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April 30, 2018

Massachusetts Joint Statewide Electric and Gas

Three-Year Energy Efficiency Plan

2019–2021

BERKSHIRE GAS

BLACKSTONE GAS COMPANY

Cape Light Compact

Columbia Gas

EVERSOURCE

Liberty Utilities

nationalgrid

Unitil energy for life

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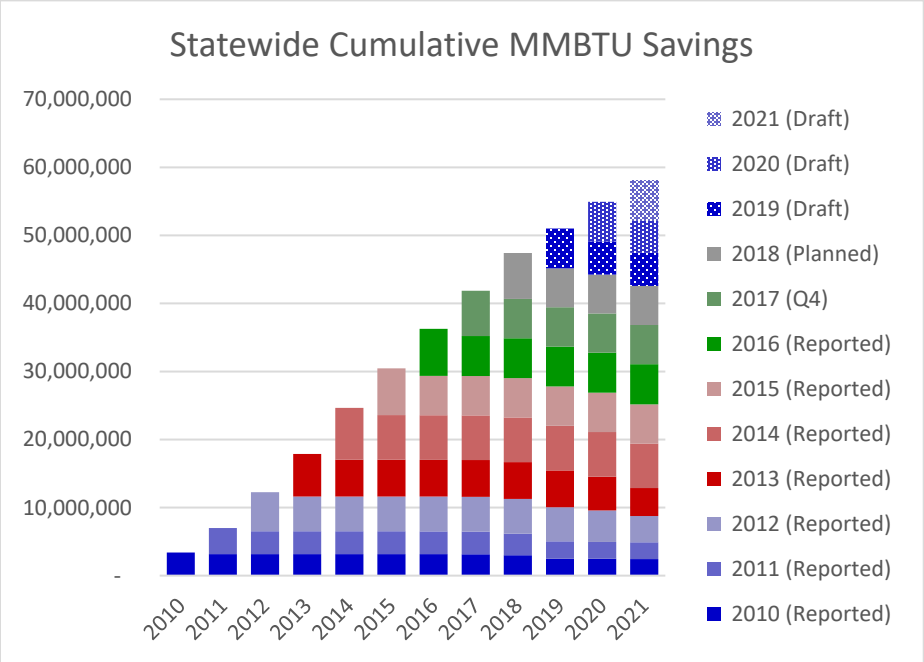
2019-2021 MASSACHUSETTS JOINT STATEWIDE THREE-YEAR ELECTRIC & GAS ENERGY EFFICIENCY PLAN

I. EXECUTIVE SUMMARY

Program Administrators propose a sustained, intense energy efficiency effort in 2019-2021

- The 2019-2021 Three-Year Energy Efficiency Plan builds on the historic success of the energy efficiency programs delivered since the implementation of the Green Communities Act, and represents sustained efforts and creative new ideas to achieve high total energy reductions over the term. The Program Administrators propose a statewide three-year investment in energy efficiency programs of **$2.3 billion** – an investment that saves customers money, helps the environment, and creates and keeps jobs. The proposed gas and electric budgets are comparable to the budgets from 2016-2018. Overall, the plan proposes an aggressive goal of over **207 million MMBTU of total energy savings**, reflecting efforts that will continue to weatherize homes, increase the comfort of customers, make businesses more competitive, and drive down total energy bill costs. The MMBTU goal translates to:
  - Proposed electric lifetime savings of 28,975,699 MWh for electric Program Administrators.
  - Proposed gas lifetime therm savings of 1,043,981,177 for gas Program Administrators.
  - Proposed oil and propane lifetime MMBTU savings of 24,533,526.
- The proposed energy savings goal represents an aggressive commitment to reducing overall customer energy usage, while providing **$6.25 billion** in benefits to customers and contributing to the Commonwealth's economic, environmental, and job creation goals.



The 2019-2021 Plan builds on past success and embraces new challenges and opportunities

- The Program Administrators have a long and unparalleled track record of success in implementing energy efficiency programs. This success has contributed to Massachusetts' nation-leading position in energy efficiency and made the programs a model for the rest of the country. This success has earned the Program Administrators the trust of customers and stakeholders in the Commonwealth. Program Administrators achieve success because of their ability to look forward and analyze technologies and the marketplace, and evolve programs to best serve the energy goals of customers under the mandate and framework of the Green Communities Act.

- The Program Administrators, with the support of the Council, have been able to transform the lighting market and support increased building codes through the successful implementation of the energy efficiency programs. Due to these efforts, the lighting market has been substantially transformed to the point where LED lighting is fast becoming the standard in Massachusetts in many lighting applications. These new standards resulting from the efforts of the Program Administrators and the Commonwealth create enduring economic and environmental benefits for all customers, but the savings associated with standard practice and rising baselines reduce the savings claimable by the Program Administrators.

The proposed 2019-2021 investment will continue to expand the Program Administrators' robust contractor infrastructure

- According to MassCEC's 2017 Clean Energy Industry Report, the energy efficiency, demand management, and clean heating and cooling industries are estimated to support the employment of about 78,000 workers. In this Plan, the Program Administrators expand their commitment to a robust, well-trained contractor infrastructure. To do this, the Program Administrators will modify contractor training to match the evolution of the programs.

The Plan describes a holistic approach to customer-focused energy efficiency called Energy Optimization.

- The 2019-2021 Plan will provide a more holistic and integrated approach to helping customers address their energy use and associated costs based on their individual needs and goals. The energy optimization approach builds on the successful integrated gas and electric program delivery, and will include strategies that target customers' overall energy costs, as well as provide broader energy and economic benefits both for participating customers as well as all ratepayers. This fuel neutral approach will allow the Program Administrators to pursue net energy reductions. The focus on energy optimization is indicated by an all-in MMBTU metric, which takes into account the total energy picture through a measurement that combines all forms of energy use into one metric.

The Program Administrators maintain their passion for excellence in program design and serving all customers

- The Program Administrators propose a **bold rethinking of residential program delivery**, designed to better serve customers, provide more opportunities for engagement, more effectively address barriers, and leverage relationships with contractors and market actors.
- The Program Administrators will continue their intense focus, working with the deeply committed team at LEAN, to serve **income eligible customers** with successful energy efficiency programs that provide myriad benefits that extend well beyond lower energy costs.
- The Program Administrators are amplifying efforts to serve all customers, including moderate income customers. Targeted efforts include expanding and simplifying delivery channels to all customers, in order to ensure all **moderate income and rental customers** are being served effectively.
- The Program Administrators will continue their diligent focus to serve **commercial and industrial customers** with successful programs that reach customers through many different pathways and target existing and emerging technologies including lighting with integrated controls, HVAC and controls, and industrial processes including heat recovery.
- The 2019-2021 Plan includes exciting new statewide **Active Demand Reduction Initiatives** for residential and commercial and industrial sectors that will use a technology agnostic approach. Customers will earn an incentive for verifiably shedding load during expensive, electric system peak periods in response to events called by Program Administrators based on specific conditions.
- Development and promotion of the **Passive House** approach for new construction projects.

The Plan fulfills the requirements of the Green Communities Act and provides value for customers

- Each program and core initiative is cost-effective with statewide portfolio benefits of **$6.26 billion,** nearly double the total program costs (inclusive of customer contributions) of **$3.2 billion**.
- Through statewide collaboration and coordination, the Program Administrators continue to share best practices, leverage collective resources, and use competitive procurement to minimize administrative costs. This results in **almost three-quarters of program budgets being allocated to participant incentives that flow back to customers**.

The Program Administrators look forward to discussing this draft 2019-2021 Plan with the Energy Efficiency Advisory Council, and continuing to work with stakeholders as the Program Administrators refine and enhance the Plan. This aggressive draft Plan reflects the Program Administrators' commitment to a robust and dynamic investment in energy efficiency and continued leadership during 2019-2021.

II. OVERVIEW

A. Introduction

Bay State Gas Company d/b/a Columbia Gas of Massachusetts ("CMA"), The Berkshire Gas Company ("Berkshire"), Boston Gas Company, Colonial Gas Company, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid ("National Grid"),[1] Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil"), Liberty Utilities (New England Natural Gas Company) Corp. d/b/a Liberty Utilities ("Liberty"), Cape Light Compact JPE ("Compact" or "CLC"),[2] and NSTAR Electric Company and NSTAR Gas Company, each d/b/a Eversource Energy ("Eversource") (collectively, "Program Administrators" or "PAs") developed and prepared this 2019-2021 Energy Efficiency Plan ("2019-2021 Plan" or "Plan") pursuant to the mandates of An Act Relative to Green Communities, Acts of 2008, c. 169, codified at G.L. c. 25 §§ 19, 21-22, amended by An Act Relative to Competitively Priced Electricity in the Commonwealth, Acts of 2012, c. 209 ("Green Communities Act" or "GCA").

The 2019-2021 Plan includes multiple parts that, taken together as an integrated whole, describe the Program Administrators' strategy for acquiring cost-effective energy efficiency and demand reduction resources through a sustained effort while considering short term customer bill impacts. The provisions of the entire Plan must be considered as a whole to fully appreciate and understand both the Program Administrators' energy efficiency programs and their strategy for satisfying the mandates of the GCA over the next three years. While detailed, an energy efficiency investment plan under the GCA ("Three-Year Plan") is a strategic plan, not an implementation guide. This strategic plan approach provides the Program Administrators with the flexibility necessary respond to meet changing circumstances in order to deliver on their Plan goals and comply with the GCA.

The tremendous success of energy efficiency programs in Massachusetts is directly related to the collaboration amongst the Program Administrators in developing and delivering integrated programs and services, as well as the robust stakeholder and customer engagement process. Engagement through the Energy Efficiency Advisory Council ("Council"), as well as informal outreach and engagement, have contributed to this success. Program Administrators have also engaged with customers and organizations, researched and analyzed evaluations and best practices, and participated in collaborative discussions with key stakeholders including the Council, its consultants, Department of Energy Resources ("DOER"), the Office of the Attorney General (the "Attorney General"), and the Low-Income Energy Affordability Network ("LEAN"). The Program Administrators coordinate closely with LEAN in serving income eligible customers and appreciate LEAN's continued commitment to the Commonwealth's most vulnerable residents.

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[1] Pursuant to D.P.U. 15-79, National Grid offers energy efficiency services to Blackstone Gas Company customers.

[2] The Cape Light Compact is the only publicly funded, municipal aggregator (as defined by G.L. c. 164, § 134) energy efficiency program administrator in Massachusetts. Since it is a public entity consisting of twenty-one towns and one county, it does not participate in performance incentives or collect lost-based revenues. As such, any discussion of these topics contained in the Three-Year Plan does not pertain to the Compact and general references to Program Administrators in these topic narratives do not include the Compact.

B. Sustaining Excellence in 2019-2021

The energy marketplace is evolving quickly, and the Massachusetts Program Administrators have been at the center, driving the changing landscape of energy efficiency. The Program Administrators' nation-leading and collaborative efforts have accelerated market transformation, and contributed to lower demand, lower energy prices, and a more efficient energy system. Sustaining very high claimable savings goals becomes increasingly difficult in each subsequent year as markets become saturated, "easy" savings no longer exist, and rising baselines continue to reduce claimable savings opportunities. Over the next three years, the Program Administrators will need to find ways to mine savings from more difficult, costly, and challenging projects and market segments. To maintain the robust levels of energy efficiency investments, the Program Administrators will undertake a paradigm shift focused on positioning the Program Administrators as energy advisors to empower customers to make educated decisions about their energy use and **ensuring that energy efficiency remains consumers' first choice**. Opportunities for efficiency still exist, and in the 2019-2021 Plan the Program Administrators continue to innovate and raise the bar for energy efficiency programs, despite increased challenges.

The 2019-2021 Plan sets an ambitious agenda to build on the success of prior plans through a more holistic and integrated effort. The Program Administrators have defined a new approach: Energy Optimization. This approach includes a combination of energy efficiency, active and passive demand reduction, and holistic approaches targeted at reducing customers' overall energy use, particularly for space and water heating. Through Energy Optimization, the Program Administrators will seek to reduce customers' total energy use, measured in terms of millions of British Thermal Units ("MMBTU"), and optimize how customers' use their energy in a fuel neutral manner. This holistic approach focuses on the customers' individual energy needs and goals, such as customers' desires for cleaner and less expensive energy, in order to provide significant energy and economic benefits to customers and the Commonwealth. Under an Energy Optimization approach, Program Administrators will provide education to customers to help them optimize their energy consumption. For example, with respect to heating equipment, customers will receive information such as the costs, financial incentives, other government agency incentives, estimated payback periods, energy savings, and emissions reductions of various heating measures, regardless of fuel type, that are offered through the integrated electric and gas programs and are appropriate to their premises. This innovative approach allows customers to make informed decisions on the energy solution most appropriate for their goals and needs. The Program Administrators are seeking to engage customers and provide effective combinations of education and incentives to drive efficiency and optimize energy use.

The 2019-2021 Three-Year Plan introduces several new strategies and redesigned programs:

Residential and Income Eligible

- *Program Realignment*: designed to target customer-specific opportunities and provide multiple engagement paths for customers
- *Enhanced Customer and Ally Support*: structuring initiatives to provide enhanced support for customers and relationships with trade allies, tailoring energy savings packages for

direct delivery to customers, and levering in-home assessments to provide deeper education and more facilitated options to support adoption of major measures

- *Moderate Income*: simplifying communications and providing seamless, uncomplicated pathways to mitigate structural barriers in order to serve all customers, including addressing the needs of moderate income customers
- *Active Demand Reduction*: a new bring-your-own device active demand reduction initiative that allows customer to expand the use of controllable efficiency equipment that can provide demand reduction during peak hours
- *Pay for Savings*: fully optimized incentive structure that rewards builders for savings based on energy modeling in the New Homes & Renovations initiative
- *Passive House*: offering training, technical support, and incentives for evolved design approach that focuses on super-efficient shall or building envelope design and optimized energy systems
- *Market Rate and Income Eligible*: better alignment of market rate and income eligible programs to support increased awareness and drive customer participation, and align auditor and contractor protocols, program measures, and service delivery
- *Income Eligible Workforce*: developing training and retention strategies to ensure a knowledgeable workforce to continue on-the-ground success in income eligible programs

Commercial and Industrial

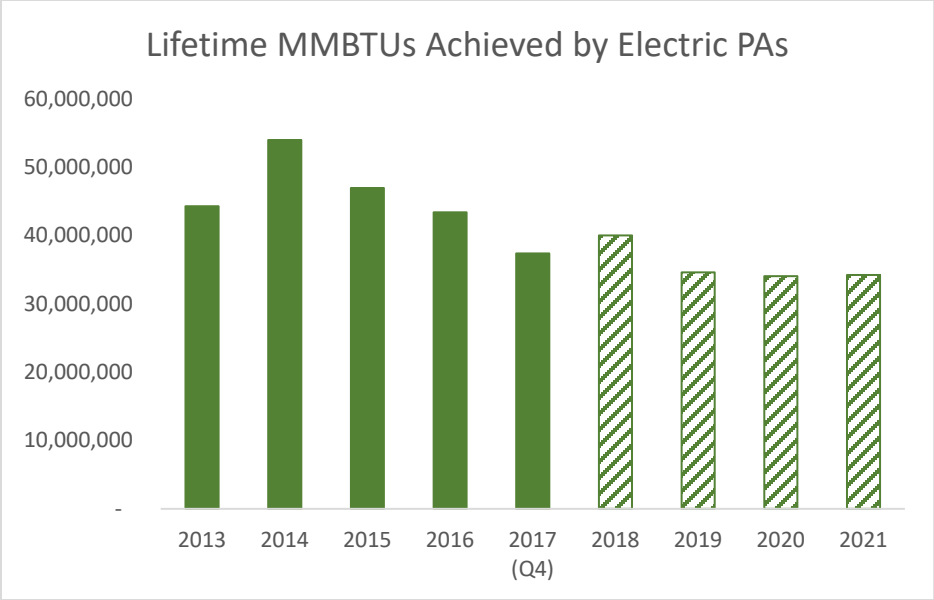
- *Active Demand Reduction*: offering an innovative technology-agnostic curtailment initiative allowing customers to work with experts to develop facility-tailored curtailment strategies and receive incentives for verifiable load shedding during peak periods
- *Enhanced Technical Assistance and Design Support*: advanced, integrated design path that fosters collaboration among owners, designers, and Program Administrators to incorporate high performance characteristics into the earliest design schemes and optimize performance
- *Whole Building Project Approaches*: testing new approaches to engage with design teams early to encourage designers and customers to set energy use intensity targets that can lead to more zero net energy or Passive House criteria projects
- *Operations and Maintenance Savings*: providing simplified and expedited paths for implementing common low-cost/no-cost measures or actions through a prescriptive incentive as a means to help capture and achieve consistent, verifiable operations and maintenance savings
- *Advanced Systems Training*: including new training offers for advanced lighting controls to ensure that contractors have to expertise to optimize the specifications and installation of energy efficiency equipment combined with system controls
- *Franchised Businesses*: offering customized and specialized industrial engineering services for franchised businesses

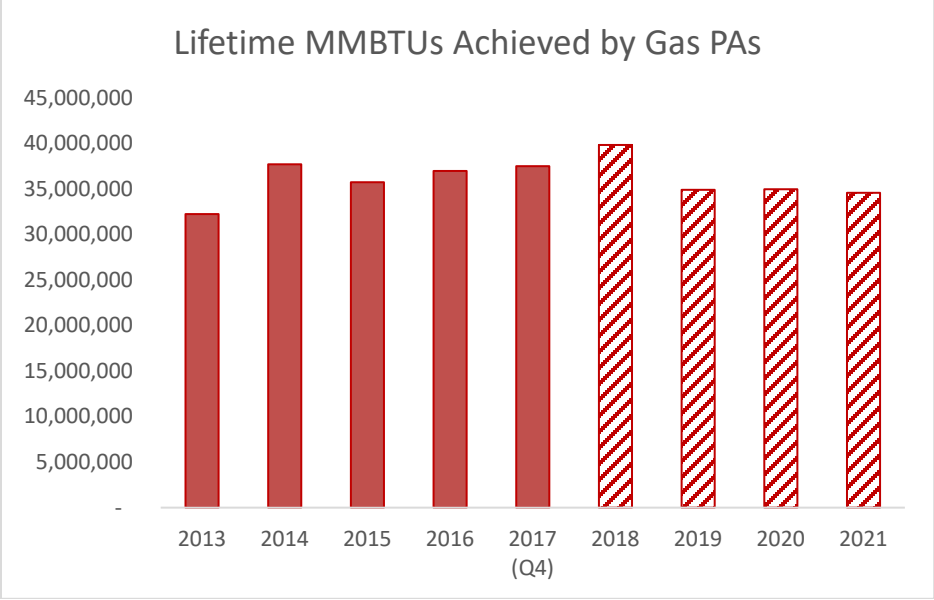
Fundamentally, the 2019-2021 Plan will provide customers with the tools and knowledge to save energy and lower bills, improve the comfort of homes and businesses, and increase business productivity.

C. Core Goals for 2019-2021

In the 2019-2021 Plan, the Program Administrators are measuring their success using a lifetime MMBTU goal to reflect the overall energy savings achieved by the Program Administrators, rather than a focus on electricity or natural gas in isolation. This metric supports the overall Energy Optimization approach to reducing customers' energy use. Electric, natural gas, fuel oil, and other fuel savings can all be expressed in terms of MMBTU, which makes it the ideal metric with which to measure holistic energy savings. In addition, the electric Program Administrators are placing increased emphasis on demand reduction in this Plan, and will therefore also be measuring success through a peak kW goal that reflects both passive and active demand savings.

Measuring energy savings in lifetime MMBTUs captures all the energy savings that are achieved through the Plan. While the Program Administrators have consistently saved fuels other than their primary fuel, this metric for success will allow for a more transparent view of the total energy efficiency savings. For example, electric Program Administrators have had enormous success in providing weatherization and efficient heating systems for customers who heat their homes with oil and propane, and gas Program Administrators have been able to provide electric services in customers' homes who live in a municipal light plant territory. These savings have been included in the energy efficiency tables in the past, but not in a manner in which all savings achievements can be added together and viewed as a complete picture. Additionally, in an increasingly complex energy efficiency and demand reduction framework, the Program Administrators are seeking to balance various savings opportunities that can have interactive effects. An MMBTU goal allows the Program Administrators to prioritize and accurately capture overall energy reductions even in cases where the adoption of measures may provide both positive and negative energy savings. The Program Administrators propose to continue to provide measures that reduce energy use from one fuel source but may increase use of another fuel. For example, efficient lighting measures produce less heat waste than traditional lighting but they still result in an increase in heating fuel usage. New active demand reduction strategies may shift energy consumption from one time period to another, producing peak savings but not necessarily overall energy savings; and pre-cooling of air conditioning may result in higher kWh consumption to provide significant peak demand savings and benefits that are important to both customers and the Commonwealth. Also, storage technologies may have efficiency losses during use resulting in lower peak kW but higher kWh consumption. A lifetime MMBTU goal transparently illustrates the net effect of all the actions taking place within the energy system under the Program Administrators' control and focuses the Program Administrator efforts on reducing overall energy consumption and cost.

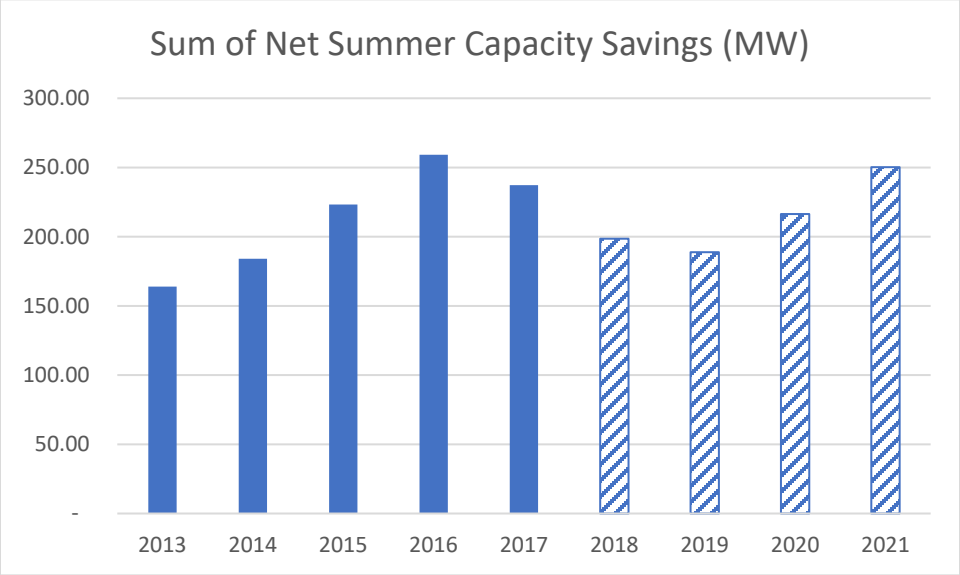




While lifetime MMBTUs will be the primary goal for planning and measuring success in this Plan, the Program Administrators will continue to transparently report all savings metrics that are currently reported, including any and all positive and negative annual and lifetime kWh, therms, MMBTU of oil, MMBTU of propane, and gallons of water. The Program Administrators will continue to report benefits and calculate cost-effectiveness consistent with the Department's current Energy Efficiency Guidelines established in Investigation by the Department of Public Utilities on its Own Motion into Updating its Energy Efficiency Guidelines, D.P.U. 11-120-A, Phase II (2013) ("Guidelines").

With respect to demand, the 2019-2021 Plan will measure success of all demand reduction efforts that reduce system peak in a peak kW goal. The Program Administrators plan to achieve this kW goal through a combination of passive and active demand reduction measures and

strategies.[3] The kW goal will measure the overall impact of the Program Administrators' efforts to capture cost-effective demand reduction. The Program Administrators' demand reduction savings will be tracked and reported within the energy efficiency tables, as measures or core initiatives as appropriate. Through the measure and core initiative reporting, stakeholders will be able to view active and passive demand measures separately. This will provide transparency into all demand measures (passive and active) so stakeholders will have insight into the impact of each demand measure/approach.



In setting forth goals and budgets in this Plan, the Program Administrators have carefully considered new program structures and strategies, lessons learned from past three-year plans, changing baselines, new technologies, market opportunities, individual territory characteristics, and the desire to foster a sustainable energy efficiency infrastructure in the Commonwealth. The Program Administrators will pursue available cost-effective energy efficiency and demand reduction, with consideration of reasonable short-term customer bill impacts, consistent with Department precedent, and will seek to maximize benefits to the Commonwealth and its residents. Specifically, the Program Administrators have sought to minimize bill impacts by proposing relatively level funding on a statewide basis. An overview of the statewide savings, benefits, and budgets described further in this Plan are set forth below.

[3] Passive demand reduction includes measures that provide kWh reductions and summer and winter demand kW savings, which have cumulative benefits. Active demand reduction includes measures and strategies that primarily provide kW savings (but may increase kWh) and are dispatched over specific periods of time through automation, programming, or control.

	2019	2020	2021	2019-2021
Lifetime Savings (MMBTU)	69,497,987	69,004,443	68,786,777	207,289,207
Annual Savings (MMBTU)	5,936,972	5,886,263	5,920,016	17,743,250
Peak Demand Reduction (kW)	188,796	216,367	250,224	655,386
Budget ($)	772,827,845	776,321,628	780,161,425	2,329,310,898
Benefits ($)	2,080,970,128	2,085,350,073	2,086,716,424	6,253,036,625

D. Continuing Innovation Under the Green Communities Act

The GCA transformed energy efficiency efforts in Massachusetts, and continues to lead Massachusetts on a path of innovation. The enactment of the GCA expanded energy efficiency mandates by requiring the Program Administrators to develop three-year energy efficiency plans that will "provide for the acquisition of all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply." G.L. c. 25, § 21.

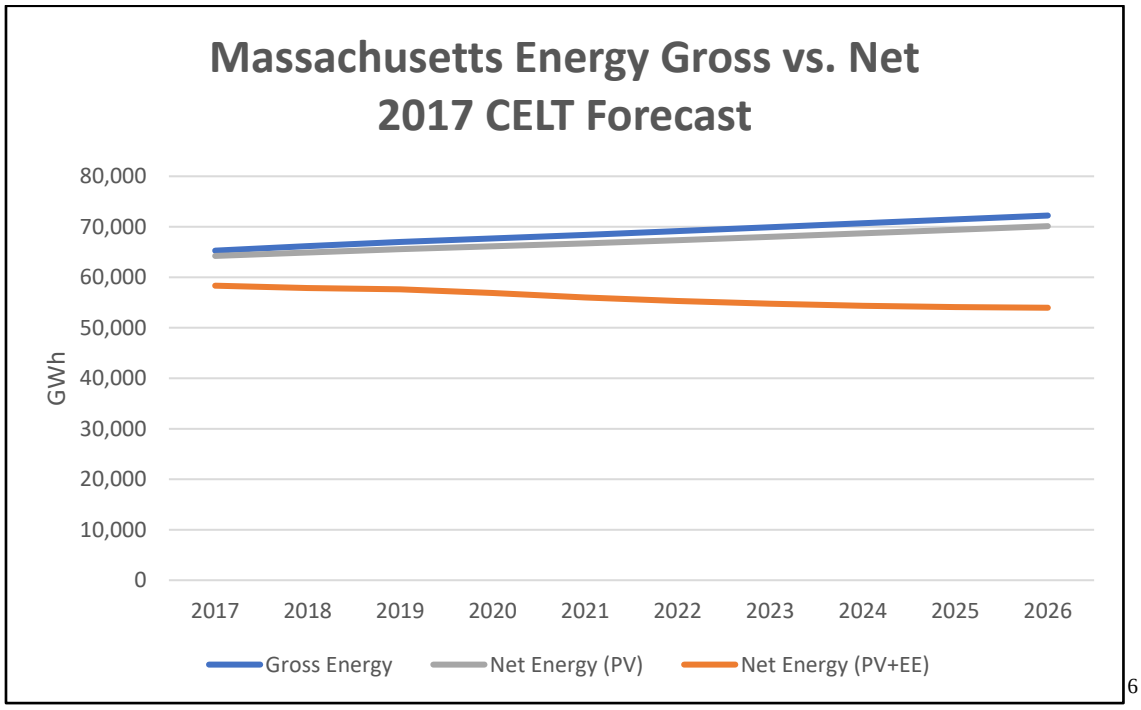
To date, the GCA's framework and statewide collaborative approach has produced unprecedented results. The mandates, scope, and language of the GCA are broad and provide a flexible framework that allows the Program Administrators to adapt with the changing energy market. Under the GCA, Program Administrators are able to embrace new strategies and adopt emerging technologies in order to continuously pursue new cost-effective opportunities and meet the goals of the Commonwealth, including supporting greenhouse gas emission reduction goals. Relying on the GCA, the Program Administrators are able to offer exciting opportunities in energy efficiency, including serving customers in a fuel neutral manner, supporting growing technologies such as heat pumps, and advancing new active demand reduction strategies.

In delivering energy efficiency programs under the GCA, the Program Administrators have achieved over $20 billion in total benefits (significantly greater than the cost of delivering them). Using the strategies set forth in this Plan, the Program Administrators plan to deliver another $6.25 billion in total benefits in 2019-2021. The benefits delivered under the Program Administrators' programs directly tie to customer savings and other benefits, and always consider short term and long term customer bill impacts. Delivering programs under the GCA provides an optimal framework for delivering broad and innovative programs, while at the same time ensuring a direct benefit for customers.

E. System Benefits of Energy Efficiency

The unprecedented and sustained level of energy efficiency savings that continue to be achieved by the Program Administrators has a significant impact on offsetting the need for investments in generation, transmission, and distribution. Energy efficiency continues to play an important role in reducing customer demand, and has a positive impact on system reliability. Investments in weatherization and high efficiency heating equipment that lower a customer's energy consumption can provide significant contributions towards improving winter reliability issues.

Even as increased baselines, saturation of efficiency measures, and market transformation in the Commonwealth make the pursuit of savings claimable under this Plan more challenging, the cumulative impacts of energy efficiency in Massachusetts are evident. As shown below, the Independent System Operator – New England's ("ISO-NE") 2017-2026 Forecast Report of Capacity, Energy, Loads, and Transmission ("2017 CELT") projects that, when considering energy efficiency, demand will remain relatively flat and annual energy use will decrease over the next ten years.[4] Massachusetts energy efficiency has achieved more than 50 percent of all ISO-recognized energy efficiency in New England.[5] By impacting capacity and energy forecasts, the Program Administrators' energy efficiency and demand reduction efforts help save customers money and offset the need for securing additional capacity resources.



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[4] ISO-NE 2017 CELT is available at: https://www.iso-ne.com/system-planning/system-plans-studies/celt/.

[5] ISO-NE 2017 Energy Efficiency Forecast is available at: https://www.iso-ne.com/static-assets/documents/2017/05/final_eef_2017_v2.pdf.

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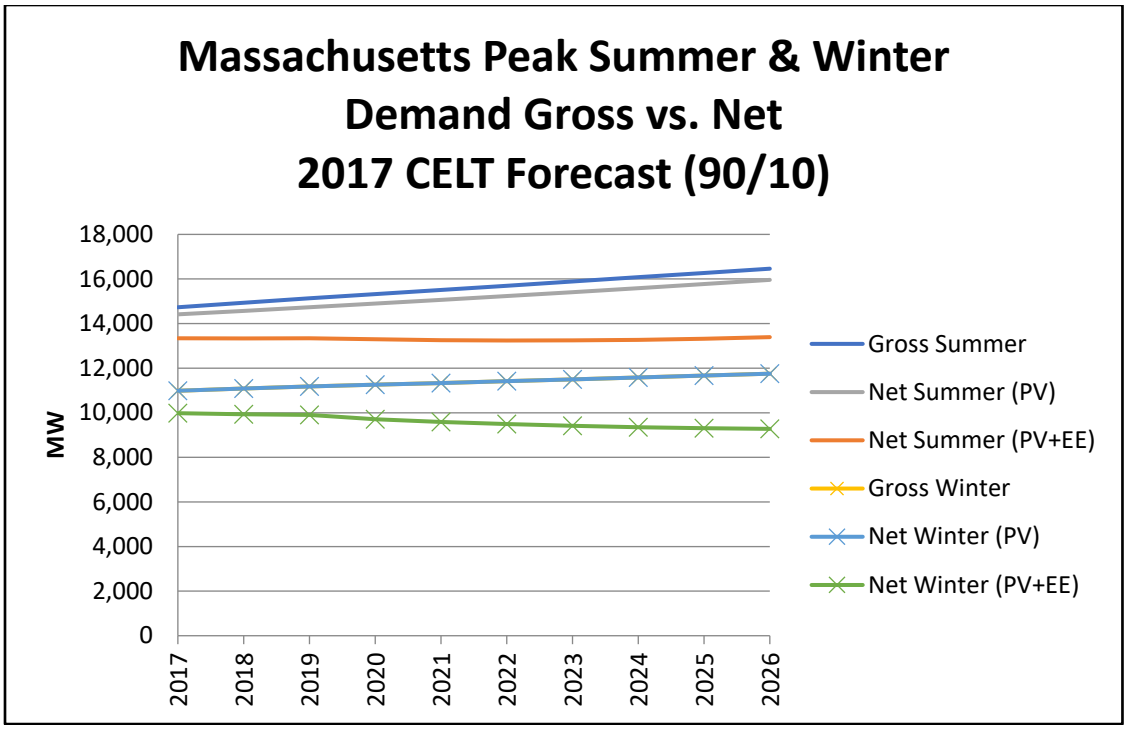

*Note that Gross Winter demand and Net Winter (PV) trend identically.

F. Statutory and Regulatory Context and Process

1. Overview

Energy efficiency in Massachusetts is governed by the statutory framework set out in the GCA. The Program Administrators are responsible for administering energy efficiency programs pursuant to the GCA. G.L. c. 25, §§ 19, 21. The GCA requires the Program Administrators to pursue all available energy efficiency and demand reduction resources that are cost-effective or less expensive than supply. G.L. c. 25, § 21(b)(1). The GCA sets up a multi-level framework in which the Program Administrators work with a diverse Council on program development and implementation, and also appear before the Department for Plan approval, reporting, and cost recovery.

2. Roles and Responsibilities

a. Energy Efficiency Advisory Council

The Department appoints and convenes the Council, which consists of 15 voting members of diverse backgrounds and expertise.[7] G.L. c. 25, § 22(a). The Council's membership is

[7] The 15 voting members include one person representing each of the following: (1) residential customers; (2) the low-income weatherization and fuel assistance program network; (3) the environmental community; (4) businesses, including large C&I end-users; (5) the manufacturing industry; (6) energy efficiency experts; (7) organized labor; (8) the Department of Environmental Protection; (9) the Attorney General; (10) the Executive Office of Housing and Economic Development; (11) the Massachusetts Non-profit Network; (12) a city or town in the Commonwealth; (13) the Massachusetts Association of Realtors; (14) a business

comprised of governmental and non-governmental members. G.L. c. 25, § 22(a). The Council also includes one "non voting, ex-officio member"[8] from each of the Program Administrators (comprised of Massachusetts electric and natural gas distribution companies and municipal aggregators with certified energy plans). G.L. c. 25, § 22(a). There is also one non-voting member from each of the heating oil industry, energy efficiency businesses, and ISO-NE. G.L. c. 25, § 22(a).

The statutorily defined composition of the Council ensures that the Program Administrators can benefit from a broad range of unique perspectives, such as non-profits, business, manufacturing, and real estate associations, environmental advocates, municipalities, state agencies, and residential and income eligible customers. The expertise of the Council's diverse membership and consultants allows it to provide strategic, objective advice to the Program Administrators. The Council also provides a forum for coordinating stakeholder feedback on a statewide basis. The Council is tasked with coordinating with the Program Administrators in developing a three-year plan, periodically reviewing program cost-effectiveness, and providing a report to the Legislature regarding the implementation of the Program Administrators' three-year plan. G.L. c. 25, § 22(b), (c). The Council may retain energy efficiency experts. G.L. c. 25. § 22(c). To conduct its business, the Council holds meetings, which are subject to the open meeting law, typically on a monthly basis. They Council may also create subcommittees to assist with its business (e.g., the Executive Committee). The Council is designed to engage the expertise of its diverse member and consultants to provide strategic, object advice to the Program Administrators and the Council.

b. Department of Public Utilities

The Department is a quasi-judicial regulatory agency with extensive statutory authority over the Program Administrators.[9] The Department is responsible for ensuring that the electric and gas utilities provide safe, reliable, and least-cost service to Massachusetts customers. Having the resources, technical expertise, and the statutory obligation to regulate in the public interest, the Department is uniquely structured to ensure that energy efficiency funds are spent cost-effectively, that customers are receiving energy efficiency services, and that energy savings are being achieved.

Under the GCA, the Department has oversight authority over the Program Administrators and the Council and is responsible for final administrative review of energy efficiency

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employing fewer than 10 persons located in the Commonwealth that performs energy efficiency services; and (15) DOER. The Commissioner of DOER serves as chair of the Council. G.L. c. 25, § 22.

[8] The dictionary defines "ex officio" as meaning "by virtue of one's position or status." The Oxford English Dictionary (2013). Ex-officio members have exactly the same rights and privileges as do all other members, except as otherwise specified by statute. See http://www.robertsrules.com/faq.html#2.

[9] The Department's authority extends beyond energy efficiency to all aspects of the operations of electric and gas distribution companies including, but not limited to, rate setting, service quality, customer care, and the operation of a safe and reliable utility. See G.L. c. 164, § 76. Since its establishment by the Legislature in 1919, the Department has comprehensively regulated the operations of electric and gas utility companies in Massachusetts pursuant to G.L. c. 25 & 164 to ensure that electric and gas services are provided pursuant to just and reasonable rates.

determinations. G.L. c. 25, §§ 19, 21, 22. The Department has ultimate jurisdiction with respect the final plan approval, cost-effectiveness, rates, and cost-recovery.[10] The Department has established Guidelines that set forth the requirements for energy efficiency, including the elements, review process, and mid-term modifications related to the Three-Year Plan, the method for determining cost-effectiveness, and the mechanisms for cost recovery. The Department conducts its review of Three-Year Plans and Program Administrator performance through individual adjudicatory proceedings consistent with the Massachusetts Administrative Procedure Act, G.L. c. 30A, which requires the Department to maintain standards of fair procedure such as notice, an opportunity to be heard, and the ability to appeal decisions.[11] Funding for the programs is also approved by the Department and reconciled annually through separate proceedings discussed in Section V.B below.

The Department is also responsible for determining the effectiveness of the Three-Year Plan annually consistent with G.L. c. 25, § 21(d)(2). Annually, the Program Administrators submit detailed reports to the Department documenting program participation, savings, benefits, and expenditures, summarizing and providing completed evaluation studies, and explaining any variances from anticipated performance levels. Plan-Year Reports filed following the initial two years of a term are not adjudicated; however, if a Program Administrator has not reasonably complied with its Three-Year Plan, the Department may open an investigation into the Program Administrator's performance. G.L. c. 25, § 21(e). At the conclusion of the program term, each Program Administrator files a detailed Term Report demonstrating compliance with the requirements of the GCA and Department Guidelines and directives. The Department reviews the Term Report through an adjudicatory proceeding and provides final approval of costs and performance incentives.

3. Three-Year Plan Process

a. Development of the Plan

The process established by the GCA for developing the energy efficiency plans is designed to provide extensive and meaningful stakeholder input into the design and implementation of the Three-Year Plans. The Program Administrators engage with the Council on the development of each new Plan, including through regular meetings, topic-specific Council workshops, and through regular communications with the Council's consultants. Following the workshops in 2018, the

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[10] The GCA states that, in authorizing energy efficiency programs, the Department "shall ensure that they are delivered in a cost effective manner capturing all available efficiency opportunities, minimizing administrative costs to the fullest extent practicable and utilizing competitive procurement processes to the fullest extent practicable." G.L. c. 25, § 19(a, b). To mitigate capacity and energy costs for all customers, the GCA also requires the Department to ensure that electric and natural gas resources are first met "through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply." G.L. c. 25, § 21(a).

[11] See G.L. c. 30A, §§ 5, 10-12, 14 (outlining adjudicatory proceedings and availability of judicial review). Additionally, to comply with c. 30A, the Department must maintain a record of its adjudicatory proceedings, afford parties the opportunity to present evidence and argument and issue decisions in writing or on the record with a statement of reasons. G.L. c. 30A, §§ 10-11. Finally, Department decisions are subject to appeal to the Supreme Judicial Court on the record formed during the c. 30A adjudicatory proceeding. G.L. c. 30A, § 5.

Council issued a resolution memorializing certain strategic and tactical recommendations to the Program Administrators from the Council workshops. See Appendix D. The Program Administrators have also participated in public comment listening sessions organized by the Council.

The submission of this draft Plan to the Council every three years on or before April 30th commences the formal stakeholder process, which entails opportunities for public comment and formal review and recommendations from the Council. G.L. c. 25, § 21(c). The Council's formal role in the development of a Three-Year Plan concludes three months after submission of the plan (i.e., end of July), at which time the Council offers its approval or comments to the Program Administrators. G.L. c. 25, § 21(c). In this role, the Council "shall review and approve demand resource program plans and budgets, work with program administrators in preparing energy resource assessments, determine the economic, system reliability, climate and air quality benefits of efficiency and load management resources, conduct and recommend relevant research, and recommend long term efficiency and load management goals to maximize economic savings and achieve environmental goals." G.L. c. 25, § 22(b). As part of its review of Three-Year Plans, the Council must approve "efficiency and demand resource plans and budgets" with a two-thirds majority vote. G.L. c. 25, § 22(b).

The Program Administrators work collaboratively with the Council, even after the formal July approval or comments, and with stakeholders to discuss challenges, such as barriers to entry, and opportunities to provide energy efficiency services to customers. In addition to the formal process with the Council, the Program Administrators also engage myriad stakeholders, including customers, past participants, contractors, energy experts, trade associations, manufacturers, and distributers. Throughout this process, the Program Administrators refine their program designs and goals, based on Council and stakeholder input, and prepare a final Plan for review and approval by the Department of Public Utilities, the next phase of the Three-Year Plan process.

On or before October 31, every three years, the Program Administrators file their joint energy efficiency plan, together with the Council's approval or comments and a statement of any unresolved issues, with the Department for its review and approval. G.L. c. 25, § 21(d)(1).

b. Department Review and Approval of the Plan

i. Overview

The Department reviews the plan to ensure that each Program Administrator acquires all cost-effective energy efficiency resources, delivers energy efficiency programs while minimizing administrative costs, and complies with the other requirements of the GCA. Within 90 days after submission, the Department "shall approve, modify and approve, or reject and require the resubmission of the plan accordingly." G.L. c. 25, § 21(d)(2).[12] In reviewing the Program

[12] Due to the deadlines set forth in the GCA, the Department does not approve the three-year plan until after the start of the new three-year program term (i.e., the end of January). In recognition of the need for continuity of energy efficiency programs, the Department has allowed for the interim continuation of existing energy efficiency programs, pending approval of proposed new programs under review. See 2013-2015 Three-Year Plans Order, D.P.U. 12-100 through 12-111, at 160-161; Massachusetts Electric Company and

Administrators' Three-Year Plans, the Department reviews the elements set forth below to determine whether the Program Administrators have met their obligations under the GCA and other Department precedent.

ii. All Cost-Effective or Less Expensive than Supply

In approving a Three-Year Plan, the Department seeks to mitigate capacity and energy costs for all customers "through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply." G.L. c. 25, § 21(a). The Department is charged with ensuring that the Program Administrators "have identified and shall capture all energy efficiency and demand reduction resources that are cost effective or less expensive than supply." G. L. c. 25, § 21(d)(2). To comply with the GCA, a Three-Year Plan must provide for the acquisition of these resources "with the lowest reasonable customer contribution." G.L. c. 25, § 21(b)(1). There is no simple, algebraic method to evaluate whether the mandate of all available cost-effective energy efficiency has been met. 2013-2015 Three-Year Plans Order at 36. The Department weighs (1) the steps the Program Administrators have taken to implement energy efficiency given the current state of energy efficiency supply and demand; (2) the steps the Program Administrators will take to expand future energy efficiency opportunities; and (3) the results of potential studies.[13] 2013-2015 Three-Year Plans Order at 36-37; 2016-2018 Three-Year Plans Order, D.P.U. 15-160 through D.P.U. 15-169 at 24-25.

The Department has determined that the acquisition of these resources, however, must be achieved through a sustained effort. 2013-2015 Plans Order, at 37 (2013); 2010-2012 Gas Order, at 71 citing G.L. c. 25, § 22(b); 2010-2012 Electric Order, at 85. To determine the rate at which Program Administrators must acquire these resources, the GCA requires the Program Administrators, Council, and Department to consider a number of factors.

> Determining a reasonable pace for a sustained acquisition requires the Program Administrators and the Council (in developing the Three-Year Plans) and the Department (in reviewing the Three-Year Plans) to strike an appropriate balance between several factors, including: (1) identifying the potential level of cost-effective resource currently available; (2) exploring ways in which this level can be increased; (3) assessing the capability of the energy efficiency vendor and contractor industry to support increased program activity; and (4) assessing the capacity of the Program Administrators to administer increases in program activity efficiently and effectively. The Department must take into consideration an additional factor: the rate and bill impacts that result from increased program activity.

2010-2012 Gas Order, at 71-72 and 2010-2012 Electric Order, at 85-86.

Nantucket Electric Company, d/b/a National Grid, D.P.U. 09-116, Order Approving Motion for Interim Continuation (December 30, 2009).

[13] Potential studies are only one component of the planning process, but can help the Program Administrators understand the remaining technical, economic, and achievable energy efficiency opportunities within their service territories, which play a key role in helping Program Administrators set savings goals. 2016-2018 Three-Year Plans Order at 24-25.

In developing their 2019-2021 Plan, the Program Administrators considered what an optimal pace is for acquiring all cost-effective energy efficiency resources for the period from 2019 to 2021, to ensure long-term sustainability for energy efficiency program offerings. In developing savings goals for 2019-2021, the Program Administrators took into consideration the four factors above, as well as rate and bill impacts on their customers. The Program Administrators provide detailed information on the development of their goals in Section IV.C,[14] demonstrating that they are seeking to acquire all cost-effective energy efficiency and demand reduction resources for the 2019-2021 term.

iii. Program Cost-Effectiveness

The GCA specifically requires cost-effectiveness screening for energy efficiency programs. G.L. c. 25, §§ 19(c), 21(b)(3).[15] The Department is required to review all energy efficiency programs on a program-specific basis as contained in a three-year plan, except hard-to-measure energy efficiency programs, for cost-effectiveness.[16] G.L. c. 25, § 21(b)(3); Guidelines § 3.4.3.1. For cost-effectiveness screening, the Department allows the Program Administrators to consolidate core initiatives into broader program offerings since the consolidation provides appropriate program flexibility and improves the customer experience. 2013-2015 Three-Year Plans Order at 105. The Department has determined that a Total Resource Cost ("TRC") test that weighs the impact of all benefits and costs associated with each program satisfies this requirement D.P.U. 08-50-A at 14; Guidelines § 3.4.3. A program is cost-effective under the TRC test if the cumulative present value of its benefits is equal to or greater than the cumulative present value of its costs. Guidelines § 3.4.3.1. Benefits calculations include the cost of energy supply that is avoided when energy efficiency efforts are utilized and therefore the TRC test satisfies the GCA's requirement that energy efficiency programs be less expensive than supply. D.P.U. 08-50-A at 14-15.

For the 2019-2021 Plan, the Program Administrators applied the results of the regional Avoided Energy Supply Components in New England: 2018 Report ("2018 AESC Study"), which was completed on March 30, 2018, and is attached hereto at Appendix E.

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14 The Program Administrators will provide their individual benefit/cost ratio ("BCR") models with the Plan filed with the Department in October, further demonstrating that they are seeking to acquire all cost-effective energy efficiency and demand reduction resources for the 2019-2021 term.

15 The GCA requires energy efficiency programs included in Program Administrators' Three-Year Plans to "be screened through cost effectiveness testing which compares the [economic] value of program benefits to the program costs to ensure that the program is designed to obtain energy savings and system benefits with value greater than the costs of the program." G.L. c. 25, 21(b)(3).

16 The Program Administrators are required to allocate the benefits and costs of hard-to-measure energy efficiency programs to the program's customer sector. Guidelines at § 3.4.3.2. If such inclusion causes the sector's benefit-cost ratio to fall below one, then that hard-to-measure energy efficiency program shall be deemed to be not cost-effective. Id. An energy efficiency plan shall include the following information regarding a hard-to-measure energy efficiency program: (a) the best estimates available regarding the hard-to-measure energy efficiency program's savings, costs and benefits; (b) detailed descriptions of the purpose, scope and design of the hard-to-measure energy efficiency program; (c) supporting documentation for why the program is qualified to be treated as hard-to-measure energy efficiency program; and (d) any recommendations made by the Council regarding the hard-to-measure energy efficiency program. Id.

iv. Program Budgets

A Program Administrator's budget is comprised of its energy efficiency program implementation costs, performance incentives, and recovery of lost base revenue ("LBR"), if any, as approved by the Department. Guidelines § 3.3.1. Program implementation costs include all costs incurred by a Program Administrator to implement its energy efficiency programs, including, but not limited to: (a) program planning and administration ("PP&A"); (b) marketing and advertising; (c) program participant incentives; (d) sales, technical assistance and training ("STAT"); and (e) evaluation and market research. Guidelines §§ 3.3.3, 3.4.5. Performance incentives are included as costs per the Guidelines §§ 3.3.4, 3.6. Program participant costs must include all expenses incurred by a program participant as a result of its participation in an energy efficiency program, including, but not limited to: (a) the net cost of energy efficient equipment; (b) the cost to plan for and install energy efficient equipment; and (c) the cost of energy efficiency services. Guidelines § 3.4.5.3.

In reviewing and authorizing Program Administrator energy efficiency programs, the Department must ensure that: (1) the Program Administrators have minimized administrative costs to the fullest extent practicable; (2) sufficient funding is allocated to income eligible programs; and (3) competitive procurement processes are used to the fullest extent practicable. G.L. c. 25, § 19(a), (b), (c); Guidelines §§ 3.3.6, 3.3.7; 2013-2015 Three-Year Plans Order at 75-76. With respect to the income eligible program budgets, the GCA requires electric and gas Program Administrators to spend at least 10 percent and 20 percent, respectively, of their total energy efficiency budget on comprehensive income eligible demand side management and education programs. G.L. c. 25, § 19(c).

The Program Administrators have addressed each one of these issues throughout the Plan, and specifically in Section IV.E, below. In addition, the Program Administrators seek to minimize bill impacts when setting their respective budgets. From a statewide perspective, the Program Administrators' three-year budget is relatively level compared the 2016-2018 Plan budget.

v. Bill Impacts

As discussed previously, the GCA requires the acquisition of all available cost-effective energy efficiency resources. G.L. c. 25, § 21(b)(1). However, the pace at which the Program Administrators must acquire these resources is informed by the associated rate increases on residential and commercial customers' bills. See 08-50-D at 9-10 and n.11; see also 2013-2015 Three-Year Plans Order at 122-124; Gas Three-Year Plans Order at 71-72 and n.63; Electric Three-Year Plans Order at 84-86 and n.77; G.L. c. 25, § 19(a). The Department has determined that a bill impact analysis with a short-term perspective that isolates the effect of a proposed change in the energy efficiency surcharge ("EES") is appropriate because it provides an accurate and understandable assessment of the impact that customers will experience on their bills. 2013-2015 Three-Year Plans Order at 122; D.P.U. 08-50-D at 11-12. The Department has recognized, however, that when considering the reasonableness of a short-term bill impact, it is also important to look at the long-term benefits that energy efficiency will provide because, unlike some other activities that cause rate increases, investments in energy efficiency will result in direct customer benefits, in terms of reduced consumption and reduced costs, which will persist for the lives of the

energy efficiency measures installed. 2013-2015 Three-Year Plans Order at 122; see also D.P.U. 08-50-D at 11-12.

The Program Administrators discuss consideration of bill impacts throughout the Plan, and specifically in Section V.C, below

vi. Program Funding

The GCA authorizes the Department to review the funding of energy efficiency programs administered by the Program Administrators. G.L. c. 25, § 19. For electric Program Administrators, the GCA identifies four specific funding sources for energy efficiency programs: (1) revenues collected from ratepayers through the System Benefit Charge ("SBC"); (2) proceeds from the Program Administrators' participation in the Forward Capacity Market ("FCM"); (3) proceeds from cap and trade pollution control programs, including but not limited to the Regional Greenhouse Gas Initiative ("RGGI"); and (4) other funding as approved by the Department, including revenues to be recovered from ratepayers through a fully reconciling funding mechanism (i.e., EES). G.L. c. 25, §§ 19(a); 21(b)(2)(vii). The Guidelines specify the method the electric Program Administrators must use to allocate revenue from each funding source and the manner in which the Program Administrators calculate the EES for each customer sector. Guidelines §§ 3.2.1.2 through 3.2.1.6.

For gas Program Administrators, the GCA does not identify multiple funding sources for energy efficiency programs and instead requires the gas Program Administrators to include a fully reconciling funding mechanism to collect energy efficiency program costs from customers (i.e., EES). G.L. c. 25, § 21(b)(2)(vii); see also G.L. c. 25, § 21(d)(2). The gas EES is included in each gas Program Administrator's Local Distribution Adjustment Clause tariff (the "LDAC"). Guidelines § 3.2.2. Funding from sources other than the gas Program Administrator LDAC are to be allocated to the gas Program Administrator's residential, low income and commercial and industrial customer ("C&I") sectors in proportion to the sector's therm consumption. Guidelines § 3.2.2.1. The Department must consider the effect of bill impacts when approving customer funds to support energy efficiency programs. G.L. c. 25, § 19; 2016-2018 Three-Year Plans Order at 93; D.P.U. 08-50-A at 58; Guidelines §§ 3.2.1.5, 3.2.1.6.3, 3.2.2.1, 3.2.2.2.

For a detailed discussion of the funding sources that are currently available to the Program Administrators, please refer to Section V.B, below.

III. STATEWIDE PROGRAMS

A. Strategic Overview of Residential, Income Eligible, and C&I Programs

The 2019-2021 energy efficiency plan sets an ambitious agenda to continue to drive energy saving benefits for Massachusetts residential and commercial energy consumers, while proposing new approaches to meet the challenges of the rapidly changing energy landscape. The plan seeks to position the Massachusetts Program Administrators to be energy advisors and supporters, empowering customers to make educated decisions about their energy use and ensuring that energy efficiency remains consumers' first choice.

The 2019-2021 program designs position the Massachusetts energy efficiency programs to shift the model of efficiency programming. The energy marketplace is evolving quickly, offering more and more complex choices for customers. The Massachusetts Program Administrators have changed the landscape of energy efficiency, as evidenced by elevated baselines in several areas, including new construction for residential and commercial buildings, lighting, and heating systems. The 2016-2018 plan drove unprecedented levels of savings for Massachusetts energy consumers, achieving market penetrations in both the residential and commercial sectors that are unparalleled in other states. Massachusetts was rewarded with recognition and multiple awards for nation-leading energy efficiency programs, both by federal agencies and national non-governmental energy organizations.

Building on Success

Over the past three plan cycles, Program Administrators became ever more accomplished at working with customers to encourage adoption of efficient measures for homes and businesses. The major challenges were finding the best channels and entry points to engage all customers and devising effective combinations of incentives and support to complete efficiency sales. The Program Administrators' continued focus on developing clear, uncomplicated participation pathways helped to improve the equitable distribution of benefits by making it easier for all customers to engage in their programs. This was done by making transactions easier, outlining the benefits to customers more compelling, or incorporating other customer benefits, such as employee productivity or comfort and health, as part of the efficiency sale. This was a major achievement.

The savings from energy efficiency, while significant, have always competed for customers' attention against other investment opportunities. For businesses, investment in production often could generate higher returns, either directly or in the ways the company is valued. In the residential sector, the invisibility of home weatherization has always had to compete with more visible home upgrades and, for some customers, even basic household needs.

In the 2013-2015 Plan, the Program Administrators developed initiatives to drive the lighting revolution. The intentional transformation of the lighting market with light-emitting diode ("LED") technology is a signature achievement for the prior plans' design and implementation. LED lighting was an emerging technology only a few years ago. The Program Administrators quickly recognized the valuable opportunity for customers and pushed rapid adoption through a multi-channel approach, harnessing upstream channels and retail and direct-install opportunities

across the portfolio as well as leveraging the power of their mature programs to rapidly drive volume and pricing.

The Challenge

The challenge as we enter the next three-year plan, and more profoundly as we look beyond the next three years, is that efficiency programs must be part of a more fundamental paradigm shift. The next wave of energy efficiency innovation will be focused on optimizing systems and changing human behavior to maximize efficiency. We are unlikely to continue to see substantial drops in lighting wattage or increases in heating system efficiency; there simply is not that much further to go. The next evolution of cost-effective energy efficiency program design will not be scaling new efficient technology (like LED lighting), but incremental new systems for ramping down or turning off equipment, and new techniques for minimizing energy use through passive building systems such as daylighting, insulation, and optimized scheduling of use. The new paradigm requires more investment in human systems, and in training and education, at every stage. Program Administrators will be working with manufacturers to make interoperable systems and controls that offer greater efficiency and ensure that distributors stock and support these new systems. Program Administrators will help vendors, contractors, and builders understand the connection between energy-conservation measures and improved building operation, and provide homeowners with the education and tools they need to control and manage their energy future.

Massachusetts' success in driving energy efficiency for homes and businesses has in many instances transformed the market, ensuring that the baseline efficiency of Massachusetts homes and businesses is high. For Massachusetts to remain the nationwide energy efficiency leader Program Administrators must innovate and create new models to drive to even higher levels of energy efficiency. The comprehensive projects the Program Administrators must pursue will have longer development cycles. The newer technologies and integrated systems come with significant product, design, and training costs, even as the lower incremental savings constrain incentive budgets. Structural barriers often correlated to customer market segments like moderate income customers and renters must be addressed. The Program Administrators' high historic penetration rates with customers mean the Program Administrators must go deeper and broader to secure the next unit of efficiency. Program Administrators must now focus on projects with leaner savings and greater barriers, and engage customers who, to this point, have been less inclined to pursue energy efficiency.

Principal Strategies

To meet the challenges of the next decade the Program Administrators are proposing a strategic set of programs and initiatives that are both flexible and targeted. Navigating this transition to a greatly changed energy efficiency landscape will not happen quickly or easily. It will require intensive trial and error and leaps of innovation, followed by retrenchment and refinement.

The core principle of the 2019-2021 program design, across both the residential and commercial sectors, **is to keep the customer at the center of program design and evolution**. This means organizing and presenting efficiency measures to customers as easy-to-understand and

easy-to-implement improvements to their homes and businesses. The Program Administrators firmly believe that serving all customers, especially addressing moderate income customers' needs, requires programs that are both simple to communicate, and easily accessible. This requires flexible design that helps customers to see energy efficiency as supporting their business objectives and making their lives better. Success depends on a sustained cultural shift where efficient products and behavior are default expectations, regardless of customer income and size.

Sector	Program	Initiative
Residential	Residential New Buildings	Residential New Homes & Renovations
	Residential Existing Buildings	Residential Coordinated Delivery
		Residential Conservation Services
		Residential Retail
		Residential Behavior & Active Demand Reduction
Income-Eligible	Income-Eligible Existing Buildings	Income-Eligible Coordinated Delivery
Commercial & Industrial	C&I New Buildings	C&I New Buildings and Major Renovations
	C&I Existing Buildings	C&I Existing Building Retrofit
		C&I New & Replacement Equipment
		C&I Active Demand Reduction

Residential Programs and Initiatives

The Residential Programs and Initiatives reflect the refined delivery strategies the Program Administrators envision for the 2019-2021 plan period. The centerpiece of the plan is the Residential Coordinated Delivery Initiative, which integrates and expands on Program Administrators' facilitated paths for all residential customers to secure comprehensive home upgrades. The facilitated pathways offer customer support through every stage in the achievement of energy efficiency savings from assessment of opportunities through installation of energy saving measures and follow up post installation.

The Program Administrators anticipate a series of enhancements that support a renewed focus on helping customers adopt major measures, including weatherization and heating and cooling systems. The plan expands relationships with trade allies (e.g., heating, ventilation, and

air conditioning ("HVAC") and weatherization contractors, and electricians) to capture customers at all entry points and help them secure ancillary services that support customers in implementing major measures.

In addition, the Program Administrators are also expanding the Retail Initiative, which seeks to build an integrated marketplace where efficient products are positioned as attractive primary choices for customers. The plan also expands the former New Construction Initiative to offer the New Homes and Renovations Initiative, which provides a clearer path for customers who are pursuing additions and renovations, and integrates Passive House into the high-performance building offers. The "pay for savings" model developed during the 2016-2018 plan period is applied across the New Homes and Renovation Initiative to address the challenges from rising baselines.

The Residential Behavior Initiative now also includes a new proposed Active Demand Reduction offer.

Commercial and Industrial Programs and Initiatives

The Commercial and Industrial Programs and Initiatives concentrate on maintaining the Program Administrators' leadership in Commercial and Industrial program design and delivery by continuing to optimize the multiple participation paths. Program Administrators are collaborating to increase the clarity and consistency of offers across the Commonwealth, while continuing to provide solutions tailored to specific customer needs. Planned enhancements include an expedited path to capture operations and maintenance savings and retro-commissioning, a new approach to accelerate engineering support for industrial and manufacturing customers, implementation of the new Mass Save®[17] Portal, and a new model for working with franchise businesses. Program Administrators also plan to continue to add enhancements to the small business pathways, expand segment-specific approaches, and look to expand the use of the upstream channel to increase the volume and scale of energy efficiency measures available in the market.

The Commercial and Industrial Programs have consistently delivered cost-effective and cost-efficient energy savings. As a result of these successes, efficiency programs are now confronting a future of diminishing incremental savings opportunities, as baselines rise, technologies approach natural limits, and the penetration of customers with significant savings opportunities reaches saturation. In response to these challenges, Program Administrators are committed to intensifying their emphasis on training and customer-support services to help customers install and operate integrated systems that enable them to continue to harvest efficiency savings.

The Commercial and Industrial Existing Buildings Program is also proposing a new Active Demand Reduction initiative.

[17] Mass Save® is a registered service mark of the Program Administrators.

A Customer-Centric Approach

The Residential and Commercial and Industrial Programs offered for 2019-2021 recognize that customers are not all the same. Programs cannot define customers by one characteristic, but must offer designs that meet customers in different moments and circumstances and that respond to different customer values. The programs in this three-year plan acknowledge that customers will not always be motivated to engage in energy efficiency by energy cost savings. Barriers of time and knowledge frequently present greater challenges. The 2019-2021 programs provide more facilitated offers and more streamlined customer-directed options. This plan creates a framework that allows Program Administrators to directly respond to each customer's motivations and barriers to participation, thereby increasing the Program Administrators ability to provide more personalized customer experience paths that address customers' unique challenges to participation. This approach increases Program Administrators ability to provide attractive offers for populations currently identified as hard to serve, including renters, moderate income customers, small businesses, and non-profits while keeping open the ability to adapt for new or emerging hard to reach groups. The plan is intentional in recognizing the need to look at ever better demographic and psychographic customer data and to use this information to continuously refine outreach, intake and program offerings to maximize customer capture. All of these approaches recognize that building a future in which energy efficiency remains customers' first fuel choice requires that Program Administrators continue to focus on building long-term relationships with our customers that allow the flexible and iterative engagement that results in opportunities to continue to provide ever more comprehensive energy efficiency services to their homes and businesses.

B. Residential and Income-Eligible Programs

1. Overview

Over the 2019-2021 plan period, the residential programs are being realigned to allow Program Administrators to start and finish with the customer, designing every interaction to maximize savings and benefits. The new program design aims to clarify residential energy efficiency by creating pathways that are more intuitive to customers and better align with existing channels for home improvement.

The new residential design offers three programs and six initiatives:

Sector	Program	Initiative
Residential	Residential New Buildings	Residential New Homes & Renovations
	Residential Existing Buildings	Residential Coordinated Delivery
		Residential Conservation Services
		Residential Retail
		Residential Behavior & Active Demand Reduction
Income-Eligible	Income-Eligible Existing Buildings	Income-Eligible Coordinated Delivery

This realignment allows Program Administrators to provide customers with offers that are targeted to their specific opportunities and available in their chosen engagement path. Customers will have flexible options across a full complement of energy saving measures, whether they access them directly from an independent contractor, a brick-and-mortar store, an online retailer, or through the Program Administrators' highly facilitated and tailored offering delivered by participating program vendors.

Program Design Highlights

- ✓ A Coordinated Delivery initiative that integrates and expands the best elements of the Home Energy Services and Multi-Family Retrofit initiatives of the 2016-2018 plan to provide an optimized customer experience, including:
  - Expanded online assessments and program-enrollment options;
  - Enhanced support at customer intake, capturing and connecting additional detail to triage customers to targeted program offerings;
  - Leveraging the in-home assessment to provide deeper customer education and more facilitated options to support customer adoption of major measure savings opportunities (i.e., weatherization and HVAC Measures);
  - Enhanced relationships with allied trades (HVAC, electrical and insulation contractors) to capture customers at all entry points and help customers to secure ancillary services;
  - Tailored energy savings packages designed for direct delivery to customers; and
  - Enhanced relationship management for customers, with tracking of the adoption of measures and continuous re-engagement with additional opportunities.

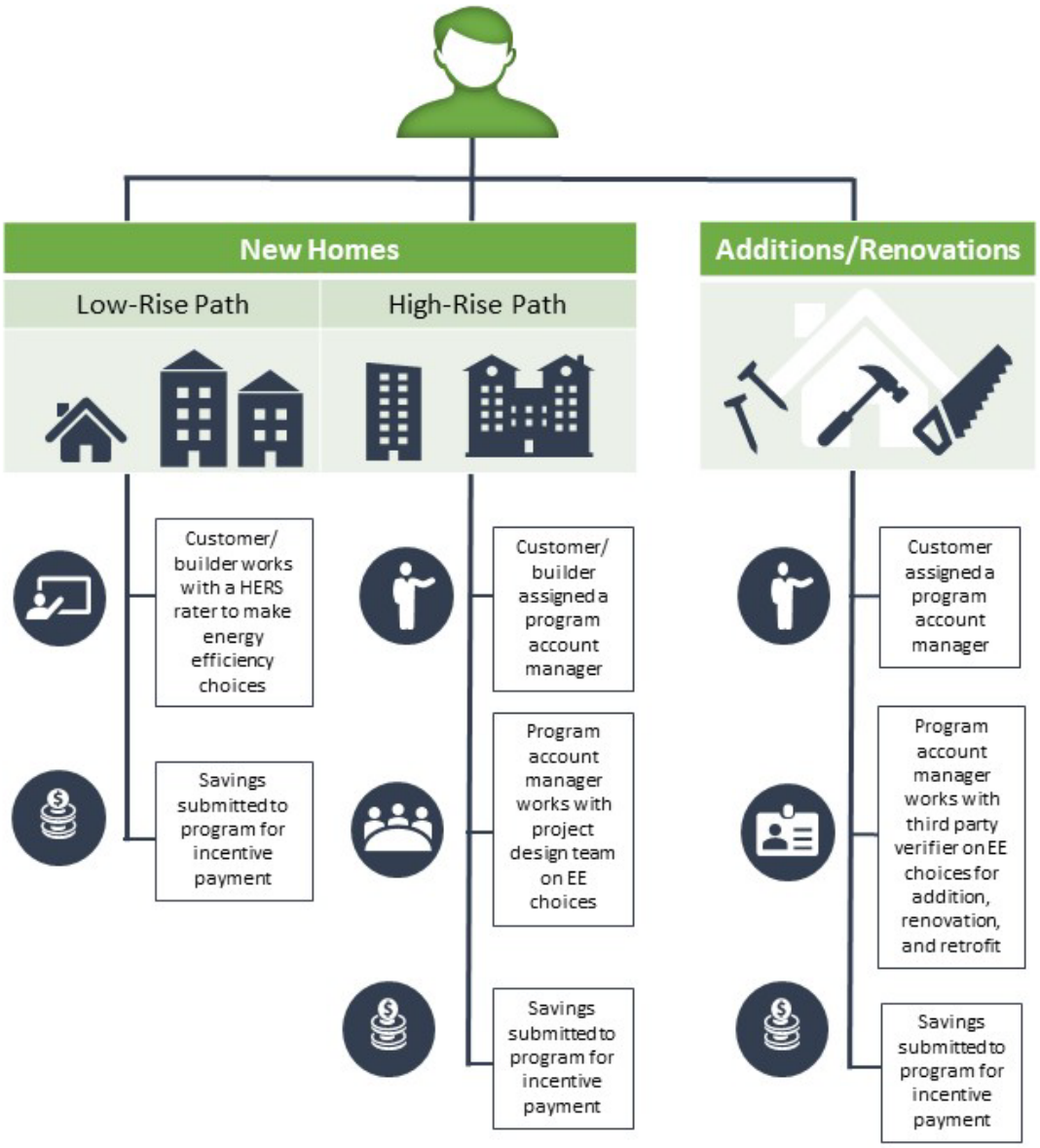
- ✓ An expanded Retail initiative that creates an enhanced integrated marketplace where energy efficient products are positioned as attractive primary choices for customers.
- ✓ Exploration of a retail point-of-purchase instant-rebate platform that expands the Program Administrators' reach into the retail market.
- ✓ Broadened partnerships with distributors and contractors to open additional on-ramps for customer participation.
- ✓ A new statewide Active Demand Reduction offering.
- ✓ Better alignment between Income Eligible and market rate protocols and services.
- ✓ Facilitated workforce retention, recruitment, and development strategies to ensure a robust energy efficiency workforce.

The new structure allows Program Administrators, their vendors and trade allies, and other partners to say "yes" to customers, and to respond to opportunity where and when it is available. The realignment responds to key barriers to participation and allows Program Administrators to greatly ease participation for customers who have been targeted as hard to reach such as moderate income, renters, and non-English speakers, while also broadening accessibility to additional customer groups who have not been served.

The Program Administrators plan to enhance their presence in customers' natural purchasing channels —such as when a customer is engaging in home improvement or new home construction, shopping for electronics or appliances, or inspired to save money on their energy bills. Rather than being forced to conform to a program design, customers can define how they participate and what offering they want. Initiatives are responsive to the customer's preferred engagement path and focus on removing perceived barriers to participation.

2. Residential Program and Core Initiative Descriptions

Residential New Buildings Program



a. Residential New Homes and Renovations Initiative

a.i Overview and Objectives

The primary objective of the Residential New Homes and Renovation initiative is to reduce energy use and demand in new homes, and in homes undergoing renovation. The secondary objective is to support the transition of the residential new-construction market toward the highest-

efficiency building practices and equipment installations.

The greatest opportunity to promote highest-efficiency energy systems and to maximize the performance of a building's shell (the exterior walls, foundation, and roof) comes during initial construction and renovations. This initiative provides financial incentives, coupled with education, training, and technical support, to builders and home owners to help new residential construction and renovation projects meet ever-increasing energy performance standards, including ENERGY STAR ® certification and Net Zero Ready status. In the 2019-2021 period, the Program Administrators will introduce additional technical assistance and an enhanced incentive structure to help customers achieve Passive House certification.

The New Homes and Renovations initiative supports the development and implementation of increasingly stringent codes and standards and the demonstration and normalization of highest-efficiency practices. The initiative supports the training of municipal code officials to continue to increase compliance with existing code and to prepare for future codes and standards.

a.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Pay for Savings**

  In the 2016-2018 plan, the program transitioned from using tiered savings thresholds to a pay-for-savings model. The pay-for-savings incentive structure rewards builders and customers for each kWh and therm secured, based on energy modeling. The pay-for-savings incentive structure is being closely monitored. Program Administrators will have a fully optimized pay-for-savings incentive structure for the New Homes and Renovation initiative for the 2019-2021 plan. Early results suggest that the design is pushing builders to seek additional incremental savings, resulting in higher average project savings.

- **Additions and Renovations**

  An additions and renovations offer is being added to the New Homes and Renovations initiative. While total gut renovations have long been part of the program, the new offer provides a pathway for customers who are engaging in a partial renovation and/or addition to their existing home, thus leveraging the program's effective model of supporting builders and verifiers during design and construction to secure energy savings.

  Recognizing that customers who are engaging in traditional renovations have similar energy savings opportunities and work through a similar process of contracting with a builder to complete their projects, the initiative will add a tailored offering that leverages the existing new construction delivery path. This new offer for additions and renovations will help maximize the opportunities that exist when there is a builder on site, including installation of highest-efficiency systems and maximization of shell improvement opportunities. This new offer combines the unique opportunities to secure energy efficiency measures during new construction and renovation activity with the potential for securing all of the traditional energy upgrades, including weatherization and other

envelope improvements, for the portions of the home that are not undergoing renovation. The new offer provides a streamlined process for customers to access holistic and comprehensive energy efficiency.

- **Passive House**

  Passive House techniques offer an evolved design approach that focuses on super-efficient shell or building envelope design and optimized energy systems. The Passive House approach also manages solar gain to take advantage of the sun's energy for heating and to minimize overheating during the cooling season. The Passive House Institute US and the Passivhaus Institut establishes standards and provides certification for such homes.

  The Passive House approach is well aligned with the Program Administrators' core mission to secure all cost-effective energy efficiency. Passive House offers the ultimate goal in high efficiency design; a building that uses little or no energy with additional resiliency benefits. Because of this, the Program Administrators are committed to supporting Passive House new construction in Massachusetts through a combination of targeted trainings, technical support and incentives.

  Program Administrators will use the 10+ current and former residential new construction initiative projects that are using Passive House techniques to garner Massachusetts specific lessons and leverage that information to broaden Passive House market penetration. Program Administrators will focus on multi-unit and mixed-use new construction projects to begin these efforts, as Passive House techniques are shown to be best applied to larger facilities.

a.iii Initiative Design

The Residential New Homes and Renovations initiative promotes comprehensive integrated design, incorporating high-efficiency structure design that maximizes the use of insulation and other high-performance materials, building orientation, and other passive measures to minimize the need to consume energy. This approach focuses builders on right-sizing energy equipment and incorporating highest-efficiency heating, cooling, water heating, lighting, and appliances.

The initiative provides two pathways. There is a Low-Rise pathway for homes under three stories, including single-family and multi-unit projects, and a Master-Metered/High-Rise pathway for residential master-metered buildings, and those with four or more stories. The pathways provide tailored technical support, outreach, recruitment, training, verification, and incentive structures that encourage and support all residential new construction and renovation projects in the Commonwealth to participate in the initiative.

Incentives are directly tied to a dwelling's modeled energy performance or installed prescriptive measures, and all participating homes must pass a final verification inspection. Overall energy savings are determined by modeling the electric savings and fuel savings and

comparing them to the average new home in Massachusetts. The pay-for-savings incentive structure rewards builders and customers for each kWh and therm secured, driving participants to secure each additional incremental savings opportunity.

For the Low-Rise pathway, the Program Administrators will continue working with the Home Energy Rating System ("HERS") Rater infrastructure. HERS raters play a critical role in recruiting builders to enroll projects in the Low-Rise pathway. HERS raters can directly enroll projects into the program via an online intake tool and provide verification of savings at project completion.

The new additions-and-renovation offer provides customers with all the technical support of the New Homes and Renovation initiative, including trainings and education for builders and connection to the HERS raters. This enables customers to leverage the most advanced building science and efficiency technology and push for highest efficiency in the new and renovated portions of their projects. For this offering, customers will also have the opportunity, while their builder and rater support are in place, to add traditional retrofit energy savings measures to their project, securing the maximum energy savings represented by the renovation opportunity. The savings will be modeled, and incentives will continue to reward each additional therm and kWh savings secured.

In the Master-Metered/High-Rise pathway, account managers from the lead vendor work directly with larger developers and builders to enroll projects. The Joint Management Committee ("JMC"), including both residential and commercial new-construction technical experts from Program Administrator staff and the lead vendor, assist in the recruitment and defining performance targets while providing guidance on maximizing incentives, on energy efficient construction practices, and highest-efficiency technologies and systems.

Energy Star

Program Administrators have supported additional incentives for Energy Star® certification. Program Administrators will be continuing their promotion of Energy Star certification through an incentive to support additional, related costs.

Zero Net Energy and Zero Energy Ready

Program Administrators are continuing their partnership with the Massachusetts Clean Energy Center for Zero Net Energy training and education. A more intensive training series is being led by the Massachusetts Clean Energy Center to move beyond the basics of Zero Net Energy, offering continuing education credits, and including training on how to incorporate heat pumps in new construction. The Program Administrators are also exploring an incentive to support Zero Net Energy or Zero Net Energy ready related costs.

Passive House

Program Administrators will focus on developing targeted training, technical support and incentives to promote Passive House building knowledge and investments that can most

effectively promote adoption of the Passive House model. Early work will focus on promotion of Passive House for multi-unit and mixed-use buildings. The residential team will work closely with the commercial team's New Construction Programs.

Statewide Coordination

The Program Administrators collaborate through a working group of residential and commercial sector experts from each Program Administrator to oversee the Low-Rise and Master-Metered/High-Rise implementation strategies with the statewide lead vendor. The lead vendor provides the direct field implementation.

The lead vendor is responsible for development and deployment of training, education, and outreach efforts, as well as tracking and reporting program activity to each Program Administrator. The lead vendor has principal responsibility for recruiting and enrolling projects. Many Program Administrators maintain additional account representatives and field personnel that support project recruitment and maintain relationships with the target market and allies. HERS raters, as noted above, play a key role in the Low-Rise path for recruiting and enrolling projects.

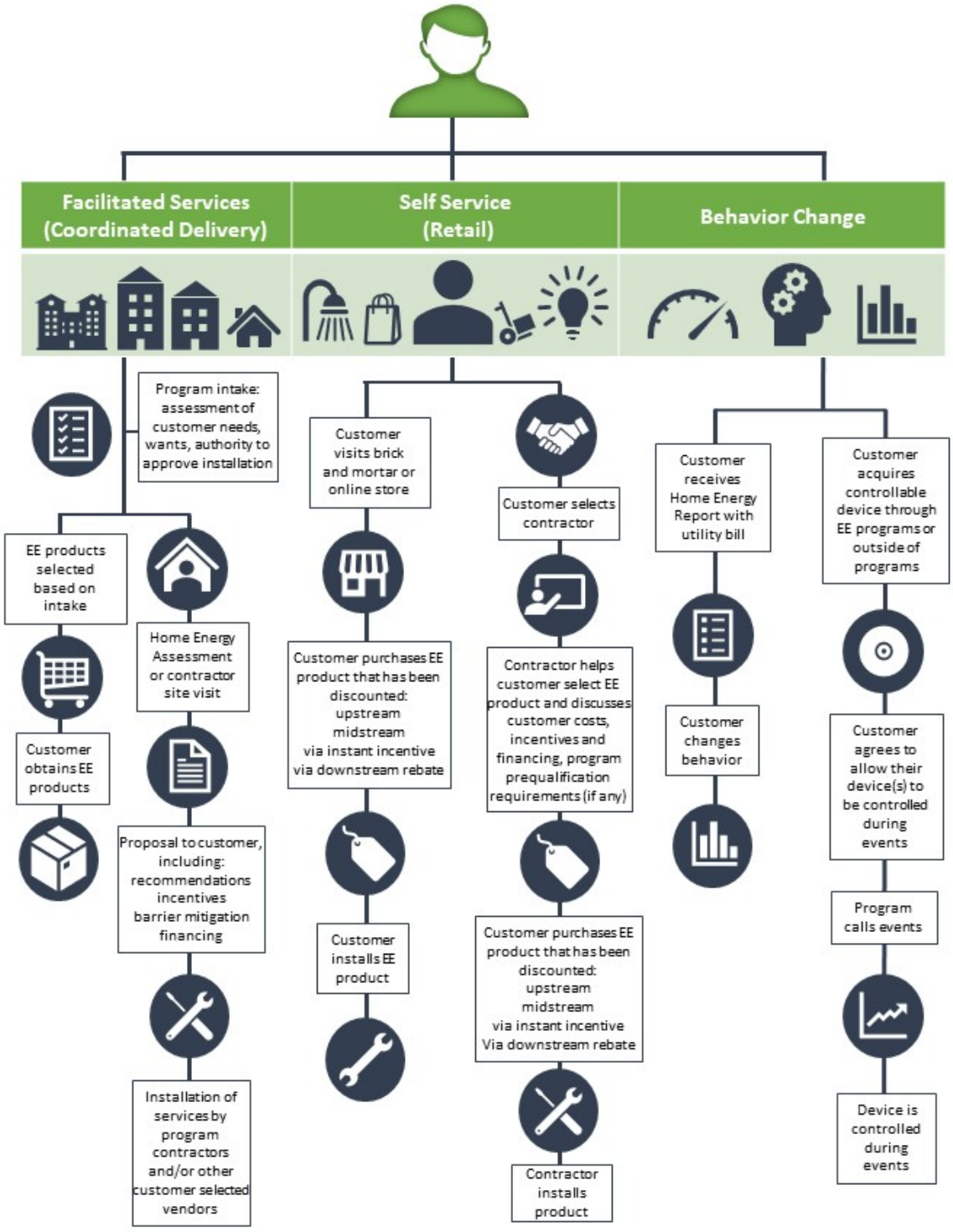
Marketing

The New Homes and Renovation initiative targets marketing and outreach efforts to homebuilders, developers, and contractors. Program Administrators also provide outreach to the associated market actors that interact with program participants, such as architects, designers, and trade allies. A third critical focus in marketing the initiative is on key decision makers and influencers in the residential real estate market, including homebuyers, realtors, code officials, appraisers, and mortgage bankers. This multi-pronged strategy guarantees that at each touch point in the new home construction and delivery process, Program Administrators build awareness and demand for highest efficiency homes and provide potential participants clear and easy access to the residential new homes offerings.

Codes and Standards

The Program Administrators will continue to focus on improving compliance with the current energy code for both new construction and renovation projects by conducting code trainings and offering technical assistance for project specific code questions. The Program Administrators will also expand this effort to advance the adoption of progressively more efficient energy codes, including stretch codes, and efficiency standards for appliances and equipment. The Program Administrators will research the energy savings opportunity to support the development of enhanced energy codes and product standards at the state and national levels and consider implementing a formulaic, multi-year approach based on information collection, data analysis, and stakeholder engagement.

Residential Existing Buildings Program



b. Residential Coordinated Delivery Initiative

b.i Overview and Objectives

Residential Coordinated Delivery ("RCD") facilitates comprehensive weatherization and home energy efficiency upgrades in existing homes. Residential Coordinated Delivery helps customers with all cost-effective projects that reduce whole-home energy consumption. The initiative provides access to the information, technical support services, and implementation contractors who can assist customers from identification of energy efficiency opportunities through to final implementation.

The goal is to deliver a seamless experience and maximum energy savings to every customer, regardless of unit type or ownership structure. By refocusing the delivery of services on building science, opportunity, customer choice, and what each customer has the authority to implement, the new design aims to put customers in control of their energy future and reduce the number of customer confusion points. Focusing on clear, uncomplicated participation pathways will expand the equitable distribution of benefits by making it easier for all customers to engage. The Residential Coordinated Delivery initiative will help establish the Program Administrators as the customer's trusted energy advisor, building long-term relationships that lead to comprehensive energy efficiency upgrades to Massachusetts' homes.

b.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

Coordinated Delivery is the cornerstone of the residential realignment, encompassing the best elements of the former Home Energy Services and Multi-Family Retrofit initiatives. The new structure integrates and expands the previous residential offerings into an optimized customer experience designed to capture and retain more customers and support the implementation of comprehensive energy efficiency measures. The Coordinated Delivery initiative represents a paradigm shift away from asking customers to find and fit into a siloed delivery path, to a new focus on creating program infrastructure that can accept customers at all points along a path to comprehensive home energy efficiency.

Coordinated Delivery builds more entry points and tools to help customers begin and continue their energy efficiency journey and supports program re-entry. Strategies include:

- Expanded online assessments and program enrollment options;
- Enhanced support at customer intake, capturing and connecting additional detail to triage customers to targeted program offerings;
- Leveraging the in-home assessment to provide deeper customer education and more facilitated options to support customer adoption of major measure savings opportunities (i.e., weatherization and HVAC Measures);
- Enhanced relationships with allied trades (HVAC, electrical and insulation contractors) to capture customers at all entry points and help them to secure ancillary services;
- Tailored energy savings packages designed for direct delivery to consumers; and

- Enhanced relationship management for customers, with tracking of the adoption of measures and continuous re-engagement with additional opportunities.

b.iii Initiative Design

The Residential Coordinated Delivery initiative helps customers acquire comprehensive home energy efficiency upgrades, with an emphasis on weatherization and heating and cooling systems. The initiative uses incentives, financing, outreach and education, and relationships with trade ally partners to make it easy, clear and compelling for customers to implement energy efficiency upgrades. RCD will continue to deliver services using a team of highly skilled and coordinated lead vendors, energy specialists, home performance contractors, and insulation contractors who use a systems approach, considering all components of the home (base load, envelope, mechanical) to support customers in achieving deeper energy savings.

Single-family homes, including free-standing town homes, will use the delivery and incentive structure of the former Home Energy Services ("HES") initiative. Multi-unit buildings will be triaged to qualified vendors and contractors according to specific building type. Smaller multi-unit buildings will continue to use the HES-style delivery, with a scaled set of incentives based on the number of units participating in the initiative to encourage landlords and condo associations to install energy efficiency measures for all units in a building. Larger multi-unit buildings will follow a more customized path, with custom incentives and savings methodologies, to maximize capture of the unique opportunities of larger and mixed-use multifamily structures, and provide a strong business proposition that makes energy efficiency upgrades for residents an easy decision for property owners. Delivery for all multi-unit residential buildings (regardless of meter type) will be led by the residential program team. For both smaller and larger multi-unit buildings, all customers expressing interest in energy efficiency improvements will be offered solutions to improve their home's energy efficiency specific to their situation. The initiative is fuel-blind.

All home energy savings measures can be facilitated to customers through the Residential Coordinated Delivery path, including lighting, water saving devices, weatherization (i.e., air sealing and insulation), heating, cooling, and water heating equipment and other qualified efficient products.

Since multi-unit buildings may contain residential and/or commercial metering and include building-level systems more traditionally found in commercial facilities, a number of measures more often found in the C&I Retrofit program are made available for upgrades in these multi-unit buildings, as appropriate. These measures may include:

- HVAC high-efficiency equipment upgrades and controls;
- Variable speed drives and motors;
- Chillers;
- Air compressors;
- Water heating equipment;

- Energy-management systems; and
- Custom measures.

Home Energy Assessments

The unique element of the Residential Coordinated Delivery initiative is that all customers are provided an opportunity to take advantage of an energy assessment. The goal in the 2019-2021 plan is to tailor the assessment to the customer. Program Administrators are working to expand the variety and precision of online assessments available through the initiative. Increasing the use of online assessments will help bring more customers into the initiative and better triage customers to the most appropriate pathway for home energy upgrades. On-line assessments and digital pathways are critical to providing time-constrained customers the 24/7 access to opportunities and education that consumers seeking home products and services have come to expect.

The highly marketed Mass Save residential telephone number will continue to be the central residential phone-intake system. The Program Administrators will provide comprehensive intake screening and triage customers to the type of assessment that best applies to their situation. All customers calling will be offered some means to participate in Program Administrator's energy efficiency programs and their participation will be facilitated, even in instances in which the involvement of other parties (landlords, other unit owners, etc.) is a priority.

Program Administrators will offer customers without the ability to implement major-measure opportunities (e.g., weatherization or HVAC measures) tailored energy savings suggestions including recommendations for any measures they may be eligible to receive. Customers will be presented with a personalized energy efficiency plan which could include a selection of eligible energy savings measures, such as lighting, water-saving devices, and other efficiency products that respond to specific opportunities to increase the efficiency of their home. The customer can select the measures they will install, and a tailored package (with instant incentives applied) can be sent directly to the customer by the Program Administrators.

Costs related to home energy assessments will be charged to the Residential Conservation Services ("RCS") budget line, in accordance with the Department's directives and the RCS statute.

Increased customizing of the in-home assessments

Program Administrators have learned, through program evaluations and consultations with program vendors, that a primary challenge during on-site home assessments has been having time to fully educate the customer about their energy saving opportunities. By capturing key information on customer opportunities through the enhanced intake screening and focusing on those measures that require in-home visits, Energy Specialists will have more time to spend educating the customer. This education is not limited to the specific energy efficiency opportunities available and the potential financial savings and incentives. Many customers have concerns about the time, disruption, and risks that may be associated with the installation of some major measures, such as insulation and air-sealing. Increasing the time spent on education and customer support during on-site assessment will allow customers to be more in control of their

energy decisions and give them a trusted partner to help navigate major energy savings opportunities. The Energy Specialist can dedicate time to help customers understand how the actual implementation of weatherization and heating systems upgrades will unfold. Energy Specialists will now also be encouraged to help connect customers to heating contactors and other ancillary services that prepare them for major-measure installation. This includes working with trade allies to address the mitigation of pre-weatherization barriers.

In order to receive weatherization incentives and certain rebates, customers are required to have an in home assessment through either the Program Administrators' lead vendor or via a participating Home Performance Contractors ("HPC") to identify and prioritize all cost-effective energy efficiency upgrades. The initiative continues to implement set pricing for weatherization. The set pricing model provides certainty regarding cost-effective energy efficiency upgrades for customers, contractors, and Program Administrators alike. This prevents claims or concerns of price gouging by customers, provides ease of participation (e.g., no requirement of the customer to solicit multiple bids) and helps generate and support further business within the market. Set pricing also allows contractors and Program Administrators to plan more efficiently and ensure the total resource costs remains cost-effective. Without set pricing the in-home energy assessment could not result in the production of an executable weatherization contract for the customer, which is a very unique and valuable program design within the Massachusetts Residential Coordinated Delivery initiative. The Program Administrators carefully select weatherization materials and measures based on energy savings, customer costs, total costs, scalability/ease of installation, and other pertinent characteristics. Focusing on a specified set of measures, in addition to having set pricing, further eases participation for homeowners.

Serving all Customers

The Program Administrators remain fully committed to ensuring that all customers have access to the benefits of energy efficiency. While the economic, environmental, comfort, and health impacts of our programs are important to all participants, lower income households have the potential to gain the most.

The Program Administrators' dedication to delivering the benefits of energy efficiency to all is evident through the many initiatives the Program Administrators have implemented to help ensure equitable distribution of energy efficiency. Examples include partnerships with municipalities and community organizations, targeted outreach to landlords, the Efficient Neighborhood+® initiative (which included door to door marketing, use of lawn signs, pre-qualifying geographic areas for special incentives, and numerous partnerships), the 2016-2018 Plan moderate income and renter offers, and the trial with LEAN to serve moderate income customers recently underway. With each effort, the Program Administrators learn more and use these experiences to improve the ability to reach every household.

The current residential offers targeting hard to reach segments are premised on the assumption that money is the primary barrier and incentive levels are the most critical motivational levers to secure customer participation. Recent evaluations require the Program Administrators take a broader view of the factors influencing participation of different targeted populations. For

example, a recent evaluation[18] suggests that time is the greatest challenge moderate income customers face in participating in the Program Administrators' programs. This finding aligns with the Program Administrators' extensive experience in delivering programs and working with stakeholders. It demands a reexamination of the current approach to reaching all customers.

Taking an exclusive focus on income may come at the expense of addressing more fundamental barriers to participation such as time and complexity. Ensuring simplicity and ease of participation for customers is the core principle underlying the realignment of programs, which drives out unnecessary roadblocks, and focuses on ensuring each customer is afforded a positive experience where their needs are the primary focus of every interaction. The new alignment allows for increased accessibility of all programs for all customers while continuing Program Administrators unwavering commitment to deliver ever greater access to customer segments that have been highlighted in the past, such as moderate income and renters. Program Administrators are also redoubling efforts to use evaluations and market research, along with community partner and stakeholder input, to ensure we are continuously learning and expanding our to equitably serve all customers. While maintaining a clear focus on delivering clear and accessible programs, the Program Administrators will continue to look for innovative, data driven ways to reach all customers.

Enhanced relationships with trade allies to increase weatherization and HVAC system upgrades

Program Administrators are exploring new ways of partnering with trade allies, including HVAC contractors and electricians. Based on these explorations, which include demonstrations underway in 2018, the Program Administrators will develop new and improved tools and pathways to help customers who have identified opportunities take the next step in implementing recommended energy upgrades. Our delivery teams can help customers with the next step, which might be helping to secure a provider for barrier mitigation, such as evaluation of knob-and-tube wiring, or supporting customers in securing competitive services of an HVAC provider to install a new heating, cooling, or hot water system. Vendor roles will need to include coordination across these partners to provide customers with a more tailored and connected experience.

Program Administrators are also leveraging their relationships with HVAC contractors and electricians to remove barriers to servicing customers who participate in the Coordinated Delivery initiative. Similar to providing new tools and pathways to the Program Administrators' lead vendors and contracted partners to help make connections to trade allies, Program Administrators are examining similar inducements for HVAC contractors and electricians to connect their customers to the additional facilitated solutions Residential Coordinated Delivery can offer.

Enhanced Heating Equipment Education

The energy marketplace has evolved quickly and is becoming increasingly complex. This complexity is especially apparent in heating equipment decisions, with many choices available to customers, including systems that provide both heating and cooling functions (e.g., heat pumps),

[18] http://ma-eeac.org/wordpress/wp-content/uploads/Moderate-Income-Market-Characterization-Report-Final-16Mar2018.pdf

new Wi-Fi and automated control systems, and alternative fuel options. To assist customers in moving forward with energy efficiency and meeting their energy goals, the Program Administrators are seeking to help educate customers so they can make informed decisions. For the 2019-2021 Plan, the Program Administrators will provide education through energy assessments about all heating measures available to help customers to optimize energy consumption at their premises. During the assessment, customers will receive information regarding the costs, financial incentives, other government agency incentives, estimated payback periods, energy savings, and emissions reductions of various heating measures, regardless of fuel type, that are offered through the programs and are appropriate to their premises. If a customer chooses to install a heat pump, Program Administrators will also provide information on the implications of retaining or removing the prior heating system.

Program Administrators will educate customers and encourage the use of available technology, as appropriate, to help customers operate their new systems optimally and efficiently. This effort focuses on fostering informed customer choices. While the Program Administrators will not be recommending specific or preferred technologies, the Program Administrators are expecting the increased education will result in some customers electing to convert from oil or propane to highly efficient heat pumps or gas equipment when those choices are cleaner and less expensive than their current system. Incentives will continue to be set to encourage greater efficiency and energy reductions at the customer's home. Customers may also leverage incentives offered by other government entities, such as DOER and the Massachusetts Clean Energy Center ("MassCEC"), which are designed to encourage adoption of specific technologies. The Program Administrators will include MMBTU savings from the offset oil or propane usage in their claimed savings and account for the increase in primary fuel usage. This new focus is intended to be a holistic approach to lowering a customer's total energy use and costs, and providing additional value to customers through education efforts.

c. *Residential Retail Initiative*

c.i Overview and Objectives

The goal of the Residential Retail initiative is to enhance the Program Administrators current retail efforts to provide a broader integrated marketplace where energy efficient products are positioned as attractive, primary choices for customers making purchasing decisions, whether online, in-store, or through independent contractors.

The Residential Retail initiative ensures that all residential customers can access high-efficiency lighting, heating, cooling, and water heating equipment; thermostats and residential lighting controls; appliances and other energy efficient products. The initiative works to place the most energy efficient options before customers who prefer to navigate their energy efficiency journey themselves or with their contractors, rather than through the Program Administrators' highly facilitated Coordinated Delivery Path.

c.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Point-of-Purchase Instant-Rebate Platform**

  The Program Administrators are exploring options for a point-of-purchase instant-rebate platform that can help expand their reach into the retail market. There are many point-of-purchase systems currently on the market for efficiency providers with a variety of capabilities. Program Administrators are planning a demonstration in the summer of 2018 to help inform their decision. Program Administrators are interested in finding a platform that can connect customers with available incentives while the purchase for an energy efficient product is top of mind for the customer and in their preferred channel. Considerations for a digital platform include the ability to offer instant rebates for online purchases, and digital coupons for efficient products purchased through brick-and-mortar retailers.

- **Broadened Partnerships with Distributors and Contractors**

  Program Administrators are increasingly interested in working with distributors in a midstream channel strategy to support stocking and promotion of larger residential energy efficient equipment. As new energy saving products come on the market, a midstream approach provides an effective mechanism to increase measure volume and savings for items not yet well known to customers and contractors.

  Whether by using the same point-of-purchase instant-rebate platform or an alternative platform with supply houses and contractors, a system that digitally captures customer information and allows for instant rebates delivers a better customer experience during the purchase, as well as the ability to collect better customer information for evaluation and follow-up outreach.

- **Tailored Energy Savings Packages**

  The Retail Program plans to expand and enhance the existing Mass Save online store and help create customized packages for customers. Customers who complete an on-line assessment and are identified as having no opportunities for major measures will be presented with an energy-upgrade plan that includes a selection of energy savings measures, including lighting, and water saving devices, that increase the efficiency of their home. The customer can select the measures they will install, and a tailored package (with instant incentives applied) can be sent directly to the customer.

c.iii Initiative Design

The Retail initiative helps customers acquire a full complement of energy saving equipment, from simple self-install items (like LED light bulbs and shower heads), to products that are selected by consumers but often installed and serviced by specialized technicians (such as appliances and lighting fixtures), to larger equipment that requires professional installation (such as water heaters). Energy saving products that the Retail initiative supports include lighting and

associated controls, smart strips, water saving devices (such as shower heads and faucet aerators), appliances, efficient electric heating and cooling equipment, heat-pump water heating technologies, gas heating (hot water boilers and warm air furnaces), water heating equipment, and associated controls such as wireless and programmable thermostats and outdoor reset controls. Additional products are continuously being evaluated and added to the portfolio.

To successfully influence consumer choices for this broad portfolio of products, Program Administrators use a multi-channel strategy supported by extensive marketing to and training of trade allies and retail partners. Trade ally training plays a significant role in driving product placement and acceptance. Customer-facing rebates are also critical to building demand for and acceptance of high-efficiency products. Rebates and incentives may be upstream, midstream, or downstream.

Product Placement

The initiative seeks to create opportunities for customers to access efficient options by working with big box and other retailers, with manufacturers, distributors, and supply houses, and through the Mass Save online store.

In addition to working with traditional retail outlets, a major focus of program activity is to provide support to plumbing and heating and cooling contractors and others in the supply chain (manufacturers, distributors, and suppliers) to ensure the availability, promotion, and quality installation of the highest efficiency equipment.

Program Administrators continuously engage their partners. Program Administrators recruit and train retailers (including discount retail outlets) to participate in upstream incentives, provide and support placement of point of purchase materials in retail stores. Program Administrators also work closely with supply houses and support education of trade allies.

The purchase and installation of heating and water heating equipment is heavily influenced by the installing contractor and the supply chain behind them. For this reason, a major focus of this initiative is to understand and work with the market actors who strongly influence the purchase and placement of these efficient options, including plumbing and HVAC contractors and technicians.

The installation and service practices of these same key trade allies further influence how well energy efficient equipment performs once it is installed. Therefore, Program Administrators promote installation best practices for a wide assortment of energy efficient equipment, including central-air-conditioning equipment and air-source heat pumps, hot water boilers, warm air furnaces (with electronically commutated motor or equivalent advanced furnace fan systems), select heating system controls (including after-market boiler reset controls and programmable and wireless-enabled thermostats), water heating equipment, and heat-recovery ventilator equipment (“HRV”). Program Administrators own the GasNetworks® website. This is a valuable channel for reaching the plumbing and heating contractors.

Mass Save Online

As social media and online marketing have grown in influence for consumer products, Program Administrators have successfully leveraged online marketing opportunities to promote residential energy efficiency. This marketing is supported by a branded online Mass Save Store which provides instant incentives on energy efficient products. Program Administrators plan to more fully leverage this channel to supply tailored packages to customers from the comfort of their keyboard direct to their home.

The Program Administrators intend to continue to maintain a stock of products offered through the Mass Save catalog and online store, staff a toll-free line for customers, and process purchases.

Incentives

The Program Administrators have offered generous incentives to customers to help offset the higher cost of their investments in high-efficiency products and heating, cooling, and water heating equipment for many years. In addition to the direct financial support to help customers make the purchase, the highly visible incentive programs help customers to recognize efficient products as part of the efficiency programs and to position efficient products as premium products. These efforts will continue in the 2019-2021 Plan.

d. Residential Behavior Initiative

d.i Overview and Objectives

The primary goal of the Residential Behavior core initiative is to encourage customers to engage in behavior that will result in energy conservation or demand reduction. The Residential Behavior core initiative seeks to identify the motivational factors that cause residential customers to actively employ personal energy saving actions or participate in energy efficiency and demand reduction programs.

Program Administrators engage in extensive education, marketing, and workforce development and training activities, all of which are focused on building a climate of energy efficiency awareness and conservation. The Residential Behavior initiative focuses specifically on targeting behaviors that can result in energy conservation or demand reduction. The Program Administrators' behavioral offerings must be able to accurately capture the direct impact in measured energy savings or demand reductions that result from promoting behavioral actions. Customers must therefore be actively targeted for behavioral interventions, and their specific behavior or action must be rigorously connected to measured savings or demand reduction outcomes.

Customers may participate in the program activity through passive receipt of program treatment or active enrollment in a specific behavioral program offering. Behavioral programs do not claim savings that result from decisions by customers to upgrade or install energy efficient equipment, as those savings are captured in the Coordinated Delivery and Retail initiatives.

While all residential customers theoretically are eligible for Residential Behavior offerings, the measurement rigor and sophistication or specific installed technology that is required may limit how many customers can be treated or enrolled in a specific offering.

d.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Active Demand Reduction Offering**

  Two electric Program Administrators (National Grid and Cape Light Compact) ran residential active demand reduction demonstrations during the 2016-2018 term. Unitil plans to offer its Department-approved residential demonstration starting in November 2018. The electric Program Administrators are actively refining the design and will deploy a statewide active-demand offering for the 2019-2021 term across all Program Administrator territories, if cost-effective.

d.iii Initiative Design

Home Energy Reports

In previous plan terms several Program Administrators introduced and evaluated behavior-based designs to promote energy conservation within their respective territories. The Home Energy Report ("HER") model remains the behavior model with successful evaluation results. It provides reliable and predictable savings.

The HER model assigns qualifying customers to treatment and control groups. The treatment groups receive electronic or mailed reports on an ongoing basis and have access to an online portal. The control groups are retained as untreated to allow for comparison and identification of the savings impact of the treatment on the treated group (i.e., the difference in energy savings experienced by the treated group over the untreated control group). Customers in the treatment group are treated as a group indefinitely, or until the Program Administrators decide to stop treating customers with HERs.

The HER design promotes energy savings through two primary paths:

- Educational reports
- Educational reports *and* customer interaction with their online platform.

The HER details and benchmarks customers' energy usage against their past usage and against similar homes in the area. Customers also have the option of opting in to an online platform to get more feedback on their energy usage. Data collected from the Program Administrators, third-party datasets, and customers are used to provide behavioral tips specific to the customer. In addition, these reports have space to cross-market other energy efficiency programs offered by the Program Administrators, adding an additional value to the program.

The HER model requires a substantial financial and time investment in mapping information-technology systems (from Program Administrator to vendor and back) to allow for

data transfer. This critical infrastructure development is a prerequisite for being able to develop effective treatment groups and tailored HERs.

There is limited flexibility in influencing the design. For Program Administrators with smaller populations available for treatment, it has been challenging to start or implement an HER model program cost-effectively. Several Program Administrators have been told directly by the leading vendors that they cannot provide the HER for their service territory at a reasonable cost (i.e., that would meet regulatory cost-effectiveness requirements).

A statewide request for proposals ("RFP") would not increase availability, as the required investment is specific to Program Administrators' internal billing and usage monitoring systems. These large upfront costs cannot be reduced by aggregating Program Administrator customers into one contract, because the required investment is specific and unique to each Program Administrators' internal systems. That said, the majority of Massachusetts customers are treated with HERs, because the largest Program Administrators have fully operational offers. For example, Liberty's gas customers are already treated with an HER through National Grid's HER offer. This not only provides these customers the "treatment" but also severely limits any behavior savings potential from an additional Liberty HER treatment further exacerbating cost-effectiveness concerns. Two smaller Program Administrators (Berkshire Gas and Unitil) are continuing to explore the potential to offer the HER cost-effectively during the new plan term. The Cape Light Compact will also be exploring the potential to cost-effectively offer an HER during the new plan.

Active Demand Reduction

The Program Administrators will be implementing demand reduction based on the recent evaluated demonstration efforts. National Grid and Cape Light Compact ran residential active demand reduction demonstrations in the summer of 2016 and 2017 targeting summer cooling loads. Unitil plans to run the demonstration approved by the Department in D.P.U. 16-184 in the summer of 2019. National Grid and Cape Light Compact shared the evaluations of their demonstrations with Eversource and Unitil, and collectively, the electric Program Administrators have modified the demonstration offering approach and designed a new active demand offering incorporating the lessons learned from the demonstrations. Program Administrators believe the modifications will allow the program to reach scale and operate cost-effectively.

The core model remains focused on reducing cooling demand during summer peak events typically targeting twenty hours per summer. The Program Administrators may have to consider more hours to ensure the peak hour(s) achieve demand reduction. The design is a bring-your-own-device model, starting first with communicating thermostats (typically Wi-Fi) controlling central air units. Additional eligible connected/communicating devices may include batteries, lighting, water heaters, pool pumps, and other devices. Incorporation of additional devices will depend on device saturation, manufacturer concentration, and the costs associated with integrating and enabling load control on each type of device. Customers with eligible technology will be offered the opportunity to enroll in the active demand offering and given financial incentives to participate in demand reduction during summer peak events. Program Administrators will seek to enroll both customers with devices already installed and customers installing devices through the energy efficiency delivery pathways during the 2019-2021 period.

Eligible customers' devices will be connected to a platform through an application programming interface ("API"), a mechanism that allows two different electronic systems to exchange core data and interact in a common language. Program Administrators will send a signal to the device during an event that causes the controller to reduce the demand of the connected device. Events will be called in advance, primarily in the months of June, July, August, and September.

3. Income Eligible Program and Core Initiative Descriptions

Income-Eligible Existing Buildings Program

a. Income-Eligible Coordinated Delivery Initiative

a.i Overview and Objectives

The Income Eligible Coordinated Delivery initiative provides cost-effective, energy efficiency products and services to income eligible residential customers. Income eligible is defined as at or below 60 percent of the state median income level for 1-4 unit buildings and at or below 60 percent of the state median income level for 5+ unit buildings. The initiative is administered in coordination with LEAN and implemented by local Community Action Program ("CAP") Agencies. Revenue streams are leveraged with the Department of Housing and Community Development ("DHCD") Weatherization Assistance Program ("WAP") and the Heating System Repair and Replacement program ("HEARTWAP"). This approach provides a seamless, integrated experience leveraging all applicable revenue streams for income eligible participants with no co-payments required from customers.

a.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Better Alignment between Income Eligible and Market Rate Protocols and Services**

  Program Administrators and LEAN are collaborating to identify and deploy more coordinated solutions and partnerships between the Income Eligible and Market Rate programs to support increased awareness and drive customer participation for both income eligible and market rate customers. Particular emphasis will be placed on aligning, to the extent possible, auditor and contractor protocols, program measures, and service delivery.

- **Facilitate workforce retention, recruitment, and development**

  In collaboration with LEAN, the Program Administrators will develop and implement new workforce retention, recruitment, and training strategies to ensure a knowledgeable and sustainable income eligible workforce. CAP agencies are trusted energy service providers in communities across Massachusetts. Program Administrators and LEAN want to ensure their continued on-the-ground success through an increased investment in the people that provide these valued services.

a.iii Initiative Design

The initiative is implemented by local Community Action Program Agencies and integrated with resources from the Department of Housing and Community Development Weatherization Assistance Program and the Heating System Repair and Replacement program. To continue to align with leveraged funding sources, the Income Eligible Coordinated Delivery initiative will preserve existing implementation strategies:

1-4 unit buildings

Income Eligible Coordinated Delivery serves residential customers living in one to four-unit dwellings who are at or below 60 percent of the state median income level and are qualified to receive fuel assistance and/or utility discount rates. Once customers are deemed eligible, they will receive an in-home energy assessment from their local CAP agency. The assessment evaluates the building shell, efficiency, and (for electric Program Administrators only), the appliance conditions. All assessments include an evaluation of home health and safety. The lead vendor/CAP agency will then arrange for all applicable measures and services to be installed by a qualified contractor.

The initiative piggybacks on the current DHCD WAP and HEARTWAP programs. All applicable revenue streams available are leveraged to enhance services. Federal money will primarily be used to address health and safety issues, as well as repairs, to allow for cost-effective energy efficient measures to be installed. Program Administrator energy efficiency funds can be used to push for deeper measures on the cost-effective priority list, including approved weatherization-related repairs. As federal support has decreased over the preceding years, an increasing portion of both repair and energy efficiency measures are carried solely on the Program Administrator efficiency budgets.

The Program Administrators will provide funding of up to 100 percent of the cost of measures to be installed. All applicable revenue streams from each program are leveraged and offered jointly to income eligible residents.

As mandated by DHCD, all projects that receive Department of Energy ("DOE") funding, must receive CAP agencies post-installation quality assurance inspections to ensure that all work is performed to the program guidelines. The CAP agencies also perform a minimum of 50 percent in-process inspection of projects.

Because the Program Administrator initiative piggybacks on the DHCD program, many jobs have multiple funding streams with associated requirements; therefore, quality control is completed for both DOE and PA-funded projects at the same time. DHCD performs another level of visual inspection for 20 percent of all DOE-funded projects. During these inspections, DHCD reviews both DOE and PA-funded work. Additionally, the Program Administrators have an independent third-party vendor perform quality assurance inspections for an additional level of quality control. Program Administrators require up to 5 percent of all jobs that are exclusively funded by the Program Administrators to be inspected by a third-party quality control vendor.

5+ unit buildings

Income Eligible Coordinated Delivery serves properties that have five or more units in which at least 50 percent of the occupants are at or below 60 percent of the state median income level, including properties owned by public housing authorities, non-profit organizations and for-profit organizations. Eligibility for the initiative measures and services is based on the established cost-effectiveness of measures and services, which includes agreed upon non-energy benefits calculations specific to income eligible populations and is not restricted by the rate class associated with the meter(s) for the facility. The program requires that multi-unit property applicants participate in benchmarking their building's energy usage pre- and post-improvement.

The Income Eligible Coordinated Delivery initiative is structured to ensure 5+ unit buildings are provided with a whole building, fully integrated offering that targets both gas and electric end uses. Assessments and services for buildings that are going through the refinance process will be coordinated with relevant stakeholders.

Once a property is deemed eligible, an energy assessment is performed by the local CAP agency. The assessment evaluates the building shell, efficiency, and (for electric Program Administrators only), the appliance conditions. All assessments include an evaluation of building health and safety. The CAP agency will then arrange for all applicable measures and services to be installed by a qualified contractor. Savings will be deepened by installing additional energy efficiency measures, to the extent the overall project remains cost-effective.

Energy efficiency products and services are implemented within the common interior and exterior areas of the building as well as directly within the dwellings of residential customers, benefiting income eligible occupants and owners of multi-unit buildings. The Program Administrators will provide up to 100 percent of the funding for cost-effective projects with established limits based on projected savings. All applicable revenue streams from each program are leveraged and offered jointly to income eligible residents.

Measures promoted

Measures are provided at no cost to 1-4 unit customers with established limits. For 5+ unit buildings, Program Administrators will pay up to 100 percent of the project cost with established dollar limits where applicable. The measures available to Income Eligible Coordinated Delivery properties include:

- Insulation (attic, wall, pipe, and duct)
- Air sealing
- Heating system repair and replacement
- Programmable thermostats
- Domestic water heating, including low-flow showerheads, faucet aerators, pipe wrap, heat pump water heater (electric)
- Lighting, including LEDs, lighting fixtures, and torchieres

- Appliances, including refrigerator and freezer replacement, second refrigerator removal, advanced power strips, clothes washer replacement, dehumidifier replacement, and window air conditioner replacement
- HVAC/mechanical systems, including Energy Management System ("EMS"), motors and drives, chillers, air compressors, ventilation system repair adjustment or replacement, heat recovery ventilation/energy recovery ventilation, redistribution systems, temperature building controls
- Weatherization repairs (electrical, roofs, etc.)
- Health and safety (combustion safety testing, ventilation, etc.)

In coordination with LEAN, the Program Administrators will work with the Massachusetts Technology Assessment Committee ("MTAC") to include new measures or technologies as appropriate.

Customer Education

Energy efficiency education and information is provided to all participating customers. The primary form of energy education is verbal communication between the auditor and the client along with leave-behind materials. Educational materials have been translated into multiple languages, and will continue to be updated and provided to customers as applicable. Additionally, the CAPs notify all customers verified for fuel assistance of the energy efficiency programs available to them and to encourage enrollment in the program.

The Program Administrators will work in collaboration with the Low-Income Best Practices working group, including LEAN, DHCD, lead vendors (where applicable), and CAP agencies to coordinate statewide on all aspects of Income Eligible Coordinated Delivery initiative, including but not limited to planning, delivery, implementation, education, marketing, training, cost-effectiveness, evaluation, and quality assurance.

C. **Commercial & Industrial Programs**

1. Overview

The C&I programs are being reorganized and simplified for the 2019-2021 plan period. The new approach is designed to give the Program Administrators sufficient flexibility to provide tailored delivery strategies to customers of all sizes and types while providing a simplified map for stakeholders to understand the Program Administrators' strategic approach to the Commercial and Industrial sector.

Sector	Program	Initiative
Commercial & Industrial	C&I New Buildings	C&I New Buildings & Major Renovations
	C&I Existing Buildings	C&I Existing Building Retrofit
		C&I New & Replacement Equipment
		C&I Active Demand Reduction

There are two overarching programs corresponding to the types of building efficiency opportunities found in the commercial and industrial sector: New Buildings and Major Renovations and Existing Buildings. The program initiatives have been reconfigured to reflect the way customers identify with and access energy efficiency services. The model respects the customer's role as the primary partner with the Program Administrators in pursuing energy efficiency and active demand-reduction strategies.

The Program Administrators work with a broad base of trade allies to offer every customer a compelling value proposition that is easily understood, that meets the customer's particular business needs and objectives, and that can be implemented in a streamlined manner. Organizing the portfolio this way ensures that Program Administrators can focus on efficient paths to the deepest savings for each customer, addressing each customer's immediate circumstances while building a long-term relationship that allows the Program Administrators to continue to help customers harvest energy efficiency and active demand-reduction opportunities as their businesses, technology solutions, and energy markets evolve.

The Program structure also provides greater clarity to help customers, trade allies, regulators, and stakeholders understand the Program Administrators' strategic approach to the commercial and industrial sector. The sector is inherently complex, including many types and sizes of buildings. Unlike the residential sector, where all buildings have much greater homogeneity, commercial buildings often host multiple uses (i.e., manufacturing, offices, storage, parking, food service, laboratories), and some have multiple uses housed in the same structure. Commercial buildings also have opportunities across the full spectrum of end uses (HVAC, lighting, domestic hot water, process), and customers can operate in existing buildings while expanding and constructing or renovating new ones. The more open structure of this plan helps to clarify the Program Administrators' main delivery strategies, while recognizing that Program Administrators work simultaneously with individual customers across multiple initiatives and savings activities.

Program Design Highlights

This plan maintains the Program Administrators' leadership in energy efficiency program design and delivery by continuing to optimize current programs, increasing the clarity and

consistency of offers while expanding offers and tailoring of solutions for customers. The plan also includes an increasing emphasis on training and customer support services that will help enhance the culture of efficiency that exists in Massachusetts. Highlights and enhancements include:

- **New Buildings and Major Renovations Program**
- ✓ Enhanced Technical Assistance and Design Support for New Construction
- ✓ Investigating and Testing New Approaches to Whole-Building Projects, including Net-Zero and Passive House Criteria for large commercial buildings

- **Existing Buildings Program**
- ✓ Expedited Paths to Capture Operations & Maintenance ("O&M") Savings and Retro-Commissioning ("RCx")
- ✓ Expanded Advanced Systems Training
- ✓ Industrial and Process Engineering Approach
- ✓ Customized Services to Franchise Businesses
- ✓ Small Business Enhancements
- ✓ Strategic Energy Management Cohort Demonstration
- ✓ Expanding Upstream Offerings
- ✓ Implementation of Mass Save Application Portal (MAP)
- ✓ Addition of an Active Demand Reduction Initiative

The Commercial and Industrial programs have been remarkably successful in engaging customers directly, in intervening strategically with manufacturers and distributors to increase the availability of high-efficiency technologies, and in working with designers, engineers, and code officials to increase the efficiency of commercial buildings in Massachusetts. The programs have consistently delivered cost-effective and cost-efficient energy savings for Massachusetts businesses. Their success has also produced ever-increasing baselines from which the Program Administrators must strive to harvest additional incremental efficiency savings. In the face of these rising baselines and more limited opportunities to secure savings from increasing efficiency of equipment, Program Administrators have designed a plan that can set the foundation for a renewed and aggressive energy efficiency focus for the coming decade. It is based on a customer-first focus and a recognition that we best serve our customers by building the education and training infrastructure that supports a culture of energy efficiency.

2. C&I Program and Core Initiative Descriptions

C&I New Buildings Program

a. C&I New Buildings & Major Renovations Initiative

a.i Overview and Objectives

The goal of the New Buildings and Major Renovations initiative is to capture energy saving opportunities in new commercial construction projects. These projects include ground-up new construction of whole buildings or additions, major renovations that trigger the energy code, or substantial alterations in connection with events like tenant or space-use changes. The initiative is the Program Administrators' primary vehicle for leading the Massachusetts construction industry toward higher-performing buildings, including attainment of LEED, Energy Star, Net-Zero Energy-ready, and Passive House criteria for commercial buildings. The Program Administrators' vision is to empower building developers, design teams, and end-use customers to create buildings that deliver exceptional performance and have the most efficient energy systems, lowered operating costs, and work environments that support happier and healthier occupants and higher productivity for the Commonwealth's businesses.

The initiative targets commercial property owners and managers, developers, architects, and engineers who are involved in the initial stages of either new construction or major renovation projects. Through this initiative Program Administrators also influence the market conditions by working on raising codes and standards to move markets to greater efficiency and by providing targeted training of market participants on codes and standards advances.

a.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Enhanced Technical Assistance and Design Support**

  Program Administrators have developed a clearly defined statewide Whole Building Solution--an advanced integrated design path for all new construction projects of more than 20,000 square feet. The common offer simplifies and codifies an integrated design approach, committing owners, designers, and Program Administrators to collaborate in incorporating high-performance characteristics into the earliest design schemes and to continue to optimize performance through each design iteration. The offer provides incentives to both owners and designers and delivers additional support for charrettes, energy modeling, advanced design research and services, and connection to cutting-edge, energy efficient equipment and building technologies. Program Administrators have collaborated to ensure consistency by introducing standard documentation for baselines, energy modeling and reporting requirements to streamline and reduce confusion in the market place. The Program Administrators have drawn upon the successful use of memoranda of understanding ("MOU") with large customers undertaking retrofit projects to create new-construction MOUs that commit owners, designers, and Program Administrators to a partnership to secure exceptional new building energy performance.

- **Investigating and Testing New Approaches to Whole Building Projects**

  The traditional new construction framework, which focused on incentivizing energy conservation measures, will become increasingly challenging to support as available incremental savings decline. The shift during this three-year plan cycle to a focus on integrated design will be complemented by an investigation and testing of more far-reaching design innovations in anticipation of this continued market evolution. The Program Administrators will explore approaches to capturing whole building savings that include:

  - Engaging with design teams early to encourage the designers and customers to set energy use intensity ("EUI") targets that can lead to more zero-net-energy or Passive House criteria projects.
  - Considering performance-based incentives for new construction based on actual-versus-modeled building performance while balancing the capital needs of the construction cycle.

a.iii Initiative Design

The New Buildings and Major Renovations initiative offers developers of new buildings and owners renovating or expanding their existing buildings a menu of efficiency services and incentives tailored to their unique ownership objectives and investment criteria. The initiative is designed to add value regardless of where a building is on the continuum from design to construction, and without impacting the design/build schedule.

Understanding the greatest opportunity to secure deep cost-effective energy savings exists at the earliest stage of new construction design. Program Administrators aggressively seek to recruit owners and designers at the earliest stage of project development. This requires multiple strategies, because early stages of development take place largely out of the public eye years in advance of the first obvious signs of site work. The Program Administrators' use a myriad of sources, such as networks of architects and engineers, construction lead services, industry trade groups, and strong relationships with existing customers to gain market intelligence so that Program Administrator representatives can engage with customers as early as possible in their process and influence the fundamental design decisions that most impact future energy use.

Whole Building Solution

The Program Administrators have created an enhanced and optimized integrated design path to engage new construction projects at the earliest stages of development. The offer provides a clear, consistent, and transparent approach to the design and development community, outlined in two standard packages: a Small Buildings Whole Building Solution for all new construction projects between 20,000 and 100,000 square feet; and a Large Buildings Whole Building Solution for all new construction projects greater than 100,000 square feet. Both the Small and Large Building Solution paths provide a consistent set of technical assistance support and customer incentives statewide. Both require customers and their designers to review and sign a Memorandum of Understanding, which clearly articulates the program offering, but more critically creates mutual commitments among the owners, designers, and Program Administrators to engage

in the integrated design process. Both Solutions have incentive structures to reward owners and designers, provide support for design charrettes, and connect customers with subsidized technical and design assistance. Each Solution also requires a minimum 10% beyond-code energy performance and has a scaled incentive structure to push higher levels of achievement. The Small Building path has additional flexibility for the customers to rely on the Program Administrator technical teams for energy modeling and more streamlined design exploration commensurate with the potential savings opportunities and design and engineering investment limits of smaller projects. The development of the statewide MOUs ensures the consistency of the offering statewide, and consistent policies across all Program Administrators for reviewing and approving projects.

When Program Administrators are able to engage with design teams in the early concept phase of projects, they can provide comprehensive project review, design assistance, scenario modeling, and support for whole-building equipment specification. Program Administrators will partner with a team of pre-screened energy design experts to provide these comprehensive support services. Building orientation and site considerations, envelope improvements, motors and drives, HVAC equipment and system design, lighting design and controls, and equipment selection can all be considered.

Influencing these early design decisions can fundamentally shape the energy costs of a building for its entire life. For many participants, the greatest value of the New Buildings and Major Renovations initiative is the access to expert, unbiased technical assistance provided by Program Administrator staff and the network of technical experts who are made available through the program.

The intensive design collaboration with owners, designers, engineers and contractors provided by new buildings engagement is a central mechanism for Program Administrators to introduce and promote adoption of cutting-edge equipment (lighting, HVAC) and integrated solutions (i.e., systems design, equipment and controls) to the Massachusetts market. Program Administrators are proactive about standardizing, streamlining the requirements and promoting training for customers, designers, engineers and building operators to compliment the installation of these advanced systems. The trainings support optimizing and right-sizing of systems and provide critical tools for maximizing realized savings through understanding of proper system operation and management.

Systems and Equipment Solutions

Once a new construction or major renovation project is beyond the design development or construction document phase, a more prescriptive approach to individual systems, or a custom approach to discrete building systems, can still capture considerable efficiency. This path is also the primary mechanism for serving new-building and major renovation projects under 20,000 square feet, where a more intensive design process may hold less potential to uncover additional savings or performance benefits. Medium and large buildings can also use this systems and equipment solutions approach when buildings are undergoing equipment or lighting replacement and changes are not affecting the building envelope.

Codes & Standards

The Program Administrators will continue to focus on improving compliance with the current energy code for both new construction and renovation projects by conducting code trainings and offering technical assistance for project specific code questions. The Program Administrators will also expand this effort to advance the adoption of progressively more efficient energy codes, including stretch codes, and efficiency standards for appliances and equipment. The Program Administrators will research the energy savings opportunity to support the development of enhanced energy codes and product standards at the state and national levels and consider implementing a formulaic, multi-year approach based on information collection, data analysis, and stakeholder engagement.

C&I Existing Buildings Program

b. C&I Existing Building Retrofit Initiative

b.i Overview and Objectives

The Existing Buildings Retrofit initiative is available to all non-residential customers and supports efficiency and demand-savings opportunities for all types of commercial buildings and operations. The initiative works with customers who are interested in pursuing energy and demand-savings measures and strategies to optimize their operations, manage their energy and capacity expenses, and improve their workplaces.

The initiative promotes a menu of incentives and technical services to encourage building owners to replace inefficient equipment with more efficient options and to optimize systems and processes to reduce energy consumption and demand. The goal is to give customers confidence in estimates of project savings, and equipment reliability and performance, and then to execute the upgrades as simply and seamlessly as possible.

The Program Administrators also offer a suite of ongoing complementary services to business customers, including training for building operators, to ensure that equipment operates as designed, and that all low-cost/no-cost opportunities for energy and electrical demand savings are fully exploited.

The Program Administrators further tailor their offers and marketing to respond to the unique barriers different customers face. This includes providing pathways that respond to customer size, geography, the needs of particular industry segments, and specific energy end uses (e.g., lighting, HVAC, Combined Heat and Power ("CHP")).

b.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Expedited Paths to Capture Operations & Maintenance Savings & Retro-Commissioning**

  A pay-for-performance pathway has, historically, been used as a primary pathway for customers pursuing retro-commissioning and monitoring-based commissioning ("MBCx"). The process allows customers to hire an appropriate technical resource and then identify and implement energy efficiency measures. Once appropriate documentation is submitted, Program Administrators verify the savings and pay an incentive based on the demonstrated performance. As approaches to retro-commissioning, including monitoring-based commissioning, have evolved, and as Program Administrators have been able to identify and quantify savings from specific O&M interventions, Program Administrators see an opportunity to provide more tailored guidance and an expedited pathway for customers to pursue these savings.

  The O&M offering will provide a simplified approach to implementing common low-cost/no-cost measures or actions with predictable savings that can be captured through a prescriptive incentive. Program Administrators are actively reviewing the property-management and equipment-tuning strategies that have been deployed through the pay-for-performance path, in MOU plans, and through broader research, to identify a package of opportunities that customers can implement quickly and easily to achieve consistent verifiable savings. By leveraging this historic data, Program Administrators can create a streamlined path that dramatically reduces documentation requirements and shortens the time it takes to reward customers with their earned incentive. This eliminates two major barriers to participation while also improving the customer experience.

  For customers interested in more resource-intensive, longer-term approaches to pursuing deeper savings, including monitoring-based or continuous-commissioning platforms, Program Administrators are investigating design options that can offer more up-front technical guidance to help customers choose technical resources and platforms and developing more predictable incentive structures with earlier or periodic payment schedules that can encourage customers to commit to these systems by giving them greater confidence that they will realize a return on their investment if they implement the identified energy saving measures.

  Customers will continue to have the option to participate in the current pay-for-performance pathway. The redesign work has begun and is expected to continue into the 2019-2021 plan cycle, with estimated implementation of the completed O&M prescriptive pathway in the third quarter of 2019, and completed design planned for a streamlined deeper retro-commissioning offering in 2021.

- **Expanded Advanced Systems Training**

  As equipment baselines and codes rise, an increasing share of energy efficiency program savings will need to be derived from a systemic approach that focuses on optimizing the

specification and installation of energy efficient equipment combined with sophisticated controls and management systems that ensure that savings are maintained. Lighting will increasingly be designed and installed to be an interactive network, capable of sensing customer lighting needs, using dimming and on-off cycles and incorporating daylighting-sensor information and information about occupant activity and location. HVAC systems will similarly become "smarter," responding to customer ventilation and temperature needs in real time by combining data on outside conditions with information about the number and location of occupants. Lighting and HVAC systems will increasingly create opportunities for customers to participate in active demand reduction without compromising the functionality of their equipment or disrupting their operations.

Program Administrators plan to include two new training offers to support advanced lighting controls. The Program Administrators will implement the National Advanced Lighting Controls Training Program ("NALCTP") which trains and certifies electrical contractors and electricians in the installation, calibration, programming, commissioning, and maintenance of advanced lighting-controls systems. The Program Administrators partnered with Massachusetts Energy Efficiency Partnership ("MAEEP") to develop and deliver a day-long seminar on Advanced Lighting Controls Systems ("ALCS"). The session targets lighting designers and specifiers, engineers, major property owners, vendors, and contractors. The training introduces attendees to the newest enhancements to Advanced Lighting Controls Systems, such as Luminaire Level Lighting Control ("LLLC") and new software.

- **Industrial and Process Engineering Offer**

The Program Administrators have implemented an enhanced Industrial Engineering offer for industrial customers. The Program Administrators provide industrial customers access to a suite of contracted engineering firms that specialize in industrial or process-related energy efficiency. The contracted firms also have expertise in management of efficiency projects in the manufacturing environment and can provide this additional technical knowledge and service.

The engineering technical assistance offer has been specifically designed to overcome the time barriers industrial customers have experienced with traditional technical assistance models, i.e., long investigation and report preparation cycles. Vendors are deployed strategically to expeditiously identify and analyze targeted energy conservation measures, which results in quicker turnaround and prompt implementation.

The use of vendors with the ability to provide project-management support has been instrumental in overcoming customer resourcing constraints. This is particularly critical in overcoming these constraints for medium and small manufacturers. Being smaller does increase relative costs compared to savings, because while the fixed costs of finding efficiency opportunities are the same in smaller manufacturing settings, the potential savings are less. But the efficiency of the program design has secured cost-effective savings even for small manufacturing customers.

The offer makes it easy for Program Administrators to coordinate gas and electric offerings. Contracted firms provide comprehensive technical support, including the identification and delivery of opportunities for gas and electric projects. The approach enables the coordination and back-end processing of associated costs and incentive delivery where multiple Program Administrators serve the same customer, without any interruption of service. From a customer perspective, they have one engineering-support partner who can provide tailored high-impact strategies that are responsive to their unique business priorities and constraints. During the testing of this element of the platform with larger customers, Program Administrators discovered that an extra benefit of the integrated design and delivery is increased instances of shared knowledge and savings delivery between Program Administrators.

- **Customized Services to Franchise Businesses**

Most Casual Dining and Quick Service Restaurants ("QSRs"), are independently owned. They represent a significant and growing business segment that present unique challenges and opportunities for energy efficiency program savings. In addition to the traditional obstacles to serving small restaurants (e.g., modest savings potential with high transaction costs), QSRs that are franchisees face two additional barriers: owners are averse to any changes that could compromise the customer experience or the franchise relationship, and owners are rarely on-site.

To address these issues, Program Administrators have partnered with a major national QSR franchise, headquartered and with over 1,200 QSRs within Massachusetts, to develop a more targeted strategy to support efficiency across their franchisees. The franchise owner brought franchisee representatives, corporate operations specialists, and construction and finance experts to the partnership effort. The Program Administrators brought account executives, evaluation analysts, program engineers, and senior leadership to work with franchise owners to develop solutions. Together the group developed and piloted a package of energy management systems that included control-enabled LED lighting, refrigeration controls, and water savings devices. The combination of measures was vetted in a six-store test. The package of measures is now offered through a joint Program Administrator/Franchise owner presentation at quarterly franchisee meetings. After the first such meeting approximately one-third of these "hard to serve" small business franchisees signed on to participate in this statewide comprehensive offer, and over 80% of that initial group has completed or will soon complete whole-store projects with comprehensive measures.

Program Administrators are now engaged in discussions with several other multi-facility operators, including QSRs, convenience stores, gas stations, and mini marts to broaden this highly successful approach to franchise businesses.

- **Small Business Enhancements**

The Program Administrators conducted a comprehensive review of small business turnkey delivery programs offered by program administrators across North America. The research found two critical elements that improve savings:

- Segmentation in either program design or marketing; and
- Allowing negotiated incentives to help secure more comprehensive projects.

These elements—segmentation and negotiated incentives—are already core components of the small business pathways. Program Administrators are focused on continuing to enhance these aspects of the small business turnkey pathway, adding additional tailored segment-specific packages and increasing training and direction for vendors to support comprehensive projects. Currently the restaurant and lodging segments are being targeted for customized offerings.

- **Strategic Energy Management Cohort Approach**

Program Administrators conducted a comprehensive review of Strategic Energy Management ("SEM") in practice. SEM was revealed to be an evolving concept with no definable set of consistent program-design elements or method of delivery. While the examined programs did produce real energy savings through a combination of O&M actions and incremental new measures, Program Administrators identified some significant drawbacks to SEM as a program offering:

- SEM is narrowly applicable to small numbers of very large customers and expensive to deliver, and the costs-per-customer do not effectively scale.
- Evaluation data does not clearly establish that SEM succeeds in instilling a culture of continuing efficient practices when program support ends.
- Most of the program administrators deploying SEM offerings do not have long histories of engagement with their large and mid-sized customers.

The Program Administrators plan to take lessons learned and implement enhancements that offer opportunities to secure additional savings in the two areas targeted by SEM offers: O&M and incremental-measure adoption. Program Administrators' O&M enhancements are described above under *Expedited Paths to Capture Operations & Maintenance Savings and Retro-Commissioning.*

The Program Administrators plan to investigate an SEM Cohort approach, where a group of customers work together to adopt a more strategic approach to energy management in their facilities. The Program Administrators' objective in studying a SEM cohort approach is to test a model that could address the drawbacks identified above, i.e., inability to scale to medium and smaller customers, and failure to instill a lasting culture of efficiency among participants.

Program Administrators are currently developing an RFP to secure a partner to support delivery of this SEM cohort approach. The SEM cohort approach is expected to conclude

in Q4 of 2020, and the results will be reviewed in the context of the critical questions listed above. The design, scale, and timing of future SEM cohort approach will take place in the context of this review and in consultation with customers and other stakeholders.

b.iii Initiative Design

The Existing Building Retrofit initiative offers prescriptive incentives for electric and gas technologies, and custom incentives when a unique characteristic of the customer, site, or process requires a custom approach. All opportunities to save gas and electric energy and demand are considered.

Prescriptive incentives are offered for measures that provide predictable energy savings in all applications where they replace a similar technology of lesser efficiency. Incentives are available for a long list of electric and gas technologies, including lighting equipment and controls, HVAC controls, motors and variable frequency drives, spray valves, and steam traps. Prescriptive incentives often serve as the customer's initial exposure to the Program Administrators' efficiency program and may lead to more complex custom projects.

Prescriptive measures have achieved predictable savings across a wide universe of applications, and can therefore be offered to customers through a simplified application and approval process.

As a mature efficiency delivery approach with established and trusted customer relationships and over thirty years of successful delivery of services to this market, the Existing Building Retrofit initiative is seeing an increase in sophisticated custom projects. Many larger customers are more sophisticated about their energy use and the potential for additional saving. The Program Administrators have matched these elevated expectations by encouraging customers to engage in a thoughtful series of building upgrades.

To identify and quantify custom opportunities, the Program Administrators provide customers with expert technical assistance, using both their own technical staff, preferred engineering vendors (independent energy advisors), and subject-matter experts drawn from a pool of private-sector engineering consultants who meet the Program Administrators' criteria for expertise and experience. To move customers to action once opportunities have been identified, the Program Administrators offer varying financial incentives and resources that are calibrated to match customer investment criteria and reduce barriers to adoption, while maintain cost-effectiveness and minimizing Program Administrator costs of acquisition.

Managed Account Approach

The managed account approach is focused on learning the customers' unique needs and opportunities and connecting customers to the resources and offerings best suited to their circumstances. All Program Administrators offer managed account services for some sub-set of larger C&I customers. Most medium and large customers have access to Program Administrator representatives. Smaller customers have access to turnkey, upstream and downstream prescriptive pathways which offer more tailored simplified pathways targeted to provide these customers a smooth onramp to the wide variety of Program Administrator offerings.

Program Administrators have built up internal staff with direct experience or engaged vendors expert in the manufacturing and industrial space, commercial real estate, healthcare, hospitality, grocery and other distinct business segments. Program Administrators have continued to learn the language of the customers, improving the experience for customers while deepening our ability to work with facility managers across the spectrum of sectors and segments to identify, scope, and specify projects.

Memoranda of Understanding

For the very largest customers, including large manufacturers, university campuses, and large healthcare systems, the Program Administrators use MOUs to facilitate longer-term energy efficiency projects that achieve greater depth and comprehensiveness. The MOU identifies shared goals, defines the relationship between the customer and the Program Administrators, and outlines a plan to achieve the goals. It may also specify incentive structures. These large customers have human and financial resources and management-planning horizons that allow for this more intensive shared partnership. Often there are larger complex projects available in these customers' facilities that offer significant savings opportunities.

The successes of MOUs translate into savings for these large customers. In addition, the creative and innovative approach that is inherent in shared explorations and project development with these large customers provide Program Administrators with insights that can be applied to medium-sized and smaller customers in the same sectors, whether through the account management pathway or a tailored segment-delivery path. There can even be payoffs for smaller businesses who use the small business pathways, as new technologies are proven in the field and can be added as prescriptive offerings to turnkey delivery.

Serving Small Businesses

The Program Administrators use a suite of approaches to deliver services to small businesses. Some are turnkey approaches, and others work through distributors at a point-of-sale where customers, or contractors doing work for customers, can essentially self-serve. Small business customers are eligible to participate in all Program Administrator retrofit and replace-on-failure offerings for specific measures, as long as the equipment meets the eligibility requirements.

Small Business customers are also eligible for the tailored approaches offered to specific segments. Maintaining an array of approaches allows the Program Administrators to deliver efficient solutions to the tens of thousands of smaller customers in the Commonwealth, solutions that effectively respond to the customer's unique circumstances and preferred engagement model. Program Administrators regularly review and reflect on what is working and take lessons from one delivery path and apply it to others. This approach serves thousands of smaller customers, above and beyond those served through the traditional "small business program", which remains an important delivery pathway that is constantly being improved and expanded over time. The flexibility of approaches serves customer needs efficiently.

Small businesses face significant barriers when considering and implementing energy efficiency measures. Owners often have limited time, focus, and know-how to analyze options, and are averse to even short interruptions of business operations. The small business pathway

provides two statewide unified offers: a turnkey delivery model implemented by vendors subcontracted to the Program Administrators, and a Customer Directed Option ("CDO") which allows customers to choose their own installation vendor who meet specific criteria for technology and installation. These offers address the barriers small businesses face and maximize their uptake of comprehensive retrofit measures (lighting and controls, HVAC controls, Demand Hot Water Heating controls, among others).

Turnkey, sometimes referred to as direct install delivery, is the traditional form of energy efficiency delivery to small business customers. The approach consists of a no-cost assessment, a customer-specific proposal, installation, and recycling or post-installation cleanup for customer-selected measures. The turnkey-delivery path offers electric and gas measures (as applicable) and is intended to help customers navigate efficiency options, mostly retrofit-type measures that improve the operations of their existing buildings in a streamlined manner. The vendors working for the Program Administrators conduct thousands of these projects each year and have done so throughout the long history of this delivery pathway. The activity and savings from this pathway are recorded in the Small Business Core initiative for 2016-2018.

The turnkey small business common offer includes:

- No-cost energy assessments that can occur while the business maintains operations;
- A simple-to-understand report outlining key opportunities and costs for energy retrofit upgrades;
- A proposal with recommendations for efficiency measures and the opportunity for direct installation of certain measures and facilitation of professional installation for more complex measures;
- Incentives covering up to 70% of equipment and installation.
- Financing options (dependent on PA); and
- Quality assurance and quality control through randomized on-site project verification.

After the assessment is complete, participants choose which measures to install. The vendors install or subcontract out the installation work, then invoice the Program Administrators for the incentive amounts. Electric and gas Program Administrators conduct quality control ("QC") checks on a limited number of sites. Although the turnkey model is a statewide small business delivery method, certain service-area characteristics do require customization. Tailored approaches are therefore offered to enhance and customize specific opportunities to customer needs.

Additionally, the Program Administrators offer a pathway that lets customers use their trusted or preferred vendors while still accessing the incentives for qualified measures that make these retrofit projects financially attractive.

Customer Directed Option is a delivery path recently offered to customers and other trade allies not under contract to the Program Administrators to allow customers to choose the installation vendor with which they are the most comfortable. Some Program

Administrators provide this pathway using an administrator under contract to the PA, who acts as the gateway to ensure that base-case conditions requirements, installation rigor, and evaluation, measurement, and verification ("EM&V") requirements are met. This pathway has been welcomed by customers and trade allies and has grown over the past few years. The activity and savings from this pathway are recorded in the Small Business Core initiative.

The Customer Directed small business common offer includes:

- A standard participation pathway for measures and incentives typically offered via turnkey vendors for all other interested trade allies;
- Common specifications of technology, installation, and quality assurance;
- Incentives (covering up to 70% of equipment and installation);
- Financing options (dependent on PA);
- Quality assurance and quality control through randomized on-site project verification.

Main Streets

Very small businesses, sometime referred to as micro-businesses, the classic "main street" businesses such as a small local bakery or hardware store are particularly challenging to reach because energy use is low while effort is generally high, so it is imperative to increase the volume of projects to overcome the resource costs of labor, trucks, and other equipment needed to perform the installations. One approach Program Administrators use to reach very small businesses in downtown areas is working collaboratively with cities and towns, through the community and economic development offices, with local chambers of commerce and other local business associations to create multiple touchpoints to encourage these customers to take part in the small business turnkey pathway.

Program Administrators can, with local input, tailor the offering and provide a dedicated team of auditors and turnkey implementers. Program Administrators work to include materials that are translated into local languages and may offer special Main Street days or other approaches to meet these small customers effectively and efficiently. By leveraging community connections and tailoring to this micro business market, Program Administrators are able to ensure even the smallest of small business customers are provided a path to energy efficiency savings. The Main Street approach to marketing the turnkey delivery pathway is one of many participation pathways for very small businesses to participate in efficiency offerings.

Customer Focused Technical Assistance and Resources

Customers have multiple pathways to receive technical support in adopting more energy efficient practices. The managed account approach, the small business pathways, and segment-specific approaches all offer customers facility assessments and skilled professionals who can provide advice and help in selecting energy efficient options. Program Administrators also support specialized trainings to give customers and trade allies technical knowledge and keep energy and

demand savings at the forefront of their thinking. This includes technical sessions with information targeted at those in charge of making the financial and facility decisions.

There are instances where customers can benefit from additional technical or engineering study beyond what is offered through the standard customer support and trainings. Program Administrators have created a system that allows customers to pursue additional engineering and technical support in a shared investment model with Program Administrators. Any customer may propose a study or technical-support project via a simple-to-follow online engineering services application. The Program Administrators support a team of engineers and technical experts, both in-house and under contract, who review applications and approve a scope-of-study or technical assistance. The customer's investment in the study helps ensure that they are committed to implementing its recommendations.

All customers have access to the technical assistance application process, and all applications are given a comprehensive review and support to scope and implement studies or assistance projects. It is a common practice for technical assistance vendors and account managers working with customers to identify study opportunities and work with customers to submit applications. A vendor may see a significant opportunity for custom measures, but need to do a study to more clearly define the savings. The vendor can propose the study and help the customer submit the application. Program Administrator representatives working with customers may see an opportunity that needs better definition or may recognize that the customer needs help with prioritizing multiple opportunities to reach an investment decision and staged upgrade plan that works for their specific business operation and facility. In these cases, the Program Administrator representative may suggest the customer use the engineering-services pathway and support the customer's submission of an application. In all cases, the Program Administrators' objective is to actively promote technical support as a critical tool to help customers understand their energy saving opportunities and act on them.

Training

As the tools available for Program Administrators to achieve savings evolve, the Program Administrators are adjusting their programmatic offerings to help customers not only adopt integrated systems, but properly install, commission, and operate them to maximize energy and demand savings. To capture *and maintain* the savings inherent in these sophisticated new systems, the Program Administrators will need to rely to an even greater degree on the skillsets of facility managers and trade allies who provide services in the field. Trades like electrician and HVAC installer and technician will not only require enhanced entry-level skillsets, but also access to continuing training opportunities as these professions encounter an increasing range and complexity of end uses that are always changing.

The Program Administrators have been working with the industry experts to provide an annual training for the plumbers and HVAC contractors installing high efficiency furnaces, boilers, water heaters and other instant savings gas measures such as aerators and spray valves. Program Administrators will be offering training on "How to Properly Size Condensing Furnaces and Boilers". This session includes how to conduct heating and cooling load calculations, including introducing contactors to using the Air Conditioning Contractors of America Manual J and D

calculators which help contractors determine optimal heating system and duct system design. Condensing boilers and furnaces have different specifications than the equipment they generally are replacing. Program Administrators will offer sessions on "How to service, set up and install piping for condensing boilers". Program Administrators are also supporting our trade allies in completing the efficiency sale by offering training that helps present the efficiency and financial benefits to customers in a manner that creates a winning sales proposal that moves customers to action.

Below are examples of two advanced lighting-training offers that the Program Administrators will implement during this plan period. The Program Administrators will also continue to identify and enhance their training offerings to respond to this changing market, and will likely add trainings that focus on other advanced systems.

Training for Installers of Advanced Lighting Controls:

Program Administrators have evaluated and plan to offer the National Advanced Lighting Controls Training Program. NALCTP trains and certifies electrical contractors and electricians in the proper installation, calibration, programming, commissioning, and maintenance of advanced lighting-controls systems, including dimmers, occupancy sensors, photo-sensors, electronic ballasts, and high-efficiency lamps and fixtures, as well as communication-based control equipment. Certification requires 10 hours of prerequisite study, followed by 10 hours of classes and 40 hours of hands-on lab work where participants apply what they have learned by installing controls devices on electrical lab boards. Participants must pass every lab practicum and a written exam. The curriculum is updated annually, with manufactures providing their latest products for inclusion as soon as they become commercially available. By offering this training and certifying practitioners, Program Administrators will support building owners and designers in identifying practitioners with the requisite skills to install and maintain advanced lighting systems for maximum energy savings and performance.

Training for Vendors and Specifiers:

The Program Administrators also continuously offer short courses or seminars for vendors, trade allies, external engineers, program consultants, and others in the latest technologies and their applications. The objective of these sessions is to move emerging technologies to market in an informed manner, so that they are specified and installed appropriately. The Program Administrators align with expert organizations, such as manufactures themselves, the Design Lights Consortium, and the Massachusetts Energy Efficiency Partnership to deliver content. The Program Administrators partnered with MAEEP to develop and deliver a day-long seminar on Advanced Lighting Controls Systems. The session was targeted to lighting designers and specifiers, engineers, major property owners, vendors, and contractors, and was open to additional parties interested in the technology. The goal was to introduce attendees to the newest enhancements to Advanced Lighting Controls Systems, such as Luminaire Level Lighting Control and new software interfaces that allow ALCS usage in more building types than ever before. Participants leave better equipped to explain the features and benefits that ALCS offer and how to maximize their benefits. This training program is more adaptable than the intensive National Advanced Lighting Controls Training Program certification described above and can be delivered

to existing market participants, including facility operators, vendors, and specifiers who do not work exclusively on lighting systems, but have regular responsibility for maintaining, installing, and servicing lighting systems or participate in specifying lighting systems.

Tailored Approaches for Segments

Program Administrators regularly engage in market segmentation, a process of subdividing customers into segments with similar characteristics. This process allows Program Administrators to create segment-tailored mixes of prescriptive and custom measures, and package them with outreach and delivery that speaks to customer's specific business priorities.

Market segmentation is both an art and a science. Each Program Administrator uses multiple market segmentation strategies as needed in their respective service areas. For instance, Eversource has used a quartile analysis segmentation strategy for years, National Grid was early-to-market with a differentiated technical assistance offering for grocery customers, and Cape Light Compact has deep experience with the lodging market based on their unique geography.

Each Program Administrator follows multiple sub-markets. A Program Administrator may have as many as 50 or more sub-segments for which they track market intelligence and connect it with customer firmographic data, to provide optimized offerings to customers in their territory. Through their common management and technical committees and EM&V studies, Program Administrators have continuously shared and pooled their learning from their independent market-segmentation strategies. They have created common marketing materials for eight market segments. Program Administrators continue to share intelligence on advances in energy saving technology and systems-design approaches specific to each segment.

Segment	Segment Characteristics
Data Centers	• High-energy-intensity buildings or sub systems within larger buildings • Common set of measures • High savings potential
Grocery Stores	• Common measures, business model, and barriers • Can benefit from provision of industry-expert technical assistance. • Potential for economies of scale in marketing and delivery • Homogenous and concentrated usage
Healthcare Facilities	• Energy intensive • Sensitive to costs • Scalable to other customers of varying sizes
Hospitality	• Common measures, business model, and barriers • More gas opportunities relative to other segments
Laboratories	• Require specialized technical expertise • High savings potential

Manufacturing Facilities	• Typically energy intensive, though energy costs often not a primary driver of cost of goods sold • Heterogeneous, requiring specialized technical expertise • Common barriers, exacerbated with small and medium size manufacturing base.
Municipal	• Have unique budgeting process and require one-on-one attention from the PA • Common barriers
Property Management	• Common barriers • Lower participation rates
Multi-Family	• Mixed customer types with differing engagement expectations and decision-making processes • Split-incentive barriers

The MOUs with larger customers, as mentioned early, deliver significant lessons for identifying and optimizing approaches for specific segments. Once codified, these approaches can be shared directly with other large as well as medium and smaller customers in the segment. In addition to identifying new technologies and defining measure mixes, Program Administrators actively develop tools that allow these more customized offerings to be rapidly taken up by medium and smaller customers in the segments.

Program Administrators actively collaborate and engage with stakeholders to develop customized engineering calculator tools. These engineering calculators, also known as custom express tools, streamline, simplify and standardize analysis of similar energy conservation measures. These tools are developed for technologies/measures where implementation is replicated easily based on potential for rapidly penetrating various market segments. Example: Program Administrators collaborated with vendors and industry partners to develop a custom express calculator tool for Roof Top Unit Optimizer products. The technology was identified as an applicable technology for small and medium customers and the developed tool resulted in simplifying data collection requirements, standardizing calculation methodology and streamlining of deliverables. Program Administrators followed up with internal and external stakeholder training to ensure smoother delivery to vendors and customers. The tool is currently being used extensively by installers (input section only) and vendors/internal Program Administrator engineers (entire tool) to calculate energy savings.

The Program Administrators will continue to develop more detailed understandings of the various sub-sectors, with an emphasis on translating and systemizing approaches for mid-sized and smaller customers. The goal is to develop marketing and delivery strategies that resonate with customers who have similar energy use, business requirements, and investment criteria. This will also involve developing more contractors who are trained in providing these comprehensive solutions to this midmarket.

Industrial and Process

Several large industrial or process-energy-use customers have entered into long-term agreements (MOUs) with their respective Program Administrators. These agreements have made

customers and Program Administrators strategic partners in securing direct energy savings and in helping Program Administrators refine their program-delivery approach to this market. Through these partnerships, the Program Administrators provide dedicated resources for identifying energy saving opportunities and delivering projects tailored to the customer's unique site and business-performance criteria. Customers give Program Administrators visibility into delivered savings and budget needs. The Program Administrator teams learn about the challenges faced for efficiency in the industrial environment through the close relationships established by the MOUs with larger customers, and through the direct customer contact associated with the managed-accounts approach taken with medium-sized manufacturers.

The primary challenges for industrial customers fit into a consistent set of themes which are laid out in the chart below. For individual customers the priority or influence of the barrier or challenge may be higher or lower. In general, as customer size decreases, the challenges are amplified. A critical insight gained from these close relationships and experience with the Massachusetts manufacturing market is understanding that information and technical documentation of opportunity and savings are rarely the primary barriers to getting manufacturing customers engaged in energy efficiency projects.

Common Industrial Challenges	
Challenge	Barriers
Customer risk, inertia, and uncertainty.	• Businesses whose profitability relies on producing goods are reluctant to interrupt or change established production processes. Regardless of the true level of risk the perceived risk for such customers is very high.
Customer focus on business growth, profitability, capital funds use	• Growth and increased profitability are the overarching goals of the industrial and manufacturing customers. Depending on where energy costs sits in the OpEx stacking, potential energy savings may not be a primary focus for investment. • Competitive sources of project funding are a challenge when an EE project is a substantial capital outlay relative to the size (i.e., medium and small manufacturers) or health of a company.
Limited human resources and time required for effective engagement	• The need for highly technical evaluation and project development and personnel who can engage through an energy efficiency project presents considerable challenges to program participation. Customer resources are scarce for managing the implementation of energy efficiency upgrades.
Complexity and constructability of site-specific EE equipment	• Much of the equipment used in industrial facilities is highly specialized with site-specific configuration, requiring custom, comprehensive solutions. The bench of available technical assistance vendors and installation contractors capable of functioning in that space is small relative to HVAC and Lighting.

To overcome these barriers and increase the reach to the smaller-to-medium industrial base, the Program Administrators offer strategic pathways and targeted offerings. Program

Administrators respond to our customers' risk perception and need for greater certainty by making a broader business case for efficiency to our customers including providing information and support that demonstrates not only the cost savings but measurable additional benefits to product quality, waste reduction and/or equipment reliability. This more expansive approach to engaging with our customers on efficiency upgrades provides customers with the most compelling and accurate case for participation which can greatly reduce their risk and uncertainty barriers. Similarly, Program Administrators provide investment information including return on investment and provide our customers with accessible financing that allows energy efficiency investments to compete favorably amongst our customers' capital investment priorities.

Program Administrators are redoubling our efforts to provide education, training and technical assistance support, including engineering support, to alleviate our customers' human resource constraints and provide streamlined engagement respectful of customer time limitations. Program Administrators are creating simplified decision paths with full supporting information to support critical customer C-suite and other decision makers' ability to engage effectively and participate in the benefits of Program Administrators energy efficiency offers. Program Administrators are investing in making available a strong bench of technical assistance vendors and installation contractors capable of functioning in the manufacturing space who can deliver site specific configurations and custom solutions.

Municipal

Another key segment of the C&I market consists of cities, towns, and municipalities in the Commonwealth which includes a wide array of buildings, infrastructure and operational aspects. The Program Administrators work directly with municipalities to address unique barriers and opportunities. As such, the Program Administrators, through dedicated staff or representatives, are adept at working with stakeholders and state agencies including the Green Communities Division of the Massachusetts Department of Energy Resources and the Massachusetts Department of Environmental Protection. The Program Administrators are also highly familiar with various grants and the funding cycles (such as Town Meeting votes) in each community, and this segmented approach aids in implementation of the projects.

Additionally, the Program Administrators work with municipalities to review costs and savings for applicable streetlights for LED conversions, for both customer-owned and company-owned lighting systems. Each community would need to take a case-by-case approach based upon the existing lighting ownership structure, project costs, existing lighting and metering configurations and the available technology options.

Combined Heat and Power

During the 2019-2021 Plan term the Program Administrators will aggressively explore more ways to increase CHP installations in Massachusetts while maintaining the high standards for project screening, qualification, and performance for which Program Administrator programs are known. The Program Administrators have developed a network of over 50 vendors, developers, and installers who want to sell CHP in the Commonwealth.

The Program Administrators have increasingly been targeting smaller units to a wider array of segments including restaurants, multifamily complexes, and hospitality in addition to the typical sweet spots of higher education, waste water treatment, hospitals, and large industrial customers with process heat loads.

Marketing

Program Administrators actively work with industry organizations and participate in industry events to raise awareness in our target market and create efficiency-sales opportunities. Program Administrators often collaborate to provide coordinated sessions which educate customers on the resources and incentives available to them. These events provide good opportunities to reach key customer segments. The Program Administrators' collaboration to organize and participate in these events helps drive consistency in offerings, resulting in increased value to their customers.

Program Administrators market and provide resources through the Massachusetts Energy Efficiency Partnership, which supports the deployment of energy efficient technology and tools to the industrial, commercial, and institutional sectors (maeep.org).

Financing Energy Efficiency Investment

The Program Administrators have partnered with the Massachusetts Bankers Association to make available subsidized financing for business, multi-family, and non-profit commercial customers who need capital beyond the value of the Program Administrator incentive to implement a project. Loans can range from $5,000 to $500,000, and can extend to 7 years. For the Program Administrators, the ability to link customers to capital where that is the barrier to project execution is an invaluable sales tool. For participating lenders, the partnership opens up a new market to attract new customers, with the assurance of receiving a market rate interest payment from the Program Administrators.

Mass Save® Financing for Business has had a modest uptake, and is best viewed as a useful, but niche, tool in the energy efficiency sales toolkit. Larger-sized businesses in the Commonwealth have indicated that access to outside capital financing is not a primary barrier to program participation. The Massachusetts experience is consistent with the financing experience of most other program administrators. There remains continued interest in investigating alternative and creative financing vehicles, such as the newly created commercial Property Assessed Clean Energy ("PACE") offering in the Commonwealth and options for third-party financing. These alternative financing options may have the potential to improve customer uptake of project financing and reach more customers who may not have participated in energy efficiency programs due to capital constraints. The Program Administrators will continue to review new studies and proposed mechanisms as they emerge. Program Administrators will continue to closely watch financing pilots and initiatives being conducted in other jurisdictions to determine which emerging models, if any, show promise for replication in the Commonwealth.

c. C&I New & Replacement Equipment Initiative

c.ii Overview and Objectives

The New and Replacement Equipment initiative encourages customers who are buying new equipment, or replacing equipment that has worn out or failed, to opt for the most efficient alternative on the market. Initial or replacement on failure equipment-purchase decisions establish energy-consumption patterns for decades. Most major commercial equipment will continue to be used until it fails or needs to be replaced, or a retrofit project is proposed. The goal of the New and Replacement Equipment initiative is to ensure that no opportunity to place the highest-efficiency equipment in service is lost.

c.ii Strategic Enhancements and Major Innovations for the 2019-2021 Plan

- **Expanding Upstream Offerings**

  The upstream delivery approach allows for rapid and equitable market penetration of certain products, particularly with more passive customers who may not otherwise choose highly efficient products, due to lack of awareness, price premium at purchase, or simply the inconvenience of having to complete a program application in anticipation of making a purchase.

  Program Administrators are working with manufacturers and distributors and using new technologies research to identify high-efficiency equipment that could be more widely adopted through an upstream channel delivery.

- **Implementation of Mass Save Application Portal**

  The Mass Save Application Portal ("MAP") provides customers with a fully digital tool to search for offers and apply for incentives. MAP launched in early 2018. The design allows customers, or business partners on their behalf, to browse offers, select the opportunities that meet their needs, and then proceed through a guided application process that connects them to additional recommended energy efficiency measures. MAP also includes features such as real-time error detection and intelligent routing of applications that will decrease end-to-end processing time and provide better and more consistent data. The system's auto-population of known information will streamline the experience for repeat participants. The back-end data platform delivers new visibility into customer behavior, with feedback loops that enable continuous process improvements.

c.iii Initiative Design

When purchasing a new piece of equipment or replacing a failed one, customers have a choice between standard, generally code dictated, and high-efficiency options. By incentivizing purchases of high-efficiency equipment Program Administrators can make such purchases easier, by reducing the up-front costs to the customer. Program Administrators generally attempt to

incentivize the incremental costs only, i.e., the price difference between the standard or code-compliant equipment and the higher-efficiency equipment, and balancing that against the incremental savings, i.e., the savings between the operation of the standard or code-compliant equipment and the high-efficiency equipment over the expected life of the equipment.

Prescriptive downstream and upstream incentives are available for a wide array of energy and demand saving equipment. Prescriptive incentives are most effective when the customer or the trade ally serving the customer can be actively engaged at the time of purchase (initial or replacement). Program Administrators are able to exert influence over customer and trade ally purchasing through account and program managers, training of trade allies, and building awareness across customers and industry regarding more efficient options. The addition of MAP, which provides trade allies quick and easy access to the Program Administrators' most up-to-date equipment incentive opportunities and expedites incentive processing, is the type of effort that helps contractors operating independently in the market deliver energy efficient options directly to customers.

Upstream Channel

The upstream model leverages existing distributor networks and infrastructure to influence the thousands of equipment-purchasing decisions that customers and contractors make every day. Under the upstream model, the Program Administrators provide incentives directly to distributors and manufacturers, rather than to end users, with the end users benefiting from the significant reductions in retail costs that this enables. The incentives are structured to remove the price premium between conventional and high-efficiency products at the point of purchase, thereby placing efficient products in direct competition with conventional products based on quality and efficiency alone.

For the upstream model to succeed, a special set of special circumstances are required:

- the higher-efficiency equipment must be a direct replacement for less efficient equipment;
- the equipment-purchase decision must be primarily driven by first cost, with no real reliability or performance distinctions between the products;
- the high-efficiency equipment must be stocked and available at distributors at the time the purchase decision is made; and
- there must be no, or minimal, additional or unique installation requirements that distinguish it from the product for which it is substituted.

Building on early success in the linear fluorescent market, the Program Administrators have broadened the application of this approach to additional lighting products, including LED fixtures and a variety of other LED products. The Program Administrators also now offer upstream pathways for many non-lighting measures that are amenable to the upstream approach (e.g., efficient technologies that can be substituted for less efficient options without any adaptation or technical or performance limitation). In addition to lighting lamps and some select fixture types, upstream incentives are now available for ECM circulator pumps, natural gas water heaters,

electric HVAC (including air-source and ground-source heat pumps and variable refrigerant flow) measures, and qualified natural gas and electric commercial kitchen measures.

Upstream offers fewer measures, primarily because it is limited to equipment types where the efficient alternative is a direct and comparable substitute for the standard equipment in all circumstances, without any requirement for program verification. But for the measures that are offered, market uptake is high and broad, due to minimal price and administrative barriers to customer access. Because upstream engages many customers who would otherwise not participate, it both captures additional savings and addresses equity concerns.

d. C&I Active Demand Reduction Initiative

The Program Administrators will be implementing demand reduction based on the recent evaluated demonstration efforts. During the summer of 2017, National Grid deployed a C&I demand reduction demonstration. Customers with interval meters on G-2 or G-3 rates, with demand of 250 kW or higher and the ability to curtail 50 kW, were eligible for the demonstration. Under this active demand reduction approach customers agree to respond to an event call targeting conditions that typically result in system peak. The demonstration is also being deployed in 2018.

The demonstration projects will serve as the basis for a new statewide C&I curtailment active demand reduction offering in 2019-2021 that is technology agnostic and provides an incentive for verifiable shedding of load in response to a signal or communication from the Program Administrators. Typical technologies or strategies used to curtail load include energy management systems, building management systems, software and controls, HVAC controls, lighting with controls (manual, networked system or integrated), process offsets, any open ADR compliant technology, startup sequencing, among other customer facility specific approaches. Since the offering is technology agnostic, the Program Administrators will be able to incent the performance of customers adopting innovative and emerging demand reduction technologies, including storage technologies. Customers can use any technology or strategy at their disposal and be incentivized based on the performance of their curtailment. In essence, the incentive equals the customers' opportunity cost – if it makes sense for a customer to shed load for the incentive price paid to them by the Program Administrator, then the customer will curtail.

This initiative uses Curtailment Service Providers ("CSPs") to assess curtailment opportunities at a facility and deliver curtailment services to enrolled customers. CSPs identify curtailment opportunities for deployment under the Program Administrators' initiative, as well as demand charge and Installed Capacity ("ICAP") tag management opportunities, and present a complete curtailment proposal to the customer. The demand charge and ICAP tag management provide opportunities for direct bill savings to customers.

Customers and CSPs respond to dispatch signals or criteria specified by the Program Administrators, generally using a system peak trigger. Events will be called the day before curtailment is needed. The core model remains focused on reducing demand during summer peak events typically targeting fewer than twenty hours per summer. The goal of the offering is to call events at times of peak energy use. For customers participating in ISO-NE demand response markets, ISO-NE event days will be excluded from baseline calculations. The program is structured to avoid interfering with the ISO-NE programs or penalizing customers for participating in both programs.

The customer value proposition for large C&I customers, subject to demand charges and/or ICAP tags, with means of controlling lighting, comfort, and/or process loads, can use this solution to generate revenue by altering their operations a few times per year. The Program Administrator incentive, combined with any ISO-NE CSO obligation revenue, demand charge management, and ICAP tag management, round out a compelling package for customers to adjust operations.

The Program Administrators can add a new service offering to the portfolio to provide value to large C&I customers and generate claimable benefits, primarily avoided capacity, T&D, and capacity DRIPE.

The electric Program Administrators will also review the results of new demonstrations proposed by Eversource and approved by the Department in D.P.U. 16-178. In 2018 and 2019, Eversource will deploy demand reduction demonstration offerings for battery storage, thermal storage, software and controls, and active demand response. These demonstrations are designed to test the ability of the projects to deliver cost-effective benefits to customers at scale. After the evaluation of the demonstrations, Eversource will submit a report to the Department with an analysis of the actual costs and benefits of each demonstration project. The electric Program Administrators collaboratively will analyze whether a program based on the demonstration projects can be deployed cost-effectively at scale. Any new program design will be implemented at the earliest appropriate time, either in the context of a mid-term modification or the next three-year plan.

D. Hard-to-Measure Efforts and Pilots

1. Hard-to-Measure Efforts

a. *Statewide Marketing (Residential, Income Eligible, C&I)*

i. Introduction

The budget in the Statewide Marketing hard-to-measure initiative is used to support general statewide marketing efforts and the statewide brands, including Mass Save®. Program marketing is included in program budgets.

By creating powerful, engaging and motivating education and marketing strategies, Program Administrators can increase awareness of the benefits of energy efficiency and drive increased participation in energy efficiency programs and services. Proposed marketing strategies will consider the unique motivational differences among residential and non-residential customers.

Building on the success of digital and social marketing platforms will continue to be a key focus in the 2019-2021 term. The Mass Save website has become a critical focal point in the comprehensive marketing program, providing a consolidated one stop shop for residents and businesses to learn about energy efficiency, program offerings and opportunities. MassSave.com received over 1.2 million unique visitors in 2017. MassSave.com and the strategies that drive customers to the website will continue to be refined to ensure the highest quality customer experience. Marketing will continue to leverage the strong social media presence built over the 2013-2015 and 2016-2018 terms. With over 133,000 Facebook fans

(www.facebook.com/MassSavers) and nearly 24,000 Twitter followers (www.twitter.com/MassSave), PA marketing and education is able to reach an ever broadening audience. The social media platforms support effective peer to peer marketing, allowing customers to become brand ambassadors.

Reaching out to customers who have not yet participated in Mass Save branded programs remains a fundamental commitment of the Program Administrators. The Mass Save website is currently accessible in English, Spanish and Portuguese, and may be translated into additional languages in the future to expand access to diverse linguistic populations. In 2016-2018, the Program Administrators executed specific educational outreach to reach targeted audiences including Spanish and Portuguese speakers, renters, income-eligible customers, and small business owners. The Program Administrators will explore affinity marketing opportunities to expand the reach to new market segments while offering the added benefit of supporting the community beyond energy efficiency. For example, Program Administrators are currently engaged in an ongoing awareness study to specifically gauge awareness in Latino and income eligible communities. The results of this study will provide Program Administrators with data to identify areas of high and low customer participation, enabling Program Administrators to deploy targeted community engagement strategies to build Mass Save program awareness and drive participation in these segments.

The key themes for the Statewide Marketing efforts for the 2019-2021 Plan are as follows:

- Define who and what Mass Save is and what it means to the customer.
- Increase the message that associates Mass Save with "A way to lower your energy bills" to both residential and business customers.
- Message and graphically tie in the Program Administrator brand logos with the Mass Save mark to create a strong association and clarity of message.
- Utilize the segmentation work identified by the RMC and C&IMC so Program Administrators can better and more consistently target customers.
- Create awareness and understanding of Mass Save as a trusted statewide resource for all customers' energy efficiency needs.
- Educate customers about the opportunities to save energy and motivate them to act.
- Ensure cross-promotion and broader and deeper program participation through a number of strategies including featuring all energy efficiency programs on social media, driving from Facebook and Twitter to MassSave.com blog articles, etc.

During the 2019-2021 Plan term, the Statewide Marketing Committee will continue to meet monthly and update DOER, through informal discussions, on any new developments concerning the Program Administrators' statewide marketing efforts. From a market research perspective, the Program Administrators will continue to conduct campaign studies and track campaign effectiveness in terms of driving customers to the website.

ii. Marketing Plan Overview

The ultimate goal of all educational, community outreach, and marketing efforts is to build a culture of efficiency. It is necessary for a rapidly evolving energy marketplace to be able to utilize a system of effective communication with Massachusetts residents and businesses. This system is a critical tool to support customer awareness, understanding and participation in the Program Administrators' comprehensive energy efficiency programs. Independent evaluation studies and a review of the marketing activities from 2010 to date illustrate the extraordinary growth and success of the coordinated marketing efforts among the Program Administrators and provide insights for Program Administrators to better understand where improvements can be made.

For the 2019-2021 Plan, core objectives of the Program Administrators' public education and promotion campaign include:

- Maximizing reach to ensure *all* residential and business customers are provided access to information and connection to resources.
- Providing compelling and accessible messages, which clearly describe the benefits of energy efficiency without excess jargon or overly technical language.
- Exploring and deploying targeted marketing to unique or specific communities throughout the state (including communities where English is not the primary language).
- Utilizing diverse media (e.g., internet, radio, public transit, social media, bill inserts) to disseminate consistent and clear messages.
- Ensuring that the various strategies work together to ultimately achieve deeper and broader savings.
- Ensuring that customers understand who their local Mass Save sponsor is and increasing the awareness of Program Administrators' commitment to their customers.

Through an extensive array of effective messages and an all-inclusive media strategy, the Program Administrators commit to engaging with the broadest cross section of residential and business customers with tailored, targeted, and actionable information. The careful balancing of breadth, depth, and understanding of customer motivation in the campaigns will drive value to customers and support obtaining the aggressive energy efficiency goals set forth in this Plan.

iii. Mass Save®

In 2010, the Program Administrators joined together to promote energy efficiency programs to the Commonwealth through a statewide PA brand. As sponsors of the Mass Save word service mark, the intent of the Program Administrators was to complement their individual PA brands when communicating with residential and business customers about energy efficiency programs.

The Program Administrators are the owners of the Mass Save word service mark. A trademark or service mark identifies goods and services as originating from a single source. Trademarks, in effect, represent the goodwill that a business has built up through its history of

offering quality goods and services. A word mark is the most common form of trademark and simply consists of a word or group of words. The Program Administrators have rights to the word mark Mass Save, having obtained federal registration of it on August 29, 2006.

Under trademark law, the Program Administrators monitor and control the use of their marks in order to maintain them and to prevent inferior energy efficiency services from diminishing them. Throughout the past three plan periods, the Program Administrators have overseen significant monitoring efforts with respect to the Mass Save mark to identify unauthorized uses of the service mark. Legal measures have been successful to stop such unauthorized uses and thus the integrity of the mark has been protected.

iv. Marketing for 2019-2021

The Program Administrators maintain a joint statewide website, MassSave.com, which is designed to educate customers and provide access to energy efficiency program information and participation. The website provides the Program Administrators an opportunity to offer streamlined information, including the online home energy assessment and online rebate processing, which offer substantial customer experience benefits. The centrality of this website to the Program Administrators' marketing efforts demonstrates the commitment of the Program Administrators to working together for the benefit of customers throughout the Commonwealth.

In May 2017, the Program Administrators launched a refreshed, improved, modernized MassSave.com website. Upgrades included:

- Optimizing the site for mobile visitors (in addition to customers accessing the site from desktops, laptops, and tablets). Mobile traffic to MassSave.com continues to increase year-over-year; in fact, it accounted for 41% of total traffic to the site in 2017.
- Refreshing each page's content, ensuring it is customer-friendly, compelling, and succinct.
- Consolidating the number of pages on the site, enabling customers to find what they are looking for in fewer clicks.
- Leveraging lifestyle imagery and icons throughout the site, adding visual interest while maintaining a clean look-and-feel.
- Creating interactive tools, enabling customers to simply enter their 5 digit zip codes to find a custom list of participating contractors, retailers, vendors, etc. who serve their area. Tools include listings of:
    - Home Performance Contractors
    - Independent Installation Contractors
    - AC Check Contractors
    - Community Action Programs
    - Retailers for Lighting and Products
    - C&I Upstream HVAC Distributors

- C&I Upstream Lighting Distributors
- C&I Food Service Vendors

- Introducing personalization variables such as homepage hero images, welcome text, and program promotional content customized to residential, multi-family, and business audiences by zip code. Personalization encourages higher engagement and ultimately improved conversion rates (i.e., online rebate application completions; PDF downloads, product purchases; etc.).

- Launched homepage hero images and welcome text specific to returning visitors (distinct from what first-time visitors to the site see). Returning visitors receive custom creative based on their customer segment (residential, multi-family, or business) which encourages their further exploration of the site.

- Ensured all high-traffic program pages are accessible through easy-to-remember vanity URLs such as MassSave.com/Thermostats, MassSave.com/Eligible, MassSave.com/NewHome, MassSave.com/Business, and MassSave.com/Contractors, etc.

While the Program Administrators have recently completed these significant updates, MassSave.com will continue to be evaluated for content and usability and improvements that can be made. The Program Administrators' focus on total customer experience recognizes the entry of the customer through the website as a critical component of that experience. The Program Administrators will continue to feature all the PAs' brands in conjunction with the Mass Save marks per the findings from the Massachusetts Statewide Marketing Campaign Evaluation Report and consistent with their goal to convey who and what Mass Save is.

In addition to optimizing the website, Mass Save uses consistent, succinct, effective campaign messaging: "It's easy to save energy and money with Mass Save."

The Program Administrators use marketing campaigns to increase awareness of energy efficiency and Mass Save across the Commonwealth. The Program Administrators promote the programs across many forms of media, including radio, internet banner ads, social media, smartphone and tablet ads, pre-roll video, native advertising, and print ads.

The marketing efforts include: (1) updating and optimizing the MassSave.com website; (2) posting customer-facing videos on the Mass Save website that share customers' positive experiences with home energy assessments and energy efficiency technologies; (3) leveraging of social media outlets like Facebook and Twitter to launch creative campaigns; (4) reviewing marketing materials and rebate forms across programs to ensure they leverage a consistent look and feel and follow best practices; (5) using an integrated out-of-home advertising campaign,

including platforms such as commuter rail, subway, bus, and billboard ads across the state; and (6) using native advertising and infographics to the mix of promotional strategies.[19]

The Program Administrators also execute annual and post-campaign studies, allowing the Program Administrators to benchmark and evaluate the effectiveness of their messaging and media planning and adapt the marketing strategies to take into account the results. In reviewing campaigns, Program Administrators review key findings regarding: (1) customer awareness of the Mass Save brand; (2) customer awareness of www.MassSave.com and self-reported website usage; (3) web traffic; (4) clarity and resonance of campaign messaging to residential and commercial customers; (5) self-reported exposure to Mass Save messaging; and (6) depth of knowledge about program offerings among residential and commercial customers. The most recent Mass Save Awareness Campaign showed increases in customer awareness in each of these areas and showed that customers found the messaging to be clear and resonant.

v. Maintenance of Complementary Individual Efforts

While working diligently on the statewide public education efforts, the Program Administrators will also continue individually to maintain customer awareness, satisfaction, and participation goals. Accordingly, the Program Administrators will continue outreach efforts utilizing customer representatives and account executives (who enjoy one-on-one/person-to-person relationships that are especially important in the C&I sector) and PA-specific efforts that complement and are consistent with statewide marketing and outreach efforts.

b. Statewide Database
(Residential, Income Eligible, C&I)

The budget in this category is used to support database and data review and sharing efforts, including costs associated with vendors developing and improving Mass Save Data, the Program Administrators' statewide energy efficiency database. Statewide database efforts will affect all sectors, with funds budgeted for each sector. Please see Section IV.I.5 for more information on Mass Save Data.

c. DOER Assessment
(Residential, Income Eligible, C&I)

The DOER Assessment represents an annual budget for DOER that is assessed per G.L. c. 25A, § 11H.

[19] Native advertising enables the Program Administrators to present educational messages seamlessly within the surrounding website environment, engaging audiences rather than disrupting the user experience. Mass Save also offers educational information on a variety of topics, in a variety of formats.

d. Council Consultants
(Residential, Income Eligible, C&I)

The Council consultants budget is managed by DOER and used to support the retention of expert consultants by the Council and reasonable administrative costs, in accordance with G.L. c. 25, § 22(c). The Council must annually submit to the Department a proposed budget for the "retention of expert consultants and reasonable administrative costs." G.L. c. 25, § 22(c). The cost for Council consultants allocated to the electric Program Administrators has traditionally been taken directly out of RGGI revenue that would have been distributed to Program Administrators by DOER. As a result, the electric Program Administrators did not collect this expenditure through the energy efficiency surcharge. The gas Program Administrators, however, do recover these costs through their energy efficiency surcharges. As discussed below in Section V.B.2.c, Department directed the Program Administrators to account for all consultant costs in the energy efficiency tables. To comply with this directive and all maintain good accounting practices, the Program Administrators will work with DOER to receive the RGGI funds directly so the Program Administrators can properly account for both the revenue and expenditures in energy efficiency and energy efficiency reconciliation filings.

e. Sponsorships & Subscriptions
(Residential, Income Eligible, C&I)

Costs included on the Sponsorships and Subscriptions hard-to-measure line items provide direct benefits to customers, but are not directly linked to specific in-the-field energy efficiency measures or services. Sponsorships and subscriptions support the energy efficiency market, encourage workforce education, attract skilled employees to Massachusetts, and promote innovation in both service delivery and the development and testing of energy efficient technologies. In accordance with the Order of the Department of Public Utilities regarding the 2019-2021 Three-Year Energy Efficiency Plan and general accepted practice, each sponsorship and subscription expense must be reasonable, prudently incurred, and provide a direct benefit to Massachusetts customers. Detailed definitions are as follows:

- **Sponsorship**: Payment by or on behalf of a Program Administrator to financially support an organization, event, or project directed by a non-PA person or group, in order to gain participation or access to a benefit of sponsorship. The purpose of these costs may include, without limitation, sharing of regional and national best practices, transformation of energy efficiency markets, influencing manufacturers, furthering energy efficiency evaluation techniques and standards, and the ability to network (with customers, contractors, evaluators, or other experts) to learn about additional energy efficiency opportunities and ways in which to improve offered energy efficiency services. These activities all provide benefits to customers and programs generally, but do not focus on a specific initiative. Specific categories of sponsorships enumerated by the Department include:

    1. Energy efficiency forums
    2. Trade associations
    3. National industry associations
    4. Groups that target specific industry sectors

5. Universities and organizations that develop new technologies
6. Residential focused groups to educate and engage with the community

Costs reported in the hard-to-measure line items will be limited to sponsorships that are anticipated to provide benefits to customers but are not associated with a specific program or initiative. Conversely, expenses related to the above categories that directly impact programs will be included in the appropriate program budget.

- **Subscription**: Payment by or on behalf of a Program Administrator to receive or use something related to energy efficiency over a fixed period, such as a periodical, a book series, or an informational service.

Costs will be categorized in the appropriate cost category. For additional information on Sponsorships & Subscriptions, please see the policy set forth at Appendix I.

f. Residential HEAT Loan
(Residential)

The Residential HEAT Loan budget includes costs to buy down the interest due on the loan and the cost to administer the loans.

The highly successful Mass Save HEAT Loan offers zero percent interest financing to help customers finance the purchase and installation of qualified energy efficiency technologies. For some customers, raising sufficient capital to pay for their upfront customer contribution is a barrier to installing energy efficiency. Financing allows these customers to borrow funds, without having to also bear the cost of the interest on the loan, in order to invest in energy efficiency. Customers may qualify for loans up to $25,000 with terms up to 7 years, depending on the Program Administrator and the loan provider. Additionally, some pre-weatherization repair costs (up to a maximum of $1,000) may be eligible for financing if the repair removes the barrier to installing insulation measures. Examples of pre-weatherization barriers are: knob and tube wiring, combustion safety issues, and moisture problems.

Any savings or costs associated with installing energy efficiency measures due to availability of the HEAT Loan are included in the core initiative under which the measure was installed, for example, in Residential Coordinated Delivery. HEAT Loans are generally administered by the electric Program Administrator, except for instances in which a gas Program Administrator serves a customer in a municipal light plant territory, in which case the gas Program Administrator would offer the loan. Program Administrators have worked with the Massachusetts Bankers Association to provide procedures for banks to participate in the program.

The process for applying for a HEAT Loan is described in detail on https://www.masssave.com/en/saving/residential-rebates/heat-loan-program/.

g. Workforce Development
(Residential, Income Eligible, C&I)

The Program Administrators continue to monitor and support trainings in order to contribute to building and maintaining a qualified workforce that will meet the demand for energy efficiency. Trainings provided under Workforce Development provide general skills not specific to a certain program, including topics such as building science, energy efficient new construction, heating and cooling technologies and techniques, and marketing. Trainings can help promote cross-training across different areas of expertise. Program Administrators consistently look for collaborative ways to improve the communication and delivery of trainings to address the demands of the market. This effort is ongoing within the respective management groups and best practices group, as exemplified by the Low-Income Best Practices Working Group chaired by LEAN, and the Contractor Best Practices Working Group, as well as through ongoing communication with key trade allies. In 2019-2021, all Program Administrators will be charging only external (non-employee) general training to this hard-to-measure category.

h. Research and Development ("R&D") and Demonstration
(Residential, C&I)

In the continued efforts to explore new technologies and measures, Program Administrators set forth this budget to pursue new technologies, processes, and strategies that may not immediately lead to savings. This allows the Program Administrators to be proactive, and to be leaders in innovation. Costs associated with the MTAC, as well as research and development into areas of interest, are charged to this category.

i. Residential Education
(Residential)

The budget in the Residential Education hard-to-measure effort is used to support public education efforts.

The key objective of the Residential Education effort is to offer an array of K-12+ educational outreach programs and enhanced consumer education. The focus will be to create powerful, engaging, and motivating education and marketing strategies that will increase awareness of the benefits of energy efficiency and drive increased participation in Mass Save energy efficiency programs and services. The strategies developed for statewide energy efficiency education, outreach and marketing will augment the efforts already in use by several Program Administrators.

The Program Administrators' support of educators, students, and parents through program opportunities, curriculum, and materials on energy efficiency and conservation is a critical component in fostering an energy efficiency literate society. Students are the Program Administrators' future customers and staff, and instilling positive energy behaviors in them will prove to be a positive outcome for society.

Several Program Administrators collaborate with the National Energy Education Development ("NEED") Project, bringing energy efficiency curriculum and training to teachers in

Massachusetts. In addition to the teacher trainings in 2019-2021, some Program Administrators will implement an energy efficiency take-home initiative involving packages that will contain instant-savings measures such as light bulbs, showerheads, and faucet aerators, as well as educational materials. After in-class lessons about energy-efficiency, students will bring the packages home and report back on which measures their families install. In this way, the Program Administrators can capture additional savings and expand the reach of the education programs beyond teachers and students, to parents, as well.

Additional efforts directed at consumers focus on educating customers on the benefits of investing in energy efficiency products and services and the multitude of energy efficiency initiatives available to them. Collaborative efforts for consumer education in the 2013-2015 plan included the Energy Savvy online energy assessment tool on the Mass Save website and kits containing "Kill A Watt" meters available through libraries. These efforts will be continued in 2019-2021.

Some Program Administrators also conduct additional direct outreach and provide additional in-school programming to schools in their service territories. These programs will continue to evolve and expand to reach more students. Many of these programs have earned local and national awards for energy education programs.

The Program Administrators plan to work with DOER, educational institutions, the statewide marketing working group, and PA education and/or marketing departments to continue to develop educational and promotional strategies. Efforts for school-aged education will focus on expanding the existing, in many cases award-winning, PA school programs. Educational outreach strategies for 2019-2021 may include:

- Provide energy efficiency related classroom presentations and activities to K-12+ schools.
- Direct educators and children to online educational resources to help educate children about energy safety and conservation.
- Aid with science fairs, teacher training workshops, and other elementary and secondary educational opportunities in collaboration with DOER, Massachusetts Department of Education, and schools throughout the Commonwealth.
- Encourage schools and informal education programs to participate in the annual NEED Project's Youth Awards Program held in April of each year, with follow-up awards program and ceremony in June in Washington, D.C.
- Partner with youth group summer camps promoting energy conservation and behavioral change.
- Partner with communities to educate and promote energy efficiency through energy fairs and community-specific outreach.
- Participate in various energy efficiency employee awareness events.
- Conduct school fundraisers promoting energy-efficient technologies.
- Offer prompt-based contests for students to showcase their energy and energy efficiency knowledge.

- Direct customers to online calculators and web tools learn more about home energy usage and to offer energy saving recommendations, including information on available energy efficiency incentives.
- Partner with vocational high schools to promote green jobs by providing training and curriculum.

The Program Administrators will work to develop energy efficiency marketing messages aimed at residential customers, educators, students, parent/teacher organizations, and community groups. Proposed collateral will highlight the many benefits of investing in energy efficiency, savings that can be generated by individual efficiency measure upgrades, behavioral changes, and testimonials from past program participants. The Program Administrators will employ a variety of media sources for messaging, which may include bill inserts, bill messages, customer newsletters, www.masssave.com, direct mail, employee and business partnerships, newspapers, social media outlets, and educator workshops.

j. Low-Income Energy Affordability Network (Income Eligible)

LEAN works with the Program Administrators to comprehensively serve income eligible households. LEAN delivers income eligible energy programs and represents income eligible Program Administrator customers in legislative discussions and regulatory proceedings. The LEAN budget is used to pay for their administrative and personnel costs related to income eligible implementation.

k. Evaluation and Market Research (Residential, Income Eligible, C&I)

Starting in 2019-2021 the Program Administrators propose to charge all EM&V costs to a hard-to-measure line item called Evaluation and Market Research, rather than to individual programs. This change aligns more effectively with current EM&V efforts, which apply to multiple program areas. In fact, the lessons learned from EM&V studies are often applicable to many or all of the programs. Given that EM&V costs are necessary and important, but do not directly lead to savings opportunities, they are appropriately categorized as hard-to-measure. This change will also allow reviewers to better evaluate the actual costs of implementing the program, without comingling the costs of evaluating the program. This budget category will include costs associated with the EM&V budget, potential studies, the avoided energy supply cost study ("AESC Study"), the Technical Reference Library ("TRL"), acquisition of data sets, related labor costs, and other evaluation and market research costs. Evaluation and Market Research costs will be allocated to one or more sectors as appropriate to the activity.

2. Pilots

The Program Administrators are not proposing any new pilot programs or initiatives for the 2019-2021 Plan term.

E. PA-Specific Programming

The Program Administrators strive for consistency in program offerings with the goal that customers across the Commonwealth can take advantage of comprehensive energy efficiency services. In some instances, however, individual Program Administrators may provide additional services or unique incentive structures that are specific to their territory. These offerings may be specifically related to the unique characteristics of a service area, or may be developed based on unique conditions in that territory, such as gas constraints or reduction in expense related to very large capital improvement projects. They may also be based on the governing structure of a Program Administrator, such as the Compact, which has a distinct role as a municipal aggregator. Finally, these efforts may be run as a test case by one Program Administrator, with the idea that the programming could be rolled out across Program Administrators if proven successful and cost-effective.

The PA-specific initiatives set forth in Appendix F represent proposals of only the Program Administrator making the proposal. They do not constitute proposals that have been reviewed and agreed to by all Program Administrators, and Program Administrators may have divergent views on the materials contained therein. All Program Administrators reserve their right to comment on these proposals in the future, and the inclusion of these materials does not constitute the consent of any Program Administrator to any other Program Administrator's specific initiatives or proposals.

F. Coordination and Best Practices

1. Management Committees and Working Groups

a. Overview

Consistent with the GCA, the Program Administrators work together to jointly develop and implement the Three-Year Plan. The Program Administrators have maintained their commitment to work collaboratively on a daily basis to ensure that all eligible customers in Massachusetts experience seamless programs, with consistent application procedures, incentives, and supportive educational and technical services. The Program Administrators consistently develop and share best practices and seek continuous improvement to provide the best possible service to their customers. The Program Administrators have developed management committees, working groups, and best practices committees to have structured channels for sharing best practices. Additionally, the PA Leads, which consists of the individuals responsible for overseeing their respective Program Administrator's energy efficiency activities, collaborate extensively to ensure that the overall strategy and vision remains consistent and in the best interests of customers. The PA Leads meet at least monthly to discuss and set statewide objectives, share challenges and opportunities, and management practices. The PA Leads provide guidance and directives, as needed, to the various management committees.

b. Residential and C&I Management Committees

The Program Administrators maintain working groups that bring together experts from every gas and electric company and energy efficiency service provider in the Commonwealth.

These working groups provide for seamless program delivery across fuels and across service territories, and help maintain consistent messaging to customers, trade allies, manufacturers, market actors, and market channels. Chief among these groups is the Residential Management Committee ("RMC") and the Commercial & Industrial Management Committee ("C&IMC"), which work together and with the Council's consultants to plan and deliver programming in their respective sectors. Managing and delivering a statewide portfolio of programs is an ongoing and dynamic exercise, and the management committees are a venue for the program managers to discuss consumer dynamics and expectations, new efficiency technologies, price and baseline changes, effects of evaluation studies on the programs, and changes in the market. In addition to enhancements to existing programs and initiatives, new programs and initiatives are primarily designed by the management committees.

Each management committee works to ensure that: (a) all Program Administrators remain up-to-date on the key activities of other Program Administrators; (b) implementation activities and efforts by all Program Administrators are integrated and coordinated to the optimal extent; (c) program implementation and the Statewide Marketing Committee is coordinated; (d) evaluation and market assessment studies are reviewed and appropriate recommendations are implemented in the programs; (e) program policy and implementation issues are resolved collectively, and decisions are communicated to each PA's staff to ensure uniform application; and (f) program best practices, technology innovations, and integration and coordination efforts in other jurisdictions are reviewed and incorporated as appropriate.

The RMC, C&IMC, and Evaluation Management Committee (described below) meet altogether quarterly in Tri-Management Committee ("Tri-MC") meetings to discuss topics of interest to all management committees. The Tri-MC provides a unique forum for the Program Administrators to communicate and coordinate on topics affecting the statewide programs.

These Management Committees provide an essential function for the Program Administrators to maintain the statewide collaboration and consistent programs that are the hallmark of the nation-leading Massachusetts energy efficiency programs.

c. Low-Income Best Practices

With respect to income eligible efforts, LEAN has convened the highly effective Low-Income Best Practices Group to coordinate practices across all Program Administrators and agencies. The Low-Income Best Practices group meets regularly, and continues to offer opportunities for various stakeholders to discuss program implementation, new measures, innovative strategies, and other matters related to the Program Administrators' income eligible programs.

d. Evaluation Management Committee

The Evaluation Management Committee ("EMC"), established by the Program Administrators and the EM&V Consultant, serves as a steering committee for statewide evaluation activities and issues, providing guidance and direction to each of the evaluation research areas. The EMC works to plan, prioritize and delineate the research studies to be undertaken over the Three-Year Plan term. For more information about the EMC, please see Section H.2.

e. The Massachusetts Technology Assessment Committee

MTAC reviews new technologies that have the potential to cost-effectively save energy. MTAC is both a proactive and a reactive body, and consists of key PA technical staff. The committee addresses residential, commercial and industrial technologies, drawing on the subject matter experts from the committee, PA staff, or outside expertise as necessary. It establishes and publishes threshold technical requirements that must be met to qualify products or processes as eligible for program incentives. It documents its findings in a standardized manner and disseminates them to the PA program managers, technical staff, account managers, and outside parties such as vendors, customers, and other interested parties, as appropriate.

The MTAC is the authority for consistent program interpretation of technical matters relating to emerging technologies and provides information, documented technical interpretations, and technology assessments to the Program Administrators. The committee has developed a set of protocols for the content of their review and procedures for documenting and disseminating their conclusions and technical interpretations. These protocols are publicly available on MassSave.com.[20] The MTAC meets as needed, either as a whole committee or in ad hoc technology or issue-specific subgroups, and more regularly during the annual program review and planning period.

f. Other Committees and Working Groups

The Program Administrators convene other long-term and short-term working groups. Some are discussed below.

Statewide Marketing Committee organizes statewide marketing and media campaigns, manages www.MassSave.com, updates social media campaigns, and works to ensure that communications are presented in multiple channels to reach highly diverse customer bases. The Combined Heat and Power Group sets standards required for projects including efficiency levels and incentives. The Common Assumptions Group works to maintain consistent application, calculation, and presentation of savings, benefits and costs. The Demand Working Group works on initiatives related to reducing customer demand, including pilot programs, cost-effectiveness review, and statewide strategies. The Program Administrators also have groups that review tables, specific costs, codes & standards, and education efforts, among other aspects of the energy efficiency programs.

2. Community, Stakeholder, and Third-Party Engagement

The Program Administrators are continuously engaged with a variety of stakeholders. Every day the Program Administrators communicate with residential and commercial customers, program participants, contractors, service providers, equipment manufacturers and distributors, trade and professional associations, legislators and regulators, environmental and community advocates, civic leaders, business owners and organizations, media and marketers, and other

[20] MTAC materials can be found here: https://www.masssave.com/en/learn/partners/assessing-new-efficiency-technologies/.

interested parties. Every citizen and every business has an interest and a stake in the effectiveness of the portfolio of Massachusetts energy efficiency programs because energy costs touch and affect every person and business in the Commonwealth.

Massachusetts residents and other interested parties can voice their views through existing and established public oversight processes. The Council, which represents a broad spectrum of stakeholder interests, has facilitated additional organized venues for individual and organizational input specific to the energy efficiency programs through regular public comment periods at Council meetings, and additional sessions during the Plan development time period. All the comments and input collected from these various forums are reviewed closely by the Program Administrators.

On a continuing basis, there are a variety of other structured or semi-structured events, venues, or processes through which stakeholder input is encouraged. For example:

- **Annual open houses for trade allies.** Every year the Program Administrators host several large statewide events for the express purpose of presenting and explaining program changes and updates to the business partners the Program Administrators depend on to deliver their various programs to customers. Attendees have ample opportunity to network with each other and PA staff, and to engage in a dialog about program design and operations.
- **Best Practices Working Group.** This group is constituted of a subset of the residential contractors elected annually by their peers, as well as the Program Administrators, and the Lead Vendors. The members meet monthly to provide continuous feedback for the improvement of the program across the state. Topics discussed have ranged from refining the QA/QC process, to adopting new measures such as spray foam, to pricing and training.
- **The Proposal process.** The Program Administrators provide a structured process by which any third-party organization can propose to a management committee a program concept or proposal to supplement or enhance the Program Administrators' approved programs. The criteria and two-step process for considering a proposal is clearly articulated. This process, while open, is rigorous and applicants must demonstrate that their concept can demonstrate and produce cost-effective and incremental energy savings beyond the work being performed by the Program Administrators.[21]
- **The Massachusetts Technology Assessment Committee process.** The clearly-articulated and open process by which MTAC reviews submitted technologies provides a level playing field. Any manufacturer or vendor of an emerging or newly-commercialized efficiency technology can make a science-based case for acceptance of their product into the Program Administrator offerings.
- **Informal Program Administrator speakers' bureau.** Program Administrator representatives are regularly called upon to represent and explain the programs to trade and civic associations. Industry associations, like the Massachusetts Restaurant Association and the Massachusetts Lodging Association, seek knowledgeable speakers to explain how

[21] The documents related to the proposal process are available at: https://www.masssave.com/en/learn/partners/process-for-managing-proposals/

the programs can work for their members and provide relevant case study examples from their industry.

- **Proactively solicit input from customer and industry experts.** The Program Administrators routinely seek input from key constituencies when they are considering program design changes or considering new product innovations. For example, a Program Administrator may need to establish that a product meets a customer's priority business need before promoting the energy saving attributes.
- **Input and advice from peer programs.** The delivery of energy efficiency programs throughout the country is largely a collaborative and congenial enterprise. PA program managers have come to know their peers in other jurisdictions around the country, and consider each other colleagues in a shared mission of improving the efficiency of homes and businesses in the United States. This means that emerging program ideas and best practices are freely shared. Massachusetts program managers test program concepts and share evaluation results and technical information with their counterparts, and receive feedback that is built into new program designs or improvements to existing ones.
- **Provide collateral materials for customer events**. Individual Program Administrators routinely offer stakeholders significant volumes of energy efficiency program collateral for distribution at local community and trade association meetings.

IV. STATEWIDE BUDGETS, SAVINGS, AND BENEFITS

A. Summary of Budgets, Lifetime Savings, and Benefits

1. Introduction

The program budgets, savings, and benefits set forth in this Plan are presented on an aggregate, statewide basis. In the Energy Efficiency Data tables, each Program Administrator provides its individual recommended savings and budget levels for the three-year term commencing January 1, 2019, consistent with the statewide program designs and energy efficiency framework. Please also see Appendix C for statewide Energy Efficiency Data Tables for budgets, savings, benefits, and cost-effectiveness.

As described above, the energy savings goals set forth in this Plan are measured in MMBTU. The Program Administrators are measuring success using this goal to reflect the overall energy savings achieved by the Program Administrators, and support their overall holistic approach to reducing energy use for customers. In addition, the electric Program Administrators will also be reflecting their increased emphasis on demand reduction and will therefore also be measuring success through a peak kW goal that reflects both passive and active demand savings. Please see Section II.C for more details regarding the benefits of the core goals for measuring success in 2019-2021.

Following historic aggregate savings achievements, the goals set forth in this Plan reflect the current market after years of energy efficiency programming in Massachusetts, the unique characteristics of each Program Administrator's service area, and the specific needs of each Program Administrator's customers from 2019-2021. These programs provide benefits for customers related to avoided costs, non-energy impacts, greenhouse gas reductions, and job growth and retention.

2. Statewide Combined, Electric, and Gas Data

a. Statewide Combined Data

Statewide tables reflect aggregated proposals of the individual Program Administrators.

Statewide Budgets ($)				
	2019	2020	2021	2019-2021
Residential	352,928,189	346,664,338	343,821,396	1,043,413,923
Income Eligible	118,020,099	119,524,484	120,608,357	358,152,940
Commercial & Industrial	301,879,556	310,132,806	315,731,671	927,744,034
Total	**772,827,845**	**776,321,628**	**780,161,425**	**2,329,310,898**

Statewide Lifetime Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	31,712,010	31,228,910	31,025,845	93,966,765
Income Eligible	7,452,886	7,459,892	7,435,040	22,347,818
Commercial & Industrial	30,333,091	30,315,641	30,325,892	90,974,624
Total	**69,497,987**	**69,004,443**	**68,786,777**	**207,289,207**

Statewide Annual Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	2,920,999	2,854,297	2,876,316	8,651,613
Income Eligible	436,888	436,788	435,504	1,309,180
Commercial & Industrial	2,579,085	2,595,178	2,608,196	7,782,458
Total	**5,936,972**	**5,886,263**	**5,920,016**	**17,743,250**

Statewide Summer Peak Demand Reductions (kW)				
	2019	2020	2021	2019-2021
Residential	65,938	69,186	67,381	202,505
Income Eligible	5,872	5,530	5,370	16,771
Commercial & Industrial	116,986	141,650	177,473	436,110
Total	**188,796**	**216,367**	**250,224**	**655,386**

Statewide Benefits ($)				
	2019	2020	2021	2019-2021
Residential	810,188,477	814,311,532	804,260,315	2,428,760,325
Income Eligible	220,013,586	219,379,797	218,447,158	657,840,541
Commercial & Industrial	1,050,768,065	1,051,658,744	1,064,008,951	3,166,435,759
Total	**2,080,970,128**	**2,085,350,073**	**2,086,716,424**	**6,253,036,625**

b. Statewide Electric Data

Statewide tables reflect aggregated proposals of the individual electric Program Administrators.

Electric Program Administrator Budgets ($)				
	2019	2020	2021	2019-2021
Residential	221,162,748	212,479,085	206,730,695	640,372,529
Income Eligible	68,367,493	69,428,158	69,909,685	207,705,337
Commercial & Industrial	256,585,751	264,217,538	269,138,433	789,941,721
Total	**546,115,992**	**546,124,782**	**545,778,813**	**1,638,019,587**

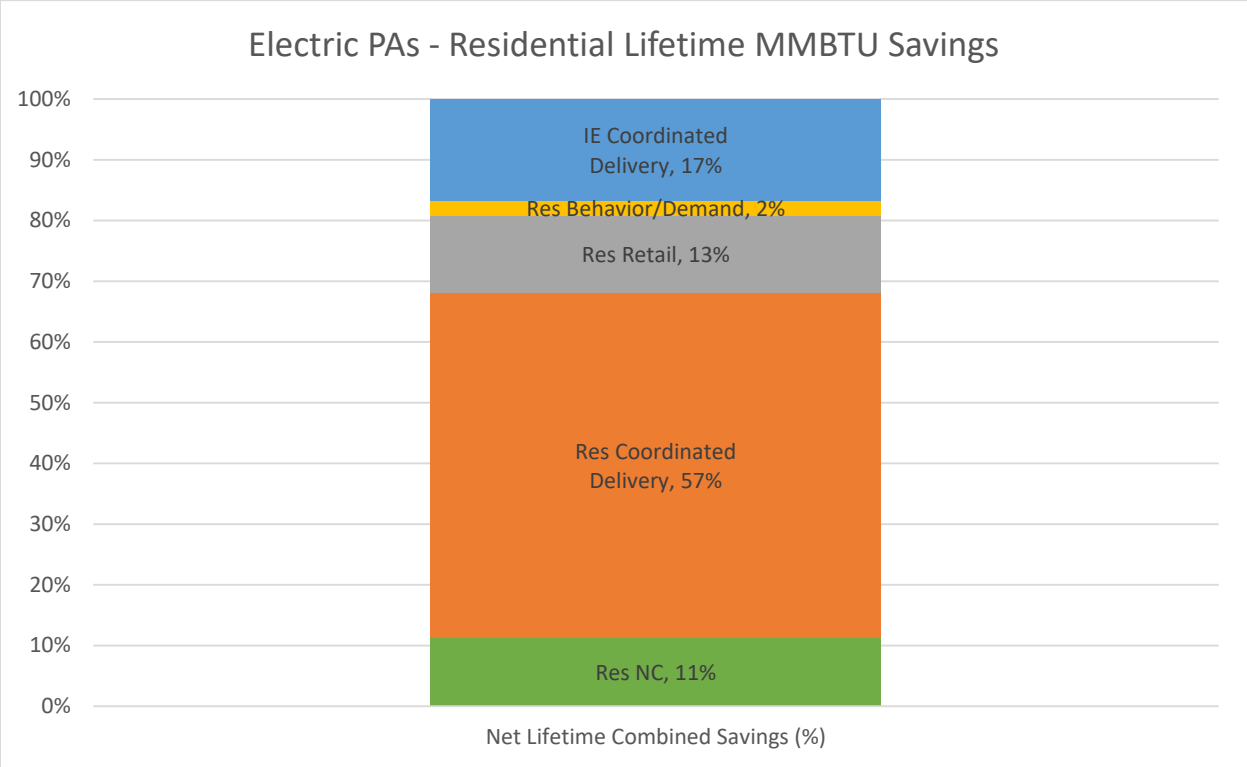
Electric Program Administrator Lifetime Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	13,766,317	13,200,174	13,132,553	40,099,043
Income Eligible	2,676,407	2,683,216	2,658,365	8,017,988
Commercial & Industrial	18,167,271	18,170,346	18,436,441	54,774,058
Total	**34,609,995**	**34,053,736**	**34,227,358**	**102,891,089**

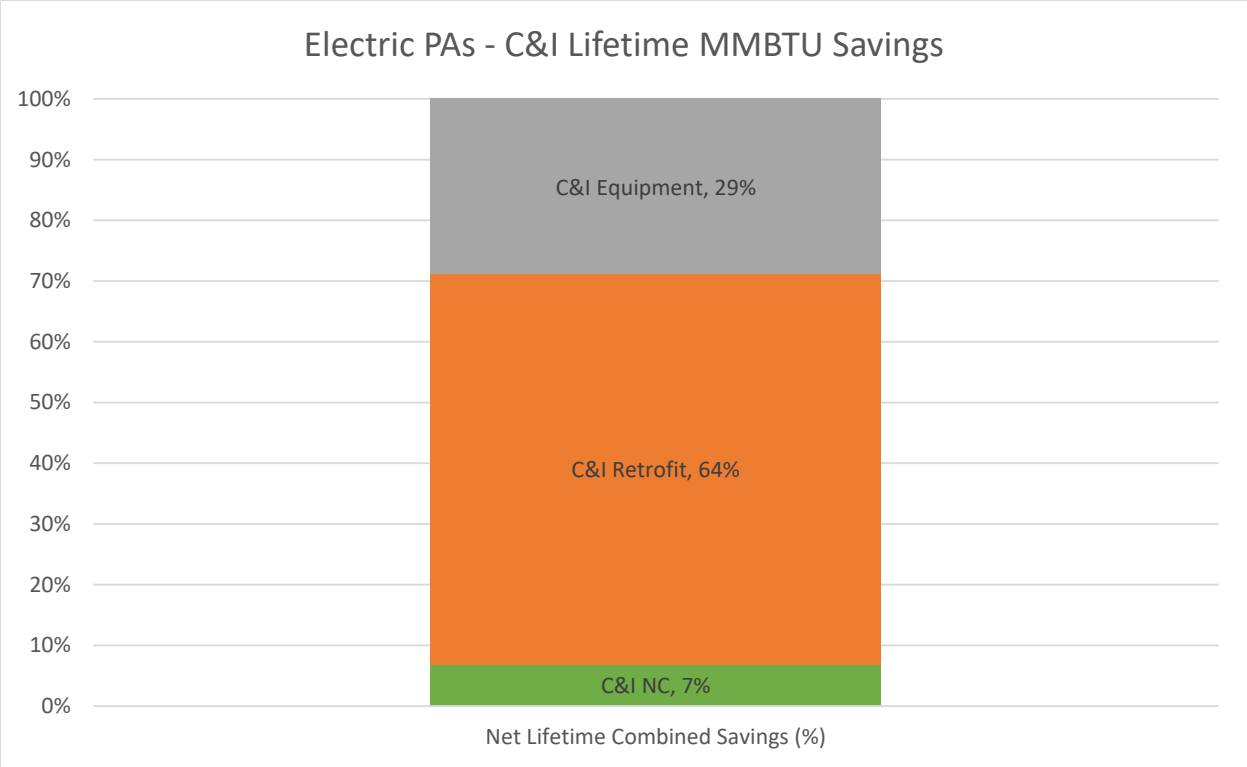
Electric Program Administrator Annual Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	1,400,629	1,331,788	1,363,939	4,096,356
Income Eligible	198,707	198,603	197,319	594,629
Commercial & Industrial	1,633,790	1,639,849	1,656,683	4,930,322
Total	**3,233,126**	**3,170,240**	**3,217,941**	**9,621,307**

Electric Program Administrator Summer Peak Demand Reductions (kW)				
	2019	2020	2021	2019-2021
Residential	58,399	61,738	59,999	180,136
Income Eligible	5,331	4,988	4,828	15,146
Commercial & Industrial	116,981	141,646	177,468	436,095
Total	**180,711**	**208,371**	**242,295**	**631,377**

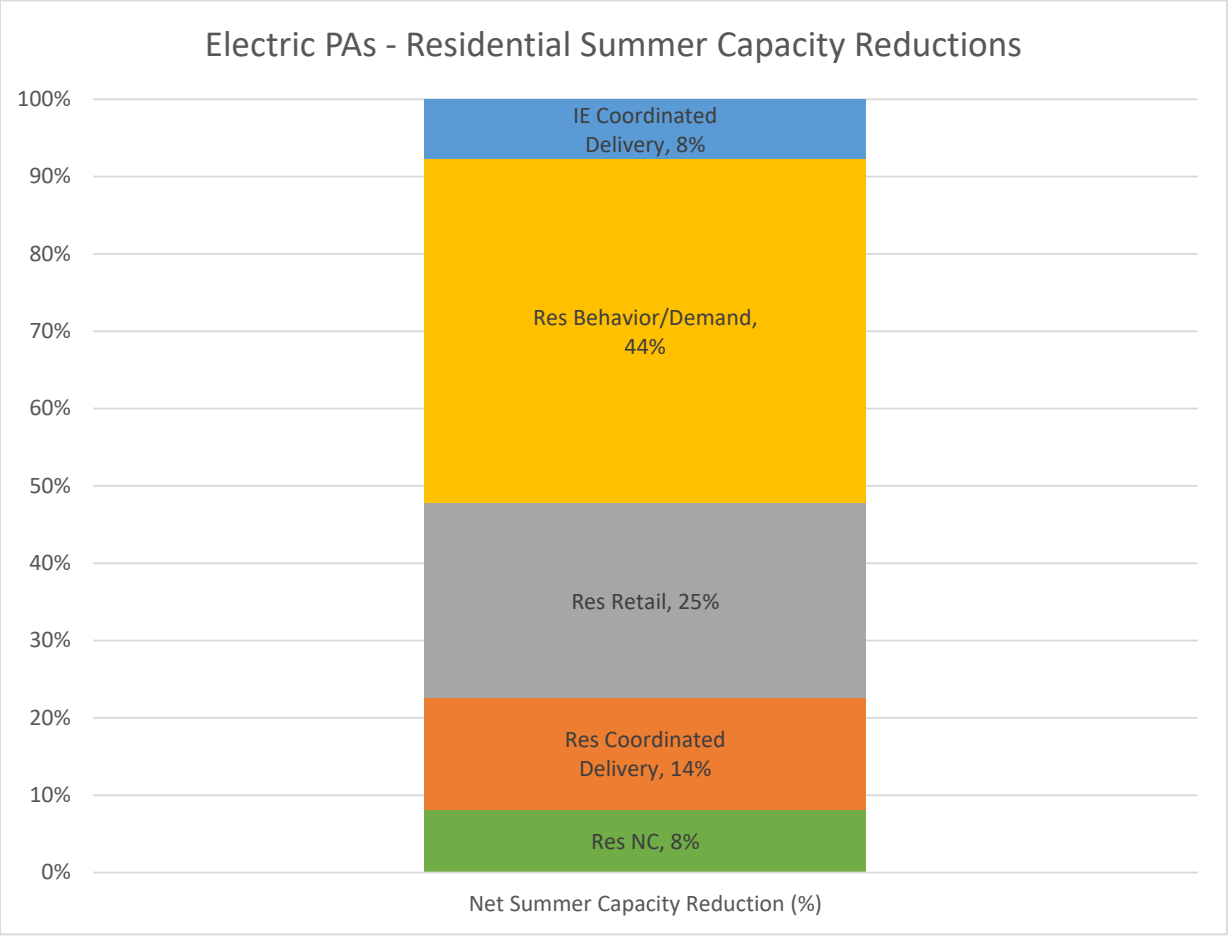
Electric Program Administrator Benefits ($)				
	2019	2020	2021	2019-2021
Residential	503,238,336	507,156,794	498,344,064	1,508,739,194
Income Eligible	127,027,243	126,565,429	126,101,988	379,694,659
Commercial & Industrial	916,411,476	917,957,804	933,068,349	2,767,437,629
Total	**1,546,677,055**	**1,551,680,026**	**1,557,514,401**	**4,655,871,482**

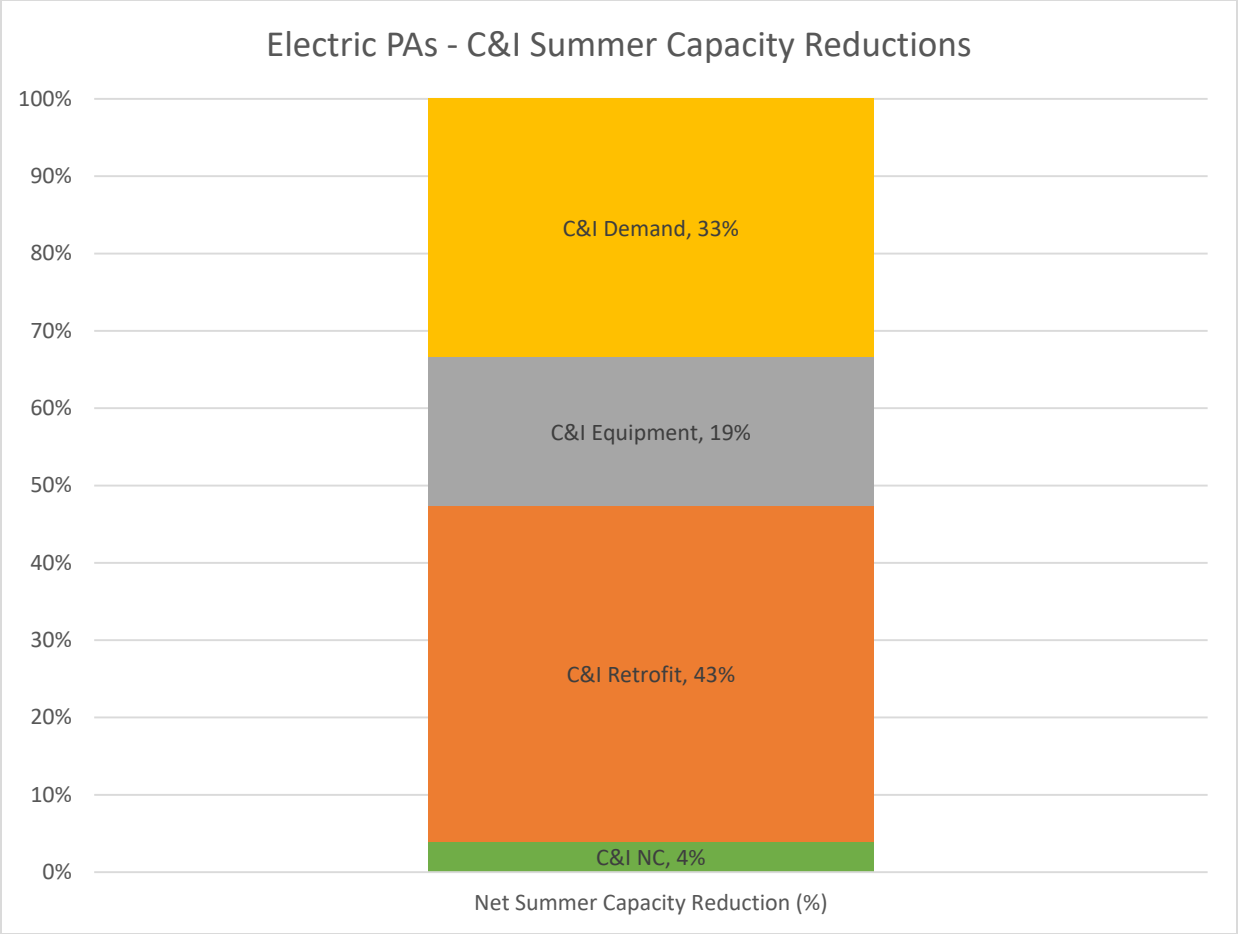
Please see the charts below for percent of lifetime MMBTU savings by core initiative for electric Program Administrators.




Electric PAs - C&I Lifetime MMBTU Savings
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
C&I Equipment, 29%
C&I Retrofit, 64%
C&I NC, 7%
Net Lifetime Combined Savings (%)

Please see the charts below for percent of peak demand savings by core initiative for electric Program Administrators.





c. Statewide Gas Data

Statewide tables reflect aggregated proposals of the individual gas Program Administrators.

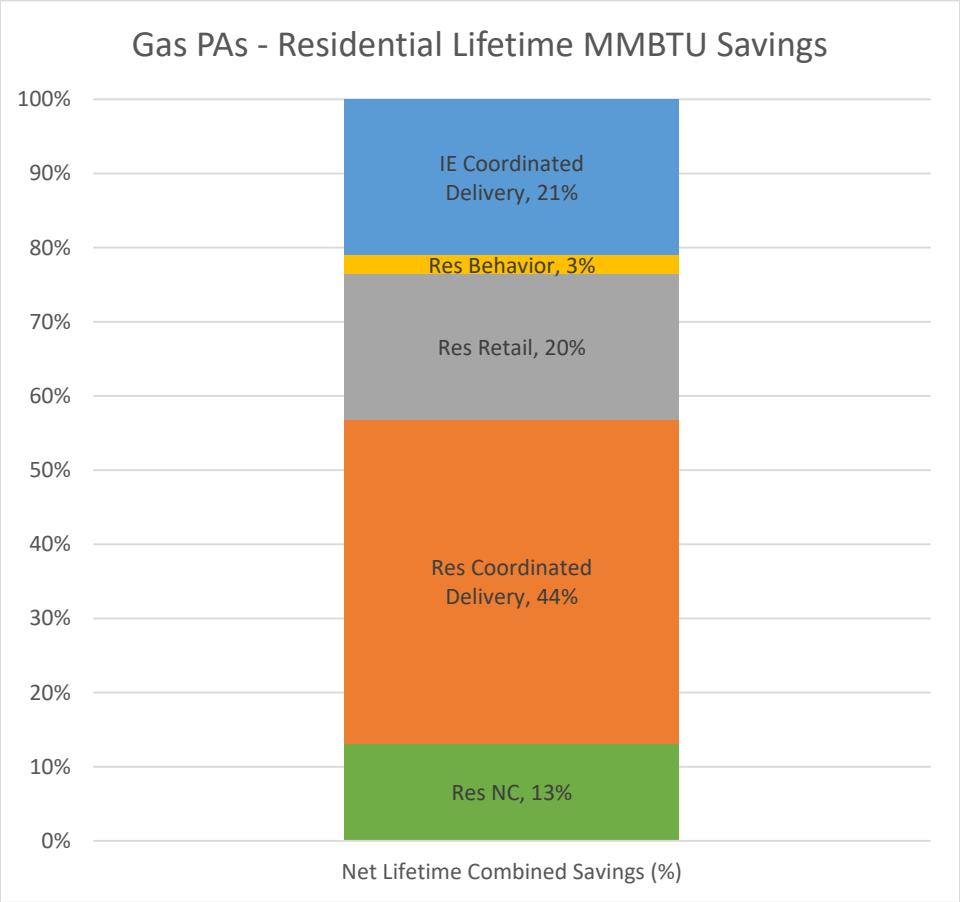
Gas Program Administrator Budgets ($)				
	2019	**2020**	**2021**	**2019-2021**
Residential	131,765,441	134,185,252	137,090,701	403,041,395
Income Eligible	49,652,606	50,096,326	50,698,672	150,447,604
Commercial & Industrial	45,293,806	45,915,268	46,593,239	137,802,313
Total	**226,711,853**	**230,196,846**	**234,382,612**	**691,291,311**

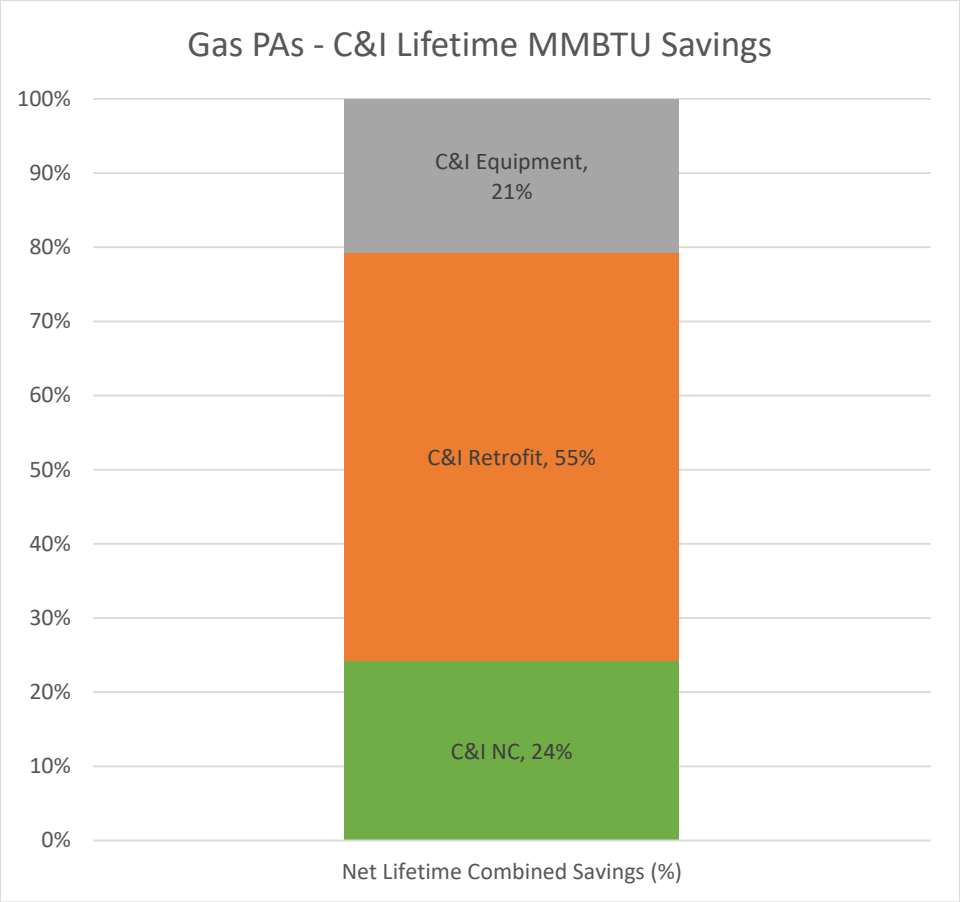
Gas Program Administrator Lifetime Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	17,945,693	18,028,736	17,893,292	53,867,722
Income Eligible	4,776,479	4,776,676	4,776,676	14,329,830
Commercial & Industrial	12,165,820	12,145,295	11,889,451	36,200,566
Total	**34,887,992**	**34,950,707**	**34,559,419**	**104,398,118**

Gas Program Administrator Annual Savings (MMBTU)				
	2019	2020	2021	2019-2021
Residential	1,520,370	1,522,509	1,512,378	4,555,257
Income Eligible	238,181	238,185	238,185	714,551
Commercial & Industrial	945,294	955,329	951,513	2,852,136
Total	**2,703,845**	**2,716,023**	**2,702,075**	**8,121,944**

Gas Program Administrator Benefits ($)				
	2019	2020	2021	2019-2021
Residential	306,950,141	307,154,738	305,916,251	920,021,130
Income Eligible	92,986,344	92,814,369	92,345,170	278,145,882
Commercial & Industrial	134,356,589	133,700,940	130,940,602	398,998,131
Total	**534,293,073**	**533,670,047**	**529,202,023**	**1,597,165,143**

Please see the charts below for percent of lifetime MMBTU savings by core initiative for gas Program Administrators.





B. Common Assumptions and Technical Reference Library

The Program Administrators continuously work together to develop and apply common assumptions. Consistent collaboration and structured review of common assumptions through the working groups, such as the Common Assumptions Working Group, allows the Program Administrators to collectively provide the best available data in the most consistent manner. The Program Administrators work together to harmonize assumptions and approaches to various cost, savings, and benefits data. Program Administrators collectively determine way the avoided costs from the AESC Studies and evaluation results are applied, including non-energy impacts. Additionally, Program Administrators have worked together to include similar data, measure IDs, and naming conventions in the screening models and TRL.

Specific program assumptions are accounted for uniformly, and algorithms are applied in the same manner across Program Administrators, as set forth in the TRL. The TRL documents how the energy efficiency Program Administrators consistently, reliably, and transparently calculate savings resulting from the installation of prescriptive energy efficiency measures. The TRL provides methods, formulas, and default assumptions for estimating energy, peak demand, and other resource impacts from energy efficiency measures. The TRL is an excellent example of how the Program Administrators work together, share data and best practices and work to develop common assumptions that reflect state-of the-art EM&V results. The Program Administrators have transitioned the former technical reference manual into an electronic version, which is

available publicly and provides additional search functions to aid users. The TRL reports are available at http://www.masssavedata.com/Public/TechnicalReferenceLibrary.

Under the GCA, the Program Administrators implement common programs. Therefore, in order to be able to review participants in a consistent manner, the Program Administrators develop a set of common definitions to guide each Program Administrator's participant calculation. These definitions are designed to reflect unique participants in each program and initiative. The programs have been re-imagined for this Plan, and therefore, the participant definitions must be redefined. The Program Administrators are working on common participant definitions, which will inform the October 31, 2018 Plan. Given that the definitions are in progress, participant numbers are not included in the tables for this April Plan.

C. Development of Goals

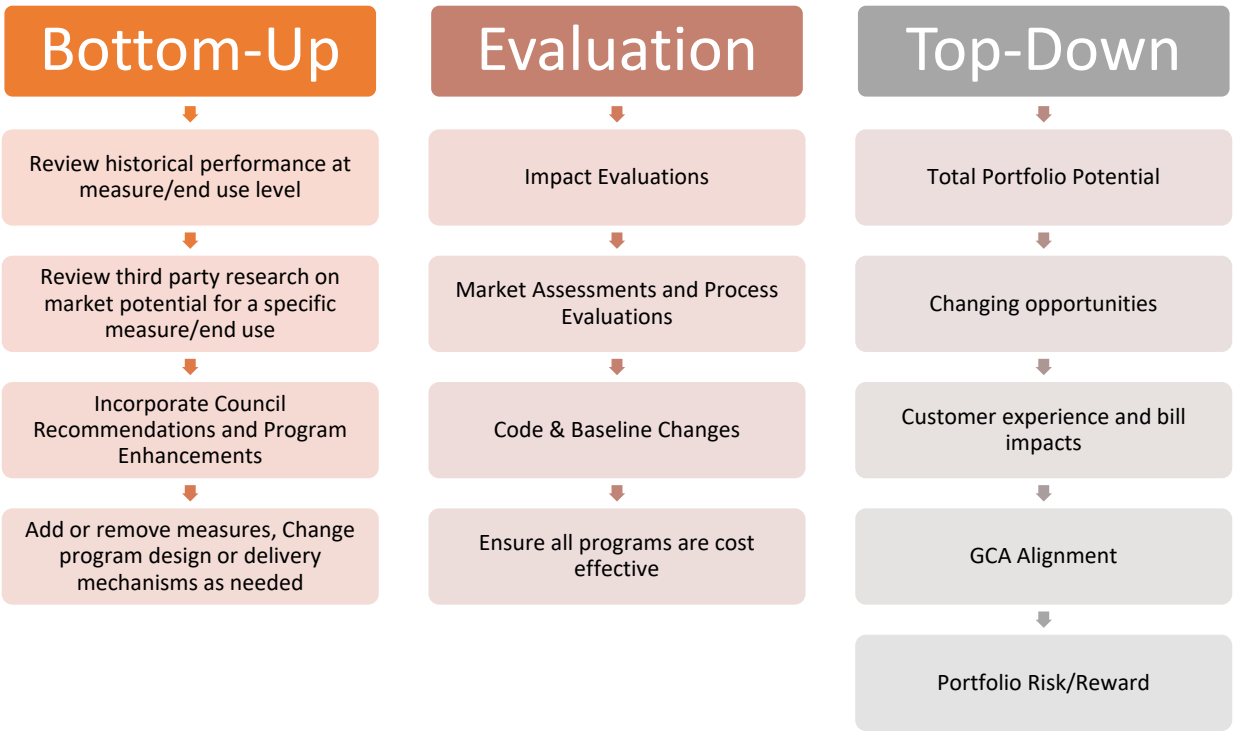
1. Introduction

The Program Administrators engage in a highly collaborative and detailed planning process for setting savings goals and budgets. Programmatic decisions that inform savings goals and budgets are made both at the individual PA level and at the statewide level, including work by the respective management committees, which facilitate ongoing stakeholder input, continuous sharing of best practices, and consistency of offerings among the Program Administrators. While ultimately the results associated with development of a Program Administrator's plan are PA-specific and the planning process for savings varies for each program and initiative, certain common processes apply to inform the development and to facilitate regulatory review.

2. Process to Determine Goals

a. Overview

The development and determination of the proposed statewide and Program Administrator-specific savings goals involves many considerations, and there is no simple, algebraic method to develop goals to meet the requirements of the GCA. The Program Administrators' process considers many factors, including the assessment of savings opportunities in individual PA service areas (bottom-up), incorporation of recent evaluation study findings, and a collaborative consideration of statewide policy objectives that balances savings goals with the total cost of capturing energy efficiency (top-down). The bottom-up process involves determining savings by measure, including projected quantities and customer incentive amounts for every piece of energy efficient equipment, and the type of technology or program service. The top-down process looks at the portfolio as a whole, evaluating the potential for achieving savings given the mature markets in which the programs are operating, subject to overall cost. The impact of evaluation results, including process and market assessment studies, are considered in both bottom-up and top-down planning and may drive other adjustments. The process to determine goals is appropriately fluid, flexible and iterative, incorporating information that the Program Administrators learn throughout the planning process related to program design, evaluation, market conditions, costs and other factors.



The 2019-2021 Plan accounts for many interacting considerations, including, but not limited to, bill impacts, cost-efficiency, integrated program delivery, economic and environmental benefits, efforts focused on innovation, customer experience, changing market conditions, and the need to establish an "integrated" effort that can be "sustained" over time, as mandated by the GCA. G.L. c. 25, § 22(b). In assessing the level of energy efficiency savings that is possible and sustainable for this Plan, the Program Administrators considered a number of factors. These factors include: (1) quality of program implementation; (2) customer economic conditions; (3) bill impacts; (4) market conditions/seasonality for various measures; (5) lower avoided costs; (6) market barriers; (7) equity concerns; (8) the need to avoid "stops/starts" that send negative messages to the contractor community; (9) the capacity and reach of vendors and contractors; (10) the need to provide consistency over time to be able to capture time-dependent opportunities such as renovations and new construction; and (11) the need to accommodate new technologies over time. Ensuring sustainability requires the Program Administrators to examine all of these considerations when developing their energy efficiency goals.

The planning process for the 2019-2021 period began with a focus on customers' experience with the suite of energy efficiency programs. Significant effort and expertise was dedicated to reviewing the hierarchy of both residential and C&I programs and initiatives. As a result, the Program Administrators have refined the design of programs to better reflect how energy efficiency services are accessed from the perspective of customers. Refocusing Program Administrator efforts to enhance the customer-centric program design will help to promote flexibility in delivery models, and drive maximum achievement of energy efficiency savings and benefits.

b. Bottom-Up Planning

The bottom-up planning process includes a combination of PA-specific and statewide activities, is iterative, and is often impacted by changes to program design and delivery models. The enhanced focus on a customer-centric approach affects bottom-up planning in that the budgeting process will now be driven more strongly through multiple channels. For example, the budgeting process in the Residential Retail initiative is driven by the number of rebates expected to be delivered through mass market, while the Residential Coordinated Delivery initiative is planned based on the projected number of audits undertaken, homes weatherized, and customers served.

The Program Administrators typically begin each planning process by examining historical data to gain insight into participation trends, savings achieved, and costs to achieve annual and lifetime savings. The Program Administrators also consider recent or pending changes in federal efficiency standards, as well as other third-party research on consumer adoption of new technology. In parallel to each Program Administrator assessing what they can achieve over the next three years, the Program Administrators collaborate to decide what changes, if any, need to be made to program offerings. For example, the Program Administrators may decide to discontinue measures that have become standard efficiency practice, or to add new measures and services in response to improved technologies or identified consumer needs, subject to consideration of cost-effectiveness. The value of energy benefits is determined through a regional AESC Study, which also guides the Program Administrators as they look to achieve all cost-effective energy efficiency opportunity. See Appendix E.

The statewide planning work is undertaken at the respective management committees and working groups, ensuring input from all stakeholders, continuous sharing of best practices, and facilitating consistency of offerings among the Program Administrators. Each Program Administrator uses this information to develop a forecast of energy efficiency that can be achieved in its unique service territory. Program Administrators also consult with their own or statewide vendors to support or augment their forecasts based on their own market intelligence. Manufacturers and contractors may also be consulted for insight into workforce capacity and technology availability and limitations.

c. Top-Down Planning

While bottom-up planning focuses on individual measures within each Program Administrator's service territory, top-down planning considers what is reasonable and achievable for the energy efficiency portfolio as a whole. This planning effort involves the examination of impacts to the markets the programs are targeting, as well as cost implications to the Program Administrator, its participating and non-participating customers.

One of the tools that Program Administrators use in top-down planning is potential studies, which help Program Administrators to better understand the overall opportunity to achieve energy efficiency savings within their territory. Potential studies typically provide the Program Administrator with insight into three types of energy efficiency potential:

- *Technical Potential* is defined as the *complete* saturation of energy efficiency measure that are technologically feasible without consideration of cost or likely consumer acceptance.
- *Economic Potential* is a subset of *technical potential* consisting only of that technology that results in more benefits than costs over the life of the measure.
- *Achievable Potential* is a further subset of economic potential and is limited to that which is attainable given barriers faced by real-world program infrastructure and customer, market or other limitations.[22]

The Program Administrators use the results of potential studies to gain valuable insight into the achievable, cost-effective energy efficiency potential over a period of years. This information helps guide the Program Administrators to set term savings goals that consider not only what is available and cost-effective, but also how willing and able customers are to adopt energy efficiency measures. Each of the Program Administrators has performed a territory-specific potential studies in advance of the 2019-2021 Plan filing in accordance with the Department's directive. 2016-2018 Three-Year Plans Order at 24-25. The results of those studies, and the lessons learned, have been shared among all Program Administrators so that each PA can learn from these studies. The PA-specific potential study materials are attached at Appendix G. Some of these studies are in final form, while others will be updated with new information, such as the 2018 AESC Study.

d. Evaluation Results

As noted above, Program Administrators also utilize the results of third party evaluation to inform proposed goals. As part of the statewide EM&V framework, the Program Administrators collectively conduct many different types of evaluation studies, including impact evaluations, baseline studies, net-to-gross studies, market effects evaluation, non-energy impact studies, cost and measure life studies, market characterization, and process evaluations. For more information on each type of study please see Section IV.H.4.

e. Cost Drivers

A final step in energy efficiency goal setting for the three year term is to develop budgets to deliver the energy efficiency programs to the marketplace. This involves assessing the cost impact of the programs on participating and non-participating ratepayers in support of "right sizing" proposed budgets. The Program Administrators' statewide energy efficiency programs have matured significantly since the development of the first Three-Year Plan in 2009, as have the technologies that are promoted through the programs. In the 2019-2021 term, the Program Administrators face new challenges in pursuing all cost-effective energy efficiency, including more robust lighting and equipment baselines, stretch code adoption in most of Commonwealth towns and cities, and widespread adoption of the easiest and least expensive energy efficient technologies such as LED lighting. The cost of marketing, delivering and evaluating ever more sophisticated programs is also expected to increase in order to capture more complex and deeper opportunities, such as controls and demand reduction.

[22] Potential definitions are based on ACEEE definitions available at http://aceee.org/topics/efficiency-potential-and-market-analysis.

To address these challenges and deliver cost-effective energy efficiency programs to their customers, the Program Administrators have developed a thorough understanding of current and future cost drivers for their proposed energy efficiency programs. Because each Program Administrator is affected to a different degree by each cost driver, variations in savings goals and the cost to achieve these goals are to be expected. Customer demographics, fuel mixes, economic conditions, differences in the built environment and even contractor wages vary widely across the Commonwealth and impact each Program Administrator's service territory differently. Each Program Administrator sets its goals based on their own unique service territory.

From 2009-2011, the cost to achieve savings for electric energy efficiency programs throughout the state was trending downwards.[23] During that same period, the cost to achieve savings for gas programs was trending upwards. From 2012-2014, the cost to achieve savings for electric and gas energy efficiency programs throughout the state was relatively stable with a modest increase in the cost of delivering gas programs. During the 2016-2018 there was an upward trend in cost to achieve savings from 2013-2015, though thanks to cost-effective implementation practices, the increase was not as great as Program Administrators anticipated.[24] Although the number of customers to be served in 2019-2021 is expected to remain steady, the average claimable savings per participant will be lower due to naturally-occurring energy efficiency and past participation, as well as more stringent local, state and federal codes and standards. As a result, the Program Administrators anticipate that costs will increase due to a shift to a shorter-lived and more expensive measure mix. Additional details on key cost driver considerations include the following:

- **Codes and Standards** – As federal and state codes and standards become increasingly rigorous, the amount of incremental savings from installing energy efficiency measures decreases (unless the efficiency of the program measures rise as well). This decrease in savings results in a higher cost per unit of savings. The Energy Independence and Security Act ("EISA") lighting standards continue to raise the bar for program delivery, as do federal water heater standards, the highly efficient new construction practices in the Commonwealth driven both by the GCA requirement that member communities adopt stretch codes, as well as by aggressive outreach by Program Administrators, and increasing federal standards for many different kinds of equipment. While these changes still drive real savings for customers in the Commonwealth, these factors reduce the incremental energy savings the Program Administrators can capture and claim through their programs.
- **Going Deeper and Broader** – Another factor that is impacting the cost to achieve in this Plan is the planned implementation of new program delivery models, including the

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23 The Program Administrators note that the costs and savings of large, one-time projects can skew the historical costs to achieve savings, often making the costs appear lower than the average. Because large projects are not typical or replicable, they should not be included in the planning process to estimate budgets or savings, or when calculating costs to achieve savings, without careful analysis and appropriate adjustments. For example, some Program Administrators had large CHP projects in 2011, making the cost per kWh appear to decrease in 2011 compared to previous years. When excluded, however, costs were relatively flat.

24 "Cost to achieve" is typically discussed in terms of net savings. Net to gross factors are only updated at the beginning of a three-year term and their impact may therefore be more pronounced when looking at differences between two different Three-Year Plans.

enhanced customer-centric approach. As certain programs begin to saturate markets, Program Administrators seek to reach more difficult to reach customers, which requires more creative, and often more expensive marketing efforts, as well as deep savings, such as Passive House. During the 2019-2021 term, the Program Administrators have restructured programs and initiatives to provide multiple points of entry for customers, regardless of the services or equipment sought, which may be more expensive than previous strategies. Some initiatives proposed for 2019-2021, such as Residential Coordinated Delivery, are designed to be more comprehensive in scope than the previous initiatives. This reflects more seamless, more comprehensive, and more supportive approach to program design and delivery. Program Administrators incorporated findings of process and market evaluations to adjust programs to further penetrate already deeply penetrated markets.

- **Cost-Effectiveness Limitations** – The 2018 AESC Study projected a continued decline in wholesale natural gas prices as well as electricity and summer demand prices. As a result, the energy-related benefits of energy efficiency programs are lower than they have been in prior terms, challenging Program Administrators to minimize costs and maximize benefits to maintain cost-effective program delivery. Some traditional measures may become non-cost-effective and may have to be discontinued consistent with the provisions of the GCA. The Program Administrators are assertively pursuing new delivery options as well as new technologies to capture untapped energy efficiency potential. These efforts are not without cost, however, which puts pressure on programs in the short term. For example, new active demand reduction initiatives provide benefits to the energy system but have significant upfront and ongoing costs, and the 2018 AESC Study projects declining capacity benefits.
- **Unique Service Area Drivers** – Despite consistent program offerings, variations among Program Administrators in savings goals and costs to achieve naturally result due to each Program Administrator's unique service territory. Each Program Administrator's territory has a distinct mix of customers, markets, and vendors. Contributing to these differences are varying customer demographics, different mixes of building and business types, penetration of natural gas and delivered fuels, economic conditions, depth of community engagement, and population density. Each Program Administrator has unique commercial and residential demographics, which may result in differences in how each Program Administrator approaches program delivery. For example, the service territory of one Program Administrator may have a smaller percentage of commercial customers than the statewide average, and thus may not be able to benefit from the higher savings opportunities that tend to correspond with that customer segment. Similarly, a Program Administrator may have a higher proportion of lower-income residents, requiring greater coordination with the community and higher costs to serve. Unique characteristics of smaller territories are more apparent than in larger territories, which represent a broader array of customers and communities that make these unique characteristics less visible. Variances among Program Administrators are appropriate, consistent with sound regulatory policy, the GCA, and previous recognition of Program Administrator differences. In setting their goals, each Program Administrator has used their knowledge of their unique service territory, as well as inputs and insights from their independent energy efficiency Potential Study, to design programs that best meet the needs of their

customers. All Program Administrators are committed to achieving all available cost-effective energy efficiency in accordance with the GCA.

f. Summary of Savings Goals Development

In developing the proposed savings goals, the Program Administrators undertook, individually and collectively, a detailed review of energy efficiency opportunities and costs, with a particular emphasis on customer barriers and opportunities. This analysis included a bottom-up approach to assess savings opportunities by measure and initiative, a top-down look at overall savings potential and cost to achieve savings, and careful consideration of evaluation study findings, potential studies, and market changes. Development of the 2019-2021 Plan was influenced by collaborative discussions with the Council and stakeholders to better understand key savings and cost drivers across the Commonwealth, considering sustainability of delivery efforts and bill impacts.

D. Cost Categorization

1. Overview

The Program Administrators have developed consistent definitions and methods of assigning costs. The Program Administrators developed common definitions to assign budget costs across all five program implementation cost categories. With respect to salaries and overhead, each Program Administrator has developed a method to allocate these costs to appropriate cost categories. With respect to vendor costs, the Program Administrators utilize uniform practices to assign these costs based on cost causation principles.

2. Program Implementation Budget Cost Category Definitions

Program Administrators developed and refined the program implementation cost category definitions over several years. The categories below are consistent with the implementation of the 2016-2018 Plan. The statewide definitions used by all Program Administrators in this Plan are as follows.

Program Planning and Administration - includes costs associated with developing program plans, including market transformation plans, R&D (excluding R&D assigned to Evaluation and Market Research), day-to-day program administration, including labor, benefits, expenses, materials, supplies, overhead costs, any regulatory costs associated with energy efficiency activities, database/data repository development and maintenance, and energy efficiency services contracted to non-affiliated companies, e.g., outside consultants used to prepare plans, screen programs, improve databases and perform legal services. This category also includes internal salaries for administrative employees/ tasks, including program managers who do not have direct sales and technical assistance contact with customers.

Marketing and Advertising - includes costs for the development and implementation of marketing strategies and costs to advertise – through television,

radio, billboards, brochures, telemarketing, web-sites and mailings – regarding the existence and availability of energy efficiency programs or technologies, and to induce customers or trade allies to participate in energy efficiency programs. These costs include internal salaries for employee functions related to marketing and advertising.

Participant Incentives - includes funds paid by the reporting Program Administrator to or on behalf of customers or trade allies as rebates or in other forms. Participant incentives include costs that directly benefit customers, including permit fees, pre-weatherization expenses, repairs, and interest buy-down.

Sales, Technical Assistance & Training - includes administration, sales technical assistance and training costs to motivate: (1) customers to install energy efficiency products and services; (2) retailers to stock energy efficiency products; (3) trade professionals to offer energy efficiency services; (4) manufactures to make energy efficiency products; and (5) use of vendor services and suppliers that demonstrate benefits of energy efficiency. This category also includes costs not directly tied to savings, including residential assessments, technical assistance studies, contractor fees and performance bonuses, vendor cost of money; lead vendor fees and internal salaries for employees with direct customer sales and technical assistance contact.

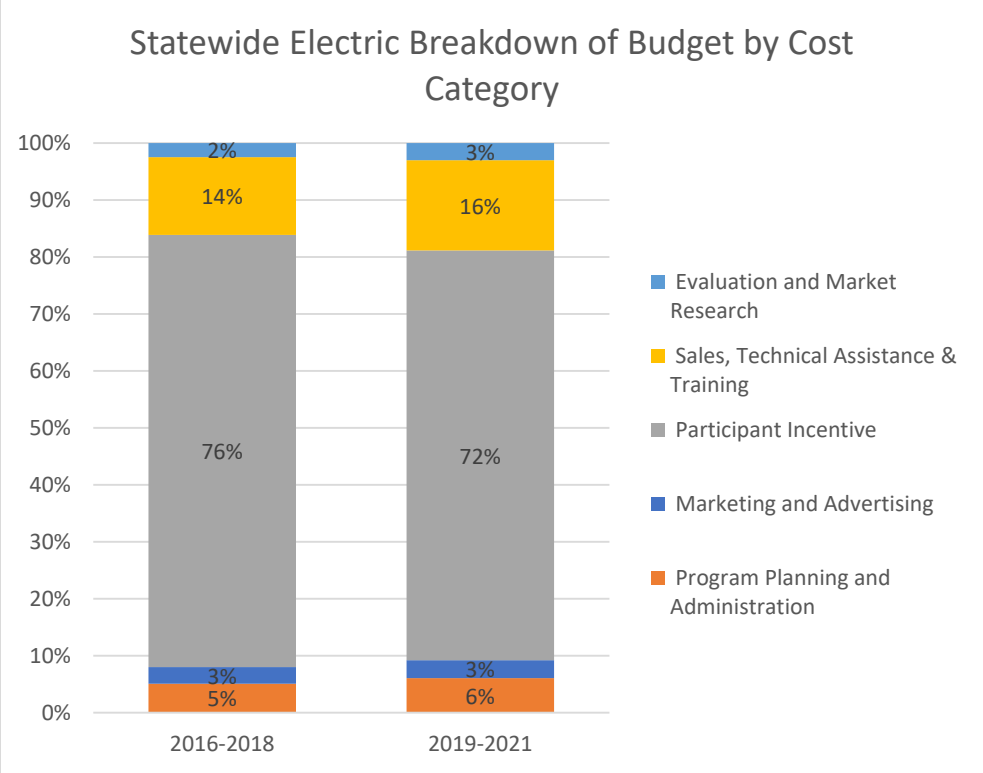
Evaluation and Market Research - includes costs associated with cost-effectiveness evaluation, market research (e.g., baseline studies, market assessments and surveys, technical potential studies), impact and process evaluation reports, tracking and reporting program inputs and outputs, funding studies, TRL, and other costs related to evaluations and market research. This category also includes internal salaries for employee functions related to evaluating the programs.

These cost categories have remained consistent since the last three-year plan, except for one cost, Potential Studies. These costs were originally classified as PP&A because they were done as part of a planning process, but were moved to the cost category of Evaluation and Market Research during 2016-2018 based on cost causation principles. While potential studies continue to be a planning tool for the Program Administrators, these studies are more appropriately categorized as market research costs and therefore charged to Evaluation and Market Research. All Program Administrators have made this change consistently.

At this time, the Program Administrators have not encountered any costs that are difficult to assign to one of the five cost categories. Costs are assigned to the relevant category within the relevant program, core initiative, or hard-to-measure program. Costs that are not appropriately assigned directly to a program are allocated among relevant programs on an appropriate basis and tracked accordingly. Costs related to Evaluation and Market Research are assigned to the hard-to-measure line item, as described in Section III.D.1.k and Section IV.H.6, below.

3. Breakdown of Program Implementation Budget by Cost Category

The majority of energy efficiency program implementation budgets are delivered directly to customers in the form of incentives that are intended to overcome the financial barrier to investment. In the 2019-2021 Plan, 72 percent of the electric and 68 percent of the gas budget is delivered directly to customers through use of participant incentives. Participant incentives help customers adopt high efficiency measures and is one of the primary drivers of historic and continuing energy savings. Approximately 16-21 percent of the Program Administrators' costs are budgeted in the Sales, Technical Assistance & Training cost category, supporting the activities of vendors, contractors and other industry professionals. These investments are driving job creation and the evolution of a green economy in the Commonwealth. Approximately 3 percent of the statewide budget is dedicated to the rigorous Evaluation and Market Research efforts. Other administrative functions, like Program Planning and Administration and Marketing and Advertising, make up approximately 8-9 percent of the statewide program budget. These percentages are in line with historical averages, demonstrating that the Program Administrators have been able to significantly grow their energy efficiency portfolios while keeping administrative costs low and maximizing the value of the programs for participating customers.



4. Salaries

Consistent with Department precedent, all Program Administrators have developed allocation methods based upon cost causation principles to assign expenses to the appropriate budget category.

For PA staff performing multiple functions, employee salaries are allocated across the

appropriate budget categories based on the percentage of employee time spent on various functions within energy efficiency. Program Administrators treat salaries as follows: (1) assign salaries of staff performing a single function to the appropriate cost category in the appropriate program/sector; and (2) assign salaries of staff performing multiple functions to multiple cost categories in multiple programs/sectors, as appropriate, based on an allocation for each employee in accordance with assigned job tasks. Salaries of program managers with direct sales and technical assistance customer contact are allocated to STAT, while salaries of program managers without direct contact are allocated to PP&A.

5. Vendor Cost Categories

The Program Administrators also collaborate to use consistent vendor cost categories. The Program Administrators consistently review new costs to determine the appropriate category. Program Administrators maintain a chart, attached at Appendix H, showing vendor cost types and the related cost category to support consistency and serve as a guide. Since the 2016-2018 Plan, the only change on this list is the Statewide Database, which was previously charged to Evaluation and Market Research to enable separate cost tracking that could not be done at that time, but is now appropriately charged to PP&A.

6. Sponsorships & Subscriptions Costs

Sponsorships and subscriptions support the energy efficiency market, encourage workforce education, attract skilled employees to Massachusetts, and promote innovation in both service delivery and the development and testing of energy efficient technologies. Consistent with Department directives, the Program Administrators developed a methodology for assigning costs related to sponsorships and subscriptions. Expenses paid to directly support a program are considered program expenses and are allocated to the appropriate programs/initiatives where benefits are expected to be realized. Sponsorship and subscription costs that are not directly linked to specific in-the-field energy efficiency measures or services are allocated the Sponsorship and Subscription hard-to-measure program. A cost may be included in program line items even if called a sponsorship or subscription because the expense is directly related to the program. Please see Sponsorships and Subscriptions Policy at Appendix I for more information.

7. Evaluation and Market Research Costs

As discussed in Section III.D.1.k, above, starting in 2019-2021 the Program Administrators propose to charge all EM&V costs to a hard-to-measure line item called Evaluation and Market Research. There will be no EM&V costs allocated to individual programs. This budget category will include costs associated the EM&V budget, potential studies, the AESC Study, the TRL, acquisition of data sets, and other evaluation and market research costs. Evaluation and Market Research costs will be allocated to one or more sectors as appropriate to the cost.

E. Statutory Budget Requirements

1. Minimizing Administrative Cost

In accordance with the GCA, the Program Administrators seek to minimize administrative costs to the fullest extent practicable. Administrative costs, also commonly referred to as PP&A costs, include costs associated with:

- Developing program plans, including market transformation plans, R&D activities (excluding R&D assigned to Evaluation and Market Research).
- Day-to-day program administration, including labor, benefits, expenses, materials, supplies, and overhead costs.
- Any regulatory costs associated with energy efficiency activities.
- Costs for energy efficiency services contracted to non-affiliated companies such as outside consultants used to prepare plans, screen programs, improve databases, and perform legal services.
- Internal salaries for administrative employees/tasks, including program managers that do not have direct sales and technical assistance contact with customers.

For the 2019-2021 Plan, 5-6 percent of the statewide electric and gas Program Administrators' costs are assigned to Program Planning and Administration. These percentages are in line with the budget allocations approved by the Department historically, demonstrating that the Program Administrators have been able to provide direct benefits to customers and contractors and grow the energy efficiency portfolios while minimizing costs. Importantly, the majority of energy efficiency budgets are returned to customers in the form of incentives that are intended to overcome the financial barrier to investment.

The most significant factor in the Program Administrator approach to minimizing administrative costs is the statewide collaborative process, which is used by the Program Administrators to coordinate planning, the adoption of consistent programs and processes, program design, EM&V studies, statewide marketing, regulatory proceedings, and the development and sharing of all best practices. Sharing of these costs, which would otherwise be borne by each Program Administrator individually, results in economies of scale that reduce the cost for each Program Administrator. For example, joint releases of RFPs lead to minimization of administrative costs in that the cost for preparation and release of the RFP are shared by the Program Administrators. The Program Administrators also minimize administrative costs by coordinating energy efficiency program delivery, where appropriate, with other customer service activities such as customer acquisition, key account management and trade ally relationships.

Notwithstanding any appropriate coordination with other customer service departments, it is necessary and appropriate for all Program Administrators to maintain a skilled and dedicated administrative staff to ensure successful delivery of programs, compliance with the GCA, timely responses to the requests of the Council, Department, and DOER, and documentation and achievement of substantial savings. The Program Administrators seek to balance the need to minimize administrative costs to the extent prudent with the need to maximize program quality

and oversight. Councilors have emphasized the need to devote sufficient administrative resources to successfully implement the aggressive programs called for in the Three-Year Plans.

While the economies of scale and other steps taken by the Program Administrators to minimize costs are effective, and administrative costs incurred by the Program Administrators are transparent, exact quantification of the minimization of administrative costs is not possible in a meaningful way. This is because the continuous scaling up and evolution of the plans make it impractical to establish a solid baseline for a comparison. When the variables are constantly (and necessarily) shifting, there is no opportunity to make a meaningful quantitative comparison. Further, a direct quantitative comparison would not be useful because it would only provide a comparison of two points in time. The mandate of the GCA is to seek administrative efficiencies, which is a continuous process that evolves along with energy efficiency planning and programming. Program needs and opportunities for administrative efficiency are always changing. The Program Administrators seek to minimize costs at all available opportunities, and not just from one point in time to another. By collaborating, creating consistent programming, and optimizing staffing needs, the Program Administrators can minimize administrative costs to the extent practicable while providing quality energy efficiency services for customers. Consistent with the Department's directives in the 2016-2018 Plan Order, the Program Administrators are working with a third-party vendor to study best practices for minimizing administrative costs. The report is expected to: (1) identify best practices, both in Massachusetts and nationwide, for tracking and assessing administrative costs; (2) identify potential benchmarks, metrics, and/or indicators for measuring administrative costs; and (3) provide specific recommendations, as appropriate, for reducing administrative costs. The report will be completed and filed with the Department on October 31, 2018.

2. Allocation of Funds for Income Eligible Programs and Education

Energy efficiency funds shall be allocated to customer classes in proportion to their contributions to those funds, and, "at least 10 percent of the amount expended for electric energy efficiency programs and at least 20 percent of the amount expended for gas energy efficiency programs shall be spent on comprehensive low-income residential demand side management and education programs." G.L. c. 25, § 19(c). Based on the budget figures set forth in this Plan, for electric Program Administrators, 12.7 percent of the total budget will be allocated to the electric income eligible programs. Based on the budget figures set forth in this Plan, for gas Program Administrators, approximately 21.7 percent of the total budget will be allocated to the gas income eligible programs.

3. Competitive Procurement

The Program Administrators utilize competitive procurement processes to engage and retain contractors and vendors to perform activities including, but not limited to assessment delivery, quality control, rebate processing, monitoring and evaluation, potential studies, and marketing. The Program Administrators are committed to continuing to utilize competitive procurement practices to the fullest extent practicable throughout the implementation of the Plan. Therefore, consistent with past practice, the Program Administrators anticipate that they will continue to issue RFPs to engage appropriate third-party vendors to provide energy efficiency services and work collaboratively to ensure that energy efficiency services have been procured in

a manner that minimizes costs to ratepayers, while maximizing the associated benefits of those investments. The Program Administrators will continue to seek to expand the pool of qualified program vendors, promote the entry of new market actors into contractor and subcontractor roles, and ensure the transparency of the contractor bidding process and selection criteria used to evaluate proposals.

F. **Performance Incentives**

1. Summary of Relevant Precedent and Guidelines

Pursuant to the GCA, the Three-Year Plan must include a proposed mechanism designed to provide an incentive to distribution companies based on their success in meeting or exceeding certain performance goals.[25] G.L. c. 25 § B.2.v. The Department has established Guidelines outlining the principles and requirements for the design of a performance incentive mechanism. Guidelines § 3.6.2. Pursuant to the Guidelines, an incentive mechanism must: (1) be designed to encourage Program Administrators to pursue all available cost-effective energy efficiency; (2) be designed to encourage energy efficiency programs that will best achieve the Commonwealth's energy goals; (3) be based on clearly defined goals and activities that can be sufficiently monitored, quantified, and verified after the fact; (4) be available only for activities in which the Program Administrator plays a distinct and clear role in bringing about the desired outcome; (5) be as consistent as possible across all electric and gas Program Administrators; and (6) avoid any perverse incentives. Guidelines § 3.6.2. Further, the Guidelines specify that the amount of funds available for performance incentives should be kept as low as possible to minimize the costs to electricity and gas customers, while still providing appropriate incentives for the Program Administrators. Guidelines §§ 3.6.2, 3.6.3.

All Program Administrators must calculate design level incentive payments based on projections of performance for the entire three-year term, not based on annual projections.[26] Guidelines § 3.6.4; D.P.U. 11-120-A, Phase II at 7-8. Both electric and gas Program Administrators collect performance incentives through the EES at the design level during the three-year term. D.P.U. 11-12-A, Phase II at 13 n.16. The Department reviews each Program Administrator's performance based on the entire three-year term of the plan and approves final performance incentives through the Term Report proceeding. See D.P.U. 11-120-A, Phase II at 13. Each Program Administrator reconciles actual and design performance incentive payments at the end of each term as part of their respective EES filings. Guidelines § 3.6.4.2.

The Department has approved performance incentive mechanisms that include savings and value components based on benefits and net benefits. See 2016-2018 Three-Year Plans Order at 67. Specifically, the Department has found that uniform statewide payout rates for the savings and value components is consistent with the goals of the GCA and Department precedent, and, because the rates do not vary by year, found that the payout rates were consistent with the D.P.U. 11-120-A, Phase II Order.

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[25] The Compact, as a municipal aggregator, does not receive a performance incentive. D.P.U. 08-50-A at 51.

[26] Design level performance is defined as 100 percent of the Program Administrator's projected benefits and net benefits multiplied by the appropriate payout rate.

The Department requires that a proposed performance incentive mechanism must encourage Program Administrators to achieve savings where they exist to reach portfolio goals. 2016-2018 Three-Year Plans Order at 69. The Department has rejected proposals that do not comply with this principle. In 2016, the Department specifically rejected a split performance incentives proposal finding that it would not encourage Program Administrators to seek all available cost-effective savings opportunities wherever they exist, but rather may encourage Program Administrators to focus on only the sector in which performance incentives remain available. 2016-2018 Three-Year Plans Order at 69.

Also in D.P.U. 13-67, the Department determined that performance metrics (i.e., an incentive model designed to encourage Program Administrators to undertake specific actions or meet specific goals) were no longer appropriate under the GCA because the Program Administrators are obligated to undertake activities targeted by performance metrics to satisfy the mandates of the GCA. D.P.U. 13-67, at 14-15. Further, the Department found that preparing and verifying performance of these metrics would divert Program Administrator and stakeholders focus from the successful implementation of the Three-Year Plans and is inconsistent with the Department's obligation to fulfill its oversight responsibilities in an administratively efficient and effective manner. D.P.U. 13-67, at 13.

2. Performance Incentive Mechanism

Based upon the well-developed principles and precedent described above, the Program Administrators propose an incentive mechanism for 2019-2021 that is comprised of a Savings Mechanism and a Value Mechanism with payout rates that are the same for both components with performance assessed at the portfolio level using cumulative three-year results. The Program Administrators are also considering setting the same payout rates for both gas and electric Program Administrators. In 2019-2021, the incentive payments for the savings and value components are based on total benefits and net benefits,[27] respectively. Program Administrators can earn performance incentives based on achievements starting at achieving 75 percent of benefits/net benefits (threshold) up to 125 percent of benefits/net benefits (exemplary). The 125 percent limit acts as a cap. The total incentive for each Program Administrator is the sum of the two components.

For this Plan, the Program Administrators are considering but have not finalized four adjustments to the well-working performance incentive mechanism. These adjustments are:

i. Instead of setting a performance incentive pool that leads to a payout rate, the Program Administrators will consider setting a payout rate directly. This will avoid having to revise the performance incentive payout rates based on adjustments to planned benefits made during the Department's review of the Three-Year Plan. In the 2016-2018 term, the statewide incentive pool was allocated to each Program Administrator based on planned benefits and net benefits. If any single Program Administrator made an adjustment during the review process, all Program Administrators were then required

[27] For the purpose of performance incentives, net benefits will be determined by subtracting actual program costs from benefits.

to revise their performance incentives even if they only resulted in non-material changes. This change will remedy this problem and is consistent with the Department's requirement to have fixed payout rates for the three-year term.

ii. Additionally, the Program Administrators are considering establishing a payout rate that is identical for electric and gas Program Administrators to provide consistent and equitable performance incentives across Program Administrators regardless of fuel.

iii. In calculating the performance incentive associated with the value component, the Program Administrators would use actual spending as opposed to total resource costs, which include calculated or estimated participant costs that are not within the Program Administrators' control. Also, using actual spending would avoid the circular use of including performance incentive dollars in the costs used in calculating performance incentives. In addition, this approach would encourage Program Administrators to minimize actual spending.

iv. The Program Administrators propose to use the same payout rate for both the savings and value mechanisms. In the 2016-2018 term, the statewide performance incentive pool was allocated with 61.5 percent of the pool being allocated to the savings component and 38.5 percent being allocated to the value component. The payout rates for savings and value were then calculated based on the allocated pool, resulting in different payout rates. Under the proposed method, the proportion of performance incentives available for each component would likely be very similar to the proportions allocated in 2016-2018. For example, if the payout rate was calculated using the 2016-2018 performance incentive pool as a basis to set the payout rate, 62 percent of the performance incentives would be allocated to the savings component and 38 percent allocated to the value component. The proportion of these allocations is due to the differences in the comparative values of the savings component (benefits) and value component (benefits minus program costs).

3. Calculation of Incentives for April Plan

At the time of this April Plan filing, the Program Administrators have not yet developed or proposed a performance incentive payout rate or considered additional enhancements to the mechanism. The Program Administrators will work with the Council to determine an appropriate proposal given the risks and increased uncertainty associated with this Plan and the additional difficulty of achieving energy efficiency and new demand reduction initiatives in 2019-2021.

For calculating total resource costs for cost-effectiveness purposes, the Program Administrators are including placeholder performance incentive payout rates and levels. The placeholder performance incentive payout rates for this draft are based on the calculations and pool ($100 million for electric and $18 million for gas) set forth in the 2016-2018 Plan.

4. Reconciliation of Performance Incentives

Currently Program Administrators are required to collect performance incentives at the design level during the term, and reconcile actual performance incentives following approval of

their Term Reports. Guidelines § 3.6.4.2. To support the goal of rate continuity, the Program Administrators propose to modify this schedule, and reconcile actual performance incentives in their EES filing following the filing of the Term Report (e.g., the 2022 peak LDAC for gas Program Administrators). This proposal will allow the Program Administrators to reconcile over- and under-recoveries of performance incentives in a timelier manner and minimize interest associated with delayed collections. The Program Administrators would continue to make any needed adjustments after the Term Report is approved.

G. Cost-Effectiveness and Benefits

1. Cost-Effectiveness

The Program Administrators have projected the expected benefits and costs associated with this statewide 2019-2021 Plan consistent with the requirements of the Guidelines and D.P.U. 08-50-A, in which the Department reaffirmed that "the Total Resource Cost test is the appropriate test for evaluation of the cost-effectiveness of ratepayer-funded energy efficiency programs." D.P.U. 08-50-A at 14. A program is cost-effective under the TRC test if the cumulative present value of its benefits is equal to or greater than the cumulative present value of its costs. Guidelines § 3.4.3.1. To conduct the TRC test, the Program Administrators have developed detailed benefit/cost screening models, and use these models to reflect assumptions relating to program costs and benefits, the discount rate, the general rate of inflation, and avoided costs.

The Program Administrators identify and quantify costs and benefits needed to calculate the cost-effectiveness of programs consistent with the TRC test. Costs included in the TRC test include all Program Administrator costs and program participant costs. Program Administrator costs include program implementation expenses, evaluation costs, proposed performance incentives, and tax liability for performance incentives. Program-participant costs include initial costs incurred by customers as a result of their participation in the program.

Benefits included in the TRC test are the value of avoided costs and non-energy impacts ("NEIs") resulting from a program over the lifetime of the measures. Benefit categories include resource benefits and NEIs (sometimes referred to as non-resource benefits). Resource benefits include avoided energy valued at different times, avoided capacity valued at peaking periods, avoided transmission, avoided distribution, and effects on energy market prices. Specifically, the Program Administrators calculate the benefits associated with positive or negative electric, natural gas, oil, propane, water savings, and capacity savings, and energy DRIPE.[28] NEIs are the values associated with the positive or negative effects attributable to energy efficiency programs apart from energy savings, such as reduced costs for operation and maintenance, longer equipment replacement cycles and productivity improvements, reductions in costs associated with reduced customer arrearages, service terminations, and reconnections, and other measureable benefits due to the installation of the energy efficiency.

[28] Demand Reduction-Induced Price Effect ("DRIPE") is a measurement of the value of demand reductions in terms of the decrease in wholesale energy prices, resulting in lower total expenditures on electricity or natural gas across a given system.

The benefit/cost screening model uses this data to calculate the present value of the program benefits and costs, and then calculates ratios of these values to produce BCRs. The present value of costs and benefits is calculated over the expected duration of the useful life of the measures installed in the program.

The tables below summarize the BCRs at the sector level for the portfolio of programs the Program Administrators propose to implement over the three-year term.

Statewide Electric Benefit Ratios				
	2019	2020	2021	2019-2021
Residential	1.78	1.84	1.89	1.83
Income Eligible	1.80	1.80	1.82	1.81
Commercial & Industrial	2.17	2.18	2.24	2.20
Total	**1.99**	**2.02**	**2.08**	**2.03**

Statewide Gas Benefit Ratios				
	2019	2020	2021	2019-2021
Residential	1.54	1.55	1.55	1.55
Income Eligible	1.84	1.86	1.87	1.85
Commercial & Industrial	2.13	2.15	2.13	2.13
Total	**1.71**	**1.72**	**1.72**	**1.72**

2. Benefit Analysis Components

a. Overview

The Program Administrators developed methods to determine the appropriate manner to measure and verify the benefits associated with the energy efficiency programs. Important elements of this analysis include using the AESC Study, and assessing NEIs, market effects, and new demand reduction initiatives, each of which are described further below.

b. Avoided Energy Supply Cost Study

To develop avoided supply costs, the Program Administrators participate in the AESC Study process, which is a well-established regional and collaborative process. The AESC Study determines projections of marginal energy supply costs that will be avoided due to reductions in the use of electricity, natural gas, and other fuels, as well as avoided environmental compliance costs resulting from energy efficiency programs. The AESC study is prepared every three years for the AESC Study group, which is comprised of the Program Administrators, as well as utilities throughout New England and other interested non-utility parties. In order to inform the initial draft of the 2019-2021 Plan, which must be submitted to the Council by April 30, 2018, the 2018 AESC Study was completed on March 30, 2018.

The AESC Study provides projections of avoided costs of energy in each New England state for a hypothetical future, the "Base Case," in which no new energy efficiency programs are implemented in New England. The 2018 AESC Study provides an updated assessment of avoided electricity and natural gas costs using a model that simulates the operation of the New England wholesale energy and capacity markets in an iterative, integrated manner. In the 2018 AESC Study, there were several factors that changed significantly from the previous study, resulting in lower overall natural gas, electric energy, and electric capacity costs. Lower Henry Hub natural gas prices, and the resulting avoided natural gas supply costs, are driven by higher shale gas production and lower breakeven drilling and operating costs relative to the 2015 AESC Study. Estimates for avoided electric energy costs are lower than in the 2015 AESC Study due to a number of factors, such as lower overall demand for electricity, lower natural gas supply prices, lower RGGI prices, increased renewable energy generation, and a new transmission line from Canada; while avoided electric capacity costs are 44 percent lower than in the 2015 AESC Study due to recent declines in the Forward Capacity Market auction prices and a change in the capacity modeling methodology. The 2018 AESC Study estimates electric energy DRIPE benefits to be higher than those in the 2015 AESC Study, and estimates electric capacity DRIPE benefits, where the 2015 AESC Study identified no capacity DRIPE benefits, due to a change in the modeling approach for DRIPE, new commodity and capacity forecasts, and changes in the market conditions. The 2018 AESC Study also includes a new avoided transmission cost component to account for avoided costs of pooled transmission facilities (PTF), as well as a new benefit component to value the improved the effect of increased reserve margins resulting from energy efficiency on generation reliability. The overall avoided costs in the 2018 AESC Study are lower than those in the 2015 AESC Study and tend to decrease benefits and cost-effectiveness relative to the previous Plan Term, making goals harder to achieve. The 2018 AESC Study is available at Appendix E.

c. Non-Energy Impacts

A NEI is a benefit (positive or negative) for participants in energy efficiency beyond the energy savings gained from installing energy efficient measures. NEIs include benefits such as reduced costs for operation and maintenance associated with efficient equipment or practices, or reduced environmental and safety costs. The Department has stated that NEIs are "a well-established component of the program cost-effectiveness analyses conducted by the Program Administrators" and found that the benefits of the NEIs are quantifiable and flow to Massachusetts ratepayers. 2013-2015 Order at 61. The Department has specifically stated that non-resource benefits (NEIs) should be included in cost-effectiveness. Guidelines at §§ 3.4.4.1, 3.4.4.2. Consistent with Department precedent, the Program Administrators have included the benefits associated NEIs established in evaluation studies in the program cost-effectiveness calculations. For 2019-2021, the Program Administrators are including NEIs that were not filed in previous Three-Year Plans and applying pre-existing NEIs to other programs as set forth below:

- Low-income single family health- and safety-related NEIs, August 2016 (filed with 2016 Plan-Year Report, D.P.U. 17-100)
- C&I new construction NEIs, March 2016 (filed with 2013-2015 Term Report, D.P.U. 16-120 through D.P.U. 16-130)

- NEI framework, January 2018: makes recommendations related to property value/rental income NEIs with their underlying non-property value NEIs
- Market-rate multi-family NEI Phase 1, March 2018: recommends Program Administrators apply the existing low-income multi-family owner NEIs to market rate multi-family and existing C&I operations and maintenance NEIs to residential multi-family common area lighting
- NEIs for heat pumps memo, Oct 2017: reconciles and recommends existing NEI values to apply to residential heat pump measures installed in multi-family, low-income multi-family, and low-income single family

d. Demand Reduction

The 2019-2021 Three-Year Plan includes new active demand reduction initiatives. Unlike passive demand reduction measures, active demand savings and benefits accrue during specified and limited time periods. Under the proposed initiatives, active demand reduction measures will be called on to perform during specified events and the claimed savings will be based on customer performance during those called events. Due to these unique characteristics of active demand reduction measures, the Program Administrators developed a methodology for appropriately accounting for costs and benefits in the TRC test.

3. Environmental and Economic Benefits from Energy Efficiency

a. Overview

In advancing the objectives of the GCA, the energy efficiency programs also support the Commonwealth's broader policy objectives. In legislation enacted in parallel with the GCA, the Commonwealth signaled its commitment to being a worldwide leader in developing a green economy through the Global Warming Solutions Act, St. 2008, c. 298 ("GWSA") and the Green Jobs Act, St. 2008, c. 307. The GWSA calls for broad statewide reductions of greenhouse gas ("GHG") emissions in the Commonwealth, spurring innovation and promoting research and development in the area of clean energy. Enacted concurrently, the Green Jobs Act provides a robust funding source for the green technology industry, facilitating economic development and job growth in the clean energy sector. Taken together, these legislative enactments reflect the Commonwealth's commitment to climate protection and its leadership in promoting clean and renewable energy. Reductions in GHG emissions and job creation are important results of energy efficiency programs implemented pursuant to the GCA. Like past plans, the 2019-2021 Plan will continue to fulfill the requirements of the GCA and support the goals of the GWSA and Green Jobs Act, with a focus on meeting customers' energy needs through energy efficiency first and minimizing costs for the benefit of customers.

b. Environmental Benefits and Support of Carbon Reduction

Reduction in the use of electricity, natural gas, and other resources provides significant environmental benefits to Massachusetts and the region. These benefits include reduced air pollution, improved air quality, and beneficial impacts on water systems. Decreasing energy

consumption results in less demand for energy from power plants and natural gas pipelines. Reduced plant operating time can lower the volume of emitted air pollutants and greenhouse gases.

Generating electricity or heat from non-renewable fossil fuels (e.g., coal, oil, or natural gas) results in greenhouse gas emissions. Reducing the amount of energy needed to operate Massachusetts homes and businesses through the adoption of energy efficiency improvements reduces these impacts both in Massachusetts and in neighboring states. One particularly impactful measure is the conversion of customers from old, often oil-fired, heating equipment to new, high-efficiency units, which help customers reduce energy use and costs, and can significantly reduce local pollution levels.

Water resources also benefit from energy efficiency programs. With fewer pollutants in the air and acid rain abatement, fresh water resources have less opportunity for particulate contamination or potential acidification. Additionally, some energy efficiency measures offer the co-benefit of reducing water usage and resultant wastewater treatment. For example, low flow aerators reduce the volume of water flowing from a faucet, thus lessening the energy needed to heat the smaller volume of water. Reducing water usage limits stress on reservoirs and water treatment facilities. The 2019-2021 Plan projects saving over 589 million gallons of water annually and over five billion gallons over the lifetime of installed measures. Five billion gallons of water is equivalent to the water needed to do 135 million loads of laundry for the average household.[29]

Investment in energy efficiency is recognized as an effective cost-containment and climate protection tool of the Commonwealth, which is one strategy to help the Commonwealth achieve the goals of the GWSA. While other programs, such as DOER's Alternative Portfolio Standard and MassCEC's grant programs, encourage adoption of renewable technologies, energy efficiency lowers energy consumption, which reduces emissions by avoiding the use of a unit of energy in the first place and delivers those reductions for the full lifetime of the energy efficiency measure. By delivering on the goals in their Three-Year Plans, the Program Administrators are materially contributing to GHG emissions reductions in the Commonwealth, and each Three-Year Plan compounds the GHG emissions reductions from the one before it. Although the GWSA does not govern the Program Administrators energy efficiency efforts,[30] the Program Administrators remain committed to achieving reductions in GHG emissions through implementation of their Three-Year Plans.

GHG emissions calculations are based on adjusted gross savings. Adjusted gross savings are the actual savings achieved due to the installation of energy efficiency measures, as adjusted by impact factors but without factors related to program attribution. Adjusted gross savings take into account the full energy reductions associated with the programs, including non-electric

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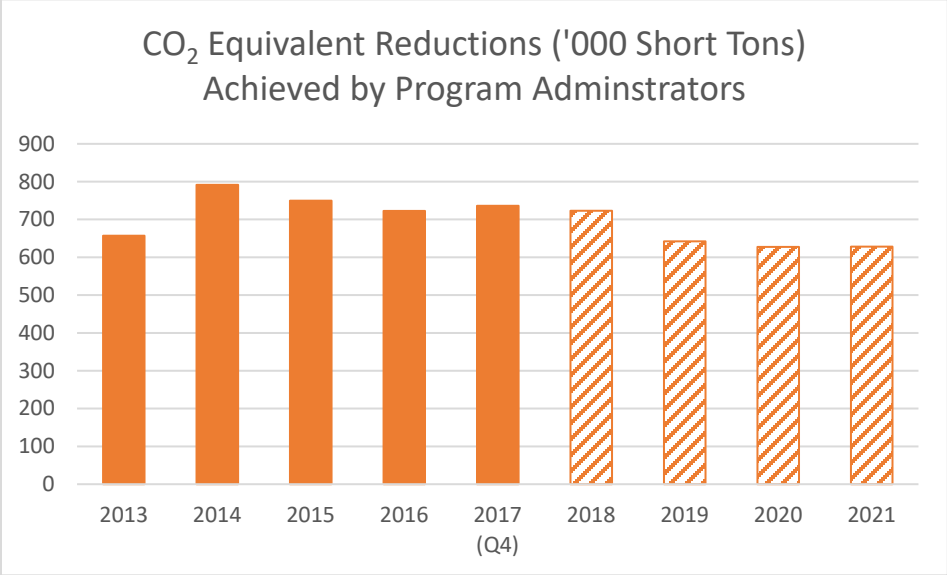
29 Equivalency calculation based on the equivalency information available on the Department of Environmental Protection's WaterSense website, https://www.epa.gov/watersense/start-saving.

30 The GCA governs the Program Administrators' energy efficiency efforts and requires them to seek to acquire all available cost-effective energy efficiency and demand reduction resources. The specified purpose of energy efficiency under the GCA is to encourage the efficient use of energy. St. 2008, c. 169 § 11; G.L. c. 164, § 1. The GWSA does not supersede or abrogate the Department's regulatory authority or the Council's role with respect to Three-Year Plans under the GCA.

savings (such as gas and oil savings) achieved by electric Program Administrators, and non-gas savings (such as electric and oil savings) achieved by the gas Program Administrators. Adjusted gross savings do not subtract savings associated with free-ridership, which are savings that are real, but are not attributable to the Program Administrators. For the purpose of Program Administrator calculations, net savings are used to show the impact of the Program Administrator programs on the market; for the purposes of calculating GHG emissions, however, the attribution is not relevant. Calculating GHG emissions using adjusted gross savings more accurately demonstrates the contributions of energy efficiency to the Commonwealth's total GHG emission reductions.

Since 2010, the Program Administrators' energy efficiency programs have resulted in significant carbon dioxide equivalents reductions, as shown in the chart below.



*CO_2e = carbon dioxide equivalents

Collectively, the programs contained in the 2019-2021 Plan are expected to provide 207 million MMBTU savings and associated greenhouse gas emission reductions that is equivalent to the amount of emission from 364,264 cars for a year.

The 2019-2021 Plan reports climate benefits resulting from the programs in the form of reduced emissions of nitrogen oxide, sulfur dioxide, and carbon dioxide equivalents. Information on the reductions in these emissions from energy efficiency is available in the energy efficiency data tables and on the GHG Reductions tab of Mass Save Data, the Program Administrators' energy efficiency database (http://www.masssavedata.com/Public/GHGReductions). The GHG Reductions tab allows for conversions between metric and short tons and displays conversion factors and sources.

The Program Administrators use the most current emission factors provided by DEP to convert savings to GHG emission reductions. These factors are available on the GHG Reductions tab of Mass Save Data.

The Program Administrators are proud to be material actors in helping the Commonwealth achieve its GHG emission reduction goals, and to be proposing a savings goal for the 2019-2021 Plan that will support the Commonwealth's obligations under the GWSA.

c. Economic Development and Job Growth and Retention

Another positive effect of the energy efficiency programs in Massachusetts has been green job growth and retention. The MassCEC has tracked the growth of the Commonwealth's clean energy economy on an annual basis. The 2017 Clean Energy Industry Report looks at Massachusetts-wide employment of people in a broad category of "Energy Efficiency, Demand Management, and Clean Heating and Cooling."[31] MassCEC's most recent report provides the following information on employees and establishments in energy efficiency related fields.

	2015 Employees	2016 Employees	2017 Employees	2015 Establishments	2016 Establishments	2017 Establishments
Energy Efficiency, Demand Management, and Clean Heating and Cooling	**72,651**	**73,370**	**77,899**	**3,414**	**3,396**	**3,788**

The Program Administrators carefully develop programs and savings goals to foster and sustain a robust energy efficiency contractor and vendor community. As the programs continue to drive market transformation, energy efficiency businesses continue to serve customers and drive deeper energy savings.

H. Evaluation, Measurement & Verification

1. EM&V Framework

Consistent with past Three-Year Plans and Department precedent, the Program Administrators propose to continue the evaluation framework that has been successfully used to promote high quality third-party EM&V efforts. It is critical that the programs be evaluated, measured, and verified in a way that provides confidence to the public at large in the results of the programs. The EM&V efforts enable the Program Administrators to report savings to the Department with full confidence. Additionally, there is a need to ensure both the reality and the perception of the independence and objectivity of EM&V activities. Accordingly, the Council will continue to have an oversight role over the EM&V activities of the Program Administrators, which will help ensure consistency, timeliness, and credibility of the results. The Council's oversight role will be accomplished through the Council's EM&V consultant ("EM&V Consultant"), a third-party expert consultant who has primary responsibility for working with the Program Administrators to plan and implement high-quality EM&V in Massachusetts.

[31] http://www.masscec.com/2017-massachusetts-clean-energy-industry-report

While Program Administrators and the EM&V Consultant will continue to work diligently to reach a consensus on evaluation issues, if there are areas of difference that arise that cannot be resolved through consensus during the ongoing interactive process between the EM&V Consultant and the PA evaluation staff, authority for decision-making will reside with the EM&V Consultant and the Council.

To enable the Program Administrators to fulfill their responsibility to report program savings to the Department with full confidence, an appeals process has been established, through which the Program Administrators may bring decisions made by the EM&V Consultant or the Council for review and resolution. This process will be implemented through the formation of an evaluation appeals committee ("Appeals Committee") of the Council, whose responsibility in this area will be to hear the matter under dispute and rule so that the study may proceed in a timely way. In general, it is expected that this review process will be completed within 72 hours once an issue is elevated to the Appeals Committee. This Appeals Committee will consist of three voting members of the Council, including DOER. Consistent with general Council proceedings, the Appeals Committee will include and consult with, in both deliberations and decision-making, a representative of both the Program Administrators and the Council's consultant team, neither of whom shall have a vote in the Appeals Committee. The Appeals Committee will review the issues related to the disputed matter, hear from the PA evaluation staff and EM&V Consultant, and make a determination on the outcome of the matter. The decision will be recorded, along with a description of the applicable issues. The participants in the appeal will sign the record of the decision, indicating their acceptance of, the representation of the issues and of the decision. In exceptional cases, where the Program Administrators perceive there to be significant risk to their ability to manage the energy efficiency programs in the near term, the Program Administrators will note their disagreement with the decision of the Appeals Committee on the record of the decision and reserve the right to immediately petition the Department on the Appeals Committee's decision. The Program Administrators shall be able to submit any such documents to the Department in conjunction with the filing of the Three-Year Plans, mid-term modifications, and term reports. The Department will be able to review the record of this decision in its review of Three-Year Plans, mid-term modifications, plan-year reports, and term reports.

To date, the EM&V Consultant and PA evaluation staff have been able to resolve all areas of differences without proceeding to the Appeals Committee. This is a testament to the professionalism, hard work and collaborative engagement of the Program Administrators and the EM&V Consultant.

The Program Administrators will maintain a statewide focus to the maximum extent possible, will review EM&V budgets with the EM&V Consultant, and will integrate electric and gas evaluation efforts to the maximum extent possible. The Program Administrators will be responsible for contracting with the independent evaluation contractors, and will work with evaluation contractors to maintain privacy of customer data.

2. Evaluation Management Committee

The Program Administrators and the EM&V Consultant established the EMC to be similar to other management committees discussed above in Section III.F.1. The EMC serves as a steering committee for statewide evaluation issues, providing guidance and direction to each of the

evaluation research areas. The EMC works to plan, prioritize, and delineate the research studies to be undertaken over the Three-Year Plan term.

The Program Administrators and the EM&V Consultant have worked to consistently improve the EM&V process over time. As issues arise, the EMC has established working groups to review and address new topics, areas of concern, or disagreement. The EMC will continue to do so, in order to keep the EM&V process running transparently, efficiently, and effectively.

3. Descriptions of Research Areas

Consistent with the experience since the establishment of the GCA, the EMC worked collaboratively to develop and refine three market research areas. These research areas are organized primarily by target markets, which design is intended to help maximize the statewide effectiveness of EM&V, while presenting minimal overlap among areas. The research areas identified are as follows: Residential, C&I, and Special and Cross-Cutting. The Special and Cross-Cutting research area covers topics that do not fit cleanly into either the Residential or C&I research areas, as well as additional specialized topics in which it is particularly important to ensure consistency across research areas and markets. Examples of topics within this research are codes and standards, education and training, market effects, top-down modeling, program and portfolio marketing, customer profile report, and demand reduction.

More details regarding these research areas and specific research topics can be found in the Strategic Evaluation Plan, which is attached at Appendix J.

4. Types of Evaluation Functions

EM&V refers to the systematic collection and analysis of information to document the impacts of energy efficiency programs and improve the effectiveness of these programs. EM&V includes the following types of studies:

- *Impact evaluation* refers to the measurement of gross energy and demand (electric and natural gas) savings achieved within overall program populations. Impact evaluations may also include the study of key impact factors to estimate savings, such as in-service rates and other resource savings, including water and non-utility fuels (e.g., propane and oil).
- *Baseline studies* refer to specific research to determine baselines, such as industry-standard practice baselines. Baseline research is sometimes conducted at the same time as impact evaluation studies.
- *Net-to-gross ("NTG") studies* refer to specific research that estimates free-ridership and the various components of spillover (e.g., participant and/or non-participant spillover).
- *Market effects evaluation* refers to the measurement of the effects that programs have on the structure and functioning of their target markets.

- *NEI studies* refer to research that estimates NEIs of demand side management measures, including participant and utility benefits. These benefits include O&M, comfort, productivity, avoided arrearages, etc.
- *Cost and measure life studies* include research to determine the total and incremental costs and lifetime of demand side management measures.
- *Market characterization* refers to the systematic assessment of demand side management markets for the purpose of improving the effectiveness of programs targeting those markets.
- *Process evaluation* refers to the systematic assessment of programs for the purpose of documenting their operations and developing recommendations to improve their effectiveness and design. It may also include marketing studies to understand the effectiveness of various marketing approaches.

5. Evaluation Planning and Strategic Evaluation Plan

The EMC has sought to establish a long-term strategic view of EM&V for the 2019-2021 Plan, including developing evaluation strategy and determining priorities that the EMC expects to research during the three-year term. These priorities were developed based on the findings of current research, a multi-day Strategic Evaluation Planning Summit in December 2017, and discussions in the EMC and with Councilors and other stakeholders. The Strategic Evaluation Plan expands upon and prioritizes the important research topics that were discussed and established at the summit and during EMC and other discussions. These details and priorities are attached at Appendix J.

6. Evaluation Budgets

The EM&V evaluation study budget for the 2019–2021 Plan is projected to be in line with historical program budget levels. Twenty percent of each sector's available evaluation budget is allocated to the Special and Cross-Cutting research area.

In 2017, EM&V evaluation study expenditures (not including potential studies and internal labor costs) totaled approximately $17.2 million ($12.8 million for electric and $4.4 million for gas). Therefore, for the three years of the 2019-2021 Plan, the Program Administrators recommend an EM&V study-specific expenditure of $51.6 million (i.e., the 2017 expenditures multiplied by three), which includes $38.4 million for electric and $13.2 million for gas. As mentioned above, this budget does not include potential study costs or internal staffing costs.

The EM&V budget is included in the Evaluation and Market Research hard-to-measure line item, along with other evaluation and market research costs, such as potential studies, the AESC Study, the TRL, and internal PA staffing related to EM&V. See Section III.D.1.k for more information on the hard-to-measure program.

7. Evaluation/Implementation Feedback Loop

One of the purposes of EM&V is to provide information to enhance the energy efficiency programs. The Program Administrators have developed a feedback loop to ensure that the results of evaluations are communicated to program implementers, who can then use those results to enhance and refine the programs.

The feedback loop has many steps, from the initial consideration of a study to completion. Before a study is commenced, multiple teams, including evaluation, implementation, contractors, stakeholders, and consultants, convene to identify researchable questions across the statewide portfolio. The EMC then works with contractors and consultants to create a plan based on the researchable questions. As evaluation studies are scoped and planned out, the work plan may be shared with implementation to ensure that the EMC is asking the most appropriate researchable questions to help implementation. Evaluators also provide advanced notice of evaluation activity, such as customer on-sites and staff interviews. During a study process, the implementation team is often interviewed as part of evaluation, particularly for process/market studies. Once a draft report is available, the materials are shared with implementation, consultants, evaluation, and other stakeholders to give interested parties the opportunity to review and provide feedback. Once a study is complete, final recommendations are reviewed by the RMC and C&IMC and their respective working groups, which determine whether it is appropriate to adopt and implement a recommendation. If the Program Administrators determine that it is not appropriate to adopt a recommendation, the decision and reasoning will be documented clearly. A chart describing EM&V recommendation decisions is provided to the Department as part of the Term Report filing. Final impact results are also reviewed and incorporated by the Common Assumptions Working Group.

Information on EM&V continuously flows in both directions, from the implementation teams seeking guidance from EM&V, and from the EMC seeking to research topics of importance to the programs. An EMC liaison participates in RMC and C&IMC meetings to inform the management committees of studies about to commence, seek input from implementation when it is needed, and to explain results and recommendations. Also, as discussed above, the management committees meet altogether quarterly in Tri-MC meetings to discuss various topics, including evaluations. Finally, the Program Administrators consistently communicate at meetings and informally on all aspects of the programs, and maintain the flexibility to incorporate new studies and their recommendations over time.

8. Market Effects

The Program Administrators have sought to study both direct and indirect effects of the energy efficiency programs. Market effects studies look at how the energy efficiency programs have successfully reduced market barriers and transformed markets. To quantify program impacts that have translated to market effects, first a baseline must be established, and then changes from that baseline can be determined to be program induced and included in the calculation of net savings. The Program Administrators are in the process of considering the type and manner of studying market effects in 2019-2021 and will work with the Council and the EM&V Consultant on potential proposals for inclusion in the final 2019-2021 Plan.

9. Evaluation Studies Completed in Advance of the 2019-2021 Plan

Studies finalized in advance of the October 31, 2018 filing that have not been filed with previous plans or reports will be filed therewith.

All currently completed studies are available on the Council's website at: http://ma-eeac.org/studies/.

I. Reporting

1. Overview

The Program Administrators provide transparent reporting on their energy efficiency activities in multiple presentations, and reports. Providing regular communications allows the public and stakeholders to receive up-to-date information regarding energy efficiency investments and savings directly from the Program Administrators. Program Administrators provide formal reporting required by the GCA and the Department, including the three-year plan, Plan-Year Reports, Term Reports, EES filings, and Quarterly Reports to the Council. Additionally, the Program Administrators provide monthly data dashboards to the Council, present regularly on various topics of interest to the Council, and maintain a detailed energy efficiency database, Mass Save Data (http://www.masssavedata.com).

2. Quarterly Report

At the end of each quarter, the Program Administrators provide a detailed report on the implementation, expenditures, savings, and benefits regarding activities during that quarter. The Quarterly Reports include a narrative component with information on energy efficiency activities in each sector, as well as a working spreadsheet. Data is provided by individual Program Administrator and aggregated statewide reflecting costs, participants, savings, benefits, and greenhouse gas emissions reductions. This data is reported on a cumulative basis throughout year (e.g., the Q3 report includes the most up-to-date values from the start of the program year through the end of Q3), as well as cumulatively over the three year term. All data is also available on Mass Save Data.

3. Plan-Year Report

As discussed above, the Program Administrators annually file a Plan-Year Report in order for the Department to fulfill its obligation to review the effectiveness of the programs pursuant to G.L. c. 25, § 21(d)(2). The reports document fully evaluated implementation results for each program year that are than incorporated as part of each Program Administrator's Term Report. The Plan-Year Reports include updated data tables comparing planned, preliminary, and evaluated results. Each Program Administrator provides detailed explanations of variances in budget, lifetime savings, total benefits, and total resource benefits. These reports include information on cost-effectiveness. In the event of a non-cost-effective program, a Program Administrator must provide a detailed explanation of the reasons why the program is not cost-effective, and how the Program Administrator expects to proceed with the program (e.g., modify program implementation, modify program budget, terminate the program, etc.) and why this course of

action is appropriate. The Plan-Year Report is filed following the first two program years of a term.

4. Term Report

At the conclusion of the term, the Program Administrators file a Term Report with the Department documenting performance over the entirety of the term. The Term Report contains similar data and variance explanations to the Plan-Year Report, along with other information to demonstrate compliance with the approved plan and statutory requirements. The Department reviews each Program Administrator's Term Report in a publicly noticed adjudicatory proceeding. At the conclusion of the proceeding, the Department provides final approval of program expenditures, performance incentives, and LBR. As discussed above, the Program Administrators propose that the Department allow the reconciliation of performance incentives in the next EES filing after the submission of the Term Report to support the goal of rate continuity. See Section IV.F.4, above.

5. Database

The Program Administrators developed and maintain a publicly accessible statewide energy efficiency database, Mass Save Data, which is available at http://www.MassSaveData.com. Mass Save Data is an online statewide database that improves public and stakeholder access to the extensive data already reported by Program Administrators, as well as provides additional information and presentations of data. It provides a single, reliable and timely data source for currently reported data on an individual Program Administrator and statewide basis that can be accessed at any time. Mass Save Data enables users to export data to Excel or PDF formats for further analysis and queries. The Program Administrators designed Mass Save Data to export data easily for those stakeholders like the Council and DOER who prepare data-driven reports on energy efficiency and, at the same time, to display data in a user-friendly, understandable manner for those users who prefer charts and graphs. Mass Save Data has been implemented in a manner that is cost efficient and protects customer privacy. The platform has been materially expanded over the last two program terms and provides accessible, meaningful information to customers, municipalities, and stakeholders over time.

Mass Save Data provides quantitative data similar to that provided in the Program Administrators' public reports, including information related to participants, expenditures, annual and lifetime savings, electric capacity savings, and benefits. The database includes data at the sector, program, initiative, and measure levels. In addition to the Program-Administrators specific data, Mass Save Data also provides savings, usage, and incentives data on the geographic tab at the county, town, and zip code level. This data allows municipalities to see the effects of energy efficiency in their town and other areas. Following a request from several municipalities, the Program Administrators are now providing usage data by town by individual month on an annual basis. Program Administrators have updated Mass Save Data and provided new information and views based on input from members of the Council and other stakeholders. Mass Save Data tabs and sections include overview sections such as time series, performance overview, monthly reporting, and sales and savings; detailed data such as performance details, cost to deliver, home energy services, HEAT Loan, GHG reductions, and measure details; and geographic information

including savings, usage and incentives by county, town, and zip code. There are also reference materials such as a glossary and the link to the TRL.

Mass Save Data appropriately protects customer privacy and reduces the need for expensive data security measures because the website is populated with aggregated rather than customer-specific energy efficiency data.[32] Protecting customer data is a core database concern of the Department, Program Administrators and stakeholders. Safeguarding the confidentiality of sensitive customer-specific account data is both a legal obligation and an important corporate responsibility for the Program Administrators.[33]

The Program Administrators update Mass Save Data with various data sets monthly, quarterly, and annually.

[32] In Massachusetts, the Program Administrators strictly control access to sensitive customer-specific account information like customer names, account numbers, rate class, location, usage, and demand data. Customer consent is necessary to permit third-party access to sensitive customer-specific account information outside the conduct of regulated Program Administrator business. Disclosure of customer information to a third-party without customer authorization would violate corporate privacy policies and expose a Program Administrator to liability under the Massachusetts Right to Privacy Act, M.G.L. c. 214, § 1B or Chapter 93A, and potentially other statutes.

[33] The Program Administrators have each adopted strict corporate privacy policies and safeguards to protect sensitive customer-specific account information. These corporate privacy policies explicitly state that customers' personal information will be safeguarded and only disclosed for a regulated Program Administrator business purpose.

V. COST RECOVERY, FUNDING SOURCES, AND BILL IMPACTS

A. Cost Recovery

Cost recovery is a critical element of the three-year plans. Cost recovery associated with the implementation of energy efficiency programs includes the recovery of a performance incentive,[34] and, for those Program Administrators without a Department-approved decoupling mechanism, the replacement of revenues that support system operating costs. For the Program Administrators to pursue the aggressive goals set forth in this Plan, it is essential that the Department provide a full and fair opportunity for the Program Administrators to be made economically whole for aggressively pursuing sales-reducing energy efficiency and demand reduction efforts and to earn a reasonable return on this investment based upon their performance and achievement. Although Department approval of the proposed Plan should ensure cost-recovery of reasonable Plan-related costs, performance incentives, and LBR,[35] if applicable, the details related to individual Program Administrator cost-recovery mechanisms will be addressed in separate Department proceedings.

Pursuant to the GCA, after reviewing a Program Administrator's proposed Plan, the Department must approve a fully reconciling funding mechanisms, in addition to other statutorily specified sources, if it determines that the Plan ensures that the Program Administrator has identified and will capture all energy efficiency and demand reduction resources that are cost-effective or less expensive than supply. G.L. c. 25, §§ 19, 21(d)(2).

B. Funding Sources

1. Introduction

The Program Administrators seek to leverage available funding sources and financing initiatives to increase the benefits of Three-Year Plans and minimize customer bill impacts. For electric Program Administrators, the GCA identifies four specific funding sources for energy efficiency programs: (1) revenues collected from ratepayers through the SBC; (2) proceeds from the Program Administrators' participation in the FCM; (3) proceeds from cap and trade pollution control programs, including but not limited to the RGGI;[36] and (4) other funding as approved by the Department, including revenues to be recovered from ratepayers through a fully reconciling

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34 For a discussion of performance incentives, please see supra Section IV.F.

35 The Department determined in D.P.U. 07-50-A that, electric and gas distribution companies would be allowed to recover LBR resulting from their incremental efficiency savings, until they begin operating under a decoupling plan. D.P.U. 07-50A at 83-84, n.24. As of the proposed effective date of the present three year plan (i.e., January 1, 2019), Berkshire does not have a Department-approved decoupling mechanism. As such, Berkshire intends to seek Department approval of LBR recovery in connection with this Three-Year Plan, supported by evidence of how incremental energy efficiency savings will be achieved and accounted for and a calculation of the LBR requested for approval. Information regarding Berkshire LBR is included in its Energy Efficiency Data Tables.

36 Pursuant to the GCA, not less than 80 percent of amounts generated by RGGI must be allocated to the Program Administrators. G.L. c. 25, § 19(a). As discussed below, pending legislation proposes to change this requirement. If passed, the change in available RGGI funding to offset ratepayer contributions may decrease and as a result increase bill impacts.

funding mechanism (i.e., an EES). G.L. c. 25, §§ 19(a); 21(b)(2)(vii). Consistent with the Department's Guidelines, the Program Administrators allocate SBC, FCM, and RGGI revenues to each customer sector in proportion to the kWh consumption of each class.[37] In approving other funding for electric Program Administrators, the Department must consider: (1) the availability of other private or public funds; (2) whether past programs have lowered the cost of electricity to customers; and (3) the effect of any rate increases on customers. G.L. c. 25, § 19(a). The Department has determined that a bill impact analysis with a short-term perspective that isolates the effect of a proposed change in the energy efficiency surcharge ("EES") is appropriate because it provides an accurate and understandable assessment of the impact that customers will experience on their bills. 2013-2015 Three-Year Plans Order at 122; D.P.U. 08-50-D at 11-12.

For gas Program Administrators, the GCA does not identify multiple funding sources for energy efficiency programs and instead requires the gas Program Administrators to include a fully reconciling funding mechanism to collect energy efficiency program costs from customers (i.e., EES). G.L. c. 25, § 21(b)(2)(vii); see also G.L. c. 25, § 21(d)(2). In approving funding for gas Program Administrators, the Department considers the effect of any rate increases on customers. Guidelines § 3.2.2.2.

Below is a description of each funding source currently available to the Program Administrators.

2. Non-EES Revenues

a. System Benefit Charge (electric only)

The SBC is calculated consistent with G.L. c. 25, § 19(a) which states: "The [D]epartment shall require a mandatory charge of 2.5 mills per kilowatt-hour for all customers, except those served by a municipal lighting plant, to fund energy efficiency programs including, but not limited to, demand side management programs." Specifically, each electric Program Administrator calculates projected SBC revenues as the product of the statutorily mandated SBC of $0.0025 per kWh and projected sales for the applicable year.

b. Forward Capacity Market Proceeds (electric only)

Pursuant to G.L. c. 25, § 19(a), the Three-Year Plans of electric Program Administrators shall be funded in part by "amounts generated by the distribution companies and municipal aggregators under the Forward Capacity Market program administered by ISO-NE, as defined in section 1 of chapter 164." Specifically, each Program Administrator calculates projected FCM revenues as the product of the clearing prices of the FCM in the applicable year and the energy efficiency capacity that is designated by ISO-NE as an FCM capacity resource for the year. The Program Administrators propose to apply all net proceeds from the FCM to energy efficiency programs.

[37] The income eligible sector is allocated at least ten percent of the funds for electric energy efficiency programs and 20 percent of the funds for gas energy efficiency programs pursuant to G.L. c. 25, § 19(c).

To minimize ratepayer funding for energy efficiency efforts, each electric Program Administrator seeks to maximize FCM revenues for its customers. FCM bidding strategies are designed to strike an appropriate balance between maximizing revenues through participation in the FCM and avoiding the risks associated with FCM penalties for failure to deliver their capacity-supply obligations. In addition, demand reduction resources must participate in the energy market if the resource has a capacity supply obligation in the FCM, which adds potential for additional revenues but carries the risk of penalties. Each Program Administrator employs its own individual strategy in bidding future capacity into the FCM. For more information on Program Administrator bidding strategy see each electric PA's testimony.

The Department has recognized the challenges Program Administrators face in projecting with precision over the term of a Three-Year Plan the level of planned energy efficiency resources that will be installed before and during each FCM commitment period. 2013-2015 Order at 119. One of these challenges is driven by the timing of the FCM auction cycles, which are conducted three years ahead and begin with a "show-of-interest" submission almost four years before the capacity-commitment period.[38] Another is that there are financial penalties for failing to deliver on FCM supply obligations. However, each Program Administrator takes all reasonable steps to maximize FCM revenues during the term.

In developing a bid, each Program Administrator uses the best information available at the time. Each Program Administrator considers historic achieved annual peak period MW reductions from their energy efficiency programs, as well as ongoing studies and evaluations that may affect future savings potential. Given the difficulty in estimating the actual energy efficiency savings that will be eligible to participate in the FCM and the potential penalties, Program Administrators typically do not bid into future FCM commitment periods the total amount of energy efficiency savings they expect to achieve. In making conservative FCM bids, the Program Administrators avoid overpromising and thereby compromising future system reliability. In addition, the reconciling nature of the EES ensures that customers are made whole if Program Administrator FCM revenue projections are overly conservative and the Program Administrators ultimately collect additional FCM revenues.

c. Regional Greenhouse Gas Initiative Proceeds (electric only)

Pursuant to G.L. c. 25, § 19(a), the Three-Year Plans of electric Program Administrators shall be funded in part by "not less than 80 per cent of amounts generated by the carbon dioxide allowance trading mechanism established under the Regional Greenhouse Gas Initiative Memorandum of Understanding, as defined in subsection (a) of section 22 of chapter 21A, and the NOx Allowance Trading Program." As described further below, the electric Program Administrators typically calculate projected RGGI revenues by multiplying projected RGGI clearing prices by a projection of allowances sales in each RGGI auction, with 80 percent of the revenues allocated to electric efficiency programs. RGGI allowances prices are derived from the AESC Study.

[38] The next forward capacity auction, in February 2019, will be for capacity delivery in July 2022.

The electric Program Administrators will consult with DOER about how best to forecast RGGI proceeds for the 2019-2021 Plan. The Program Administrators note that proposed legislation, if adopted, will eliminate the requirement that 80 percent of RGGI funds be allocated to the Program Administrators. These changes will impact the Program Administrators ability to project RGGI funding and shift costs to ratepayers, increasing bill impacts.

In prior years, DOER has paid each electric Program Administrator's share of the costs of the Council's consultants retained pursuant to G.L. c. 25, §22(c) out of the RGGI auction proceeds that are allocated to the Program Administrators. Because the consultant fees were paid by DOER directly out of the RGGI proceeds, the electric Program Administrators' proposed budgets did not include separate expense amounts for Council consultant costs. On June 16, 2017, the Department directed each Program Administrator to reflect its full allocated share of the Council's budget, including consultant fees, in all applicable filings with the Department. In order to comply with this directive and maintain good accounting practices in which revenues and expenditures should be consistent, the Program Administrators propose that DOER allocate the full share of RGGI funds to each Program Administrator and directly assess the electric Program Administrators for the Council's consultant fees, similar the current manner for assessing these fees to gas Program Administrators. This approach will allow the Program Administrators to document the revenues and expenditures fully and consistent with Department precedent in all applicable filings.

3. EES Revenues[39]

The EES is a fully reconciling funding mechanism that the Department approves for funding the Three-Year Plans. G.L. c. 25, § 21(d)(2). On an annual basis, each Program Administrator submits an updated EES for Department review, based on: (1) the Program Administrator's most recent projections of budgets, revenues for non-EES funding sources (for electric Program Administrators), and sales for the current year; and (2) a reconciliation of any under- or over-recovery of costs from the previous year. 2016-2018 Three-Year Plans Order at 114.[40] Electric Program Administrators collect the EES through EERF tariffs. Guidelines §§ 2(9), 3.2.1.6. For gas Program Administrators, the EES is collected through the LDAC tariff in accordance with established Department practice. Guidelines §§ 2(9), 3.2.2. The EERF and LDAC filings of the Program Administrators are separate proceedings from the Three-Year Plan proceeding and are implemented on schedules that vary among the Program Administrators.[41]

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[39] The Program Administrators collect funds related to RCS through their EESs. 220 C.M.R. § 7.00 et seq. The Department reviews the reconciliation of any over and under collections of RCS funds in the LDAC filings for the gas Program Administrators and in the EERF tariff filings for the electric Program Administrators.

[40] In D.P.U. 17-05-B, the Department approved a single energy efficiency charges tariff for the newly consolidated NSTAR Electric Company d/b/a Eversource Energy (in which the former Western Massachusetts Electric Company was consolidated with the former NSTAR Electric Company as of January 1, 2018). See also D.P.U. 17-05, at 44. (2017). Accordingly, for the 2019-2021 plan term, Eversource will be collecting its energy efficiency costs through class-specific energy efficiency recovery factors applicable to its entire Massachusetts service territory.

[41] With the exception of the Compact, EERF filings are made coincident with each electric Program Administrators'' residential basic service rate change, creating a lag between energy efficiency program spending and collection. The Compact's rates are effective January 1 of each year, consistent with the 2013-2015 Order at 125, n.106. The gas Program Administrators' LDAC filings are approved for effect

4. Carryover Information

In determining its EES, an electric Program Administrator takes into account funds carried over from the previous year's program, whether positive or negative. These "fund balances" are used to adjust projected funding levels in the Plan.

5. Outside Funding Levels

The 2019-2021 Plan does not contain outside funding assumptions at this time given the absence of material viable funding sources. The Program Administrators, as well as Councilors and government agencies, all actively continue to seek new sources of outside funding. The Program Administrators' approach in this regard reflects lessons learned over the course of prior Three-Year Plans. There continues to be a low likelihood that a major new federal "cap and trade" program will be implemented in the foreseeable future as had been anticipated when the 2010-2012 Plans were initially developed and approved by the Council.

As part of the Program Administrators' holistic, integrated approach, the Program Administrators will seek to educate customers about other funding offered through other government programs. One example of this is a DOER grant designed to assist moderate income customers with pre-weatherization barriers. Another example is funding designed to promote conversion to and adoption of renewable technologies, as defined by DOER. MassCEC offers generous incentives, in addition to the incentives offered under the Plan, for air source heat pumps, ground source heat pumps, wood heating, and solar hot water. In addition, MassCEC and DOER have partnered to develop the HeatSmart Mass Residential program designed to encourage customers to use clean heating and cooling technologies. DOER's Alternative Portfolio Standard for Renewable Thermal offers an opportunity for customers to obtain revenue for installing eligible solar thermal, air source heat pumps, and ground source heat pumps based on the size of the unit installed. While the objectives of these programs differ from the goals of the energy efficiency programs, customers may leverage the multiple funding sources to reduce the customer contribution cost, removing barriers to adoption of measures that provide both energy efficiency benefits and advance other state policies, including meeting the requirements of the GWSA.

C. **Bill Impacts**

Consistent with directives of the GCA and the goal of the 2019-2021 Plan to provide for the acquisition of all available energy efficiency and demand reduction resources that are cost-effective or less expensive than supply, the Program Administrators have sought to develop a statewide energy efficiency plan that acquires these resources with the lowest reasonable customer contribution. G.L. c. 25, § 21(b). The Department has determined that a bill impact analysis with a short-term perspective that isolates the effect of a proposed change in the EES is appropriate

November 1st each year. Due to the timing of these filings, the budget and revenue projections are based on the twelve month period starting on the effective date of each EES, rather than on a calendar year. Therefore, projected expenditures and revenues included in the respective EERF and LDAC filings will differ from the amounts included in the Plan.

because it provides an accurate and understandable assessment of the impact that customers will experience on their bills. 2013-2015 Three-Year Plans Order at 122; D.P.U. 08-50-D at 11-12.

The Department requires the Program Administrators to submit traditional bill impacts for non-participants under the following scenarios:

1. the current (e.g., 2018) EES to the proposed EES for the first year of the three-year plan (e.g., 2019);
2. the EES from the first year of the three-year plan (e.g., 2019) to the proposed EES for the second year of the three-year plan (e.g., 2020);
3. the EES from the second year of the three-year plan (e.g., 2020) to the proposed EES for the third year of the three-year plan (e.g., 2021);
4. the current EES (e.g., 2018) to the proposed EES for the third year of the three-year plan (e.g., 2021).

D.P.U. 08-50-D at 12. The Department also directed the Program Administrators to submit bill impacts for participants, "where consumption is reduced for three levels of savings -- low, medium, and high -- and [to] provide a description of how these savings levels were determined." Id. The Department later clarified the bill impact requirements for non-participants by providing a spreadsheet to the Program Administrators, directing them to use average monthly usage levels under the first and fourth scenarios listed above.

Accordingly, to calculate bill impacts for participants, the Program Administrators will populate the Department's spreadsheet (with peak and off-peak rates on separate sheets), using the average monthly kWh and/or therm usage for non-participants for each rate class, and the percentages set forth in the table below. To best approximate low, medium and high annual savings consistent with the Department's directive in D.P.U. 08-50-D, the Program Administrators collaborated on appropriate assumptions for residential, income eligible and C&I programs to develop statewide percentages that best approximate savings for those types of participants. The Program Administrators determined that the percentages in the table below will provide directional information on the bill impacts that a residential, income eligible or C&I participant may experience.

The Program Administrators determined that there is no low, medium and high savings scenario for income eligible participants. These participants typically receive a comprehensive "whole house" energy efficiency approach, meaning potential measures are installed in most cases (the work that can be done is done). Similarly, the Program Administrators determined that there is no low, medium and high savings scenario for residential and income eligible gas non-heating participants and street lighting. Accordingly, the Program Administrators determined that the percentages in the table below best approximate savings for those types of participants.

	Low	Medium	High
Residential- Electric:	2%	10%	30%
Residential- Gas:	2%	15%	30%
Residential Gas Non-Heating:	2%		
Income Eligible Gas Non-Heating:	2%		
Income Eligible:	25%		
Street Lighting:	10%		
C&I- Electric:	1%	10%	20%
C&I- Gas:	1%	10%	20%

At this April 30, 2018 submission date, several key components that are necessary to finalize the most accurate bill impact calculations consistent with the Department's requirements have yet to be determined or finalized. Each Program Administrator will provide final bill impacts for all rate classes in its individual filing to be made at the Department in October 2018.

While the Program Administrators cannot provide bill impacts at this time, comparing the proposed 2019-2021 budget to the 2016-2018 budget provides high level directional information on potential bill impacts. The proposed statewide electric budgets for the residential and C&I sectors are about $167 million (21%) and $57 million (7%), respectively, lower than the statewide budget for 2016-2018. The statewide electric budget for the income eligible sector is about $4 million (2%) higher than statewide budget for 2016-2018. The proposed statewide gas budgets for residential, income eligible, and C&I sectors are about $7.5 million (2%), $15 million (11%), and $2 million (1.5%), respectively, higher than the statewide budgets for 2016-2018. The income eligible sector budget is collected from all customer sectors. Based on these comparisons, on a statewide basis, the changes in the revenues needed from each sector to fund the programs are either decreasing, or increasing by relatively small amounts. Therefore, bill impacts tied directly to program budget changes should be minimal. Individual Program Administrator sector budgets do vary and some Program Administrators may propose increases in a particular sector budget. The direction and magnitude of bill impacts will vary by Program Administrator.

It is important to emphasize that actual rate and bill impacts for customers associated with the 2019-2021 Plan will vary based upon a multiplicity of factors, such as the cost of service in a particular Program Administrator's service territory, the customer's actual individual usage, the level and quality of measure installation, and the availability of public or private funds other than those collected through the SBC for application towards energy efficiency expenditures, such as proceeds realized from the FCM or from cap-and-trade programs (e.g., RGGI). Additionally, the draft Plan is based on complying with current law. Any legislative changes enacted prior to the October filing may impact program delivery, costs, and bill impacts. Finally, bill and rate impacts will vary from the bill and rate impacts included in each Program Administrator's EES filings, which are done on a different time schedule from this filing, and include up-to-date over- and under-collections.

VI. APPENDICES

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