Spring 2022 Update

Celebrating 40 years!

GREEN POWER AT LOWER COST

Municipal Aggregation is a Huge Success in Massachusetts

GREEN ENERGY CONSUMERS ALLIANCE

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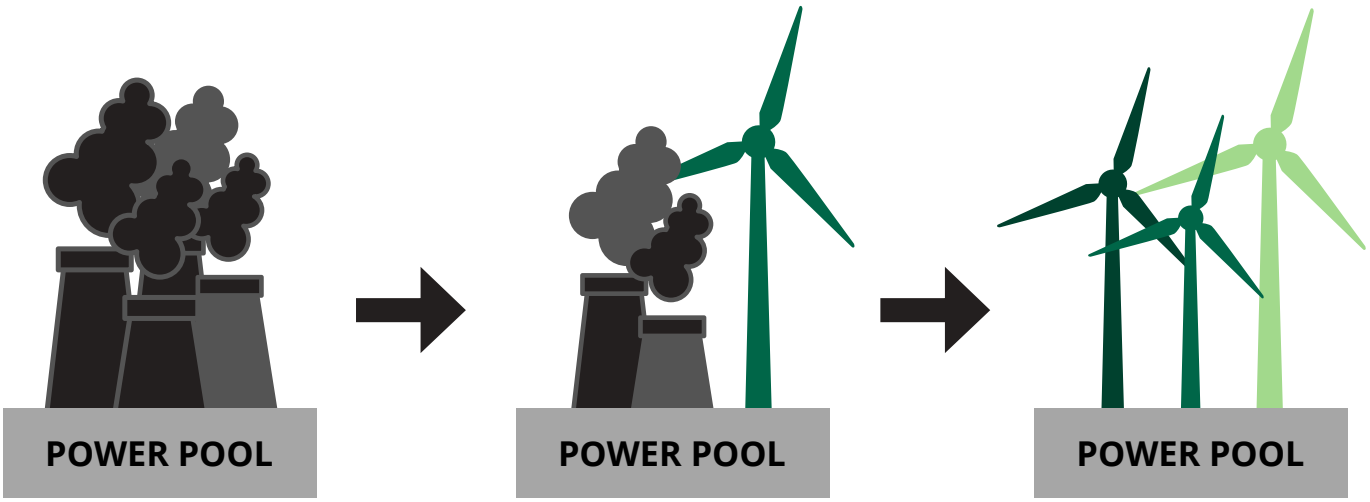
PREFACE

Communities in Massachusetts have been able to aggregate electricity supply for their constituents for many years. Recently, many cities and towns across the state have taken advantage of this ability to contract for electricity supply for their residents while also adding in more renewable energy than required by state law. This is a model called, descriptively enough, “Green Municipal Aggregation” (GMA). Green Energy Consumers Alliance developed GMA in collaboration with Good Energy, LLC, an energy consultant to municipalities. We supply renewable energy to many such communities. The data we have compiled over the past few years demonstrates that aggregation has been incredibly effective at increasing renewable energy content while also stabilizing, and even reducing, electricity supply rates for a growing number of cities and towns.

This report is intended to benefit people in communities who have an interest in energy and climate change, as well as public officials who have the authority and, in our view, the responsibility to move solutions forward. We are not shy about saying that this report covers municipal aggregation or community choice aggregation, whichever you prefer to call it, from our perspective here at Green Energy Consumers Alliance. We know more about the communities that we are working with directly and think the approach we have jointly taken is the best one to serve residents of the Commonwealth and advance our climate goals. However, we will also report on cities and towns outside our sphere; we have tried our best to be accurate.

GMA is at the core of our mission. We look forward to serving even more cities and towns in the years ahead as the Commonwealth transitions from fossil fuels imported from outside New England to clean renewable energy generated right here in Massachusetts.



WHAT IS GMA?

Our mission at **Green Energy Consumers Alliance** is to harness the power of energy consumers to speed the transition to a low-carbon future. We do so by advocating for sound public policy and by operating programs that help consumers access clean energy technologies to reduce their personal greenhouse gas (GHG) emissions. Information about our programs and advocacy work is available **on our website**.

This paper describes a community-based energy model, **Green Municipal Aggregation** (GMA), which we pioneered. It has proven to be greatly successful at reducing carbon emissions cost-effectively and equitably by increasing the demand for renewable energy.

Municipal aggregation is the process by which a municipality (a town or city) purchases electricity in bulk from a competitive supplier on behalf of the residents and businesses within the community. The fundamental characteristic that distinguishes GMA from traditional aggregations is that the default electricity supply in a GMA includes more Class I renewable content than required by the Massachusetts Renewable Portfolio Standard (RPS) and Clean Energy Standard (CES).

As of June 2022, Green Energy Consumers Alliance serves several GMAs by supplying them with renewable energy over and above the amount required to meet the state mandates: Arlington, Bedford, Brookline, Dedham, Fairhaven, Gloucester, Hamilton, Medford, Melrose, Millis, Milton, Rockland, Somerville, Stoneham, Waltham, Westford, and Winchester. Green Energy Consumers Alliance also supplies additional renewable energy for consumers in these communities who opt-up to 50%, 65%, or 100% renewable energy content.

Our work in aggregation stems from a long history of offering consumers effective and affordable clean energy solutions. In 1998, our organization became one of the first in the country to market a retail green power product, offering consumers the opportunity to support electricity from renewable energy separately from their utility bills (at that time, solar and landfill gas). In 2002, we launched a product called New England Wind, which allowed consumers the opportunity to similarly support local wind energy. The Hull 1 wind turbine was the first wind project in our portfolio and the first utility-scale wind turbine in the Northeast. Our purchase of Renewable Energy Certificates (RECs) from Hull was probably the first of its kind in New England. Today, our **Green Powered program** serves thousands of households and businesses who have decided to voluntarily buy green power. The Green Powered program is the foundation upon which we have built the Green Municipal Aggregation (GMA) model with **Good Energy, LLC**.

This paper is intended to serve as a resource to citizens and public officials wishing to understand Green Municipal Aggregation and communities considering GMA as part of a comprehensive community-scale clean energy and climate plan. Additional resources for technical assistance and next steps are included at the end.

Throughout this report, we will frequently refer to Renewable Energy Certificates (RECs), particularly those that qualify as “Class I.” If you are unfamiliar with these terms, see the appendix for a primer. Both ideas are fundamental to understanding the GMA approach!

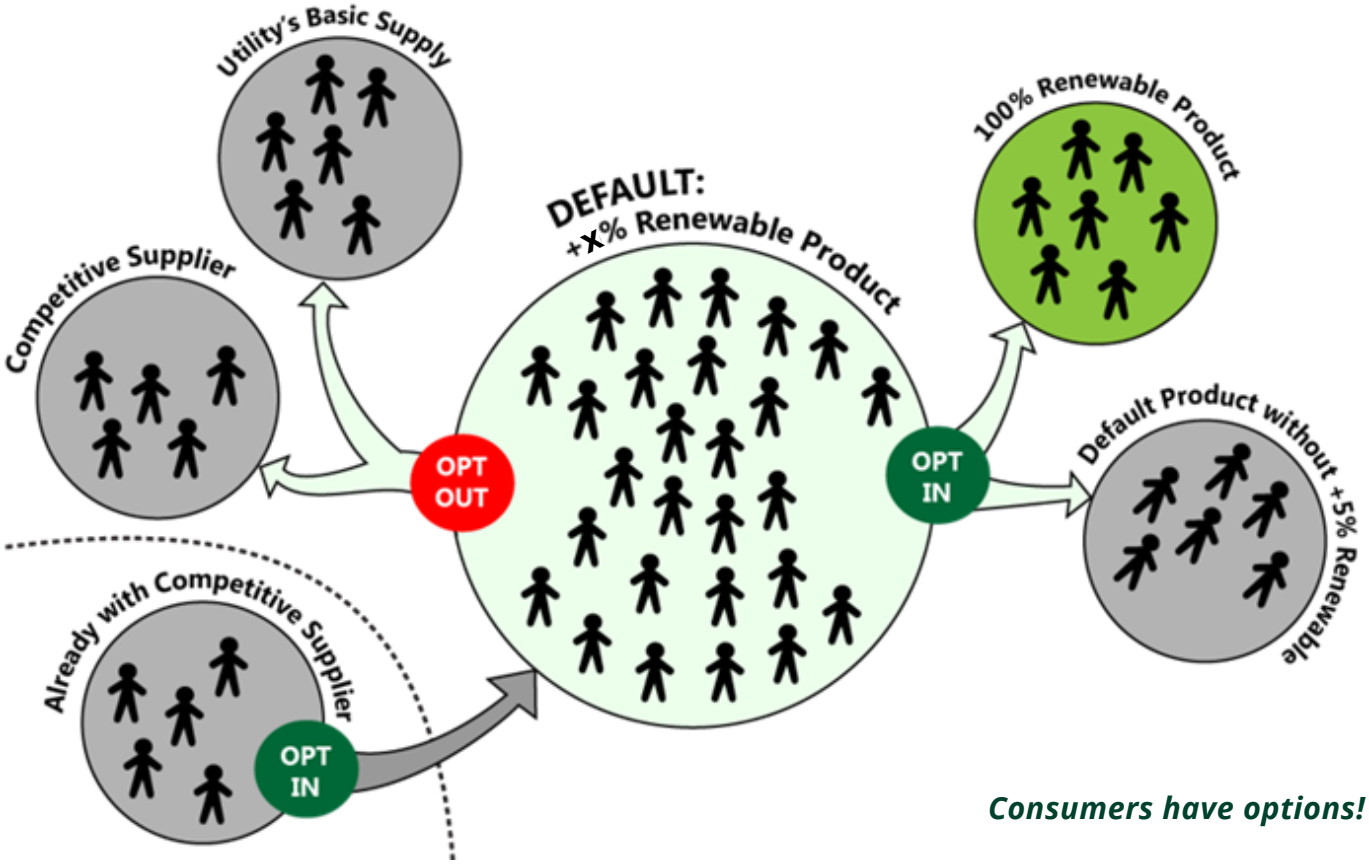
For more information, visit **www.greenenergyconsumers.org/aggregation**.

KEY ATTRIBUTES OF GMA

The “news value” of this report is that we can point to empirical data that explains how effective GMA is with respect to financial cost and environmental impact, but GMA has other attributes that are worthy of attention.

The significant environmental benefits of increasing renewable energy content via GMA are derived **without public subsidy**. Green Energy Consumers Alliance supports subsidies for clean energy when the subsidies are needed, but the additional renewable energy brought onto the grid by GMA doesn’t require direct investment from state or local government. Rather, it comes about through managed competition enabled by local government and is subject to the assent of every participant.

GMA is perhaps the most **socially equitable** clean energy intervention available today. Everyone benefits from renewable energy, even people who live outside the community, outside the Commonwealth, or even in other countries. Furthermore, ratepayers have every opportunity to opt-out of the aggregation without penalty or to opt-down should they wish to save a few dollars per year.



Consumers have options!

GMA also guarantees **certainty.** Consumers benefit from stability in their electricity prices and the knowledge that the additional "green" content in their energy mix is having an impact on the New England grid (as long as it is Class I) and not just "greenwashing." According to the agreement with suppliers, RECs, which certify the "greenness" of the electricity, must be retired on the consumers' behalf. The community and its constituents take on no risk related to financing, project siting, generation, and the like.

GMA enhances the benefits of **electrifying transportation and heating**. According to the Massachusetts Clean Energy and Climate Plan (CECP), by 2030, the Commonwealth will need close to a million electric vehicles and a similar number of heat pumps to achieve the CECP's greenhouse gas reduction target of 50% under 1990 levels. Those are daunting figures, implying a huge amount of capital investment and almost two million decisions by ordinary people. An electric vehicle or a heat pump powered by GMA is more potent as a carbon reducer than one that is not. This point is illustrated in Appendix III.

Scalability is another strong attribute of GMA. In Massachusetts, it's available to 310 cities and towns. In addition, when an aggregation goes online, it starts with customers who were previously on the distribution company's Basic Service. Subsequently, new customers to Basic Service or those who were previously with a competitive supplier can join the aggregation, further extending its impact. And each aggregation has the right to increase the percentage of Class I RECs in its default product over time. Finally, within each aggregation, consumers have the option of selecting a product that is 100 percent Class I.

MAPPING THE SUCCESS OF GMA

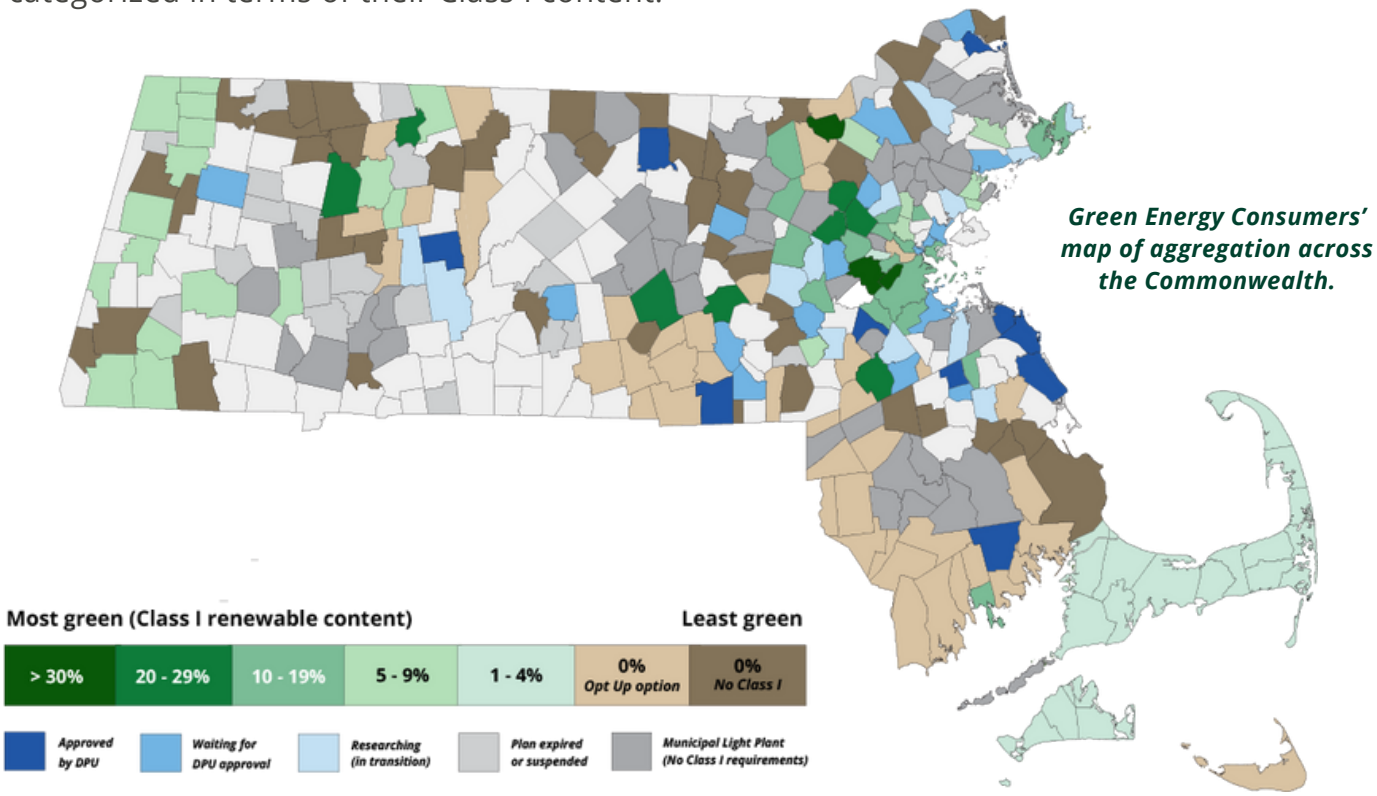
As shown in the map below, 215 cities and towns in the Commonwealth have an approved aggregation plan, have participated in aggregation in the past, are currently researching aggregation, or are waiting to be approved by the DPU. We divide these communities into groups based on the extent to which they include Class I RECs above the requirements of the RPS.

Many of these aggregations have a supply that is the same as Basic Service: this "**brown power**" mix includes just the minimal requirements of the RPS.

Many others have negotiated an aggregation whose default offer includes **less than five percent more renewable content** than the RPS or whose standard aggregation includes an optional offer to opt-up to more Class I RECs.

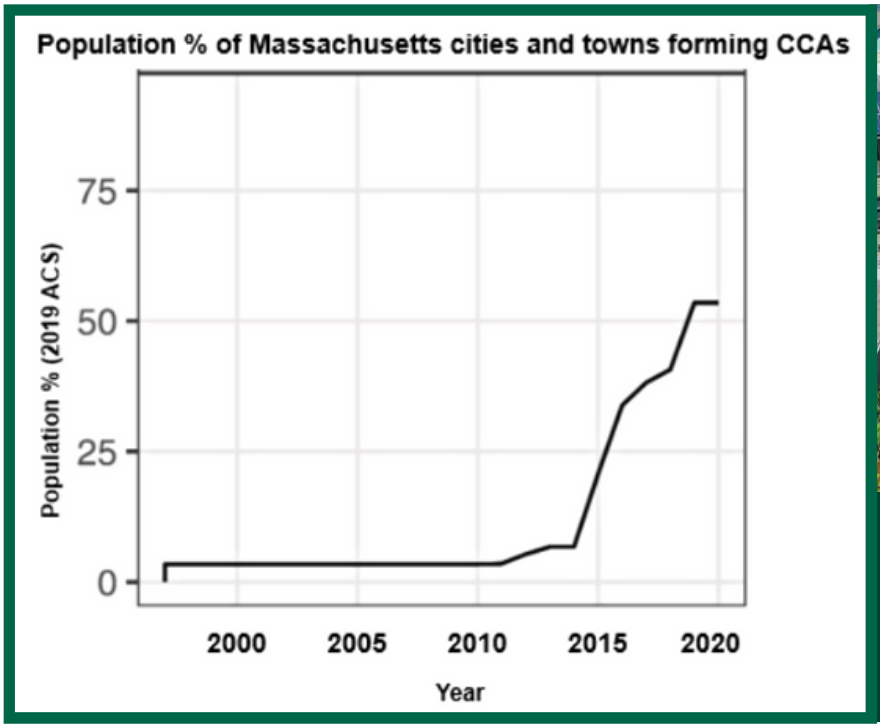
Fifty of the 215 communities, shown in darker green, have aggregations whose default supply includes **five percent or more Class I content**, exceeding the minimum required to comply with the state's RPS and creating the additionality needed to change our grid. This latter group has adopted the GMA model that was developed through a collaboration between Green Energy Consumers Alliance and a consultancy, Good Energy, LLC.

The map below demonstrates how each city and town in the Commonwealth would be categorized in terms of their Class I content.



Green Energy Consumers' map of aggregation across the Commonwealth.

The number of households served by municipal aggregations has more than quintupled since 2015. At the end of May 2022, over half of the households in the Commonwealth were served by municipal aggregation.



Source: *Hsu, David. "Straight out of Cape Cod: The origin of community choice aggregation and its spread to other states." Energy Research & Social Science 86 (2022): 102393*

The map on page 6 shows communities with various shades of aggregation, not just the ones served by Good Energy and Green Energy Consumers Alliance. Again, we are only counting what we believe to be the demand for **Class I Renewable Energy Certificates** (RECs). We made educated estimates about the communities that we do not serve based on our specific and detailed knowledge of the communities that we do serve. According to our analysis, in 2022, aggregation programs in Massachusetts will add over 1 million megawatt-hours (aka 1,000 gigawatt-hours (GWh)) per year of demand for Class I renewable energy above and beyond the RPS. In fact, aggregations are increasing demand statewide for Class I RECs beyond the RPS by about 11%.

For some perspective, 1,000 GWh per year is enough power to meet the energy needs of over 150,000 homes. To put it yet another way, a good-sized, well-sited wind turbine can generate about 3,500 megawatt-hours per year, so aggregation will soon be supporting the equivalent of about 300 such wind turbines.

While 1,000 GWh is impressive, there still remains potential for growth. If all residential consumers in Massachusetts participated in a GMA program with an average renewable energy content of 10% above the RPS, that would result in a demand for 1.6 GWh annually, or 60% more than what we estimate could be in place by 2023.

OUR IMPACT

Affordability

Based on our experience working with several communities, we know that adding Class I RECs to the mix raises costs for the retail consumer. However, the incremental increase in cost associated with the RECs can be exceeded by the incremental decrease associated with the overall electricity rate, thus producing net savings to the retail customer. **This is the magic of GMA!**

For the purpose of this report, we are providing quantitative data on a large cohort of current GMA communities. We focused on 38 Massachusetts cities and towns with between 5% and 11% of additional renewable MA Class I content (to be clear, this cohort does not include aggregations with less than 5% or more than 11% Class I content).

We looked at their aggregation rates (default product) compared to their respective utility's Basic Service rates (National Grid from December 2018 to April 2022 and Eversource from August 2017 to June 2022). Our calculations show that residential consumers in that cohort of 38 communities saved an average of 1.36 cents per kilowatt-hour (kWh).

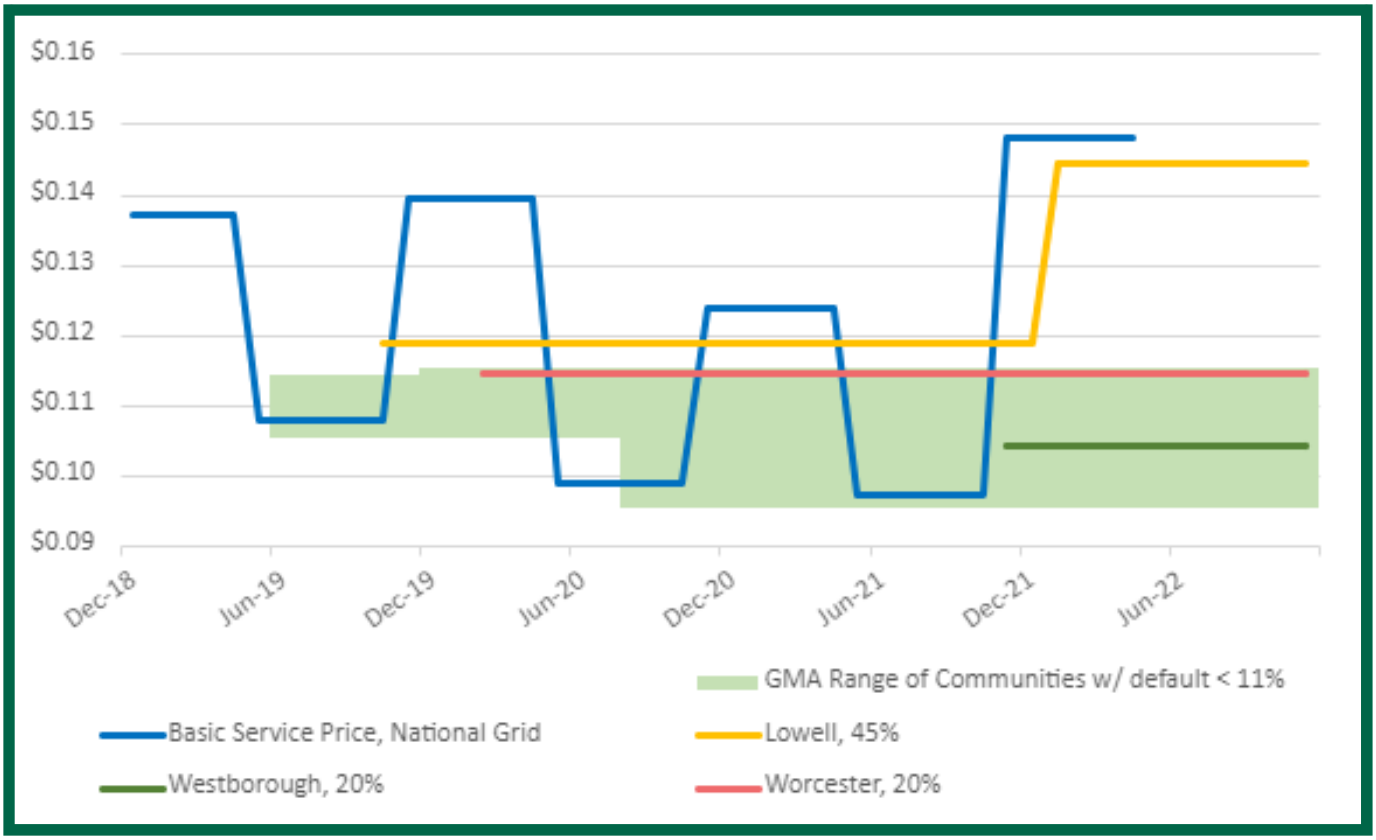
	National Grid	Eversource	Aggregations 5 - 11 %	Average savings vs. Basic Service
Min $ / kWh	$ 0.09707	$ 0.09877	$ 0.09534	$ 0.00173
Max $ / kWh	$ 0.14821	$ 0.15370	$ 0.11537	$ 0.03833
Avg $ / kWh	$ 0.12146	$ 0.11999	$ 0.10715	$ 0.01357

Period analyzed based on timing of aggregations and data available (as of March 2022)

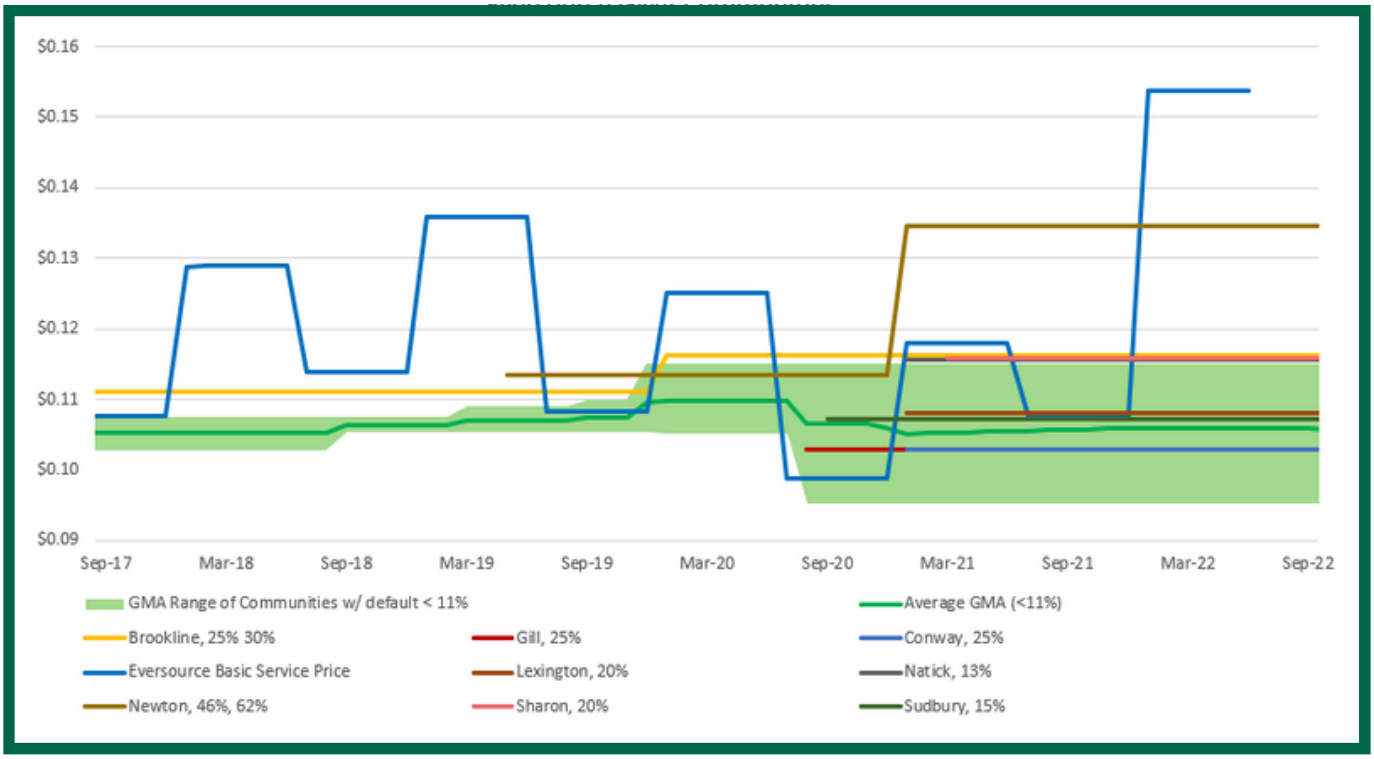
National Grid: December 2018 - April 2022
Eversource: August 2017 - June 2022

We broke down the cohort into two groups - the Eversource communities separated from the National Grid communities:

National Grid GMA Communities



Eversource GMA Communities



For the average consumer using 6,000 kWhs per year, the savings amount to $78 per year. If we extrapolate statewide and assume that every residential customer of National Grid, Eversource, and Unitil participated in an aggregation like those in this group, savings would be $208 million per year across the Commonwealth.

Breaking News for Eversource Ratepayers:

On May 20, Eversource announced that its residential Basic Service rate for eastern Massachusetts communities (July 1, 2022 through December 31, 2022) would be at an all-time high of 17.871 cents per kWh. This will compare to the average aggregation rate for the same period of approximately 11 cents per kWh. The difference of almost seven cents per kWh amounts to $35 per month for the consumer using 500 kWhs per month, or $210 for the six-month period.

Protection Against Predatory Competitive Suppliers

Attorney General Healey has **commissioned three reports** comparing what consumers have paid to competitive electricity suppliers to what they would have paid had they stayed on utility Basic Service. Over five years, consumers paid $426 million more on electricity than necessary, an average of $85 million per year. Low-income consumers are twice as likely to pay these higher bills than other customers. These consumers would benefit greatly if their communities had active aggregations.

Locally-Grown Energy

According to the Mass. Department of Energy Resources, in 2019 (most recent reported data), 40% percent of the Class I renewable energy used to comply with the state's Renewable Portfolio Standard was from projects located in Massachusetts. In that same year, 86% of the Class I renewable energy supplied by Green Energy Consumers Alliance to aggregations was from projects located in Massachusetts.

A BARRIER TO SUCCESS:
THE MASS. DEPARTMENT OF PUBLIC UTILITIES

For approximately the last three years, the Massachusetts Department of Public Utilities (DPU) has been extraordinarily slow in approving new aggregation plans and minor amendments to existing plans. In many cases, cities and towns have waited longer than a year for approval. This, consequently, delays both the savings they could be enjoying and the amount of renewable energy they could have put onto the grid.

Nearly two years ago, we wrote a blog about the DPU backlog. Unfortunately, the situation has not improved.

As of late May 2022, these communities are still waiting for DPU approval: Amesbury, Andover, Beverly, Bolton, Burlington, Chelsea, Mendon, North Brookfield, Quincy, Sherborn, Stoughton, and Weston. Of those, Weston's application has been waiting longest; the town filed on October 29, 2020. The most "recent" filing was on July 9, 2021, by Andover.

The DPU has also been slow to approve minor amendments. Many communities have been waiting for several months for approval just to add a voluntary product for consumers who would like to opt-up to 100 percent renewable energy.

For a few years now, over 100 communities have been offering a product with one percent or more Class I renewables. Many of those are now contemplating ways to enhance their aggregations with innovations of various kinds, such as those involving distributed energy resources and assistance to low-income people. Anecdotally, we know that concerns about how (and how long) the DPU would treat such proposals have caused municipalities to withhold from filing plan amendments.

FINAL THOUGHTS

The primary purpose of this report was to highlight, with hard data, how Massachusetts cities and towns can affordably increase the renewable energy content of electricity supply. But this is not the final word on aggregation.

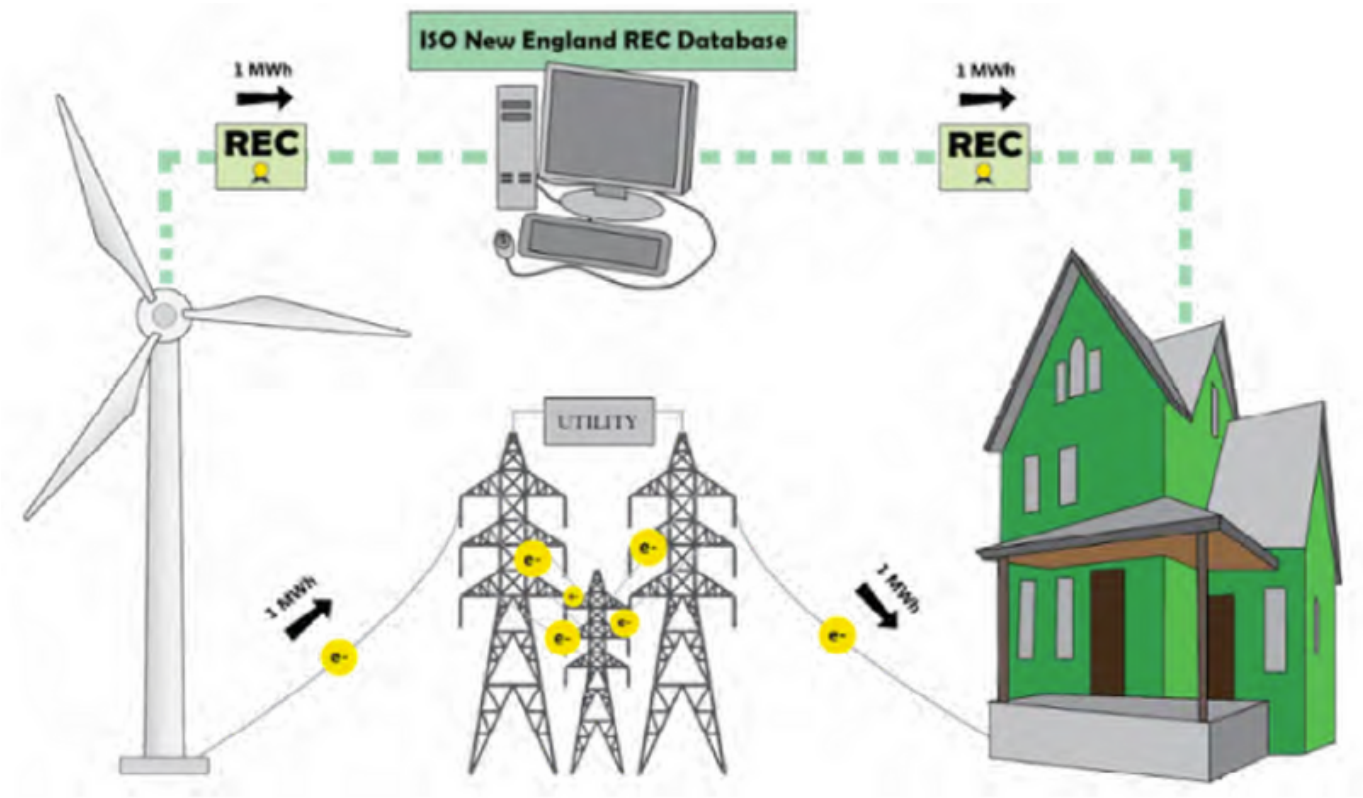
Here are some ideas on what you can do from here:

- **Subscribe to our blog**. We often write about developments regarding green electricity and aggregation.
- Occasionally check out our website's **aggregation page**. But if you subscribe to our blog, you'll get notified of updates in real-time.
- Check out our **events page**. We often have webinars about GMA and many other clean energy issues.
- Look closely as to what color your community is on our map. If it's brown or light green, work to make them greener. Contact us if you need ideas.
    - aggregation@greenenergyconsumers.org
- Spread the word. Pass on your new knowledge to friends and family.

APPENDIX I

RECs in the New England Electric Grid

Electricity consumers in the six New England states are served by a regional power grid. The grid accepts electrons from generators throughout the region – natural gas facilities, hydroelectricity plants, nuclear, and more. Once an electron leaves its source and enters the power grid, it is moved to the nearest transmission station or electricity user at the moment, but one can never know precisely which generator produced an exact electron. However, when renewable electricity is generated, it creates two things: electrons and a Renewable Energy Certificate (REC). The holder of the REC is entitled to claim the environmental and other non-energy attributes of the generation. Once on the grid, there is no way to track specific electrons, but the REC is quantifiable and traceable.



One REC is produced for every megawatt-hour (MWh) of electricity generated by a wind turbine, solar panel, or another renewable generator. Once created, a REC is sent to an electronic database administered by NEPOOL. This database is known as the "Generation Information System" (GIS) and serves as a tracking mechanism that helps to avoid double counting claims of green power purchases.

We know how many MWhs a given resource feeds into the regional electric grid, and thanks to RECs, we know who is claiming to use each and every one. Therefore, if an entity wishes to claim it is consuming renewable energy, it must purchase one REC for every MWh it consumes, and that REC must be retired rather than resold.

The GIS was created to facilitate a trading system that would allow renewable energy generators to be paid a production incentive or extra revenue over and above what the electricity market could provide. It is based upon a policy construct that acknowledges the additional value that renewable energy promises in comparison to fossil fuels.

APPENDIX II

The Importance of Going Class I

There is a lot of renewable energy that would be produced whether or not someone bought the Renewable Energy Certificate. The salient question is whether the REC purchase is promoting additionality, or creating the demand necessary to bring one more renewable MWh onto the grid and verifiably reducing greenhouse gas reductions.

In places like Texas, huge renewable energy projects can be sited and built for less per kWh than it costs to build in New England. Because of the low cost to build the project and other renewable incentives, revenue from RECs is not necessary for project feasibility in these places. Furthermore, these areas tend to have weak RPS mandates because actual supply has surpassed mandated supply, and the law was not revised to keep up. As a result, the voluntary market has been rendered ineffective. Purchasing a REC from Texas certainly has no impact on New England's electric grid. The REC purchase is not even shifting Texas's grid away from fossil fuels; it does absolutely nothing other than enrich a generator that did not require the REC revenue to build and operate.

Purchasing RECs from an old hydropower project located in New England is as ineffectual as buying RECs from a Texas wind project. Some New England hydro facilities have been operating for one hundred years and produce electricity profitably with little or no REC revenue. In fact, large hydropower projects built before 1998 are not eligible for the RPS. Texas wind and old hydro RECs are available on the market for a fraction of a penny per kilowatt-hour (kWh). While non-Class I RECs are inexpensive, the purchase of non-Class I RECs does not certifiably result in a displacement of fossil fuels. In reality, selling non-Class I RECs is greenwashing.

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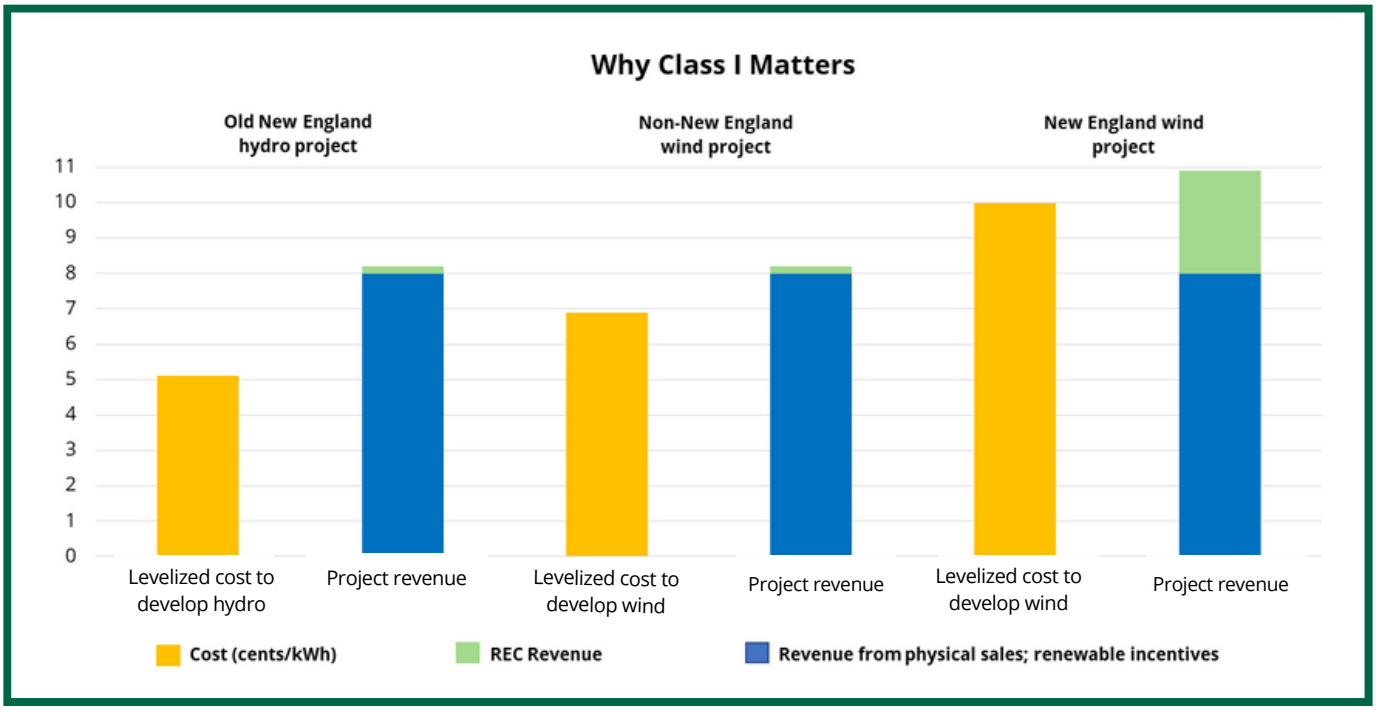
1 Solar, wind, small hydro, digester gas, or geothermal

2 On the New England power grid

3 Built after 1997

The Mass. Renewable Portfolio Standard and the voluntary market for Class I RECs require increasing amounts of renewable energy each year.



It is not that non-Class I projects are unproductive; it is that any REC sales from such projects produce surplus profits for developers and are not consequential to the project economics and therefore do not lead to additionality. Dr. Michael Gillenwater is a leading expert on climate change and renewable energy, with a specific focus on greenhouse gas (GHG) measurement, reporting, and verification issues. According to Gillenwater, the purchase of a REC from such a project does not impact project development. The price of the REC is simply too small to make a difference in project economics. In other words, if a REC's value is close to zero, you get what you pay for.

By contrast, Massachusetts Class I REC prices have rarely fetched less than $10 per MWh and have often traded for more than $50 per MWh or 5 cents per kWh. For Massachusetts Class I projects, the REC market is essential. Therefore, buying one Massachusetts Class I REC has a greater impact than buying a thousand RECs that are not Class I. We see RECs that qualify for the Massachusetts Class I standard as exceptions to Dr. Gillenwater's rule.

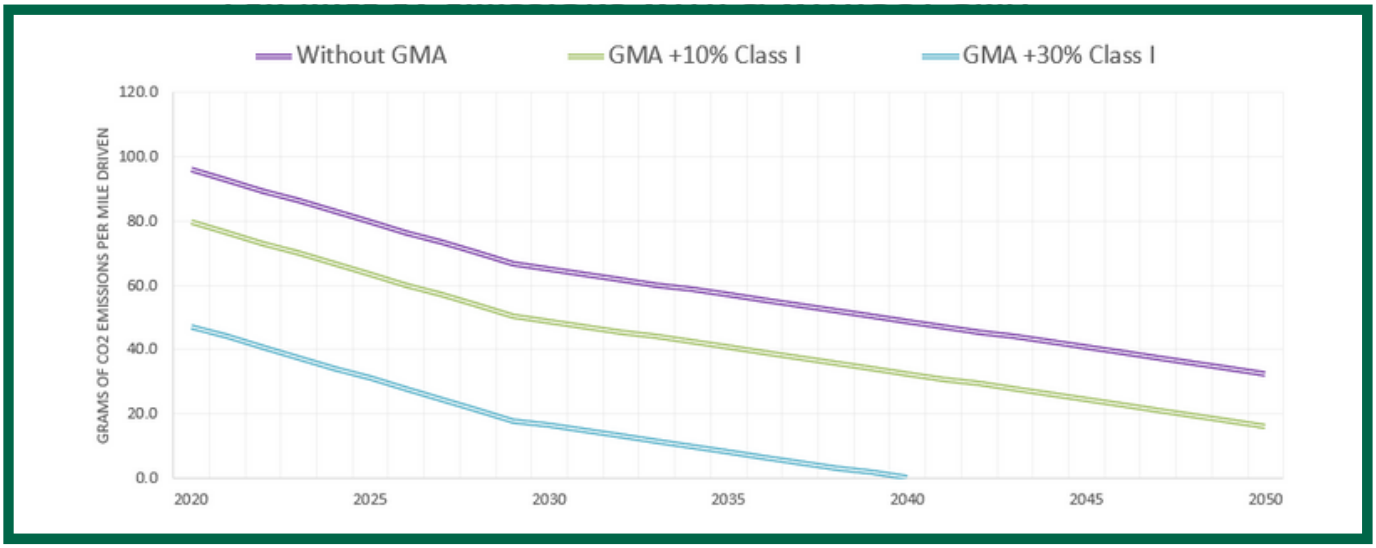
The Commonwealth's leading environmental organizations also agree that Class I RECs are paramount.

APPENDIX III

GMA Leverages Greater Benefits from Electrification

It is time to shift transportation and heating from fossil fuels to electrification. For transportation, that means electric passenger cars, buses, and trucks. A vehicle running on Basic Service is responsible for just 25% of the emissions of an electric vehicle running on gasoline or diesel. The difference will grow over time as the Renewable Portfolio Standard and Clean Energy Standard (CES) displace fossil fuels with zero-emission power. But a car powered through GMA would always have even lower emissions. A similar story can be told regarding homes that switch to high-efficiency heat pumps. Consumers who adopt heat pumps and EVs will reduce their emissions quickly in communities with GMA.

Per Mile EV Emissions With & Without GMA



Heat Pump Emissions With & Without GMA