

# An Analysis of Community Choice Energy for Boston



**Authors:**

Tyler Comings

Elizabeth A. Stanton, PhD

Bryndis Woods

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The purpose of this report is to inform efforts in the City of Boston to understand how Community Choice Energy can be one strategy to help the City reach its ambitious climate goals. The report was funded by the Barr Foundation.

**Cover Photos**

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## Executive Summary

Community Choice Energy (CCE) allows a municipality to purchase electricity from a competitive supplier on behalf of participating electric customers. CCE would allow Boston to pool customers together, using this greater bargaining power to benefit customers in the City. In addition, through CCE, the City would purchase at least five percent more Class I renewable energy than required under the Commonwealth's Renewable Energy Portfolio (RPS) law.

Currently, 127 cities and towns Massachusetts have adopted CCE—more than one-third of the 351 municipalities in the Commonwealth. Many municipalities that implement CCE procure five percent more renewable energy than is required by the Massachusetts RPS. Some are going even further, such as Brookline, which is purchasing 25 percent more renewable energy than required, and Greenfield, which is purchasing 100 percent renewables. CCE has also been enacted by municipalities in California, Illinois, New Jersey, New York, Ohio and Rhode Island.

This report reviews commonly asked questions that the City should consider as it assesses whether to adopt this policy, including the following topics:

- **CCE costs the same as or less than basic utility electric service:** Our analysis shows that CCE customers generally pay an electric supply rate that is very close to—and sometimes lower than—what they would pay for basic service from their utility, due to: low administrative costs, increasingly competitive renewable energy costs, and enhanced bargaining power.
- **CCE provides more stable rates than basic utility electric service:** CCE often provides more rate stability than basic electricity service. Eversource rates change every six months—sometimes significantly. Municipalities with CCE can sign contracts that lock in their rates for up to two and a half years—five times the length of Eversource's basic service contract, which helps to mitigate price fluctuations.
- **CCE has very low administrative costs:** Survey data of CCE program managers in Massachusetts shows that CCE programs require limited municipal employee time and funding to get started, and even less time and money to run on a regular basis.
- **CCE results in more renewable energy:** As the City of Boston charts its course towards carbon neutrality by 2050, CCE is one tool that can allow the City's customers to use their collective spending power to reduce emissions and stimulate more investment in renewables.
- **CCE lowers greenhouse gas emissions:** Boston must achieve significant greenhouse gas reductions in order to meet its climate goals. CCE is a tool to achieve greater renewable energy generation, which, together with other policies designed to make energy use more efficient, can achieve rapid greenhouse gas emission reductions.

We examined electric supply rates, policy design, a recent survey of CCE municipalities, and the impact of CCE procurement on clean energy investment to inform the City's consideration of CCE. We find that the benefits of CCE include competitive rates, maintaining customer choice, gaining rate stability, reducing carbon emissions, and moving towards the City's climate goals.

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# Introduction

The City of Boston has pledged to be carbon neutral by 2050. The City is also working toward an interim target of a 25 percent reduction in its greenhouse gas emissions by 2020, and a 50 percent reduction by 2030. Between 2005 and 2014, the City's emissions dropped by 17 percent due to its efforts to implement energy efficiency and other policies to reduce the use of fossil fuels, but reaching carbon neutrality will require a suite of new programs and policies.<sup>1</sup>

Boston's current greenhouse gas emissions predominantly come from electricity, natural gas, gasoline and diesel, with a majority contribution from commercial emissions, followed by transportation and residential sources.<sup>2</sup> As of 2014, electricity was responsible for 38 percent of emissions from energy use in the City. Boston's electric supply mix comes from the New England regional grid. At the end of 2016, the average regional electric supply was largely produced by natural gas, with only about 9 percent coming from renewable sources.<sup>3</sup> While the use of renewable energy is increasing as a result of policies like the Massachusetts Renewable Portfolio Standard (RPS) law, clean sources are still a relatively small part of our electric supply.

To help drive more renewable energy development in the region, many communities across the Commonwealth are using the buying power of their residents and businesses to support cleaner sources. Through Community Choice Energy (CCE), communities have a tool to address climate change and meet goals such as carbon neutrality. This report explains how CCE works, addresses questions about the impacts of the policy, and discusses benefits and risks of CCE.

## What is Community Choice Energy (CCE)?

Electric customers in Massachusetts have the right of "retail choice." This means that they can choose an alternative "competitive" electricity supplier if they prefer its service to the default electricity supplier. For instance, since 2005, the City of Boston has used a competitive supplier that is lower cost than basic service.<sup>4</sup> If a customer does not choose an alternative supplier, their utility automatically serves their electricity supply needs through "basic service."<sup>5</sup> Regardless of the customer's choice of supplier, the transmission and delivery of electricity are still provided by their local utility.

Through Community Choice Energy —also referred to as Community Choice Aggregation (CCA)—a town or city procures electricity supply on behalf of the residents and businesses in the municipality who are on basic service. CCE allows the town or city to pool customers together to achieve greater bargaining power with electric suppliers, and choose a supplier for customers that do not opt out of the program.

<sup>1</sup> Imagine Boston 2030 Plan at <https://analytics.boston.gov/app/imagine-boston>.

<sup>2</sup> Imagine Boston 2030 Plan at <https://analytics.boston.gov/app/imagine-boston>.

<sup>3</sup> ISO-NE website, <https://www.iso-ne.com/about/key-stats/resource-mix>.

<sup>4</sup> City of Boston website, <https://budget.boston.gov/featured-analysis/energy-management/>

<sup>5</sup> The name of this product depends on the state. In Massachusetts, it is referred to as "basic service." In other states, it is referred to as "standard offer service" or "standard service offer" (among others).

Municipalities use CCE to exercise control over how their electricity is generated. For instance, CCE can be designed to procure more renewable energy than that required by the state's Renewable Portfolio Standard (RPS). Some municipalities in the Commonwealth that use CCE procure five percent above the Massachusetts requirement for Class I renewable energy.<sup>6</sup> In 2017, these towns will procure 17 percent of their energy from Class I renewable resources, compared to the Massachusetts requirement of 12 percent.<sup>7</sup> Boston is proposing to purchase at least five percent more Class I renewable energy than required under the Commonwealth's RPS law.<sup>8</sup>

CCE has been enacted by towns and cities in California, Illinois, Massachusetts, New Jersey, New York, Ohio and Rhode Island.<sup>9</sup> Within Massachusetts, 127 towns have adopted CCE—more than one-third of the 351 municipalities in the Commonwealth (see Figure 1 on the next page).

<sup>6</sup> Massachusetts Class I is defined as generation from solar photovoltaic, solar thermal, wind, small hydropower, landfill gas, marine/hydrokinetic, geothermal, and some biomass. This generation must also be deliverable to New England (that is, be generated in New England or in the adjacent electric regions of New York and nearby Canadian provinces) and have begun operation after 1997.

<sup>7</sup> The Massachusetts RPS requirement for Class I renewable energy currently increases by one percentage point each year.

<sup>8</sup> City Council of Boston, *An Order Authorizing the City of Boston to Adopt Community Choice Energy*, filed August 2, 2017.

<sup>9</sup> Benjamin Mow, NREL blog, September 19, 2017, [https://www.nrel.gov/tech\\_deployment/state\\_local\\_governments/blog/community-choice-aggregation-cca-helping-communities-reach-renewable-energy-goals?platform=hootsuite](https://www.nrel.gov/tech_deployment/state_local_governments/blog/community-choice-aggregation-cca-helping-communities-reach-renewable-energy-goals?platform=hootsuite).

**Figure 1: Approved Community Aggregations in Massachusetts <sup>10</sup>**

Abington	Dracut	Mashpee	Sandwich
Acton	Eastham	Mattapoisett	Seekonk
Acushnet	Edgartown	Melrose	Sheffield
Adams	Egremont	Mendon	Somerset
Aquinnah	Fairhaven	Methuen	Somerville
Arlington	Fall River	Millbury	Sudbury
Ashby	Falmouth	Millville	Sutton
Ashland	Florida	Monterey	Swampscott
Attleboro	Foxborough	Nantucket	Swansea
Auburn	Franklin	Natick	Tewksbury
Barnstable	Freetown	New Bedford	Tisbury
Bellingham	Gardner	New Marlborough	Truro
Berlin	Gloucester	Newburyport	Tynsborough
Bernardston	Grafton	North Adams	Tyringham
Bourne	Great Barrington	North Andover	Upton
Brewster	Greenfield	Northbridge	Walpole
Burlington	Halifax	Norton	Wellfleet
Cambridge	Harwich	Oak Bluffs	Wendell
Carlisle	Hatfield	Orange	West Bridgewater
Carver	Haverill	Orleans	West Brookfield
Charlton	Heath	Oxford	West Springfield
Chatham	Holliston	Pelham	West Stockbridge
Chelmsford	Kingston	Pembroke	West Tisbury
Cheshire	Lancaster	Pittsfield	Westborough
Chilmark	Lanesborough	Plainville	Westford
Clarksburg	Lenox	Plymouth	Westport
Dalton	Leverett	Plympton	Williamsburg
Dartmouth	Lexington	Provincetown	Williamstown
Dedham	Lowell	Rehoboth	Winchendon
Dennis	Lunenburg	Salem	Winchester
Dighton	Marion	Salisbury	
Douglas	Marlborough	Sandisfield	

<sup>10</sup> Mass.gov, "Municipal aggregation," and various Massachusetts town websites, <https://www.mass.gov/service-details/municipal-aggregation>. Note that towns within the Cape Light Compact have jointly implemented CCE: <http://www.capelightcompact.org/>.

# Implementing Community Choice Energy

To implement Community Choice Energy, like many other municipalities, Boston would likely hire an aggregation consultant to purchase electricity on behalf of participating customers in the City. Some municipalities procure five percent more Class I renewable energy than is required by the Massachusetts RPS.<sup>11</sup> Some are going even further, such as Brookline, which is purchasing 25 percent more renewable energy than required, and Greenfield, which is purchasing 100 percent renewables. Boston's consideration of CCE would include analyzing both five percent and 100 percent renewable options.<sup>12</sup>

One important feature of CCE is that residents and businesses can choose to “opt-out” of the program. Customers who are currently on basic service are automatically enrolled in the program but can choose to leave. In some municipalities, customers can opt out at any time. In others, they have an initial 30-day window to choose to leave. If Boston moves forward with CCE, it would make program design decisions such as this, while taking cost and other factors, like its climate goals, into account.

Some municipalities also offer their own version of a “basic” electricity product that is procured by the town but does not include a higher share of renewable energy than the utility's basic service. The current proposal for Boston CCE does not include this option.

## Customer options under CCE:

- 1. Participate.** The customer does not need to act and automatically receives electricity from the CCE supplier.
- 2. Opt-out.** The customer chooses either their utility's basic service or a competitive supplier.
- 3. Opt-up.** The customer chooses a “greener” CCE option for more renewable energy than what is offered under the original CCE, if available.

Municipalities do not give up their electric supply choices once they have adopted CCE. Towns and cities retain the option to solicit bids from electric suppliers and may choose to accept or reject any of these bids. Melrose, Massachusetts was an early adopter of CCE but chose not to pursue the program in 2017 citing high capacity prices that caused their basic service rate (from National Grid) to be lower than competitive options. Melrose has stated that it will reevaluate CCE procurement in 2018.<sup>13</sup> Boston could make similar choices when necessary.

<sup>11</sup> MAPC website, <https://www.mapc.org/our-work/expertise/clean-energy/community-choice-aggregation/>.

<sup>12</sup> City Council of Boston, An Order Authorizing the City of Boston to Adopt Community Choice Energy, filed August 2, 2017. <http://michelleforboston.com/wp-content/uploads/2017/08/CCE-Ordinance-Filed-8.2.17-Meeting.pdf>.

<sup>13</sup> Capacity prices are what customers pay for electric supply to be available—especially during times of high demand. <https://melrose-cea.com/>.



## CCE Costs the Same as or Less Than Basic Utility Electric Service

CCE customers generally pay an electric supply rate that is very close to—and sometimes lower than—what they would pay for basic service from their utility.<sup>14</sup> We looked at Massachusetts towns that currently have programs similar to what is being proposed in Boston, and also are in Eversource's delivery territory: Acton, Arlington, Dedham, Lexington, Natick, Somerville, Sudbury and Winchester.<sup>15</sup> With the exception of Dedham and Natick, these towns started offering CCE in the second half of 2017.

As shown in Table 1 (on the next page), all towns in this group (except Winchester) will save money in the second half of 2017 compared to the Eversource basic service rate. Importantly, this Eversource basic service rate (10.76 cents/kilowatt-hour (kWh) for residential and commercial customers) is not available after December 2017. Basic service rates for the utility change every six months. CCE rates for these towns are locked in for longer periods; for example, both Somerville and Winchester have locked in contracts for 30 months—from July 2017 through the end of 2019.<sup>16</sup> In contrast, Eversource has requested a rate increase of 9 percent for 2018, which would raise the average non-heating residential customer's bill by \$10 a month, according to their filing.<sup>17</sup>

<sup>14</sup> This report focuses on the supply rate only. We do not review transmission, distribution and other aspects of the total electric rate as these would not change with CCE.

<sup>15</sup> This sample includes towns or cities offering a default product with 5 percent additional Massachusetts Class I renewable energy, above the state requirement. We did not include Brookline or Cambridge in this sample because their programs are unique. Cambridge is procuring an additional 1 percent of solar energy (above the state requirement) and Brookline is procuring 25 percent above the state Class I renewable requirement. Lexington is included in the sample but it should be noted that their CCE default product is what they call "100% Green." It includes the 5 percent of additional Massachusetts Class I renewable energy and procures the balance from renewable resources outside of New England.

<sup>16</sup> <https://somervillecce.com/> and <https://winpowerma.com/>.

<sup>17</sup> Eversource, Massachusetts D.P.U. 17-05, June 23, 2017. The increase refers to residential, non-heating customers in Greater Boston. Eversource assumes an average usage of 525 kWh for these customers. <https://www.eversource.com/Content/docs/default-source/ema---pdfs/public-hearings/17-05.pdf?sfvrsn=4>.

**Table 1. CCE vs. Eversource Supply Rates<sup>18</sup>**

	Supply Rate (cents/kWh)	Residential CCE savings (%)	Commercial CCE savings (%)
<b>Eversource Basic Service</b>		<b>10.759</b>	<b>10.764</b>
<b>CCE Program</b>			
<b>Dedham</b>	9.69	9.9%	10.0%
<b>Lexington</b>	10.45	2.9%	2.9%
<b>Somerville</b>	10.54	2.1%	2.1%
<b>Natick</b>	10.71	0.5%	0.5%
<b>Acton</b>	10.72	0.4%	0.4%
<b>Sudbury</b>	10.75	0.1%	0.1%
<b>Arlington</b>	10.76	0.0%	0.1%
<b>Winchester</b>	10.90	-1.3%	-1.2%
<b>Average</b>	<b>10.56</b>	<b>1.8%</b>	<b>1.9%</b>

Several factors explain CCE's lower price when compared to basic service:

- **CCE has low administrative costs.** The costs of running CCE programs are very small on a per kWh basis. Municipalities typically hire an aggregation consultant to manage and procure the electricity supply for them. The fee these services charge is usually based on the amount of energy procured—often one-tenth of a cent per kWh.<sup>19</sup> (One-tenth of cent is less than 1 percent of the average CCE electricity rate shown in Table 1.) Given Boston's size, and because many costs of a CCE program do not increase with the number of customers covered, a lower fee should be a topic of negotiation between the city and contractors bidding on this work. Later in this report we discuss a survey of CCE municipalities that were asked about their own administrative costs related to their programs.
- **Renewable energy is increasingly cost-competitive.** Renewable energy has become more competitive with electricity generated using coal and natural gas—and the cost of renewable generation is expected to continue to decline. We address the impact of CCE on renewables later in this report.

<sup>18</sup> This table reports the supply rate only—not the full electric rate. The CCE rates are available on each town's website: Acton ([www.masspowerchoice.com/acton](http://www.masspowerchoice.com/acton)), Arlington, ([www.arlingtoncca.com](http://www.arlingtoncca.com)), Dedham ([www.dedham-ma.gov/departments/community-electricity-aggregation](http://www.dedham-ma.gov/departments/community-electricity-aggregation)), Lexington ([www.masspowerchoice.com/lexington](http://www.masspowerchoice.com/lexington)), Natick (<http://www.masspowerchoice.com/natick>), Somerville ([www.somervillecce.com](http://www.somervillecce.com)), Sudbury ([www.sudbury-cea.com](http://www.sudbury-cea.com)), and Winchester ([www.winpowerma.com](http://www.winpowerma.com)).

<sup>19</sup> For example, see Somerville's letter to customers: <https://somervilledev.files.wordpress.com/2016/10/somerville-opt-out-eversource-2017-final.pdf>.

- **CCE suppliers are big enough to bargain for the best rates.** While Eversource procures a large amount of electricity in bulk, suppliers of CCE include some of the largest electricity merchants in the country, such as NextEra and Dynegy. These companies own and develop generation and can offer rates that are competitive with those of Massachusetts' utilities. Boston's size and timing of electricity usage may allow the City to get lower rates. For instance, the City's streetlights offer a steady need for electricity during the middle of the night, when other sources of demand are low. As a result, a Boston CCE should be attractive to competitive suppliers.

## CCE Provides More Stable Rates Than Basic Utility Electric Service

CCE often provides more rate stability than basic electricity service. Eversource rates change every six months—sometimes significantly. CCE contracts are typically for a much longer time period than those for basic service. Municipalities with CCE sign contracts that lock in their rates for up to two and a half years—five times the length of Eversource's basic service contract. Through CCE, Boston can lock in rates for a longer period, helping to mitigate price fluctuations that can result from extreme weather and price volatility (among other factors).

When electricity prices are low, locking in a longer-term rate through CCE can be a good value for consumers, protecting them from increasing rates in the future. At present, both renewable energy certificates (RECs) prices and natural gas prices are low.<sup>20</sup> Both are important determinants of the price of electricity in Boston. REC prices are expected to increase in coming years, as renewable targets for New England states grow.<sup>21</sup> Natural gas prices have been low for the last several years and are expected to increase, according to the U.S. Energy Information Administration (EIA).<sup>22</sup>

CCE customers know what they will pay for electricity for up to two-and-a-half years into the future; basic service customers only have the assurance of knowing their electric rates for six months. And in many municipalities, CCE customers can opt-out of CCE at any time.

<sup>20</sup> Renewable Energy Certificates (RECs) are created when a renewable generator produces electricity. These are used across the U.S. to determine compliance with a state's renewable portfolio standard (RPS). <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html>.

<sup>21</sup> Synapse Energy Economics. (2017). *An Analysis of the Massachusetts Renewable Portfolio Standard*. <http://www.necec.org/files/necec/PDFS/An%20Analysis%20of%20the%20Massachusetts%20Renewable%20Portfolio%20Standard.pdf>, p.19.

<sup>22</sup> U.S. Energy Information Association (EIA). (2017). *Annual Energy Outlook 2017 with projections to 2050*. [https://www.eia.gov/outlooks/aeo/pdf/0383\(2017\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf).

## CCE Has Very Low Administrative Costs

CCE programs in Massachusetts have required limited municipal employee time and funding to get started, and even less time and money to run on a regular basis. Mass Energy Consumer Alliance and Boston Climate Action Network's September 2017 survey of municipal town managers and energy or sustainability officers addressed the management and costs of Massachusetts CCE programs. Respondents stressed that their CCE programs required minimal employee time or government money to initiate, and even less time and money to run once operational.<sup>23</sup>

### **CCE Administration Responses Boston Climate Action Network September 2017 Survey**

**ARLINGTON:** "We really don't require anything to keep the program running, staff or money-wise. The only time we need to take action is when the utility updates its rates."

**DARTMOUTH:** "There are no full-time staff to run the program, and the cost to the town is minimal to nothing."

**DRACUT:** "It only costs us about \$250/week to run, and it's actually pretty fun! I've had a lot of feedback from people who wish they hadn't gone with a third-party supplier because what we offer is so much cheaper."

**FALL RIVER:** "The selected energy provider paid for all the mailings and advertising. The city had very few out of pocket expenses to get the program operational. Now that the program is running, there is no material cost to the city, just minimal staff time."

**MELROSE:** "Our program is halted at the moment, but it's been a great experience. We have increased trust in the town, and one of the best outcomes of the program has been consumer education about how their electric bills really work."

**NEW BEDFORD:** "Getting the program up and running took more time, but now it only requires two to four hours per week of staff time."

**SOMERVILLE:** "Implementing CCE was worthwhile for our town; we have set ourselves up to reduce our emissions moving forward, and currently, it's just me running it."

**WINCHESTER:** "There are no town employees dedicated to running the program, as all the materials were supplied by our chosen energy provider."

Survey respondents indicated that one of the most challenging aspects of implementing a CCE program was effectively communicating it to residents, noting in many cases that the bulk of government employee time was spent responding to public inquiries and opt-out requests shortly following the program launch. This suggests that communicating about CCE is critical to its success.

All of the survey respondents indicated that they believe implementing a CCE program was worthwhile, and would recommend it to other municipalities.

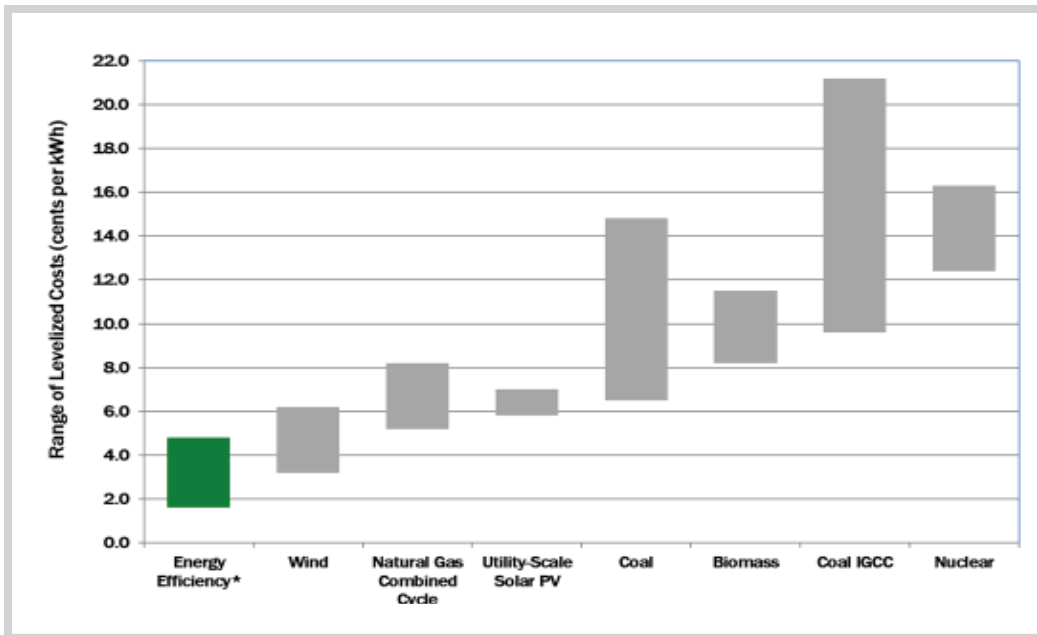
<sup>23</sup> Personal communication, Mass Energy and BCAN staff, September 2017. Note that some of the quotations presented in this report from the survey have been condensed for clarity.

## CCE Results in More Renewable Energy

As Boston takes additional steps to meet its goal of carbon neutrality by 2050, it will need to consider a range of options. Fortunately, energy efficiency and renewable energy provide low-cost options for Boston to meet its energy needs that can either beat or match the costs of natural gas generation, which currently accounts for as much as half of the region's electric generation.<sup>24</sup>

Energy efficiency measures and wind generation are competitive with (and often less expensive than) natural gas generation today (see Figure 2, which reports the range of costs per kWh to produce electricity from different energy sources nationwide). The cost of large-scale solar installations is approximately on par with that of natural gas generation, but solar has the added benefit of protecting consumers from the risk of rising fuel prices. While specific costs differ for New England, the basic ordering of these costs (energy efficiency with the lowest cost, then wind, then solar and natural gas) holds.<sup>25</sup>

**Figure 2. U.S. comparison of costs for types of electric resources, 2016**



**Source:** Reproduced from ACEEE 2016, <http://aceee.org/sites/default/files/cost-of-ee.pdf>. Energy efficiency program portfolio data from Molina 2014; all other data from Lazard 2016. High end range of coal includes 90 percent carbon capture and compression.

<sup>24</sup> ISO-NE website, <https://www.iso-ne.com/about/key-stats/resource-mix>.

<sup>25</sup> Lazard 10.0, <https://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf>.

Over the next ten years, wind and solar prices are expected to fall while the price of natural gas rises:

- **WIND:** The cost of on-shore wind systems is expected to fall 32 percent by 2030.<sup>26</sup>
- **SOLAR:** The cost of photovoltaic systems is expected to fall 30 to 65 percent by 2030.<sup>27</sup>
- **NATURAL GAS:** The cost of the natural gas used for electric generation, according to one source, is expected to rise steadily from \$2.50 per million BTUs in 2016 to between \$3.74 and \$7.97 in 2030 (an increase of 50 to 220 percent).<sup>28</sup>

Emissions from natural gas are far lower than those from burning oil and coal, but natural gas generation is far from carbon neutral. Natural gas generation facilities pose potential land use and water quality issues for their surrounding communities, and natural gas extraction and transportation via pipelines causes extensive environmental damage through air pollution, water pollution, and even increased exposure to earthquakes from hydraulic fracturing (fracking).<sup>29</sup>

The Commonwealth's Global Warming Solutions Act commits the Commonwealth to continual year-by-year reductions in greenhouse gas emissions (see Figure 3 on the next page). Total statewide emissions, as well as emissions from the electric sector must be reduced rapidly, and must continue a steady decline over time. Fossil fuels, including natural gas, currently our primary fuel for electric generation, will gradually be phased out in order to meet these legally mandated limits.

Similarly, as the City of Boston charts its course towards carbon neutrality by 2050, fossil fuels will increasingly be replaced by efficiency and renewable energy. CCE is one tool that allows the City's customers to use their collective spending power to reduce emissions and stimulate more investment in renewables. Combined with a range of other actions, CCE can be a part of Boston's efforts to meet its climate goals that can be implemented relatively quickly.

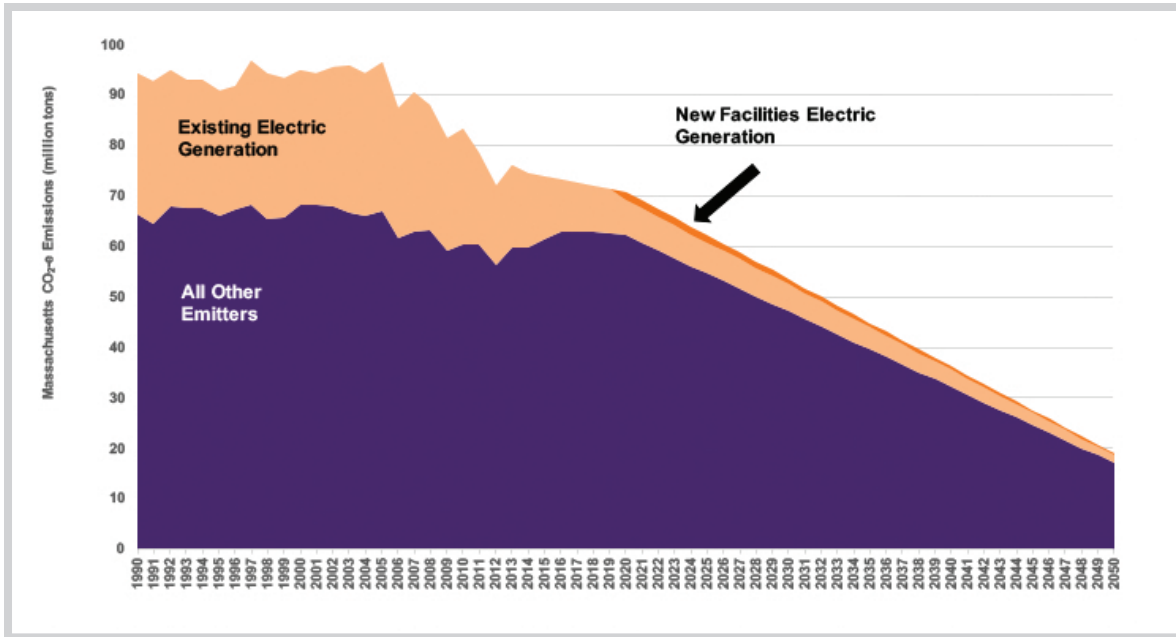
<sup>26</sup> Mone, Hand, Bolinger, et al. (Revised May 2017). 2015 Cost of Wind Energy Review. National Renewable Energy Library (NREL). <https://www.nrel.gov/docs/fy17osti/66861.pdf>, p.54.

<sup>27</sup> Feldman, Margolis, Denholm & Stelki. (2016). Exploring the Potential Competitiveness of Utility-Scale Photovoltaics plus Batteries with Concentrating Solar Power, 2015-2030. National Renewable Energy Library (NREL). <https://www.nrel.gov/docs/fy16osti/66592.pdf>, p.9-10.

<sup>28</sup> The higher estimate comes from EIA's "Low oil and gas resource and technology scenario" and the lower estimate comes from EIA's "High oil and gas resource and technology scenario". EIA, Annual Energy Outlook 2017, <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=1-AEO2017&region=0-0&cases=ref2017~highrt~lowrt&start=2015&end=2030&f=A&sourcekey=0>.

<sup>29</sup> Union of Concerned Scientists. (Accessed 20 September 2017). <http://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/environmental-impacts-of-natural-gas#.Wba5pcYkphE>.

**Figure 3. Massachusetts greenhouse gas emission reductions requirements**



**Source:** Applied Economics Clinic based on Massachusetts DEP data.

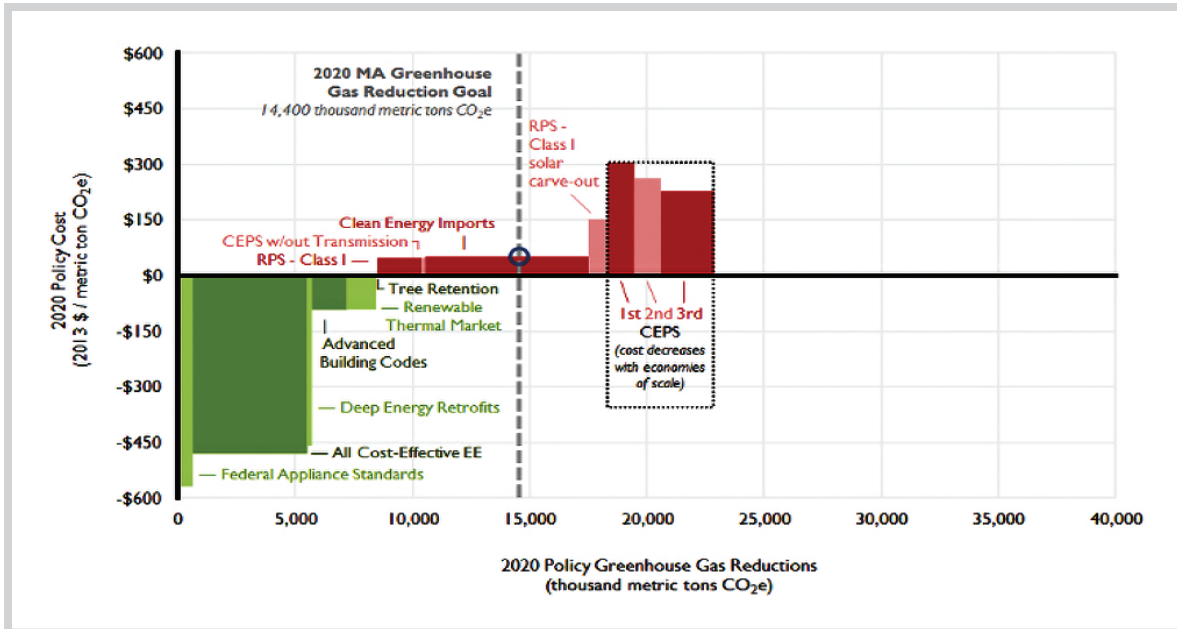
Some large cities offer CCE with high amounts of renewable energy as a default. For instance, Cleveland, Ohio renewed its CCE contract in 2015, and offers 50 percent of energy from renewable sources, with an opt-up option to 100 percent for a slightly higher rate. Other communities are pursuing next generation CCE policies with ambitious renewable energy production and emission reduction aims, including programs that directly finance local renewable development. Though the specifics differ, these policies are sometimes referred to as “CCA 2.0.” Examples include San Jose, California, which will launch the largest CCA 2.0 program in the state in 2018, offering at least one option with 10 percent more renewable energy than the default supplier, and a 100 percent greenhouse gas-free option. Boston could consider these options as it investigates CCE, or in the future.

# CCE Lowers Greenhouse Gas Emissions

As Boston continues to plan for meeting its climate goals and achieving carbon neutrality by 2050, it will need to consider and implement a range of options—including energy efficiency, clean transportation, and perhaps even offsets. To meet its goals, Boston will have to invest in renewables via policies like CCE, as well as continuing to promote and invest in energy efficiency.

Energy efficiency is the cheapest way to meet Boston’s energy needs: It costs less to help consumers reduce their electricity usage than it would to generate that electricity. In Massachusetts, energy efficiency programs and measures, appliance and building standards and codes, and assistance with modernizing older, less efficient homes and work places all save more money than they cost (see Figure 4). In net terms, these measures have negative costs for the state (in other words, they pay for themselves and then some).

**Figure 4. Comparison of costs for types of mitigation actions in Massachusetts**



**Source:** Stanton. (2014). Testimony Regarding the Cost of Compliance with the Global Warming Solutions Act. Testimony to the Commonwealth of Massachusetts Department of Public Utilities on behalf of the Massachusetts Department of Energy Resources and the Department of Environmental Protection. Docket No. DPU 14-86. [https://static1.squarespace.com/static/5936d98f6a4963bcd1ed94d3/t/596ccea5016e11a7a51c3dd/1500303019940/RebuttalTes\\_MA\\_3Dec14.pdf](https://static1.squarespace.com/static/5936d98f6a4963bcd1ed94d3/t/596ccea5016e11a7a51c3dd/1500303019940/RebuttalTes_MA_3Dec14.pdf), p.37.



Greater investments in energy efficiency and renewable energy sources—both in the City and in the region—will be needed to meet climate goals. CCE is one of many tools for promoting renewable generation, together with policies designed both to make energy use more efficient and to supply more energy from renewable resources like wind and solar.

Electric generation is a significant contributor to Boston's greenhouse gas footprint—producing more than a third of the city's greenhouse gas emissions. As a part of its 2014 Climate Action Plan, the City of Boston adopted a short-term goal to reduce emissions by 25 percent by 2020 (from a 2005 baseline) and a long-term goal to reduce emissions by 80 percent by 2050. In his 2017 State of the City address, Mayor Walsh announced a new long-term goal, that Boston will achieve carbon neutrality by 2050. Boston's Climate Action Plan is scheduled to be updated every three years, with the next report expected later in 2018.

**“We are America’s climate champion, with a target date of 2050 for going 100% carbon neutral.”** – Marty Walsh, Mayor of Boston

CCE would result in investment in new renewables and a cleaner electric grid, while reducing Boston's greenhouse gas emissions. Based on Mass Save data on Boston customers, we estimate that residential CCE participants adding five percent of renewables on to Boston's RPS requirements would generate 64 gigawatt-hours of additional renewable energy in New England each year.<sup>30</sup> (For comparison, Boston's total residential annual electricity usage in 2015 was 1,414 gigawatt-hours.<sup>31</sup>) Five percent of participants' residential electricity usage is the equivalent of fourteen 1.5 megawatt wind turbines (each the size of the turbine installed in Charlestown by the Massachusetts Water Resources Authority).<sup>32</sup> That's over 33,000 tons of carbon dioxide emissions each year that could be avoided by Boston's adoption of CCE.<sup>33</sup> This would be the equivalent of removing more than 6,400 cars from Boston's streets and highways.<sup>34</sup> More renewable energy on the system also tends to lower electricity prices and protect consumers against fuel price volatility.<sup>35</sup>

<sup>30</sup> This calculation assumes 2015 residential usage from Mass Save: 1,414,324 MWh for Boston (available at: (<http://www.masssavedata.com/Public/GeographicSavings?view=T>); a CCE program with a 5 percent increase in Class I renewable energy; and a 90 percent CCE participation rate for Boston residents.

<sup>31</sup> Mass Save Data for 2015. <http://www.masssavedata.com/Public/GeographicSavings?view=T>

<sup>32</sup> See: Using Wind Energy to Power the City. July 2016. Available at: <https://www.boston.gov/departments/environment/using-wind-energy-power-city>. We are assuming a wind turbine with a 35 percent capacity factor.

<sup>33</sup> Based on a marginal New England emissions rate of 1,036 pounds of carbon dioxide per megawatt-hour of displaced generation: (ISO-NE: [https://www.iso-ne.com/staticassets/documents/2016/10/2015\\_emissionsupdate\\_20161101.pdf](https://www.iso-ne.com/staticassets/documents/2016/10/2015_emissionsupdate_20161101.pdf)).

<sup>34</sup> Based on US EPA's data for a typical passenger vehicle: 5.2 short tons (or 4.7 metric tons) of carbon dioxide emitted per vehicle, per year. (US EPA: <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle-0>)

<sup>35</sup> ISO New England. (2016). *2016 Regional Electricity Outlook*. [https://www.iso-ne.com/static-assets/documents/2016/03/2016\\_reo.pdf](https://www.iso-ne.com/static-assets/documents/2016/03/2016_reo.pdf), p. 28.

## Conclusion: CCE Benefits Outweigh Risks

Our examination of electric supply rates, policy design, a recent survey of CCE municipalities, and the impact of CCE procurement on clean energy investment, supports the City's actions to adopt CCE. Benefits that would come from Boston's adoption of CCE include:

- **Greenhouse gas emission reductions.** Participating in a CCE program allows Boston's households and businesses to contribute to helping the city lower its greenhouse gas emissions and take a step toward achieving its climate goals.
- **Customer choice.** CCE maximizes flexibility so that customers can stay with CCE, opt-out, or opt-up in programs that offer higher levels of renewable energy. In addition, Boston retains flexibility and can decide whether and when to participate in CCE procurements.
- **Boston's size should lead to competitive rates.** It is likely that due to its size, Boston would receive bids from CCE suppliers that were competitive with Eversource's basic service rates. If, however, that were not the case in some future year, the City retains its flexibility to delay or defer signing a new CCE contract.

CCE has few risks. Adopting CCE does not prevent Boston from pursuing more energy efficiency or local, distributed generation through other policies and programs, which can all work in tandem as their ultimate goals are well-aligned. When designed properly, CCE results in minimal to no extra costs, supports renewable energy development, and is one of many actions that the City can take to achieve its climate goals.



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