Green Communities Designation and Grant Program

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Executive Summary

As part of the Massachusetts Department of Energy Resources' (DOER) mission to accelerate the adoption of energy efficiency and clean energy technologies in the Commonwealth, the Green Communities Designation and Grant Program (the Program) provides qualifying municipalities with financial and technical assistance.

DOER engaged the consulting firm ICF International (ICF) to provide support to the Program's annual report review process and evaluate the Program's progress. This report provides an update to the 2013 Progress Report, touching on key metrics from the annual reports submitted by Green Communities. ICF conducted a review of each of the ninety-nine 2014 annual reports submitted to DOER by participating Green Communities and updated the metrics for each designation criterion that could be used to benchmark the Program's success. This report also provides a brief look into the experiences of seven communities that have reached the goal of reducing their municipal energy use by 20 percent after five years, focusing on activities and strategies that enabled them to accomplish their goals.

Program Background

Following the passage of the Green Communities Act in 2008, DOER launched the Green Communities Designation and Grant Program in 2009. To achieve designation as a Green Community, municipalities must meet five criteria, as outlined in the statute:

1. Provide as-of-right siting in designated locations for renewable/alternative energy generation, or research and development, or manufacturing facilities
2. Adopt an expedited application and permit process for as-of-right renewable/alternative energy facilities
3. Establish an energy use baseline and develop a plan to reduce municipal energy use by 20 percent after five years
4. Purchase only fuel-efficient vehicles
5. Set requirements to minimize life-cycle energy costs for new construction. (The recommended way to meet these requirements is to adopt the Board of Building Regulations and Standards (BBRS) Stretch Code.)

Green Communities are eligible for funding to support clean energy projects. Funding is provided from proceeds of carbon allowance auctions under the Regional Greenhouse Gas Initiative (RGGI) and Alternative Compliance Payments (ACP) made by electricity suppliers that do not meet their statutory Renewable Portfolio Standard obligation to purchase a sufficient percentage of renewable energy.

Upon designation, a community is awarded a base grant of $125,000, plus an adder based on population and per capita income and a bonus of $10,000 if it met Criterion 1 through zoning for renewable/alternative energy generation (as opposed to renewable/alternative energy manufacturing or research and development (R&D), which are also options). Designation grants are capped at $1,000,000.

Once all previous funding has been spent and all required reporting is complete, a designated Green Communities may apply for competitive grants. The total amount of competitive awards depends on available funds and the number of applications. The annual competitive grant program was first offered in March 2012 and has thus far offered annual grants of up to $250,000 per successful applicant. Communities typically combine Program designation and competitive grants with Mass Save® incentives and other funding to complete their energy projects.

Medford is a designated Green Community

The Commonwealth's first 35 Green Communities received designation in 2010. There have been eight designation rounds since the Program originated, and there are currently 136 participating municipalities. More than 50 percent of Massachusetts' population now lives in a Green Community. As of July 1, 2015, Green Communities grants totaling close to $40 million were at work in 136 communities ($25.7 million in eight rounds of designation grants, and $13.7 million in three rounds of competitive grants).

Communities that have been designated for a full year must submit annual reports to the Division to demonstrate that they continue to adhere to the requirements of all five criteria.

Criterion-Specific Background

Criterion 1 requires that the community provides as-of-right siting in designated locations for renewable/alternative energy generation, R&D, or manufacturing facilities. Allowable renewable and alternative energy generation includes on-shore wind, offshore wind, solar photovoltaic, or biomass combined heat and power (CHP). During the designation process, communities are required to submit a description of the bylaw or ordinance that identifies designated locations, zoning information, any applicable local regulations, and other related documentation. For annual reporting, Green Communities must notify DOER if any changes have been made to the zoning districts identified during designation.

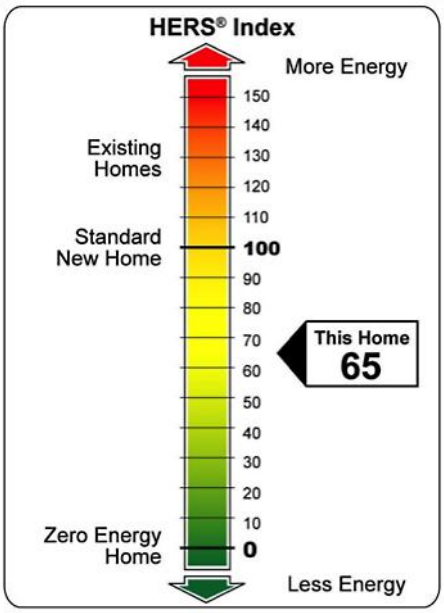
Criterion 2 requires that the community adopt an expedited application and permit process of one year for clean energy facilities located in the areas designated as-of-right under Criterion 1. For annual reporting, Green Communities must notify DOER if any projects have applied for approval under the zoning that qualified them for designation.

Criterion 3 requires that the community establish an energy use baseline and adopt an energy reduction plan (ERP) to decrease energy use by 20 percent from that baseline after five years of implementing the ERP. During the designation process, communities establish a baseline year and determine their baseline energy usage. Most communities use a fiscal year schedule (July 1 through June 30), but some choose to use the calendar year (January 1 through December 31). DOER allows communities to opt for a baseline that is up to two years prior to their designation in order to account for energy efficiency work they completed before applying for designation. For communities that choose to set the baseline a year or two prior to designation, their first year in the Program may actually be the second or third year of working on their ERP. Similarly, DOER allows communities that have installed energy conservation measures (ECM) in their fifth year to achieve the full energy savings from these measures by waiting a year to

assess their progress toward the 20 percent energy reduction commitment. Effectively, this means that some communities will achieve their 20 percent reduction after year six and still be considered to have met their designation target.

The baseline energy use inventory must include all municipal divisions and departments, including all municipal buildings, school buildings, municipal and school vehicles, street and traffic lighting, drinking water and wastewater plants, pumping stations, and open spaces owned by the city or town. For annual reporting, communities are required to report on their energy use during the past year, any ECMs that were implemented, and if they used any energy produced by renewable sources. To track their energy use, communities are encouraged to use MassEnergyInsight (MEI), a municipal energy inventory tool sponsored by the Green Communities Division and offered to municipalities and other public entities free of charge.

Criterion 4 requires that the community adopt a policy to purchase only fuel efficient vehicles (FEV) for municipal use whenever they are available and practicable. Heavy duty vehicles with a gross vehicle weight rating (GVWR) of more than 8,500 pounds, as well as police cruisers and passenger and cargo vans, are exempt from the FEV policy. For annual reporting, communities are required to submit an updated vehicle inventory of both exempt and non-exempt vehicles, noting any changes from the previous year.



Criterion 5 requires the community to set requirements to minimize life-cycle energy costs for new construction. The recommended way to meet this requirement is by adopting the Board of Building Regulations and Standards (BBRS) Stretch Code. A Home Energy Rating System (HERS) assigns a numerical rating to a newly-constructed residential building based on its energy efficiency features. To comply with the Stretch Code, homes greater than 3,000 square feet must have a HERS score of 65 or less and homes less than 3,000 square feet must have a HERS score of 70 or less. Commercial buildings larger than 100,000 square feet must be designed to use 20 percent less energy relative to ASHRAE 90.1-2007[1], as demonstrated through modeling, while those between 5,000 and 100,000 square feet must either adhere to the same approach or include a set of prescriptive requirements for particular efficiency measures. For annual reporting, communities are required to submit a list of all residential and commercial projects affected by the Stretch Code, noting completion and Certificate of Occupancy dates for all projects, as well as the final HERS rating for new homes.

Key Findings from 2014 Annual Reports

This progress report documents Program-level, as well as criterion-specific, findings from the 2014 Annual Reports of 99 Green Communities.

Criteria 1 and 2: Based on data current as of the 2014 Annual Reports, only 11 municipalities have projects sited and permitted within their designated zones. A spillover impact of the Criteria 1 and 2

[1] ASHRAE 90.1 is a US standard that provides minimum requirements for energy efficient designs for buildings except for low-rise residential buildings. ASHRAE 90.1-2007 is the version that was updated in 2007 and covers many sections of a building, which include building envelope, HVAC, hot water, and lighting. It has since been updated in 2010 and 2013 to reflect newer and more efficient technologies.

emphasis on renewable power, however, has been that designated Green Communities have developed new renewable energy projects within their municipalities *at large (*i.e., not necessarily within the designated zones, but within their borders). Fifty-seven Green Communities have completed or are planning 180 renewable energy projects. Solar is the most prevalent, but wind and thermal projects are also cited.

Criterion 3: Based on data current as of the 2014 Annual Reports, Green Communities have seen energy savings of approximately 2.2 million MMBtu, equivalent to 17,117 Massachusetts homes powered and heated over 7 years, with the highest savings seen in ECMs implemented in buildings. As of the writing of this report, seven communities have achieved the 20 percent reduction committed to in their ERP after at least five years of ERP implementation. (See *Community Spotlights* on these seven municipalities below.)

Criterion 4: Based on data current as of the 2014 Annual Reports, 44 Green Communities acquired 222 fuel-efficient vehicles in 2014. These were made up of new purchases, replacement vehicles, and acquisitions by drug seizure. This figured represents growth from the previous year, when 36 Green Communities acquired 104 fuel-efficient vehicles with an average fuel economy of 24 mpg.

Criterion 5: In 2014, Green Communities reported 188 more projects with HERS ratings below 55 compared to what was reported in 2013. Based on data current as of the 2014 Annual Reports, 4,803 new residential projects conforming to the Stretch Code have received Certificates of Occupancy in Green Communities through 2014.

CRITERION-SPECIFIC REPORT CARD

This section provides a discussion of each criterion associated with the Green Communities Program. It presents metrics derived from the 99 Annual Reports submitted in 2014 that can be used to benchmark the criterion-specific progress of participating Green Communities.

Criteria 1 & 2: Development Potential

Criteria 1 and 2 require communities to establish as-of-right siting in designated locations for renewable/alternative energy generation, research and development, or manufacturing facilities, and to adopt an expedited application and permit process for energy facilities in these locations. Results from the 2014 Annual Report review indicate that 11 municipalities have projects sited and permitted within their designated zones.

Table 1. Communities with Projects Sited in their Criterion 1 Designated Zone

Community	Date	Description
Ashland	2012	Solar
Harvard	2012	Solar
Kingston	2012	Wind
Leverett	2014	Solar
Monson	2013	Solar
New Salem	2011	Solar
Provincetown	2013	Solar
Salem	2012	R&D
Scituate	2012	Solar
Somerville	2013	R&D
West Tisbury	2013	Solar

In addition to the 11 projects sited within Criterion 1 designated-zones, Criteria 1 and 2 requirements have also created a spillover effect that has catalyzed the development of new renewable energy projects elsewhere within these cities and towns. According to the 2014 Annual Reports, an additional 17 communities have sited renewable energy projects outside their Criterion 1 designated areas. Fifty-seven of the Green Communities have completed, or are planning 180 renewable energy projects on municipal property. Solar is the most prevalent technology among these municipal projects, but wind and thermal projects are also included.

Criterion 3: Energy Baseline and Savings

Criterion 3 requires that each community establish an energy use baseline and adopt an ERP to decrease energy use by 20 percent from that baseline after five years of implementing the ERP. Participating communities use energy in a variety of ways, but buildings comprise the largest portion of their use.

Annual Reports submitted to DOER in 2014 show that communities have invested more than $290 million in energy efficiency projects over the course of the Program so far (Table 2), including through energy savings performance contracts. This represents a $135 million increase in the total investment in energy efficiency since the 2013 Annual Reports. Mass Save incentives and Green Community grants make up approximately $56 million of the installed costs, an increase of approximately $15 million since the 2013 Annual Report. Green Communities reported completing efficiency projects with no Green Community grant funding, representing a significant leveraging of the program funding. Participating communities are projected to save more than $25 million annually from completion of projects cited in these Annual Reports, a $10 million increase since 2013. These savings will last over multiple years, grow as additional efficiency projects are completed, and be supplemented with additional cost savings from avoided maintenance.

Table 2. Total Cost and Savings from Energy Efficiency Projects Reported by 99 Green Communities in 2013 Annual Reports for FY2008-FY2014

Green Communities Grant?	Sum of Projected Annual Cost Savings	Sum of Total Installed Cost	Sum of Green Community Grant	Sum of Mass Save Incentives
Yes	$19,783,045	$172,601,531	$23,121,831	$27,549,158
No	$5,853,195	$121,746,163	–	$5,472,047
Total	$25,636,239	$294,347,693	$23,121,831	$33,021,205

The resulting energy use reductions from these energy efficiency projects varies by community, depending upon a number of factors, including a community's energy use profile and its efficiency accomplishments prior to its baseline year. When looking at the progress of municipalities, results vary.

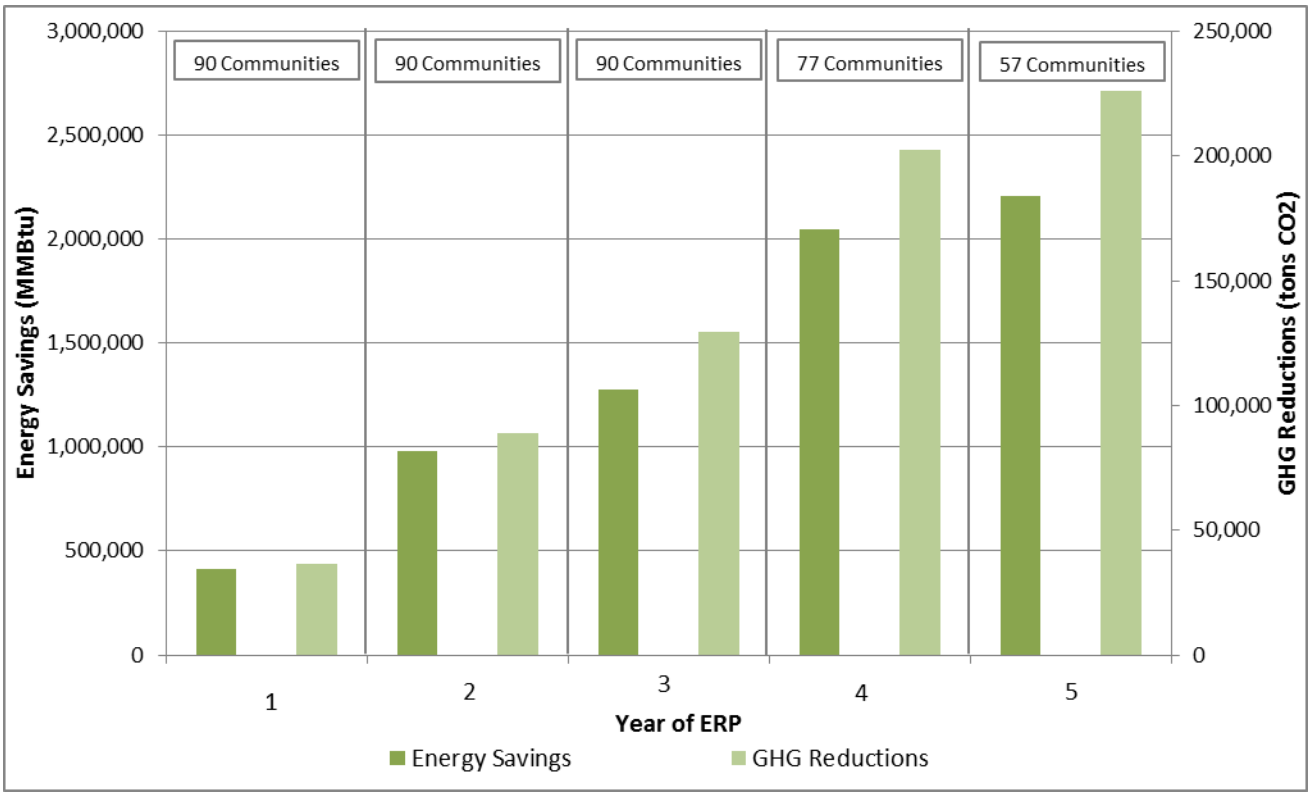
The range of energy reductions achieved by individual communities is substantial, regardless of their baseline years. In the 2014 annual reports, communities reported a change in energy use from a 37 percent decrease to a 22 percent increase. Those that have completed year three of their ERP report energy usage ranging from an increase of 28 percent to reductions of 43 percent across all years. These ranges reflect various circumstances in each of the communities, including their energy use profiles and staff capacity, as well as the realities of weather impacts on energy usage. For example, the significantly colder winter in 2013-2014 required additional energy usage, as seen by relatively smaller average reductions (compare Baseline vs. All Years to Baseline vs. 2014). In addition, efficiency projects are often accompanied by efforts to address deferred maintenance, which can cause an increase in energy use. For example, efforts to improve a building ventilation system's efficiency will sometimes uncover ventilation that does not operate properly. Although these corrections may increase the energy usage of the building, they can also greatly improve the safety, comfort and productivity of its occupants. Refer to **Appendix A** for a full list of energy reductions for ERP years one through five.

The cumulative energy savings and the resulting reductions in greenhouse gas emissions (GHG) attributable to participating communities can be seen in Figure 1. The energy savings from each

community is included in the total energy savings for each year the community participated. For example, a Green Community with a 2009 baseline would have reported energy usage for 2010, 2011, 2012, and 2013, and its energy savings for each year would be included in the total savings for year's one through four. Thus, the cumulative energy savings illustrated represent both the amount of energy savings per Green Community and the number of Green Communities included.

Based on data included in the 2014 Annual Reports, the 90 Green Communities with Criteria 3 data in their Annual Reports[2] saw a total energy savings of approximately 2.2 million MMBtu through 2014. This is equivalent to the energy needed to heat and power 17,117 Massachusetts homes for a year. Interestingly, there is a significant increase in the cumulative amount of energy savings between years 3 and 4 despite a decrease in the number of Green Communities having completed their fourth year versus their third year. Thus, the efforts in the first three years to invest in energy efficiency appear to achieve significant energy savings during the fourth year and beyond.

Figure 1. Cumulative Energy Savings and GHG Reductions by Year of ERP[3]



To begin to explain how Green Communities are reducing their energy usage, we can compare the energy reductions by categories (Actual Energy Reductions in Figure 2) with the projected (planned) energy savings from ECMs implemented for those categories (Projected Total ECM Energy Savings in Figure 2). In both graphs, it is immediately apparent that Green Communities have focused first on reducing their building energy use and secondly on reducing the energy use by streetlights. For example,

[2] Nine Green Communities submitting 2014 Annual Reports did not include Criterion 3 data.

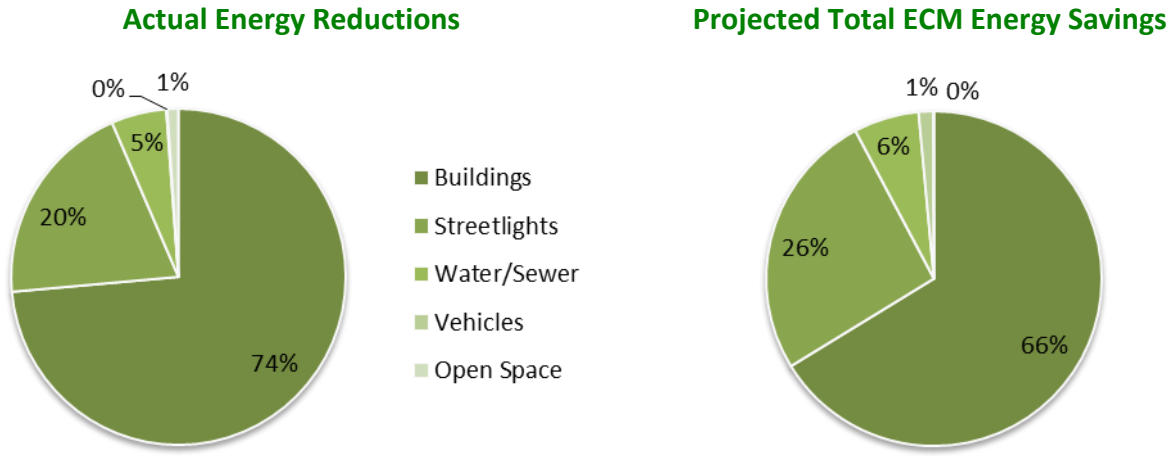
[3] Number of communities listed above the bars reflects the number of communities that are in that year of ERP. GHG reductions are estimates that may not fully represent all the energy savings due to lack of conversion factors for certain fuel types and/or changes in conversion factors over the years.
The years shown in this figure represent the year of the ERP. Year 1 could represent 2007 to 2012 depending on the selected baseline year, Year 2 could represent 2008 to 2012, and so on.

Green Communities planned to decrease their overall energy use by 66 percent based upon all of the ECMs completed in buildings. Of the energy reductions actually accomplished, 74 percent were in the building category.

It is likely that there is more than one reason to explain why building retrofits performed better than expected. First, the energy reductions are relative. A 26 percent reduction in energy use by streetlights (representing both street and traffic lights) was planned but not realized in percentage terms. Since the categories are relative, this means that the buildings contributed a larger than expected percentage of the total energy savings. As to why the street lighting projects have not yet delivered their projected savings, it may be that the projects were completed relatively late in the reporting period and did not have a complete year to demonstrate the realized energy savings.

Second, the ECM projected energy savings represent the estimates of the energy savings that will be realized upon project completion but are dependent on other factors such as weather and operating hours, etc. Thus, a reduction in operating hours compared to a baseline would show higher than projected energy savings following an ECM. Finally, this analysis is dependent upon the data provided by the Green Communities and may not represent a complete accounting of all the activities that Green Communities undertake to reduce their energy use.

Figure 2. Comparing Projected to Realized Energy Savings by Category of Usage



The specific ECMs that were implemented in 2014 at 99 Green Communities are detailed in Table 3. The most prevalent types of ECMs were interior lighting, building controls and heating, ventilation and air conditioning (HVAC) upgrades. Communities expected to see annual cost savings of nearly $8 million from these types of upgrades. An additional $5 million in annual cost savings is expected from street lighting retrofits. HVAC upgrades and street lighting retrofits also comprise the ECMs with the highest proportion of energy savings.

Table 3. Breakdown of Green Communities' ECMs by Type

ECM Type	Number of Complete Projects	Projected Energy Savings (MMBtu)	Projected Annual Cost Savings ($)	Total Installed Cost ($)
Interior Lighting	460	74,602	$3,070,760	$17,094,685
Building Controls	416	98,669	$2,271,929	$14,426,088
HVAC	345	151,125	$2,671,271	$49,498,294
Weatherization	306	44,923	$665,434	$32,085,927
Refrigeration	112	2,519	$117,336	$769,011
Pumps/Motors/Drives	99	53,774	$766,992	$4,352,102
Streetlights	87	205,851	$5,584,344	$22,224,605
Exterior Lighting	85	7,456	$347,364	$1,841,291
Vehicles	77	11,229	$350,792	$1,841,151
Other	58	15,800	$396,181	$2,213,672
Retrocommissioning	52	23,509	$394,123	$1,024,051
Hot Water	45	3,907	$63,617	$842,473
Comprehensive	28	87,473	$1,575,848	$46,175,225
Fuel Conversion	11	4,185	$60,031	$525,487
Behavior & Training	4	2,498	$46,837	$0
Grand Total	**2,185**	**787,520**	**$18,382,857**	**$194,914,063**

As of this report's writing, seven communities have achieved their 20 percent energy reduction goals following completion of the fifth year or beyond of their ERPs (Table 4). For those communities that have not achieved the goal, but have completed their fifth year, the majority have seen energy reductions greater than 10 percent. All Green Communities completing their fifth year have seen reductions in the energy use of their buildings, reflecting the focus on implementing energy efficiency measures in buildings. These reductions, however, may be overshadowed by examining the total portfolio of energy use of municipal facilities and operations. Energy use by vehicles, in particular, represents a real barrier to many Green Communities working to accomplish their 20 percent energy reduction goal.

DOER permits communities that have installed energy conservation measures in their fifth year of ERP implementation to achieve the full energy savings from these measures. To ensure this, DOER allows communities to wait a full year after year five before assessing their progress towards the 20 percent energy reduction commitment. The following seven communities have achieved their 20 percent energy reduction.

Table 4. Year 5 and Beyond: Green Communities Achieving Their 20 Percent Goals

Community	Year 5 or 6 Energy Reduction	Year Reached 20% and 5+ Years	Community	Year 5 or 6 Energy Reduction	Year Reached 20% and 5+ Years
Arlington	23.3%	FY2014	Palmer	37.1%	FY2014
Belchertown	20.9%	FY2014	Springfield	24.2%	FY2013
Cambridge	20.1%	FY2014	Sutton	21.4%	FY2014
Natick	20.2%	FY2013			

Criterion 4: FEVs purchased

Criterion 4 requires communities to purchase only fuel-efficient vehicles, where practicable, when adding new vehicles to their fleets. Heavy duty vehicles with a gross vehicle weight rating (GVWR) of more than 8,500 pounds, as well as police cruisers and passenger and cargo vans, are exempt from the FEV policy. Based on data current as of the 2014 Annual Reports, 44 Green Communities acquired 222 fuel-efficient vehicles in 2014. These comprised new purchases, replacement vehicles, and, in a small number of cases, acquisition through drug seizure. The remaining Green Communities either did not expand their fleets in 2014 or only purchased exempt vehicles. For a full list of the new purchases, refer to **Appendix A**.

Alternative Compliance

During this reporting period, five communities reported under the Alternative Compliance method for Criterion 4, and several additional communities offered additional Alternative Compliance initiatives, though not required to do so. This is a reduction from the ten communities that reported meeting Criterion 4 requirements via Alternative Compliance in 2013. In general, this compliance option ensures that municipalities with a vehicle fleet composed entirely of exempt vehicles can still commit to reducing vehicle fuel consumption. The most common Alternative Compliance methods reported were idle reduction (four communities) and bike racks (four communities). Other methods include plans to introduce biodiesel and electric-vehicle charging infrastructure. Alternative Compliance municipalities also committed to reporting their annual vehicle miles driven and fuel consumption as part of their Fuel Efficient Vehicle Policy.

While Criterion 4 focuses specifically on vehicle efficiency, several communities reported alternative fuel vehicles in their fleets. A few municipalities noted their efforts to install electric-vehicle charging stations, specifically through the Massachusetts Department of Environmental Protection's Massachusetts Electric Vehicle Incentive Program (MassEVIP). For example, Melrose received $15,000 in grant funding to contribute toward purchases of electric vehicles (EVs) or hybrid electric vehicles (HEV). Scituate will also be utilizing financial incentives from the program in order to purchase HEVs already approved by the Town.

Several communities are taking innovative approaches, including:

- Ashfield plans to begin using a biodiesel blend in its diesel Highway Department vehicles when the Northeast Biodiesel plant (still under construction in Greenfield) is complete. It could be subsidized using a portion of the savings from energy reduction improvements achieved under Criterion 3.
- Whately and Huntington are evaluating the feasibility of switching several town vehicles from diesel to either B5 or B20 biodiesel.
- Amherst planned to install a dual-head EV charging station and to purchase an all-electric vehicle for staff use in the spring of 2015.
- In response to a proposal to discontinue the transit bus route along Route 63 through Leverett, the town has requested to become a member of the Franklin Regional Transit Authority and is working with the agency to expand service to include a loop through other parts of the town, rather than limiting it to Route 63.

Criterion 5: Minimize life-cycle energy costs for new construction

Criterion 5 requires communities to set requirements to minimize life-cycle energy costs for new construction. The only approach cities and towns have followed to achieve this is to date is adoption of the BBRS Stretch Code. Based on data current as of the 2014 Annual Reports, 4,803 new residential projects conforming to the Stretch Code have received Certificates of Occupancy in Green Communities through 2014. These projects saw HERS ratings up to 70, with the majority of communities averaging in the 50s and 60s. Compared to the totals reported through 2013, the 2014 reporting period found increasing numbers of new residential projects with HERS ratings below 55 – an indication of increasing energy efficiency since the lower the HERS rating, the more efficient the building. Overall, 188 more projects with HERS ratings below 55 were reported in 2014 compared to 2013. The 2014 annual reports also revealed 4,553 residential renovation projects and 700 commercial projects were built through 2014. The full list of projects built to the Stretch Code up through 2014 can be found in **Appendix A**.

COMMUNITY SPOTLIGHTS

Seven communities achieved their 20 percent energy reduction goals following completion of the fifth year of their ERPs. They are: Arlington, Belchertown, Cambridge, Natick, Palmer, Springfield, and Sutton. This section provides a brief description of the energy use reductions that have taken place in these seven communities.

Arlington

By taking charge of its energy use, the Town of Arlington is not only reducing its environmental impact, but also locking long-term savings into its municipal budget. The town expects to save over $100,000 annually as a result of measures funded with Green Communities grants.

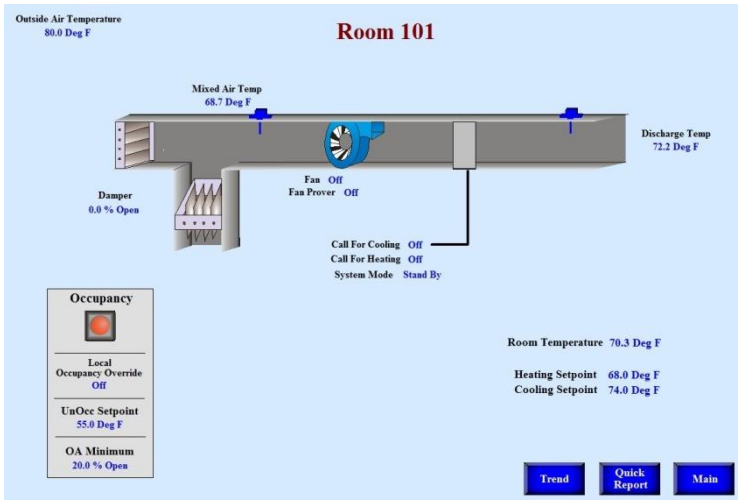
New EMS Controller at Ottoson Middle School in Arlington

Arlington's energy efficiency projects started with its largest buildings – the high school and middle school – and have included repairing steam traps, replacing old boilers with new highly efficient condensing models, and installing state-of-the-art energy management systems (EMS). These efforts have resulted in an 18 percent reduction of electricity use at the high school and 22 percent at the middle school. In addition, the town has reaped significant energy savings through interior and exterior lighting projects, including an LED streetlight retrofit. Arlington has also made a significant investment in the purchase of energy efficient vehicles – 11 to date. To build upon these successes, Arlington is continuing to pursue innovative energy efficiency efforts. For example, Arlington implemented a pilot project of fault detection and diagnostic software at the Peirce Elementary School, which is among the first such systems at a municipal facility in Massachusetts. Multiple layers of real time data are available in one place and analyze operational and efficiency issues within the HVAC

system, effectively creating constant commissioning. In order to effectively manage this new data stream and those of other EMS systems, Arlington has sent four staff members for EMS training. On the renewable energy side, Arlington has signed a power purchase agreement with Ameresco, utilizing a DOER Municipal Energy Technical Assistance grant, to install approximately 600,000 kWh of solar PV on several school buildings.

Belchertown

Belchertown earned its Green Community designation in May, 2010 - DOER's inaugural Green Community designation round - and has since then performed, tracked and overseen a variety of worthwhile projects geared towards municipal energy reduction and costs savings. Prior to becoming a Green Community, Belchertown received a federal Energy Efficiency and Conservation Block Grant through DOER that allowed the town to complete a series of energy efficiency measures at Lawrence Memorial Hall. The town then teamed up with Siemens Building Technologies, Inc. to conduct an investment grade audit designed to detect energy waste in all town-owned buildings, including schools, and identify specific areas in need of improvement. This analysis yielded a detailed compilation of overall energy loss and it helped the town to target and prioritize its energy efficiency investments. In June 2011, Belchertown residents voted unanimously to authorize the town to enter into an energy savings performance contract with guaranteed savings from myriad projects, including new boilers at the Lawrence Memorial Hall, Recreation Building lighting controls, and installation of smart thermostats, energy efficient drives, ducting and exterior lighting. Since that time, Belchertown's Department of Public Works has improved the efficiency of its lighting and heating and cooling devices. Finally, Belchertown continues to make a significant effort to purchase energy efficient vehicles as well as to reduce town-wide gas and diesel consumption through a behavioral program utilizing a vehicle fuel software management system.



Smart thermostat for classrooms on Belchertown

Cambridge

High School renovation in Cambridge

The City of Cambridge's most significant energy reduction achievements are tied to its two highest energy-consuming facilities - the high school and the water treatment facility. A comprehensive renovation project at the high school resulted in 41 percent energy savings without reducing the building's overall footprint. The Leadership in Energy and Environmental (LEED) Gold building incorporated a chilled beam HVAC system, a rooftop solar PV array, high efficiency lighting (some of which was funded by a Green Communities grant), and daylighting. Extensive process and equipment improvements are ongoing at the city's water treatment plant at Fresh Pond. To date, the facility has reduced energy consumption by 34 percent. A 170 kW solar PV array for the water facility is out to bid and will further reduce the plant's use of fossil fuels. Cambridge has been busy upgrading HVAC and lighting systems at other city buildings. Green Communities grants funded variable frequency drives and direct digital controls at two highly used youth centers, and interior lighting upgrades at schools and DPW facilities. In conjunction with its efficiency efforts, Cambridge is equally focused on further deployment of renewable energy. The City is developing a plan to install sufficient onsite solar PV on public buildings to supply 5 percent of municipal energy consumption by 2020. In addition to the array planned for the water treatment plant, a 700 kW system is planned for the reconstructed King Elementary school, which is being designed along zero net energy principles.

Natick

The Town of Natick has been chipping away at its energy use for a number of years, so it is no surprise it surpassed the 20 percent energy reduction goal it established in FY 2008. Like most other Green Communities, the town first focused efficiency efforts on town and school buildings.

Solar panels on Kennedy Middle School in Natick

In 2008, Natick's buildings consumed 102,000 MMBtus of energy and represented nearly 75 percent of the town's energy use. Since then, Green Communities grants have funded the installation of carbon dioxide sensors to optimize ventilation at Town Hall and the Community Senior Center; solar panels on school rooftops; and retro-

commissioning projects at the Morse Institute Library, Public Safety Facility, Bennett-Hemenway Elementary School and the Cole Recreation Center. The town has also invested in oil-to-gas conversion and high efficiency boiler replacements at numerous buildings. Together these investments reduced Natick's buildings' energy consumption by more than 30 percent to 72,000 MMBtus annually. Non-building sites have also been a priority for Natick, which retrofitted over 2,000 streetlights and parking lot lights with LED technology in 2013. A Green Communities grant funded 25 energy efficiency projects at the Natick Water and Sewer Department. Moving forward, the town plans to use circuit-level monitoring to assess the electricity use of all town and school buildings to identify issues with scheduling and set points. It has successfully piloted this approach at five buildings, and has seen adjustments to these buildings' energy management systems result in reductions of at least 5 percent per building. The town also plans to retrofit interior and exterior lighting at school and municipal buildings with LEDs, further reducing costs and energy use.

Palmer

Palmer Town Hall HVAC upgrade

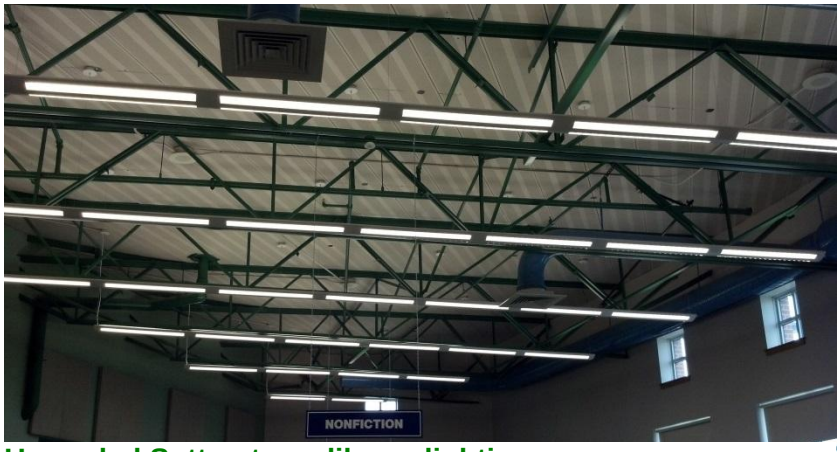
Over the past five years, the town of Palmer has taken a leading role in reducing its energy consumption. This has been accomplished through the completion of 11 separate energy improvement projects. The town's estimated $400,000 investment has been leveraged by programs offered through the Green Communities Division, Massachusetts School Building Authority, and Mass Save. These partnerships have allowed $1.3 million of improvements to occur at five municipal buildings. These consist of four HVAC, three building envelope, and two pump/motor/drive projects, a lighting retrofit, and the installation of a 10 kW roof-mounted solar domestic hot water system. Specifically, Green Community funds were integral in upgrading the Town Hall's HVAC system. This project was selected for the significant savings that would be quickly realized and is currently saving the town approximately $27,000 annually in electric and natural gas costs. To further its pursuit of greener energy, the town is contracted to purchase 100 percent of its electric needs through net metering credits from a local solar project and is engaged in a lease agreement with a separate PV developer to construct a 5 megawatt ground-mounted PV system on closed municipal landfill.

Springfield

Boiler replacement at Springfield town library

The City of Springfield has long been active in saving energy in municipal buildings. The City was quick to take advantage of funds made available through the American Recovery and Reinvestment Act of 2009. Having already assembled a prioritized list of projects, the City immediately began replacing antiquated heating systems in schools, fire stations, and libraries, as well as updating control systems in order to ensure that the new systems ran at peak efficiency and on a schedule that made sense. When the Green Communities Designation and Grant Program was announced in 2009, Springfield examined the designation criteria and became one of the very first Green Communities. Funds made available through that program were leveraged with funds from Mass Save to continue the city's infrastructure updates. Springfield was successful in applying for subsequent Green Communities Competitive Grants in 2012 and again in 2014. None of this would have been possible If City leaders and staff hadn't led the charge to make sure the City did not miss an opportunity to improve its buildings and save energy and taxpayer funds. While Springfield is pleased to meet its 20 percent municipal energy reduction goal, the city is not resting on its laurels, but rather remains focused on its goal to make Springfield the state's most energy efficient municipality.

Sutton



Upgraded Sutton town library lighting

Sutton has pursued a multipronged approach to reach its goal of 20 percent municipal energy reduction over five years. The first step in the process was staff and public education about energy usage and costs and a related program to implement behavioral changes to reduce energy usage. The Town conducted informational staff meetings and posted signage to remind people to turn off lights, computers and other sources of electricity use. The Town then removed obvious unnecessary sources of electricity draw such as soda machines, began to replace outdated fixtures, and installed occupancy sensors in all town buildings. The town also purchased its first hybrid municipal vehicles and began selecting municipal vehicles more carefully, with fuel efficiency at the forefront of decision-making. With the assistance of its first Green Communities grant, Sutton accomplished several energy saving projects including additional significant lighting upgrades that included daylight and occupancy sensors at the Sutton school complex and four other municipal buildings, and installed a heat recovery system at the municipal complex. At this point, Sutton reached its 20 percent goal. To ensure further progress, the

Town applied for and received a Green Communities competitive grant and has accomplished nearly all of the funded projects, including installation of demand control ventilation and variable frequency drives at the school complex, conversion of outdoor lighting at the school complex to LED fixtures, and installation of an energy efficient water heater at the municipal complex. The final project that will be partially funded with this grant is conversion of municipal streetlights to LED technology during the summer of FY15. Town residents unanimously voted to approve the balance of funds to complete that project, which will put Sutton in the forefront of LED streetlight conversion among Central Massachusetts communities.

CONCLUSION

The Green Communities Act was passed by unanimous vote of the Legislature in 2008 and it continues to enjoy strong legislative support. A key component of the Act, the Green Communities Designation and Grant Program has significantly outpaced expectations and is now a national model for clean energy success at the local level. Beginning in 2010 with 35 communities achieving designation, there are currently 136 designated communities. Green Communities are located all across the state from the Cape and Islands to the Berkshires, and demographically diverse, from the tiny western Massachusetts town of Rowe to the state capital in Boston.

The 136 Green Communities have committed to reduce their municipal energy usage over five years by 20 percent, or 2 million MMBTU—an amount equal to the total average energy use of more than 15,500 Massachusetts homes. This five-year commitment is also projected to cut greenhouse gas emissions by 194,682 tons, which equates to taking nearly 37,000 cars off the road for a year. It also equates to more than $21 million in avoided energy costs if all the current Green Communities meet their 20 percent energy use reduction commitments.

As of December 2014, Green Communities reported using their designation or competitive grants to complete nearly 548 interior lighting upgrade projects, 348 weatherization projects, and 4,875 HVAC upgrade projects. In 2014, 99 Green Communities submitted Annual Reports to DOER and, based on their reported data, are saving approximately 2.2 million MMBtu—equivalent to the total energy usage of 17,117 Massachusetts homes.

From the launch of the Program in 2010 through July 1, 2015, the Green Communities Division has awarded some $40 million in grants to designated communities to undertake projects that reduce municipal energy bills and improve the local environment. Moreover, Program participants have been able to combine Green Communities monies with Mass Save funding to get an even greater benefit. Mass Save incentives and Green Community grants make up approximately $56 million of the installed costs associated with these projects.

Looking ahead, the Division anticipates as many as 20 additional municipalities may apply for Green Community designation in the fall 2015 designation round. With funding secured through Alternative Compliance Payments under the state's Renewable Portfolio Standard and carbon allowance auction proceeds under the Regional Greenhouse Gas Initiative, the Program is poised to continue to support and advance the clean energy goals of Massachusetts municipalities well into the foreseeable future.

APPENDIX: ADDITIONAL CRITERION-SPECIFIC DATA

Table A-1. List of Communities that Submitted a 2014 Annual Report

Acton	Hamilton	Newburyport	Westminster
Amherst	Hanover	Newton	Weston
Andover	Harvard	Northampton	Westwood
Arlington	Hatfield	Northfield	Whately
Ashfield	Holyoke	Palmer	Williamstown
Ashland	Hopkinton	Petersham	Winchester
Athol	Huntington	Pittsfield	Winthrop
Auburn	Kingston	Provincetown	Woburn
Ayer	Lakeville	Quincy	Worcester
Barre	Lancaster	Revere	
Becket	Lenox	Rowe	
Bedford	Leominster	Salem	
Belchertown	Leverett	Scituate	
Beverly	Lexington	Sherborn	
Boston	Lincoln	Shirley	
Bridgewater	Lowell	Somerville	
Brookline	Marlborough	Springfield	
Buckland	Mashpee	Sudbury	
Cambridge	Maynard	Sutton	
Carlisle	Medford	Swampscott	
Chelmsford	Medway	Tewksbury	
Chesterfield	Melrose	Topsfield	
Conway	Mendon	Townsend	
Dedham	Middlefield	Truro	
Deerfield	Millbury	Tyngsborough	
Easthampton	Milton	Watertown	
Easton	Monson	Wayland	
Gardner	Montague	Wendell	
Gloucester	Natick	Wenham	
Greenfield	New Salem	West Tisbury	

Table A-2. Criteria 1 & 2: Sited Projects, 2014

Community	Projects?	Date	Description	Comments
Acton	No			
Amherst	No			
Andover	No			Solar Project but not under town's Green Community Designation
Arlington	No			
Ashfield	No			
Ashland	Yes	2012	Solar	Permits granted
Athol	No			
Auburn	No			
Ayer	No			
Barre	No			
Becket	No			
Bedford	No			
Belchertown	No			
Beverly	No			Solar Project but not under town's Green Community Designation
Boston	No			
Bridgewater	No			Solar Project but not under town's Green Community Designation
Brookline	No			Solar Project but not under town's Green Community Designation
Buckland	No			
Cambridge	No			Solar Project but not under town's Green Community Designation
Carlisle	No			
Chelmsford	No			
Chesterfield	No			
Conway	No			
Dedham	No			
Deerfield	No			
Easthampton	No			
Easton	No			Solar Project but not under town's Green Community Designation
Gardner	No			
Gloucester	No			
Greenfield				
Hamilton	No			
Hanover	No			
Harvard	Yes	2012	Solar	Permit granted for 1 of 2 projects
Hatfield	No			

Community	Projects?	Date	Description	Comments
Holyoke	No			Solar Project but not under town's Green Community Designation
Hopkinton	No			
Huntington	No			
Kingston	Yes	2012	Wind	
Lakeville	No			
Lancaster	No			Solar Project but not under town's Green Community Designation
Lenox	No			Solar Project but not under town's Green Community Designation
Leominster	No			
Leverett	Yes	2014	Solar	
Lexington	No			
Lincoln	No			
Lowell	No			Solar Project but not under town's Green Community Designation
Marlborough	No			
Mashpee	No			
Maynard	No			Project listed but not under town's Green Community Designation
Medford	No			
Medway	No			
Melrose	No			
Mendon	No			
Middlefield	No			
Millbury	No			Solar Project but not under town's Green Community Designation
Milton	No			
Monson	Yes	2013	Solar	
Montague	No			
Natick	No			Solar Project but not under town's Green Community Designation
New Salem	Yes	2011	Solar	
Newburyport	No			
Newton	No			
Northampton	No			
Northfield	No			
Palmer	No			
Petersham	No			
Pittsfield	No			
Provincetown	Yes	2013	Solar	
Quincy	No			
Revere	No			

Community	Projects?	Date	Description	Comments
Rowe	No			
Salem	Yes	2012	R&D	
Scituate	Yes	2012	Solar	
Sherborn	No			
Shirley	No			
Somerville	Yes	2013, 2014	R&D	4 R&D projects
Springfield	No			
Sudbury	No			Solar Project but not under town's Green Community Designation
Sutton	No			Project listed but not under town's Green Community Designation
Swampscott	No			
Tewksbury	No			
Topsfield	No			
Townsend	No			
Truro	No			
Tyngsborough	No			R&D Project but not under town's Green Community Designation
Watertown	No			
Wayland	No			Project listed but not under town's Green Community Designation
Wendell	No			
Wenham	No			
West Tisbury	Yes	2013	Solar	
Westminster	No			
Weston	No			
Westwood	No			
Whately	No			
Williamstown	No			
Winchester	No			
Winthrop	No			
Woburn	No			
Worcester	No			

Table A-3. Criterion 3: Energy Usage and Reductions by Category for Baseline Year and Most Recent Data Year

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Acton	FY2009	83,932	0	1,900	18,176	3,284	107,292	
	FY2014	71,527	0	1,184	18,823	2,948	93,942	12.4%
Amherst	FY2011	29,375	462	1,770	15,964	13,071	60,642	
	FY2014	30,469	467	1,069	12,407	13,535	57,947	4.4%
Andover	FY2008	86,638	0	4,656	16,871	28,998	137,163	
	FY2014	89,028	0	2,947	16,400	28,827	137,202	0.0%
Arlington	FY2008	104,929	0	5,203	17,823	575	128,530	
	FY2014	80,092	0	1,051	16,967	470	98,580	23.3%
Ashfield	FY2010	988	0	34	1,558	793	3,373	
	FY2014	1,008	0	29	1,796	451	3,284	2.6%
Ashland	FY2011	38,304	42	1,100	5,636	5,543	50,625	
	FY2014	-	-	-	-	-	-	-
Athol	FY2009	7,270	0	0	6,014	7,806	21,090	
	FY2014	5,936	0	0	6,027	7,094	19,057	9.6%
Auburn	FY2011	33,700	0	1,900	9,624	2,616	47,840	
	FY2014	30,361	0	1,902	9,715	2,497	44,475	7.0%
Ayer	FY2009	6,011	0	780	1,806	10,025	21,244	
	FY2014	6,203	0	669	4,428	7,444	19,937	6.2%
Barre	FY2011	6,989	6	0	0	3.930	10,925	
	FY2014	3,514	2	0	3,198	3,928	10,642	2.6%
Becket	FY2009	1,518	0	82	3,525	0	5,125	
	FY2014	1,356	0	99	3,373	0	4,828	5.8%
Bedford	FY2009	47,753	0	2,145	10,592	4,811	65,301	
	FY2014	49,519	0	1,932	9,857	3,924	65,232	0.1%
Belchertown	FY2009	48,771	5	453	7,159	3,501	59,889	
	FY2014	35,822	6	441	8,216	2,886	47,371	20.9%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Beverly	FY2009	89,880	457	7,313	9,798	5,683	113,131	
	FY2014	79,139	578	5,428	8,929	5,567	99,641	11.9%
Boston	FY2010	1,225,147	13,931	311,351	413,123	0	1,963,552	
	FY2014	1,285,458	11,440	220,167	449,461	0	1,966,526	-0.2%
Bridgewater	FY2009	11,577	822	2,075	6,756	7,807	29,037	
	FY2014	10,453	568	1,961	8,821	7,493	29,296	-0.9%
Brookline	FY2009	126,471	2,488	11,181	17,063	15	157,218	
	FY2014	140,032	2,686	9,927	19,459	5	172,109	-9.5%
Buckland	FY2009	1,252	0	149	1,349	0	2,750	
	FY2014	1,233	0	166	1,618	0	3,017	-9.7%
Cambridge	FY2008	192,115	6,821	22,204	41,725	41,591	304,456	
	FY2014	151,747	5,944	19,065	38,884	27,759	243,399	20.1%
Carlisle	FY2009	12,066	109	0	4,268	404	16,847	
	FY2014	12,183	38	0	5,075	791	18,087	-7.4%
Chelmsford	CY2008	78,817	410	2,467	15,525	12,725	109,944	
	CY2013	82,733	416	2,418	17,530	11,178	114,275	-3.9%
Chesterfield	FY2010	1,681	0	22	1,447	0	3,150	
	FY2014	1,307	0	24	2,031	0	3,363	-6.8%
Conway	FY2010	3,347	0	0	1,778	0	5,125	
	FY2014	3,255	0	0	2,007	0	5,262	-2.7%
Dedham	FY2009	54,047	274	304	5,910	169	60,704	
	FY2014	55,105	467	108	345	424	56,449	7.0%
Deerfield	FY2009	8,165	0	517	2,568	2,113	13,363	
	FY2014	6,444	0	398	3,180	1,941	11,963	10.5%
Easthampton	FY2009	29,129	9	1,342	7,640	8,355	46,475	
	FY2014	32,360	8	1,264	6,657	7,044	47,333	-1.8%
Easton	FY2009	57,488	0	2,132	11,569	5,434	76,623	
	FY2014	54,125	0	1,558	11,777	5,226	72,686	5.1%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Gardner	FY2008	43,468	79	2,005	10,739	6,350	62,641	
	FY2014	34,566	35	2,017	10,708	5,268	51,594	16.0%
Gloucester	FY2009	71,786	0	5,140	13,292	11,988	102,206	
	FY2014	62,346	0	5,028	14,489	11,292	93,155	8.9%
Greenfield	FY2008	49,742	0	4,928	12,335	6,036	73,041	
	FY2014	48,754	0	2,436	13,967	5,388	70,545	3.4%
Hamilton	FY2009	20,401	149	550	3,741	2,038	26,879	
	FY2014	19,549	168	546	3,501	1,856	25,620	4.7%
Hanover	FY2008	32,419	0	818	9,090	5,920	48,247	
	FY2014	32,970	0	770	8,063	5,959	47,762	1.0%
Harvard	FY2009	20,521	2	91	3,706	419	24,739	
	FY2014	19,289	5	90	3,278	579	23,241	6.1%
Hatfield	FY2010	5,840	0	161	2,721	1,799	10,521	
	FY2014	6,509	0	153	2,852	1,798	11,312	-7.5%
Holyoke	FY2009	137,527	0	22,271	29,473	18,556	207,827	
	FY2014	123,045	0	15,361	30,636	17,101	186,143	10.4%
Hopkinton	CY2009	48,644	0	599	7,272	2,182	58,697	
	CY2013	42,996	0	477	6,223	2,296	51,992	11.4%
Huntington	FY2011	2,865	0	130	1,254	552	4,801	
	FY2014	1,782	0	134	1,548	510	3,974	17.2%
Kingston	CY2009	28,131	135	39	8,013	9,254	45,572	
	CY2013	23,181	121	48	8,037	8,694	40,081	12.0%
Lakeville	FY2011	10,074	69	358	7,245	0	17,746	
	FY2014	9,864	46	294	7,014	0	17,218	3.0%
Lancaster	CY2008	4,925	0	252	4,125	1,182	10,484	
	CY2013	4,719	0	197	3,884	1,243	10,043	4.2%
Lenox	FY2009	21,689	14	476	4,491	4,189	30,859	
	FY2014	23,276	7	544	2,616	4,486	30,929	-0.2%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Leominster	FY2010	82,162	1,387	15,355	17,912	6,156	122,972	
	FY2014	71,252	1,452	4,996	19,345	14,058	111,104	9.7%
Leverett	FY2009	3,459	0	4	1,486	0	4,949	
	FY2014	4,540	0	38	1,257	0	5,835	-17.9%
Lexington	FY2008	105,804	681	7,727	15,023	1,889	131,124	
	FY2014	110,654	454	2,771	18,185	1,679	133,744	-2.0%
Lincoln	FY2008	22,826	7	66	4,462	2,277	29,638	
	FY2014	22,122	0	0	4,018	2,545	28,685	-0.2%
Lowell	FY2008	266,267	8,268	14,699	37,607	68,741	395,582	
	FY2014	238,556	3,746	2,704	35,908	70,508	651,422	11.2%
Marlborough	FY2009	81,329	133	5,480	15,405	28,206	130,554	
	FY2014	80,548	162	5,294	-	25,943	111,1947	-
Mashpee	FY2009	23,662	0	441	8,243	0	32,346	
	FY2014	22,478	0	390	8,169	0	31,037	4.0%
Maynard	FY2011	34,198	0	191	4,857	9,261	48,507	
	FY2014	21,825	0	127	4,842	6,947	33,741	30.4%
Medford	FY2009	112,423	1,077	8,250	17,550	101	139,401	
	FY2014	90,731	894	7,775	16,179	128	115,707	17.0%
Medway	FY2009	42,311	82	721	5,532	2,735	51,381	
	FY2014	37,816	112	627	6049	2,769	47,373	7.8%
Melrose	FY2009	55,049	0	4,956	14,765	1,167	75,937	
	FY2014	60,593	0	4,828	17,887	972	84,280	-11.0%
Mendon	FY2010	7,635	13	272	3,316	0	11,236	
	FY2014	7,205	24	200	2,931	0	10,360	7.8%
Millbury	FY2009	33,997	102	1,013	6,158	2,589	43,859	
	FY2014	32,362	46	1,023	6,222	2,842	42,495	3.1%
Milton	FY2008	66,919	27	3,834	11,725	629	83,136	
	FY2014	56,484	78	247	14,403	648	71,860	13.6%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Monson	FY2010	24,504	0	277	8,965	1,354	35,100	
	FY2014	26,520	0	270	9,412	1,072	37,274	-6.2%
Montague	FY2008	20,336	0	16	5,179	0	25,531	
	FY2014	16,725	0	16	5,158	0	21,899	14.2%
Natick	FY2008	102,029	8	2,813	21,450	13,113	139,413	
	FY2014	72,141	0	3,483	25,112	10,454	111,190	20.2%
New Salem	FY2009	1,336	0	0	1,223	0	2,559	
	FY2014	448	0	0	1,573	0	2,216	13.4%
Newburyport	FY2009	39,522	0	3,366	11,770	16,501	71,159	
	FY2014	40,202	0	3,121	9,855	16,542	69,719	2.0%
Newton	FY2008	245,902	528	15,192	34,753	3,469	299,844	
	FY2014	223,250	511	11,747	34,015	2,861	272,384	9.2%
Northampton	FY2009	74,103	1,439	4,514	15,829	15,743	111,628	
	FY2014	67,617	1,297	4,502	15,195	17,632	106,243	4.8%
Northfield	FY2011	1,820	0	206	2,666	460	5,152	
	FY2014	1,988	0	157	2,989	289	5,423	-5.3%
Palmer	FY2009	35,205	635	3,209	5,744	14,999	59,792	
	FY2014	21,524	636	1,796	6,147	7,481	37,584	37.1%
Petersham	FY2011	3,290	0	0	1,295	0	4,585	
	FY2014	3,443	0	0	1,496	0	4,939	-7.7%
Pittsfield	FY2008	117,297	1,905	8,750	32,532	25,633	186,117	
	FY2014	143,670	1,317	8,190	34,266	23,173	210,616	-13.2%
Provincetown	FY2009	17,047	56	153	8,145	1,699	27,100	
	FY2014	15,253	62	488	8,244	946	24,993	7.8%
Quincy	FY2011	185,000	871	15,901	38,138	2,500	242,410	
	FY2014	173,699	1,047	15,828	42,904	2,219	235,697	2.8%
Revere	FY2009	93,272	0	9,076	13,295	617	116,260	
	FY2014	88,857	0	8,490	9,759	312	107,418	7.6%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Rowe	FY2009	3,478	30	48	1,394	0	4,960	
	FY2014	-	-	-	-	-	-	-
Salem	FY2009	68,295	3,595	8,623	18,075	1,003	99,590	
	FY2014	71,071	3,731	7,635	18,886	1,092	102,415	-2.8%
Scituate	FY2010	40,745	199	2,326	15,142	16,622	75,034	
	FY2014	44,134	250	2,304	15,682	13,314	75,684	-0.9%
Sherborn	FY2009	9,385	23	58	8,019	19	17,504	
	FY2014	9,892	9	47	8,951	17	18,916	-8.1%
Shirley	FY2011	5,048	0	350	2,226	927	8,551	
	FY2014	5,501	0	244	2,131	903	8,779	-2.7%
Somerville	CY2008	91,694	485	921	-	7	93,107	
	CY2013	71,668	784	1,424	17,735	9	91,620	-
Springfield	FY2007	444,623	4,054	36,116	75,809	0	560,602	
	FY2014	317,826	3,536	32,038	78,197	0	431,597	23.0%
Sudbury	FY2008	65,757	1,264	1,135	11,713	3,401	83,270	
	FY2014	60,518	1,162	549	10,171	3,588	75,988	8.7%
Sutton	CY2008	27,872	0	37	7,181	1,346	36,436	
	CY2013	19,720	0	21	7,583	1,313	28,637	21.4%
Swampscott	FY2009	37,063	177	2,964	4,562	1,536	46,302	
	FY2014	40,051	178	2,925	4,779	1,439	49,372	-6.6%
Tewksbury	FY2009	81,095	0	2,430	10,893	11,848	106,266	
	FY2014	-	-	-	-	-	-	-
Topsfield	FY2009	12,942	0	37	4,171	925	18,074	
	FY2014	13,865	0	21	3,760	838	18,484	-2.3%
Townsend	FY2010	5,345	4	16	4,464	1,786	11,615	
	FY2014	5,588	13	6	4,417	1,415	11,439	1.5%
Truro	FY2010	8,428	0	53	2,834	0	11,315	
	FY2014	7,255	0	49	3,569	0	10,873	3.9%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Tyngsborough	FY2008	26,683	0	927	11,202	849	39,661	
	FY2014	25,991	0	937	8,8533	1,272	36,733	16.6%
Watertown	FY2010	74,011	0	2,035	11,965	0	88,011	
	FY2014	62,983	237	1,865	12,087	0	77,173	12.3%
Wayland	FY2010	42,891	0	1,553	7,410	3,467	55,321	
	FY2014	44,122	0	1,330	6,509	2,063	54,024	2.3%
Wendell	FY2011	1,667	10	0	915	2	2,594	
	FY2014	1,556	22	0	916	5	2,499	3.7%
Wenham	FY2009	12,182	0	413	3,381	899	16,875	
	FY2014	13,447	0	412	2,834	1,031	17,724	-5.0%
West Tisbury	CY2011	1,309	0	75	1,159	0	2,543	
	CY2013	1,273	0	75	1,159	0	2,186	14.0%
Westminster	FY2011	5,636	53	228	-	0	5,917	
	FY2014	5,686	51	228	5,330	0	11,295	-
Weston	FY2011	69,301	532	836	16,585	1,586	88,840	
	FY2014	70,567	415	804	15,517	1,392	88,695	0.2%
Westwood	FY2012	44,682	0	1,385	7,504	1,441	55,012	
	FY2014	54,722	0	1,459	9,165	1,797	67,072	-14.2%
Whately	FY2011	3,377	0	2	1,213	204	4,797	
	FY2014	3,949	0	0	1,232	212	5,609	-16.9%
Williamstown	FY2008	8,678	0	0	5,148	2,574	16,400	
	FY2014	8,273	0	0	5,307	1,905	15,485	5.6%
Winchester	FY2010	65,298	101	2,242	9,963	2,085	79,662	
	FY2014	58,362	84	1,083	11,152	1,824	72,505	9.0%
Winthrop	FY2011	29,724	148	2,417	6,487	589	39,365	
	FY2014	31,660	60	277	7,160	601	39,758	-1.0%
Woburn	FY2010	71,819	1,066	654	11,609	8,451	93,599	
	FY2014	73,536	1,029	693	12,617	17,066	104,940	-12.2%

Community	Year[4]	Buildings	Open Space[5]	Streetlights	Vehicles	Water/Sewer	Total	% Energy Reduction[6]
Worcester	FY2009	399,510	6,165	30,998	69,375	37,491	558,267	
	FY2014	443,539	8,203	32,669	97,940	25,827	613,929	-10.0%

Table A-4: Criterion 4 2014 Vehicle Fleet Additions

Community	Exempt	Non-Exempt	Total	2014 Fleet Size
Acton	0	6	6	132
Amherst	19	6	25	231
Andover	3	3	6	149
Arlington	10	0	10	212
Ashfield	4	0	4	20
Ashland	0	0	0	90
Auburn	0	6	6	81
Barre	3	0	3	27
Becket	3	0	3	26
Bedford	8	13	21	76
Belchertown	0	0	0	79
Beverly	12	8	20	358
Boston	29	35	64	658
Bridgewater	0	0	0	79
Brookline	9	3	12	284
Buckland	0	0	0	11
Cambridge	21	9	30	350
Carlisle	1	1	2	44
Chelmsford	8	3	11	151
Chesterfield	5	0	5	13
Conway	5	0	5	18
Dedham	11	1	12	111
Deerfield	0	0	6	24
Easthampton	0	4	4	74
Easton	6	0	6	121
Gardner	2	1	3	3
Gloucester	0	0	0	84
Greenfield	15	2	17	133
Hamilton	4	0	4	40
Hanover	13	1	14	106
Hatfield	1	0	1	32
Holyoke	14	5	19	239
Hopkinton	4	3	7	95
Huntington	1	0	1	13
Kingston	2	0	2	72
Lakeville	7	0	7	50
Lancaster	2	1	3	56
Lenox	14	0	14	72
Leominster	0	0	0	215

Community	Exempt	Non-Exempt	Total	2014 Fleet Size
Leverett	6	0	6	21
Lexington	4	1	5	84
Lincoln	1	0	1	38
Lowell	9	0	9	347
Marlborough	0	3	3	142
Mashpee	9	0	9	98
Maynard	0	0	0	54
Medford	11	7	18	161
Medway	6	6	12	12
Melrose	4	9	13	119
Mendon	3	0	3	35
Millbury	6	0	6	57
Milton	8	2	10	138
Monson	14	0	14	85
Montague	2	0	2	43
Natick	14	1	15	134
New Salem	2	0	2	19
Newburyport	7	2	9	122
Newton	8	0	8	215
Northampton	9	3	12	238
Northfield	2	1	3	24
Palmer	12	0	12	46
Petersham	0	0	0	21
Pittsfield	57	2	59	331
Provincetown	6	0	6	78
Quincy	39	14	53	116
Revere	11	2	13	141
Rowe	2	0	2	16
Salem	8	5	13	182
Scituate	14	3	17	156
Sherborn	0	0	0	30
Shirley	0	0	0	33
Somerville	0	0	0	264
Springfield	22	17	39	584
Sudbury	8	3	11	49
Sutton	1	0	1	69
Swampscott	13	1	14	70
Tewksbury	7	0	7	119
Topsfield	0	0	0	30
Townsend	3	1	4	54

Community	Exempt	Non-Exempt	Total	2014 Fleet Size
Truro	1	0	1	56
Tyngsborough	0	0	0	12
Watertown	6	0	6	103
Wayland	0	0	0	14
Wendell	0	0	0	13
Wenham	2	0	2	31
West Tisbury	3	0	3	16
Westminster	10	0	10	33
Weston	0	0	0	32
Westwood	0	4	4	19
Whately	0	1	1	19
Williamstown	10	0	10	36
Winchester	4	1	5	120
Winthrop	0	0	0	75
Woburn	15	7	22	174
Worcester	31	13	44	298

Table A-5. Criterion 5: Projects Built to the Stretch Code through 2014

Community	New Residential (NR)	Residential Renovation (RR)	Commercial (C)	HERS Range
Acton	260	511	118	45-70
Amherst	33	121	23	51-70
Andover	128	44	9	47-70
Arlington	10	0	0	48-66
Ashfield	6	3	0	58-58
Ashland	-	-	-	-
Athol	16	190	16	64-64
Auburn	22	29	4	50-66
Ayer	0	20	1	N/A
Barre	26	0	1	-
Becket	33	2	0	47-70
Bedford	58	62	39	41-66
Belchertown	61	0	0	4-70
Beverly	62	138	28	49-66
Boston	-	-	-	-
Bridgewater	58	0	0	54-70
Brookline	65	447	65	51-70
Buckland	2	0	0	60-60
Cambridge	44	630	45	42-65
Carlisle	44	0	0	38-65
Chelmsford	64	2	9	49-70
Chesterfield	6	5	0	57-67
Conway	5	0	0	-
Dedham	50	0	3	54-70
Deerfield	3	43	9	52-52
Easthampton	39	1	4	38-70
Easton	94	1	6	40-70
Gardner	43	368	47	56-67
Gloucester	88	17	0	28-70
Greenfield	14	0	13	55-70
Hamilton	13	6	0	46-68
Hanover	16	14	2	63-68
Harvard	20	0	0	-
Hatfield	7	0	0	70-70
Holyoke	29	2	22	54-69
Hopkinton	438	3	0	44-70
Huntington	2	0	0	66-66
Kingston	70	17	0	49-70
Lakeville	47	80	2	51-70

Community	New Residential (NR)	Residential Renovation (RR)	Commercial (C)	HERS Range
Lancaster	17	1	0	54-70
Lenox	4	0	5	41-70
Leominster	42	3	3	54-70
Leverett	6	0	0	5-58
Lexington	188	65	5	38-69
Lincoln	7	24	0	53-53
Lowell	248	0	0	48-62
Marlborough	131	28	2	43-70
Mashpee	125	1	0	48-70
Maynard	28	58	1	55-70
Medford	23	605	59	58-70
Medway	55	0	0	51-70
Melrose	5	121	1	58-61
Mendon	36	7	3	51-70
Millbury	53	25	8	-
Milton	19	2	3	48-65
Monson	19	2	3	49-70
Montague	1	0	0	-
Natick	110	1	0	43-70
New Salem	2	0	0	57-61
Newburyport	42	0	0	45-70
Newton	222	0	0	44-70
Northampton	88	0	12	11-69
Northfield	1	26	0	60-60
Palmer	11	2	0	53-70
Petersham	0	0	0	N/A
Pittsfield	10	38	2	54-65
Provincetown	15	234	4	55-68
Quincy	56	2	9	46-70
Revere	13	0	0	42-68
Rowe	1	0	0	67-67
Salem	31	0	2	44-70
Scituate	86	18	0	46-70
Sherborn	3	5	0	57-57
Shirley	40	6	0	52-69
Somerville	5	0	0	-
Springfield	160	3	15	52-70
Sudbury	51	17	7	41-67
Sutton	61	1	0	51-66
Swampscott	11	3	1	48-70

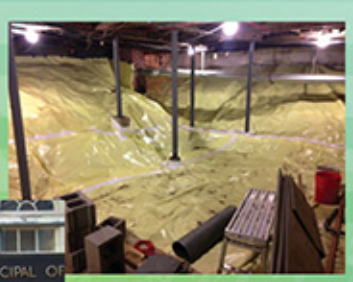
Community	New Residential (NR)	Residential Renovation (RR)	Commercial (C)	HERS Range
Tewksbury	90	0	0	33-68
Topsfield	26	0	0	52-69
Townsend	23	94	3	11-70
Truro	50	115	1	50-66
Tyngsborough	25	0	0	54-70
Watertown	0	224	47	N/A
Wayland	59	0	0	46-66
Wendell	3	0	0	-
Wenham	12	13	0	59-65
West Tisbury	11	1	1	48-48
Westminster	56	21	4	51-70
Weston	82	1	0	-
Westwood	17	2	0	45-64
Whately	10	0	0	67-67
Williamstown	3	12	6	47-62
Winchester	84	0	2	47-70
Winthrop	5	0	0	66-66
Woburn	25	19	10	50-64
Worcester	207	0	16	48-86

Table A-6. Criterion 5: Total Number of Projects with HERS Below 55 for 2013 and 2014

Community	2013 Total <55 HERS	2014 Total <55 HERS
Acton	7	41
Amherst	4	4
Andover	9	17
Arlington	1	3
Ashfield	0	0
Ashland	0	0
Athol	0	0
Auburn	0	1
Ayer	0	0
Barre	0	0
Becket	2	9
Bedford	1	11
Belchertown	3	5
Beverly	0	3
Boston	105	147
Bridgewater	1	4
Brookline	1	2
Buckland	0	0
Cambridge	2	8
Carlisle	8	28
Chelmsford	1	5
Chesterfield	0	1
Conway	0	0
Dedham	1	2
Deerfield	0	1
Easthampton	15	25
Easton	1	4
Gardner	0	0
Gloucester	8	16
Greenfield	3	4
Hamilton	1	6
Hanover	0	0
Harvard	0	0
Hatfield	0	0
Holyoke	1	1
Hopkinton	25	208
Huntington	0	0
Kingston	1	2
Lakeville	2	3

Community	2013 Total <55 HERS	2014 Total <55 HERS
Lancaster	0	1
Lenox	1	1
Leominster	1	2
Leverett	1	2
Lexington	45	87
Lincoln	2	2
Lowell	3	19
Marlborough	-	-
Mashpee	1	5
Maynard	0	1
Medford	0	0
Medway	1	4
Melrose	0	0
Mendon	1	1
Millbury	4	4
Milton	1	1
Monson	4	7
Montague	0	0
Natick	9	22
New Salem	0	0
Newburyport	0	4
Newton	89	128
Northampton	20	30
Northfield	0	0
Palmer	3	3
Petersham	0	0
Pittsfield	1	2
Provincetown	0	1
Quincy	3	5
Revere	2	9
Rowe	0	0
Salem	2	2
Scituate	3	7
Sherborn	0	0
Shirley	1	6
Somerville	0	0
Springfield	1	3
Sudbury	3	21
Sutton	5	9
Swampscott	0	3

Community	2013 Total <55 HERS	2014 Total <55 HERS
Tewksbury	4	22
Topsfield	6	7
Townsend	0	0
Truro	0	1
Tyngsborough	0	1
Watertown	0	0
Wayland	9	13
Wendell	0	0
Wenham	0	0
West Tisbury	0	1
Westminster	0	3
Weston	0	0
Westwood	0	11
Whately	0	0
Williamstown	0	1
Winchester	5	18
Winthrop	0	0
Woburn	0	6
Worcester	6	10
TOTAL	**184**	**372**



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