Usage</td>
<td>236,866</td>
<td>236,757</td>
<td>219,553</td>
<td>16,974,079</td>
<td>16,170,299</td>
<td>15,957,415</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual MWh Savings</td>
<td>8,755</td>
<td>10,938</td>
<td>5,609</td>
<td>631,034</td>
<td>681,858</td>
<td>622,230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric Incentives</td>
<td>$2,665,891</td>
<td>$2,565,994</td>
<td>$1,196,794</td>
<td>$199,455,715</td>
<td>$180,358,822</td>
<td>$141,864,749</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial &amp; Industrial</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual MWh Usage</td>
<td>381,723</td>
<td>363,137</td>
<td>378,760</td>
<td>27,131,177</td>
<td>26,865,544</td>
<td>27,651,947</td>
<td></td>
<td></td>
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<tr>
<td>Annual MWh Savings</td>
<td>8,229</td>
<td>7,163</td>
<td>8,527</td>
<td>917,127</td>
<td>751,485</td>
<td>665,557</td>
<td></td>
<td></td>
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<tr>
<td>Electric Incentives</td>
<td>$1,862,190</td>
<td>$2,027,986</td>
<td>$1,672,100</td>
<td>$224,328,302</td>
<td>$174,535,004</td>
<td>$155,515,664</td>
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<td></td>
</tr>
</tbody>
</table>

These data were then used to calculate and review simple ratios to determine what percent of the statewide pool Lowell represented for each variable, with the following results, year-by-year and for a three-year average. Results are presented in Table 2.

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1 See, e.g., EEAC Workshop #2 briefing document, presentation, and meeting summary, October 24, 2017 (http://ma-eeac.org/october-24-residential-planning-workshop-2/).
Table 2: Electricity usage, savings, and incentives in Lowell, as a percentage of total for Massachusetts, 2013-2015.

<table>
<thead>
<tr>
<th></th>
<th>Lowell as Percent of Massachusetts</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
</tr>
<tr>
<td>Residential and Low-Income</td>
<td></td>
</tr>
<tr>
<td>Annual MWh Usage</td>
<td>1.40%</td>
</tr>
<tr>
<td>Annual MWh Savings</td>
<td>1.39%</td>
</tr>
<tr>
<td>Electric Incentives</td>
<td>1.34%</td>
</tr>
<tr>
<td>Commercial &amp; Industrial</td>
<td></td>
</tr>
<tr>
<td>Annual MWh Usage</td>
<td>1.41%</td>
</tr>
<tr>
<td>Annual MWh Savings</td>
<td>0.90%</td>
</tr>
<tr>
<td>Electric Incentives</td>
<td>0.83%</td>
</tr>
</tbody>
</table>

Over the three years analyzed, Lowell’s residential electric usage was 1.41% of the Commonwealth’s total, yet electric savings were only at 1.31% and the investment of electric incentives was only 1.23%. The cost of underinvestment to the C&I sector appears to be even larger. While Lowell’s C&I electric usage was 1.38% of the Commonwealth’s, the investment of electric incentives was only at 1% of the statewide total, with electric savings that were commensurate with the investment.

Such underinvestment, especially in the residential sector, can be considered even more profound given the hard to reach nature of Lowell demographics articulated above. If anything, given the population demographics, the City would expect that the incentives provided to Lowell would be greater than proportional. This points to the need for additional attention, statewide and locally, to these underserved markets.

An analysis was also done to assess what savings and investment might have resulted if such were done in proportion to electric usage, with the following results:

Table 3: Assumed electric savings and incentives for Lowell, if proportional to electricity usage, 2013-2015.

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential and Low-Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual MWh Savings</td>
<td>8,806</td>
<td>9,983</td>
<td>8,444</td>
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<tr>
<td>Electric Incentives</td>
<td>$2,783,040</td>
<td>$2,640,719</td>
<td>$1,925,201</td>
</tr>
<tr>
<td>Commercial &amp; Industrial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual MWh Savings</td>
<td>12,904</td>
<td>10,158</td>
<td>9,116</td>
</tr>
<tr>
<td>Electric Incentives</td>
<td>$3,156,195</td>
<td>$2,359,160</td>
<td>$2,130,161</td>
</tr>
</tbody>
</table>

Finally, the sum total of under-investment over the three-year period was calculated. Based on the analysis, it was determined that Lowell was underserved by more than 10,000 MWh in savings and $3 million in incentive investment (Table 4).
Table 4: Calculated difference in electricity savings and incentives between proportional allocation and actual allocation, 2013-2015.

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWh Savings</td>
<td>4,725</td>
<td>2,040</td>
<td>3,424</td>
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<tr>
<td>Electric Incentives (Res &amp; LI)</td>
<td>$117,148.96</td>
<td>$74,724.86</td>
<td>$728,407.36</td>
</tr>
<tr>
<td>Electric Incentives (C&amp;I)</td>
<td>$1,294,004.53</td>
<td>$331,174.04</td>
<td>$458,061.50</td>
</tr>
<tr>
<td>Annual Electric Incentive Gap</td>
<td>$1,411,153.49</td>
<td>$405,898.90</td>
<td>$1,186,468.86</td>
</tr>
<tr>
<td>Total Three-Year Incentive Gap</td>
<td>$3,003,521.24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3. The City is the Best Program Delivery Agent for Lowell

The City of Lowell is well positioned to take on energy efficiency program delivery and to respond to the challenges that our demographics present to traditional statewide programming. The City government has a deep understanding of our local strengths and weaknesses, and with that can provide programming that reaches our underserved and hard to reach people. In doing so, the City can also provide models of program delivery that can later be implemented statewide in other hard to reach communities. By moving to local delivery of service, the City provides the following advantages:

- Deep understanding of the local conditions
- Trusted status among many of the hard to reach demographic groups
- Ability to leverage other City initiatives and build on our existing sustainability platform

The City does not intend wholesale replacement of statewide programming. We understand the benefits to the wider market and the Commonwealth of having consistent programming across the market. What we will do instead is to provide new outreach platforms via trusted relationships with local groups that can then drive more participation in Mass Save® programs. Where we can bring to a local level the benefits of that programming in terms of workforce development and local economic multiplier effects, we will do so as well. This will take nothing away from the Commonwealth, but rather provides a new tool for program implementation that is designed to respond and innovate to local conditions.

2.4. The City is not new to Developing and Overseeing Energy Efficiency Initiatives

The City of Lowell has been leading the development and implementation of energy efficiency and renewable energy initiatives for a decade, with substantial success and demonstrated positive outcomes resulting from our leadership. For example, the City has achieved the following:

- Invested in a technical energy audit of 48 municipal buildings. (2008)
- Completed 28 ECM projects based on results of the audit as part of a $21 million ESCO project. At the time, this was the largest ESCO in the Commonwealth. Cumulatively, this project has resulted in savings of over 17 million kWh of electricity, 2.4 million therms of natural gas, and 62,347 metric tons CO2 equivalent since the baseline year. (2010)
- Been designated as one of the first Green Communities. Thus far, the City has reduced its energy use 16.3% since its baseline year. (2010)
- Using $5 million in seed money from the Better Buildings Neighborhood Program of the U.S. Department of Energy, the City implemented a program to reduce the Downtown Historic
District’s carbon footprint, create jobs, promote multi-stakeholder partnerships, and establish a sustainable and replicable model for energy efficiency projects in historic buildings. This resulted in energy savings of 22,869 MBTU from 31 projects. (2010-2013)

- Installed 9.4 MW of solar capacity. These installations have generated over 39.7 million kWh of renewable energy. (2012-2014)

- Received Massachusetts Division of Energy Resources (DOER) Municipal Leading by Example award. (2012)

- Adopted the Sustainable Lowell 2025 Master Plan. As part of this plan, the City included objectives to implement a municipal program to promote energy efficiency utilizing ratepayer funds. (2013)

- Began a municipal aggregation program. This was the first carbon neutral power supply procured in the Commonwealth. Since its inception, this program has saved residents over $1.7 million versus Basic Service. (2014)

- Committed to the Best Practice of Maximizing Energy Efficiency and Renewable Energy Opportunities as part of the Governor’s Community Compact. (2016)

- Participated in the National Grid Community Initiative that resulted in a measurable increase in participation in existing energy efficiency programs. (2016)

- Developed and adopted a resolution by the City Council to move toward 100% renewable energy. (2017)

- Began retrofitting over 6,000 streetlights, as well as decorative fixtures throughout the City. When completed this summer, this retrofit is anticipated to save over 2.3 million kWh. (2017)

- Became one of only six Gold level SolSmart designated communities in the Commonwealth. This designation recognizes measurable steps the City has taken to make it faster, cheaper, and easier to install solar energy. (2018)

2.5. The City has Proven Experience Engaging Ethnically Diverse and Low-Income People

The City of Lowell has deep and proven experience successfully reaching, engaging with, and serving our ethnically diverse and low-income community. We have effective working relationships with key non-profit organizations and for-profit corporations engaged in our community across a wide variety of issues. We work often in partnerships with local, county, and state entities. Examples of our partners in affordable housing are provided below.

- Alternative House
- Boot Mills East LP
- Caleb Foundation
- Coalition for a Better Acre
- Community Teamwork, Inc.
- D’ouville Senior Care Center
- House of Hope, Inc.
- Lowell Transitional Living
- Nason Property Management, LLC
- Pathfinder
- Redwood Terrace
- Residents First Development Corporation
The City also partners with multiple organizations to support their mission either financially or through support of City services. Examples include:

- Acre Family Child Care
- ACTION
- Boys & Girls Club
- Brazilian Festival
- Brush Art Gallery and Studios
- Cambodian Mutual Assistance Association
- Clemente Park Committee
- Coalition for a Better Acre
- Cultural Organization of Lowell
- DIY Lowell
- Girls, Inc. of Greater Lowell
- Greater Merrimack Valley Convention and Visitors Bureau
- Greek Festival
- Habitat for Humanity
- Hellenic Culture and Heritage Society
- Kiwanis Club of Lowell
- Lowell Celebrates Kerouac
- Lowell Festival Foundation (Lowell Folk Festival; the City is a partner organization)
- Lowell Heritage Partnership
- Lowell Historical Society
- Lowell National Historical Park
- Merrimack Repertory Theatre
- Mill City Grows
- Puerto Rican Festival
- Southeast Asian Water Festival
- University of Massachusetts Lowell
- Whistler House Museum of Art

Section 3: Barriers to Full and Equitable Participation in Lowell

A variety of barriers exist to the full and equitable participation by City residents, businesses, and industries in Mass Save® statewide offerings. These are discussed below, followed by approaches planned by the City for addressing barriers through its role as energy efficiency Program Administrator.

3.1. Barrier: Language

For an estimated 29% of Lowell residents, English is not their first language. Outreach materials and outreach case workers fluent in Spanish (13% native speakers), Mon-Khmer Cambodian (11%), and Portuguese (5%) are needed to address residents in their native language. And it is not just a matter of translation services. Rather, developing a local outreach workforce that includes native speakers in each of the languages would mean that trusted local staff could meet residents in their own place, using their own language. This also will become as a workforce development opportunity for local residents.
3.2. Barrier: Technical Expertise among Small Multifamily Building Owners

More than 30% of residential units in Lowell are in small multifamily buildings (2-9 units). Small multifamily buildings are often owned and operated by small-time “investors” who are not working on this as a full-time endeavor, and have very limited time and attention. Development of an augmented outreach and technical assistance service specifically for this class of building owners could result in more of them taking advantage of the programs offered at the statewide level. This service could also be a good feeder of information to Mass Save® on what the needs of these building owners are and how to build more effective programs not just for Lowell residents but for the wider number of small apartment buildings in the Commonwealth.

3.3. Barrier: Financing

There are insufficient resources in any program to serve low-income customers on both a wide (many units) and deep (large reductions in energy use) basis. Financing is necessary, and such financing needs to be tuned in to the needs of the local population. A financing program that is specifically oriented to the opportunities present among small business owners and small multifamily building owners, especially when combined with technical assistance, could provide the resources for efficient equipment replacements.

3.4. Barrier: Rental Costs

57% of renters in Lowell are over-burdened, paying more than 30% of income on housing costs. A customized program that combines direct installation of individual measures in these units combined with a behavioral-focused program that provides prompts to reduce energy use even further could help to reduce monthly costs. It could also become a model for other jurisdictions in the Commonwealth with large numbers of renters, especially in small multifamily buildings.

Section 4: The Proposed Approach

The suite of programs offered statewide in Massachusetts, including the programs serving low-income people and multifamily buildings is considered one of the best in the country. Rather than proposing wholesale replacement of the existing portfolio of programs, Lowell instead intends to ensure the existing programs are appropriately tailored to our unique, underserved, and hard to reach population. In addition, we seek to integrate new community energy campaigns and workforce development approaches that create new avenues for Lowell residents, property owners, and businesses to avail themselves fully of Mass Save® offerings. These activities will be further supplemented by enhanced residential offerings and a strategic energy management program that helps Lowell’s major institutions and industries lead by example and achieve important energy bill reductions.

4.1. Community Energy Campaign

With so many Lowell residents and businesses falling into the hard to reach category, the City has been underserved, and a concentrated community energy campaign will be mobilized to ramp up usage of statewide efficiency offerings.
Engagement strategies to date in the statewide programs have left many Lowell residents out. With outreach strategies specifically designed for the Lowell population and using proven community engagement strategies that have been tried and tested for efficiency programs, the campaign will reach and engage much larger percentages of previously unserved residents. For many programs, residents will be directed to appropriate Mass Save® programs and services administered by the City of Lowell and likely delivered by some (or possibly all) of the implementation contractors that are currently part of Mass Save® programming.

Outreach strategies will be designed and implemented by community members. Part of this will be tied in with the workforce development program (see below). The first step will be to engage stakeholder groups as true partners in developing the work plan. Community leaders and representatives of each underserved group (whether based on income, language, culture, ethnicity, housing type) will be engaged to understand their unique barriers, tailor messages to the community, and identify key communication channels and events to reach different groups in the City.

Outreach will be conducted in more languages than have been used by Mass Save® programs to date. When collateral materials are developed in other languages, they will be routinely shared with the other PAs in the Commonwealth to ensure that Lowell’s investment has the widest statewide payoff possible. Community members who are native speakers of Spanish, Portuguese, and Khmer will be hired and trained in efficiency techniques and programs, and will reach out to their communities by:

- Leading community-based marketing and outreach efforts
- Staffing a Lowell based resource center to provide referrals to Mass Save® programs
- Conducting or partnering with current vendors to deliver on-site energy assessments for market-rate and low-income single-family, multifamily, and small business programs

As Program Administrator, Lowell will also partner with and provide additional resources (grants, technical expertise, etc.) to community-based organizations and nonprofits that serve Lowell at the community level. Other efficiency programs around the country have shown this as an effective strategy to garner participation by hard to reach residents.

4.2. Residential Retrofit Single-Family and Multifamily Program Enhancements

With the differences in Lowell’s demographics and housing characteristics, comes the need to improve service in both single and multifamily retrofit programs. The comparatively high percentage of small multifamily properties in the City makes it an ideal place to try new strategies to reach buildings owners and identify the benefits that can drive them to upgrade their buildings. Enhanced incentives, especially when the ownership or tenancy of these buildings are low- or moderate-income, can help to bring more projects to completion. Tie-ins with the workforce development program (see below) can create opportunities for weatherization providers to hire and train members of the community who have the same backgrounds as the owners of these buildings. The City’s strong background working with small and large rental property owners, and its housing programs, can help to identify opportunities and provide enhancements to programming.

Lowell would directly oversee implementation vendor(s) delivering single-family Home Energy Services and provide a single project point of contact to contractors delivering multifamily retrofits. This will ensure that Lowell has more direct influence on services and outcomes. It will also enable coordinating
with local partners for outreach campaigns (for example, training local residents to conduct home energy assessments that are sensitive to the language and culture of the occupants). The gains that Lowell makes in enhancing the workforce in such culturally competent ways will be shared on a larger regional basis, when possible, enhancing efforts and results at the statewide level as well in efforts to increase service to hard to reach households.

Enhanced incentives and financing options for hard to reach groups, such as renters, moderate-income homeowners, oil/propane customers (approximately 10% of households), and owners of 2-4 unit buildings (approximately 27% of household units), will also be explored.

4.3. Residential Behavior Program

In the 2016-2018 period, each Massachusetts Program Administrator has administered its own Residential Behavioral/Feedback initiative. Most PAs have separately engaged with implementation vendors to deliver Home Energy Reports to customers in both paper and email forms. Home Energy Reports are a longstanding and proven approach to deliver residential behavior savings. Lowell will explore opportunities to continue this offering in collaboration with other PAs, potentially as part of a streamlined process to engage a joint statewide implementation vendor.

In addition to Home Energy Reports, there is a significant, untapped opportunity to generate behavior savings from new program models and markets. Lowell will implement behavioral initiatives tailored to its unique population and needs. Such designs could include:

- **Behavior savings for renters.** Low-income renters often face high energy costs but are challenging to serve through typical efficiency programs that rely on installing measures. Lowell will explore a collaboration with affordable housing partners to offer an innovative behavior program to low-income renters living in multifamily buildings. Using a randomized encouragement design to quantify savings, this program incorporates a carefully layered approach that combines commitments and feedback to influence renters’ energy use. Initial results from a Vermont pilot are promising, with residents who committed to save energy in the pilot program saving 8% compared to the non-committed group.

- **Next-generation home energy monitoring systems (HEMS).** An emerging class of HEMS combine high-resolution energy measurements with machine learning and edge computing, opening up new opportunities for end-use disaggregation, providing more relevant real-time feedback to homeowners and renters. These next-generation HEMS offer a suite of capabilities (very high sampling rates, real-time low-latency feedback, and consumer-focused applications and engagement strategies) that can be harnessed for precise, cost-effective energy efficiency and demand response. Lowell will test the potential for this emerging class of products to drive deep and persistent behavior savings, potentially more than 5% whole-house electric savings, through higher quality information and feedback that is more relevant, specific, and actionable than previous products and programs.

4.4. Strategic Energy Management for Large Public Institutions

Lowell anticipates offering a “lead by example” Strategic Energy Management (SEM) initiative designed to comprehensively engage its large public institutions in energy efficiency. Starting with two of the city’s largest and highest profile public institutions, the City of Lowell municipal government and the
University of Massachusetts at Lowell (UMass Lowell), SEM will serve as a holistic framework to improve energy management and planning at all levels – facilities, capital investments, operations and control systems, and staff and student engagement.

The pillars of an effective SEM program are commitment, planning, and engagement. First, the SEM program will seek to work with key leaders and managers at these institutions to strengthen their energy policies, building on the strong commitments that both the City and the University have made to sustainability. Next, the program will work with the City and University to conduct an energy management assessment to review current energy management practices and identify opportunities for improvement. This will inform development of a long-term roadmap to improve energy management practices and plan for capital investments. Finally, the plan will engage staff and students in implementing energy management systems and plans. For example, facilities staff can participate in opportunity assessments or “treasure hunts” to find untapped opportunities for energy savings. The SEM program will engage students in energy-savings initiatives in the Lowell Public Schools and the University, and in the broader community.

The SEM program will also help participating public institutions put in place the infrastructure to support energy management over the long term. Key elements of this infrastructure include:

- Energy management information systems (EMIS) that provide actionable insight into energy usage across the entire portfolio of buildings
- Revolving loan funds to support ongoing investments in energy efficiency
- Energy management staff to serve as internal champions and sustain the commitment to energy savings

The SEM program would be designed to layer onto the standard incentives available to large institutions under Mass Save®, with a focus on supporting EMIS installation, enhanced technical assistance, and potentially enhanced incentives for energy savings from operational and behavioral changes.

4.5. Workforce Development

Lowell will have its own workforce development program that will tie together the resources and amplify the effects of different aspects of the City’s programming. The City will hire and train residents with interests in efficiency programming and with multiple languages and deep community roots. The residents will serve as the “ground force” for community outreach and engagement efforts.

Workforce development efforts will focus on partnering with existing Mass Save® vendors and will showcase the benefits of having a multilingual efficiency workforce. This will benefit not just Lowell and its residents, but also businesses and residents throughout the Commonwealth who are trying to reach more deeply into non-English language and immigrant communities. Such resources and any training materials developed will be shared with National Grid and other PAs to foster more effective outreach and engagement in other communities throughout the Commonwealth.

4.6. Demonstrations

To support development and refinement of energy efficiency offerings that best support residents and businesses, Lowell plans to allocate energy efficiency funding for demonstration projects starting in 2020, after deploying core programs in 2019. Such demonstrations could be used to test emerging
technologies for inclusion in standard program offerings, as well as innovative program models that may more effectively engage Lowell’s underserved populations, such as renters and moderate-income households.

4.7. Other Programs

Lowell’s energy efficiency plan focuses on leveraging community resources and relationships to improve service to the City’s hard to reach populations, which have historically been underserved by Mass Save®. To meet this goal, Lowell identified certain programs, such as Home Energy Services and Behavior Initiatives, where there are opportunities to enhance program offerings in ways that can more effectively serve local residents.

To maximize resources for these targeted programs, Lowell understands that it will need to look for opportunities to streamline delivery of other programs, particularly mass-market programs that do not need Lowell-specific enhancements. Lowell will seek to leverage the strong statewide service delivery infrastructure for these mass-market programs, such as Residential Products (e.g., HVAC rebates, consumer products sold at retail, etc.) and Commercial Upstream Lighting. For these programs, there is a strong benefit to engaging retailers and wholesale distributors in a coordinated and consistent manner across the Commonwealth. The City will explore options to partner with National Grid to administer these programs, and to participate in joint solicitations for statewide implementation vendors.

Section 5: Budgeted Costs and Savings

For purposes of developing initial estimates of budget and savings, the City primarily worked with publicly available data, much of which is based on metrics that pertain to budgets for costs and savings for the 2016-2018 period. The City understands that budgets for other PAs are being developed for the 2019-2021 period based on potential studies that define cost-effective savings for the individual PA jurisdictions. The City expects that, as the planning process unfolds in advance of submission of final plans, that the numbers below will be adjusted to reflect expected or projected 2019-2021 figures once those are made publicly available.

5.1. Estimated Electrical Efficiency Resources

The City of Lowell requested from National Grid data electric use by customer class for 2017 for all of Lowell, in order to estimate the resources that are generated and would be available for electrical energy efficiency at the City level. The table below uses the data provided by National Grid and estimates resources available, using current system benefit charge and energy efficiency reconciliation factor rates for each customer class. The assumption of additional revenue from Forward Capacity Market and Regional Greenhouse Gas Initiative funds is derived from the Cape Light Compact Plan for 2016-2018, wherein the revenues from those sources comprised 10% of the total budget.

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5 Data on statewide budgets and savings goals are from January 28, 2016, Order for D.P.U. 15-160 through 15-169, Appendix Tables 1 and 5.
Table 5. 2017 electricity usage for Lowell, by customer class, with current EEC rate, and projected budget.

<table>
<thead>
<tr>
<th></th>
<th>kwh</th>
<th>EEC Rate</th>
<th>EEC total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;I (incl. streetlighting)</td>
<td>426,580,610</td>
<td>$0.00957</td>
<td>$4,082,376</td>
</tr>
<tr>
<td>Residential</td>
<td>174,916,718</td>
<td>$0.02083</td>
<td>$3,643,515</td>
</tr>
<tr>
<td>Residential Low Income</td>
<td>50,426,986</td>
<td>$0.00465</td>
<td>$234,485</td>
</tr>
<tr>
<td><strong>Total Electric-Based Resources</strong></td>
<td><strong>651,924,314</strong></td>
<td></td>
<td><strong>$7,960,377</strong></td>
</tr>
<tr>
<td>Additional FCM &amp; RGGI</td>
<td></td>
<td></td>
<td>$884,486</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$8,844,864</strong></td>
</tr>
</tbody>
</table>

For budgeting purposes below, the City has rounded this figure to $8.8 million.

5.2. Existing Efficiency Cost Structure

The 2016-2018 statewide budget for electric efficiency had the following break-out by sector.


<table>
<thead>
<tr>
<th></th>
<th>2016-2018</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$846,597,257</td>
<td>43%</td>
</tr>
<tr>
<td>Low-income</td>
<td>$208,399,217</td>
<td>11%</td>
</tr>
<tr>
<td>Commercial and Industrial</td>
<td>$905,806,668</td>
<td>46%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,960,803,142</td>
<td></td>
</tr>
</tbody>
</table>

The allocation of those resources across efficiency cost categories is characterized below. This allocation is based on Massachusetts statewide data for 2014-2016 from the Regional Energy Efficiency Database (REED), developed and maintained by the Northeast Energy Efficiency Partnership (NEEP), as more recent data were not publicly available.

Table 7. Statewide allocation by cost category, 2014-2016.

Customer Rebates and Incentives | 77.0%
Performance Incentives         | 5.5%
Research and Evaluation        | 2.3%
Marketing                      | 2.5%
Administration                 | 4.1%
Other                          | 8.6%

In addition to looking at the existing Massachusetts efficiency cost structure, the City examined comparable cost structures from other jurisdictions, using NEEP REED data, looking at ranges and averages of jurisdictions that may have some of the same characteristics as Lowell. Based on this, the
expectation is that the City would use a cost structure that allocates somewhat less to direct incentives and more to other market related activities such as account management, customer engagement, and engineering. The City would forego any performance incentive, of course, putting all resources toward programming.

5.3. Projected Lowell Cost Structure

It is expected that the City's cost structure would look something like the following:


<table>
<thead>
<tr>
<th>Customer Rebates and Incentives</th>
<th>70.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Incentives</td>
<td>0.0%</td>
</tr>
<tr>
<td>Research and Evaluation</td>
<td>2.0%</td>
</tr>
<tr>
<td>Marketing</td>
<td>5.0%</td>
</tr>
<tr>
<td>Administration</td>
<td>10.0%</td>
</tr>
<tr>
<td>Other</td>
<td>13.0%</td>
</tr>
</tbody>
</table>

Performance Incentives have been set at zero, as the City would want all resources devoted to programming with no expectation of performance incentives that might be used for other purposes. Marketing is expected to be significantly higher than the historic data from the statewide efforts would indicate as concentrated consumer outreach that is specifically targeted to hard to reach customers will take additional resources. "Other" includes higher levels of technical assistance and training, including local workforce development, to reach deeper into business and residential savings potential.

Based on the demographics and higher costs of reaching hard to reach customers, Lowell would expect to have an allocation among sectors that looked something like the following:

Table 9. Proposed Lowell budget allocation, by customer class.

<table>
<thead>
<tr>
<th>% Allocation</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;I</td>
<td>45%</td>
</tr>
<tr>
<td>Residential</td>
<td>30%</td>
</tr>
<tr>
<td>Residential Low Income</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

The overall allocation for C&I has been kept at approximately the same rate as the statewide budget. Much of the underlying program delivery, especially for C&I customers, will be the Mass Save® slate of programs. The City expects that the allocation among sectors will be similar to the statewide budget. On the residential side, it is expect there will be significantly more resources devoted to low-income customers, and more program participation by low-income customers. Therefore a higher percent allocation is assumed for this customer group.

5.4. Savings and Benefit Estimates

Table 10 shows the 2016-2018 statewide budgeted costs and estimated savings for the overall energy efficiency plan. Note that the calculated cost per kilowatt hour may look high because it is the fully
loaded cost, rather than just the participant incentive per kilowatt hour. This cost per kilowatt hour was used to estimate potential savings for Lowell, given anticipated budget and sector allocations.

Table 10. Statewide budgeted costs and savings, by sector, 2016-2018.

<table>
<thead>
<tr>
<th>Sector</th>
<th>2016-2018 Budget</th>
<th>2016-2018 kwh Savings</th>
<th>Cost per kwh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$846,597,257</td>
<td>1,740,654,000</td>
<td>$0.486</td>
</tr>
<tr>
<td>Low-income</td>
<td>$208,399,217</td>
<td>117,972,000</td>
<td>$1.767</td>
</tr>
<tr>
<td>Commercial and Industrial</td>
<td>$905,806,668</td>
<td>2,263,518,000</td>
<td>$0.400</td>
</tr>
</tbody>
</table>

Using the proposed rate class allocations shown in Table 9 and statewide budgeted costs in Table 10, Table 11 shows Lowell’s proposed annual kWh savings.


<table>
<thead>
<tr>
<th>Sector</th>
<th>Cost per kwh</th>
<th>Annual kWh Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$0.486</td>
<td>5,427,996</td>
</tr>
<tr>
<td>Low-Income</td>
<td>$1.767</td>
<td>1,245,390</td>
</tr>
<tr>
<td>Commercial and Industrial</td>
<td>$0.400</td>
<td>9,895,634</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>16,569,021</td>
</tr>
</tbody>
</table>

In the first three-year period, much of Lowell’s efficiency portfolio will tie directly to statewide programming. There is no desire on the part of the City to denigrate or diminish in any way the benefits and efficiencies of statewide programming. As stated elsewhere, rather the intent is to be a strong partner of the statewide approach in the Commonwealth and to drive more traffic to Mass Save® offerings through enhanced community engagement, marketing, and outreach efforts. With this in mind, in the first projections for 2019-2021 energy efficiency program investments and savings in the City of Lowell, the statewide cost per megawatt hour figure was used. Some efforts may have the tendency to drive this figure higher; others to reduce it. For initial planning, the statewide numbers suffice.

Section 6: Roles

The City plans on hiring a full-time Energy Efficiency Administrator to direct and oversee the City’s role as Program Administrator. The Energy Efficiency Administrator would oversee all program design and delivery activities, and would represent the City in its role as Program Administrator for all EEAC meetings and any hearings related to Mass Save® at the DPU or DOER.

Section 7: Conclusion

Lowell seeks to work collaboratively with the Massachusetts Division of Energy Resources, the Energy Efficiency Advisory Council, National Grid, and other stakeholders to design and implement an energy efficiency portfolio that models enhanced services to underserved and hard to reach populations. The
City will build on the strong foundation of Mass Save® efficiency programs and align with statewide programs wherever possible, particularly for mass-market and upstream/midstream programs.

Lowell is open to a range of administrative and contractual structures that achieve the City’s goal of enhanced services and outreach to underserved community members. We look forward to engaging collaboratively with DOER, EEAC, National Grid, and other key stakeholders during the coming months, as the City finalizes the energy efficiency plan for 2019-2021.

Section 8: City of Lowell Point of Contact

Phil Ferreira, Director of Housing and Energy Programs, of the City of Lowell Department of Planning and Development will serve as the Point of Contact for the City of Lowell for any inquiries concerning Lowell’s plan to become the Program Administrator for the delivery of Mass Save® to the City of Lowell during the 2019-2021 program period. Phil can be reached at 978-674-1410 or pferreira@lowellma.gov.
Attachment 1:

City of Lowell

Energy Efficiency Program Administrator Resolution
COMMONWEALTH OF MASSACHUSETTS
CITY OF LOWELL

In City Council

RESOLUTION

Authorizing the City Manager to initiate the process to amend its municipal aggregation plan, previously established pursuant to M.G.L. c. 164, § 134, so as to become responsible for the design and implementation of energy efficiency programs.

The Commonwealth of Massachusetts has engaged in a process to establish a competitive market place through the restructuring of the electricity market and is implementing comprehensive energy efficiency plans; and

Citizens of Lowell have a substantial economic and social interest in terms of greater customer choice and greater opportunities for electric customers to benefit from the Commonwealth’s energy efficiency programs; and

The City of Lowell hereby finds that it may be in the interest of its citizens who are electric ratepayers, both residential and commercial/industrial, to develop and secure such approvals and enter into appropriate agreements with consultants, experts and attorneys in connection with the design and implementation of energy efficiency programs pursuant to the City’s electricity aggregation plan, and further to adopt the following resolution:

BE IT THEREFORE RESOLVED that the City of Lowell hereby:

Publicly declares its intent to take such actions as may be necessary to modify its electric aggregation plan to implement energy efficiency programs on behalf of its residential and business electric customers and to reestablish such plan if its operation is suspended or such actions are deemed necessary and appropriate.

This resolution is adopted by vote of the City Council on the 24th day of April, 2018.

Submitted by:

CITY COUNCIL – CITY OF LOWELL
/s/ William Samaras
Mayor William Samaras

/s/ Edward J. Kennedy
Edward J. Kennedy

/s/ Karen Cirillo
Karen Cirillo

/s/ John J. Leahy
John J. Leahy

/s/ David Conway
David Conway

Rita M. Mercier

/s/ Rodney M. Elliott
Rodney M. Elliott

/s/ James L. Milinazzo
James L. Milinazzo

/s/ Vesna Nuon
Vesna Nuon

In City Council April 24, 2018, Read twice and adopted on roll call vote 8 yeas, 1 absent (C. Mercier). So Voted./s/Michael Q. Geary, City Clerk

Approved by City Manager Eileen Donoghue April 25, 2018.

A true copy
ATTEST:

/s/Michael Q. Geary
City Clerk

Resolution 2018/energyaggregator