FY2017 ANNUAL REPORT

Efficiency Maine is the independent administrator for energy efficiency programs in Maine. Efficiency Maine's mission is to lower the cost and environmental impacts of energy in Maine by promoting cost-effective energy efficiency, conservation, and alternative energy systems. Efficiency Maine does this primarily by delivering rebates on the purchase of high-efficiency equipment to help customers save electricity, natural gas, and heating fuels throughout the Maine economy. Efficiency Maine is governed by a stakeholder Board of Trustees with oversight from the Maine Public Utilities Commission.

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Message from the Executive Director

In Fiscal Year 2017 (FY2017), the Efficiency Maine Trust (the Trust) began implementation of its third strategic plan, called "Triennial Plan III." Consistent with that plan, we set out in FY2017 to pursue several new strategies for achieving savings. Among these changes were discontinuing all fluorescent lighting incentives and moving exclusively to LEDs, and significantly increasing market penetration of heat pump technology (for supplemental space heating and for domestic hot water). In FY2017, our programs also called for more complementary technologies and processes (e.g., controls and sensors) to enhance the efficiency of existing measures, and established more tailored programs to target low-income customers. In addition, FY2017 saw a shift in the focus of the Trust's Small Business Initiative toward Maine's smallest commercial customers (having electric demand under 25 kW) to prioritize those most in need of support. Furthermore, we made a push for more small custom projects in mid-sized businesses and greater investment in combined heat and power (CHP) technology.

Starting in FY2017, we began applying a new set of avoided cost assumptions used to calculate the benefits of efficiency measures. Under the terms of the settlement by which Triennial Plan III was approved, these updated avoided costs reflected a significant drop in the net present value of energy saved by the programs. This had several implications for our programs. Certain efficiency measures that had been offered in the past did not pass our new, stricter cost-effectiveness test going forward, and, as a result, were made ineligible for our financial incentives. These changes had a cascading effect on a wide range of our marketing and administrative documents, including web pages, program forms, and contracts with vendors, distributors, and retailers. Incorporating updated information into these written materials caused the programs to get off to a slow start at the beginning of the year. Low energy prices also meant that some customers were not as motivated to invest in energy efficiency as they had been in years past.

At the same time, we saw a significant decline in funding for our "other fuels" efficiency programs that help reduce the consumption of oil, propane, kerosene, and biomass (wood or pellets). Due to a confluence of political and economic factors, auction revenues from the Regional Greenhouse Gas Initiative (RGGI) fell from roughly $12.5 million in FY2016 to just under $7 million in FY2017. This shortfall meant that we had to scale back some of our program offerings that targeted these fuels.

Despite these underlying challenges, the Trust succeeded in reaching significant milestones during FY2017. We continued to help Maine lead the nation in adoption of high-efficiency ductless heat pumps, and have now promoted more than 25,700 installations in the past five years. We made similar strides in incentivizing heat pump water heater purchases, with almost 13,000 installations in the past five years. As grid-supplied electricity grows cleaner, these technologies put Maine on firm ground with respect to advancing its carbon reduction goals. Additionally, our initiatives that cater to small businesses and low-income customers are helping to make energy efficiency accessible to all sectors of the economy. The Trust also secured several CHP projects in FY2017, helping jump-start Maine's market for this technology. During FY2017, the American Council for an Energy-Efficient Economy published its "State Energy Efficiency Scorecard," which ranked Maine 11th and gave our state the

"most improved" designation. Other regional and national studies about the performance of energy efficiency programs continue to indicate that the Trust has the lowest "costs of production" for achieving energy savings in New England and has been operating with the lowest administrative costs of any program in the country.

The Trust made numerous enhancements during FY2017 to improve our programs. For example, we moved the processing of incentives to the "midstream" of the supply chain for a number of heating measures in the Commercial and Industrial Prescriptive Program. This means that the Trust discounted qualifying equipment by applying instant price markdowns at the distributor level rather than requiring contractors to fill out and mail in rebate forms. Since most businesses quickly replace their boiler or furnace when the existing one fails, the shift to instant markdowns applied at the distributor captures more of the emergency replacement market and reduces the administrative and financial burden on contractors.

We also expanded our offerings for low-income customers, including market-based incentives that significantly reduced customer co-pays compared to offerings under the Home Energy Savings Program. These initiatives help more low-income Mainers stay warm and lower their heating bills. The Maine State Housing Authority collaborated with the Trust to provide us access to an updated list of Low-Income Heating Energy Assistance Program (LIHEAP) participants. This collaboration was instrumental in helping us identify and target eligible households for our low-income programs. Using this list, the Trust provided LIHEAP participants with offers for efficiency measures that they could install themselves, including LED bulbs and low-flow shower heads and faucet aerators. The Trust also provided LIHEAP participants in 560 homes with high-efficiency water heaters.

As always, it's our privilege at the Trust to manage these programs for the benefit of Maine's energy consumers. We appreciate your interest in the results of last year's work, and we welcome your questions and suggestions as we strive to improve the availability and reach of our programs in the years ahead.

/s/ Michael D. Stoddard

Abbreviations/Acronyms

AMP	Arrearage Management Program
BIP	Business Incentive Program
Boothbay NTA	Boothbay Harbor Non-Transmission Alternative Pilot
C&I	Commercial and Industrial
CAA	Community Action Agency
CCF	Centum Cubic Feet
CEO	Chief Executive Officer
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CIP	Commercial and Industrial Prescriptive Program
CMP	Central Maine Power
CTO	Chief Technology Officer
DHP	Ductless Heat Pump
DIY	Do-It-Yourself
EERRF	Energy Efficiency and Renewable Resource Fund
EISA	Energy Independence and Security Act
EM&V	Evaluation, Measurement, and Verification
FCA	Forward Capacity Auction
FCM	Forward Capacity Market
FR	Free-Ridership
FY	Fiscal Year
GHG	Greenhouse Gas
HESP	Home Energy Savings Program
HPWH	Heat Pump Water Heater
ISO-NE	Independent System Operator for New England
kW	Kilowatt(s)
kWh	Kilowatt-Hour(s)
LD	Legislative Document
LED	Light-Emitting Diode
LIHEAP	Low-Income Home Energy Assistance Program
LIHESP	Low-Income Home Energy Savings Program
MAB	Maine Advanced Buildings Program
MACE	Maximum Achievable Cost-Effective
MaineHousing	Maine State Housing Authority
MMBtu	Million British Thermal Unit(s)
MPCT	Modified Participant Cost Test
MPRP	Maine Power Reliability Program
MW	Megawatt(s)
MWh	Megawatt-Hour(s)

NBI	New Buildings Institute
NTG	Net-to-Gross
NYSERDA	New York State Energy Research and Development Authority
OPA	Office of the Public Advocate
PACE	Property-Assessed Clean Energy
PACT	Program Administrator Cost Test
PHA	Portland Housing Authority
PON	Program Opportunity Notice
PUC	Public Utilities Commission
QP	Qualified Partner
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualifications
RGGI	Regional Greenhouse Gas Initiative
RKO	Runyon, Kersteen, Ouellette, Inc.
RTU	Rooftop Unit
SBI	Small Business Initiative
SO	Spillover
T&ST	Transmission and Sub-Transmission
TA	Technical Assistance
TRC	Total Resource Cost
TRM	Technical Reference Manual

Introduction

The Annual Report of the Efficiency Maine Trust ("the Trust" or "Efficiency Maine") describes activities during Fiscal Year 2017 (FY2017), which covered the period from July 1, 2016 to June 30, 2017. The report includes the budgets, activities, and results for all programs and related activities administered by the Trust during this period. In total, these programs generated more than 1.5 billion kWh and more than 7.7 million MMBtu in cost-effective lifetime energy savings for Maine ratepayers. Some noteworthy highlights of the Trust's FY2017 programs include:

- Avoiding more than $182 million in unnecessary energy costs;
- Matching more than $53.4 million of incremental private investment with $41.6 million of program investment;
- Ceasing incentives for fluorescent lighting technologies and switching exclusively to the promotion of LEDs;
- Supporting 7,959 projects to install air sealing, insulation, ductless heat pumps (DHPs), and heating systems through the Home Energy Savings Program (HESP);
- Reaching a milestone of promoting more than 25,700 DHPs installed over the past five years;
- Moving a number of commercial heating measures "midstream," delivering instant rebates at the level of the equipment distributors rather than at the contractor level;
- Shifting the focus of the Small Business Initiative (SBI) to Maine's smallest commercial customers (below 25 kW);
- Adding more than 24.8 MW of new peak summer demand reductions to the grid; and
- Avoiding an estimated 95,148 tons of annual greenhouse gas (GHG) emissions.

The Trust was created by state statute in 2009.[1] The purposes of the Trust include:

- Consolidating under one roof the funds for Maine's consumer-focused efficiency and alternative energy programs for all fuel types: electric, natural gas, heating oil, and wood;
- Integrating delivery of electric and thermal efficiency measures so that the customer can have a one-stop shopping experience;
- Procuring energy resources (efficiency and alternative energy) that cost less than traditional energy supply to help individuals and businesses meet their energy needs at the lowest cost; and
- Helping transform the energy market in Maine so that energy-efficient products, alternative energy equipment, and related energy services are more accessible and affordable to end-use customers.

The Trust is managed by a nine-member Board of Trustees. During FY2017, trustees Kenneth Fletcher, former Director of the Governor's Energy Office, and David Stapp, Chief Executive Officer (CEO)/Chief Technology Officer (CTO) of Peregrine Turbine Technologies in Wiscasset, were reappointed to the Board. David Barber, Senior Consultant and former President of Barber Foods, and Kenneth Fletcher served as Chair and Vice-Chair, respectively. Brent Boyles, former CEO of Maine Public Service, served as Treasurer, and

[1] Title 35-A, Maine Revised Statutes, Chapter 97.

Donald Lewis, President of Nyle Systems, served as Secretary. Herbert Crosby, Professor Emeritus of Mechanical Engineering Technology at the University of Maine in Orono, and Al Hodsdon, owner of A.E. Hodsdon Engineers, also served. Ex officio positions from the Governor's Energy Office (GEO) were filled by GEO Director Patrick Woodcock through December and thereafter by Deputy Director Angela Monroe, and Dan Brennan, the designated representative of the Maine State Housing Authority (MaineHousing).

Sectors Served

The Trust's programs and initiatives serve multiple sectors. Table 1 illustrates the sectors served by each Trust program.

Funding

The Trust receives funds from a variety of sources, including Maine's electricity and natural gas utility ratepayers, the Regional Greenhouse Gas Initiative (RGGI), the Maine Power Reliability Program (MPRP) settlement, the Forward Capacity Market (FCM) from the New England grid, and a long-term contract with Maine utilities. The Trust is directed by Maine statute to invest these funds to promote more efficient and affordable use of energy and customer-sited alternative energy systems. Table 2 depicts the funding sources for each program. The table is followed by brief descriptions of the funding sources and how they are invested through Efficiency Maine programs.

Table 1: Sectors Served by Efficiency Maine Programs

Program	Commercial and Industrial	Small Businesses	Multifamily	Residential	Low-Income Households
Commercial and Industrial Custom Program	✓				
Commercial and Industrial Prescriptive Program	✓	✓	✓		
Commercial New Construction Program	✓	✓	✓		
Small Business Initiative		✓			
Consumer Products Program	✓	✓	✓	✓	✓
Home Energy Savings Program			✓	✓	✓
Low-Income Initiatives			✓	✓	✓
Renewable Energy Demonstration Grants Program	✓				

Table 2: Program Funding Sources

Program	Electric Efficiency Procurement	Maine Yankee Settlement	Natural Gas Efficiency Procurement	Regional Greenhouse Gas Initiative	Maine Power Reliability Program	Forward Capacity Market	Long-Term Contract	Federal/Other	Energy Efficiency and Renewable Resource Fund
Commercial and Industrial Custom Program	✓	✓	✓	✓	✓	✓	✓		
Commercial and Industrial Prescriptive Program	✓		✓	✓	✓	✓			
Commercial New Construction Program	✓		✓	✓					
Small Business Initiative	✓								
Consumer Products Program	✓	✓			✓	✓			
Home Energy Savings Program	✓	✓	✓	✓	✓	✓		✓	
Low-Income Initiatives	✓		✓	✓	✓				
Renewable Energy Demonstration Grants Program									✓

Electric Efficiency Procurement

Electric Efficiency Procurement funds come from payments made by utilities directly to the Trust for the procurement of cost-effective electrical energy efficiency. The amount of funding the Trust receives is determined by the budget needed to capture the maximum achievable cost-effective (MACE) energy efficiency potential approved by the Maine Public Utilities Commission (PUC). The Trust typically offsets some of the budget necessary to capture MACE potential through the use of other funding sources.

Maine's largest electric customers, who take service at the transmission and sub-transmission (T&ST) level, do not contribute to and are ineligible for funding from the Electric Efficiency Procurement.

Maine Yankee Settlement

Maine Yankee Settlement funds stem from a settlement with the federal government for the storage of spent nuclear fuel. In previous years, a portion of these funds were directed by state law to electricity-saving programs to supplement the revenues from the Electric Efficiency Procurement. At the beginning of FY2017, a small portion of these revenues from prior years remained unspent. They were distributed through a blend of the Trust's programs targeted at electric efficiency measures.

Natural Gas Efficiency Procurement

Natural Gas Efficiency Procurement funds come from natural gas distribution utilities. Similar to the standard used to establish the appropriate level of funding for electric efficiency, the amount of the procurement set for natural gas efficiency programs is based on the amount needed to capture all the natural gas energy efficiency that is cost-effective, achievable, and reliable.

Maine's largest natural gas customers, whose usage exceeds 1 million centum cubic feet (CCF) of natural gas annually, did not contribute to and were ineligible for funding from the Natural Gas Efficiency Procurement through FY2017. However, the Maine Legislature amended the Efficiency Maine Trust Act in the spring of 2017; moving forward, these customers will pay the natural

gas assessment on their first 1 million CCF of usage and be eligible for the Trust's natural gas efficiency programs.

Regional Greenhouse Gas Initiative

RGGI is a nine-state regional initiative to limit carbon emissions from electricity generators. Maine joined RGGI in 2009 when it was established. Under RGGI, large generators are required to purchase "carbon allowances" in an amount equal to their annual carbon emissions. Allowances are sold at quarterly auctions for this purpose. In Maine, proceeds from the auctions are transferred to and managed by the Efficiency Maine Trust.

The Trust uses RGGI funds for energy conservation programs that reliably reduce electricity consumption or GHG emissions. In the spring of 2016, the Maine Legislature amended the Efficiency Maine Trust Act to provide new direction on the allocation of RGGI investments. Beginning in FY2017, the amended law requires the Trust to allocate $3 million annually to the PUC to be disbursed to a select group of energy-intensive manufacturers, known as "affected customers." In accordance with the statutory directive, the Trust allocated 50% of the remaining funds to the residential sector and 50% to the commercial and industrial (C&I) sector.

In light of declining RGGI revenues over a period of several quarters, the Maine Legislature instituted further amendments to the statute in the spring of 2017. First, it reduced the $3 million annual affected customer transfer to $2.5 million in FY2018 and $2.5 million in FY2019, and added a $1.0 million payment in FY2020. Second, it eliminated, for the next three years, the requirement that the Trust split the remaining RGGI revenues evenly between residential and C&I programs.

Maine Power Reliability Program Settlement

The funds received by the Trust from the MPRP Settlement are governed by a May 7, 2010, stipulation approved by the PUC. In FY2017, the Trust received $300,000 through the MPRP Settlement for the weatherization of low-income homes, $500,000 for efficiency projects for T&ST customers, and $700,000 for electrical efficiency projects in the Trust's discretion. In FY2017, the Trust allocated its discretionary funds equally to the C&I Prescriptive Program and the Consumer Products Program.

Forward Capacity Market

FCM funds are proceeds from the Trust's capacity resource that is bid into the Independent System Operator for New England (ISO-NE) markets. The compensation the Trust receives from the FCM is for the reduction of capacity provided through qualifying efficiency projects that are tracked and reported by the Trust.

Long-Term Contract

In October 2014, the PUC approved a long-term contract between the Trust and Maine's two investor-owned transmission and distribution utilities for the purchase and sale of energy efficiency capacity resources. The funds were directed to be awarded through the C&I Custom Program and were required to be committed by June 30, 2015. Per the order approving the long-term contract, the Trust will submit annual reports to the PUC indicating the savings from each individual project funded by the contract.

Federal/Other

Federal funds were received through the American Resource Recovery Act in 2009 and 2010. These funds were disbursed through grants and through a revolving loan fund. The revolving loan fund continued to operate in FY2017.

Energy Efficiency and Renewable Resource Fund

The Energy Efficiency and Renewable Resource Fund (EERRF) is composed of voluntary contributions from ratepayers, as well as alternative compliance payments from entities that do not meet Maine's renewable portfolio standard requirement. Maine law stipulates that 35% of these revenues be directed to the Maine Technology Institute to help promote research and development of renewables. The Trust may use the remainder of these revenues to fund demonstration projects or to provide rebates for customer-sited, commercialized renewable energy equipment, as funds allow.

Results

In FY2017, the programs administered by the Trust played a critical role in helping Maine businesses and homes take advantage of energy efficiency, educating consumers about products that save energy, and helping them connect with vendors and contractors. The Trust's programs provided financial incentives that spurred consumers to choose energy-efficient options over lower-priced, less-efficient options — a choice that will reduce energy bills over the long term and put the Maine economy on a stronger footing.

Tables 3 and 4 illustrate the total energy savings and lifetime avoided energy costs associated with each of the programs administered by the Trust in FY2017. Savings values reported in the program summary tables here, and in the individual program tables throughout this report, are "adjusted gross savings" unless otherwise indicated. Adjusted gross savings reflect the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted by factors developed through program evaluations.[2]

In addition to energy savings, the tables show the sum of Efficiency Maine's costs. These costs reflect the financial incentives paid by the program, as well as the costs to manage the programs, provide public information and outreach, hold training sessions, provide technical support, and conduct quality control of each program. The tables also show the program participants' (customers') incremental costs invested in the energy upgrades. The benefit-to-cost ratio indicates the ratio of the financial benefits (from the lifetime avoided energy costs[3]) to the combination of Efficiency Maine costs and participants' incremental cost.

[2] Periodically, the Trust enlists independent third-party contractors to evaluate the savings impacts of major programs. The evaluations help the Trust develop factors to improve the accuracy of gross savings calculations based on installation rates and actual, site-verified savings rates. The evaluations are also used to analyze program attribution, including identifying program participants who would have installed the same or equivalent efficiency measures on their own even if the program had not been offered ("free-ridership" [FR]) and the percentage of efficient equipment installed due to program influences even though no incentive or technical assistance was received ("spillover" [SO]). Factoring in free-ridership and spillover delivers "net savings," which quantifies the savings directly (adjusted gross minus FR) and indirectly (SO) attributable to the program. The Trust publishes the FR and SO factors in the Technical Reference Manuals (TRMs).

[3] The lifetime energy benefit shown in the summary tables, and in the individual program tables throughout this report, is calculated using methodologies and assumptions approved by the PUC as part of the approval process for the Trust's *Triennial Plan III*. The specific assumptions used to estimate avoided electric energy and capacity costs, avoided natural gas and other fuels costs, and avoided water costs are consistent with the settled agreement to reflect adjustments made in the Commission's Staff Bench Analysis - High Case (see Commission Staff, *Bench Analysis*, Docket 2015-00175, February 24, 2016, pp. 15–16), which references forecasts performed for the Commission by London Economics International in June 2015.

Table 3: Costs and Savings for Electric Programs

Program	Annual kWh Savings	Lifetime kWh Savings	Efficiency Maine Costs	Participant Cost	Lifetime Energy Benefit	Cost/kWh (Lifetime)	Benefit-to-Cost Ratio
Commercial and Industrial Custom Program Electric Measures	27,080,585	386,875,264	$3,735,137	$4,297,306	$15,779,564	$0.021	1.96
Commercial and Industrial Prescriptive Program Electric Measures	21,395,636	308,319,024	$6,275,157	$10,260,264	$29,562,077	$0.054	1.79
Commercial New Construction Program Electric Measures	1,028,909	20,578,188	$358,264	$1,201,122	$962,605	$0.076	0.62
Small Business Initiative	1,106,584	15,998,489	$1,818,995	$796,189	$2,333,051	$0.163	0.89
Consumer Products Program	39,583,238	448,554,238	$8,763,814	$17,493,758	$52,473,542	$0.059	2.00
Home Energy Savings Program Electric Measures	11,466,773	206,401,914	$3,619,171	$1,349,690	$10,832,043	$0.024	2.18
Low-Income Initiatives Electric Measures	12,024,882	117,636,560	$3,632,885	$3,363,848	$17,106,021	$0.059	2.44
Strategic Initiatives – Electric			$713,365				
Administration – Electric			$2,180,133				
Total	**113,686,608**	**1,504,363,676**	**$31,096,921**	**$38,761,977**	**$129,048,904**	**$0.046**	**1.85**

Table 4: Costs and Savings for Thermal Programs

Program	Annual MMBtu Savings	Lifetime MMBtu Savings	Efficiency Maine Costs	Participant Cost	Lifetime Energy Benefit	Cost/ MMBtu (Lifetime)	Benefit-to-Cost Ratio
Commercial and Industrial Custom Program Natural Gas Measures	18,462	204,284	$298,644	$215,451	$837,615	$2.52	1.63
Commercial and Industrial Custom Program Other Fuels Measures	251,871	3,125,655	$2,937,021	$3,727,324	$19,239,992	$2.13	2.89
Commercial and Industrial Prescriptive Program Natural Gas Measures	56,355	1,096,537	$694,979	$212,766	$4,553,679	$0.83	5.02
Commercial and Industrial Prescriptive Program Other Fuels Measures	33,289	618,161	$830,545	$207,020	$5,260,427	$1.68	5.07
Commercial New Construction Program Natural Gas Measures	1,638	32,768	$167,910	$549,115	$118,721	$21.88	0.17
Commercial New Construction Program Other Fuels Measures	306	6,128	$31,448	$92,523	$57,180	$20.23	0.46
Low-Income Initiatives Natural Gas Measures	33	500	$2,390	–	$2,349	$4.78	0.98
Low-Income Initiatives Other Fuels Measures	21,938	378,206	$1,101,090	$740,128	$3,808,117	$4.87	2.07
Home Energy Savings Program Natural Gas Measures	13,668	324,268	$571,245	$1,279,680	$2,741,378	$5.71	1.48
Home Energy Savings Program Other Fuels Measures	81,797	1,940,590	$3,182,759	$7,658,274	$16,405,840	$5.59	1.51
Renewable Energy Demonstration Grants Program			$0				
Strategic Initiatives – Thermal			$73,224				
Administration – Thermal			$646,110				
Total	**479,359**	**7,727,097**	**$10,537,366**	**$14,682,282**	**$53,025,298**	**$3.26**	**2.10**

As discussed in the "Finance and Administration" section of this report, the Trust invested more than $44.8 million in FY2017 to fund the programs and cost savings described above. Table 5 provides a summary of the Trust's payments during FY2017.

The following sections of the Annual Report provide short descriptions of each of the programs referenced in Table 3 and Table 4. Each description generally includes a statement of the main purpose of the program, a brief explanation of the activities undertaken to implement the program, and a summary of quantifiable results.

Table 5: FY2017 Payments Made[4]

Use of Funds	Amount
Programs	**$38,007,651**
Commercial and Industrial Custom Program	$6,768,852
Commercial and Industrial Prescriptive Program	$7,793,748
Commercial New Construction Program	$557,621
Small Business Initiative	$1,829,674
Consumer Products Program	$8,947,837
Home Energy Savings Program	$8,155,893
Low-Income Initiatives	$3,954,026
Renewable Energy Demonstration Grants Program	–
Strategic Initiatives and Administration	**$3,610,900**
Strategic Initiatives	$786,589
Administration	$2,824,311
Other Payments	**$3,264,238**
Total Use of Funds – Efficiency Maine Trust	**$44,882,789**

[4] The financial data reported in Table 5 is slightly different from that in Table 3 and Table 4 due to differences in accruals. Generally, Table 3 and Table 4 reflect savings, costs, and benefits based on project completion dates, while Table 5 is based on accrual-basis accounting.

Efficiency Maine Programs

Commercial and Industrial Custom Program

The Commercial and Industrial (C&I) Custom Program incentivizes tailored energy efficiency projects that require unique engineering analyses and/or projects with energy conservation measures that are not covered by prescriptive incentives. The C&I Custom Program is designed to overcome the barriers confronting Maine's larger businesses and institutions when making investments in complex energy efficiency and distributed generation projects. These projects represent important facility improvements that keep operating costs down for Maine's largest energy users.

Commercial and Industrial Custom Program

Sectors Served

- Commercial and Industrial

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market
- Long-Term Contract

FY2017 Activities

In FY2017, the program continued its strategy of focusing on attracting a diverse set of customers. To that end, program staff conducted targeted outreach to hospitals, assisted living facilities, schools, and other institutions. The Trust worked closely with key representative associations, such as the Maine Health Care Association, to identify opportunities in these types of facilities. The program also sought out opportunities for natural gas customers, building on the expanded eligibility to all utility territories in FY2016. Finally, the program continued its outreach to large manufacturers and followed up with customers who expressed interest in developing new, complex projects at their facilities.

With the launch of Triennial Plan III and the consolidation of all custom projects under one program, in FY2017 the Trust started a concerted effort to reach out to medium-sized C&I customers in search of opportunities that were smaller than past projects, but still large enough to justify the cost and effort of a custom review. This effort included instituting a reduction in the minimum project incentive from $100,000 to $10,000 at the end of FY2016. The shift sparked significant program activity in FY2017; program staff initiated 40 projects with incentives under $200,000.

Triennial Plan III also identified combined heat and power (CHP) as the measure with the largest potential within the C&I Custom Program. In an effort to jump start the market for CHP in Maine, the Trust launched a targeted outreach campaign in FY2017. Program staff held a CHP Forum in the fall, inviting prospective customers, vendors, and other stakeholders to learn about the technology, familiarize themselves with program guidelines, and hear from past participants. Program staff also initiated a limited-time promotional incentive. These initiatives spurred significant interest in the program; the Trust received nine CHP applications in FY2017, ultimately awarding five participants more than $2.3 million in incentive offers.

The Trust continued to employ an incremental approach to developing projects with the largest energy users in the state. This approach encourages customers to selectively pursue energy

projects that meet their own priorities rather than requiring them to conduct an expensive, comprehensive energy-planning process. Specifically, the Trust contacted new customers with the goal of completing a single project that fit within the customer's budgeting process. As the customer was guided through the incentive process for an initial project, the Trust sought to identify additional opportunities that built off prior efficiency projects.

Finally, the C&I Custom Program worked through program eligibility changes stemming from the passage of Legislative Document (LD) 1398, "An Act to Reduce Electric Rates for Maine Businesses," in the Maine State Legislature in late FY2016. The bill required that, for each of the following three years, $3 million in annual Regional Greenhouse Gas Initiative (RGGI) revenues be returned to a group of "affected customers" (a subset of Maine's energy-intensive manufacturers) in the form of a disbursement. This refund rendered affected customers ineligible for RGGI-funded energy efficiency incentives, except in cases where they applied the disbursement to a qualifying efficiency project. The bill included language regarding modified incentive levels for these cases. In the fall of FY2017, program staff convened a stakeholder group consisting of affected customer representatives, policy makers, and other interested parties to interpret this language and help guide the Trust toward an official protocol. The program adopted this protocol in early January 2017 and applied it to one project in FY2017.

FY2017 Results

Table 6 and Table 7 show the results for the C&I Custom Program in FY2017, separated into savings of electricity (measured in kWh) and savings of other energy (measured in MMBtu), including natural gas and other fuels (oil, propane, biomass, etc.). During FY2017, the program completed 39 projects for an estimated total lifetime savings of more than 386 million kWh and 3.3 million MMBtu. The savings resulted in a benefit-to-cost ratio of 1.96 for electric measures, 1.63 for natural gas measures, and 2.89 for other fuels measures. Incentives paid by the Trust leveraged more than $8.2 million in incremental private investment.

Table 6: C&I Custom Program Electric Results

Metric	Value
Total Participants	30
Total Projects	31
Annual kWh Savings	27,080,585
Lifetime kWh Savings	386,875,264
Efficiency Maine Costs	$3,735,137
Participant Costs	$4,297,306
Lifetime Energy Benefit	$15,779,564
Benefit-to-Cost Ratio	1.96

Table 7: C&I Custom Program Thermal Results

	Value	
Metric	Natural Gas	Other Fuels
Total Participants	1	5
Total Projects	2	6
Annual MMBtu Savings	18,462	251,871
Lifetime MMBtu Savings	204,284	3,125,655
Efficiency Maine Costs	$298,644	$2,937,021
Participant Costs	$215,451	$3,727,324
Lifetime Energy Benefit	$837,615	$19,239,992
Benefit-to-Cost Ratio	1.63	2.89

FY2017 Analysis

Maine businesses in the C&I Custom Program relied primarily on outside contractors and vendors to identify energy efficiency opportunities in FY2017. Most of these projects required site-specific engineering beyond what most energy contractors or vendors are willing to explore on speculation. Accordingly, the Trust targeted its customer outreach to overcome this lack of site-

specific assessment and expertise by providing free scoping audits to identify projects.

In FY2017, the program completed eight scoping audits. One of these resulted in a C&I Custom Program project application in FY2017, and four resulted in referrals to the C&I Prescriptive Program. The others remain in the pipeline of potential projects for FY2018. Activity in FY2015 and FY2016 suggests that, on average, 14% of scoping audits ultimately lead to technical assistance (TA) studies and 43% of scoping audits lead to project implementation in subsequent fiscal years.

The Trust administered TA grants to support development of potential projects involving complex energy efficiency and distributed generation projects. The program approved four TA incentives over the course of the year, two of which led to full project implementation. This outcome represents a TA-to-project conversion rate of 50%. Of the 20 studies completed during the past four fiscal years (FY2014, FY2015, FY2016, and FY2017), 15 projects were approved for investment. This result represents an average TA-to-project conversion rate of 75%. The Trust anticipates that one more of these TA grantees will follow through with a viable project installation application in FY2018, which would increase the average conversion rate to 80%.

The number of projects resulting from scoping audits and TA studies suggests that the program's approach of dedicating resources to those activities is both important and effective. The program involves multi-year project planning and budgeting. In addition to empowering and encouraging customers to move forward with meaningful energy efficiency projects, scoping audits and TA studies can help customers reduce costs. Moreover, the program scrutinizes the work of engineering firms and contractors, reducing the risk that customers will pay for inflated costs or unnecessary add-ons.

FY2018 Plans

The program opens FY2018 with 44 potential projects in various stages of planning and execution. The Trust generally anticipates maintaining the program strategy and activities consistent with what was done in FY2017, with two notable exceptions.

First, program staff will place added emphasis on targeting opportunities for natural gas customers. Given the low price of natural gas, customers were not especially motivated to invest in natural gas efficiency measures in FY2017. This economic environment suggests that program staff have a challenging year ahead. Fortunately, the program now has access to a larger pool of potential customers; in late FY2017, the Legislature voted to require previously exempt large natural gas utility customers to pay a natural gas assessment, so they are now eligible for the Trust's natural gas programs.

Second, in FY2018 the C&I Custom Program will not offer incentives for thermal efficiency projects that reduce the consumption of oil, biomass, and fuels other than natural gas. In the face of significant RGGI budget constraints, the program suspended measures targeting these unregulated fuels in late FY2017. Unless and until there is a sustained upturn in RGGI auction revenue proceeds, such measures will remain suspended in FY2018. This budget constraint will also affect large natural gas projects; without the ability to supplement those project incentives with RGGI funds, the program will reduce the incentive limit from $1 million to $500,000 per project.

Though the Trust will not offer a promotional incentive for CHP projects, program staff expects

FY2018 to be another busy year for this technology. Outreach efforts in FY2017 created considerable momentum in the Maine marketplace.

As in past years, the Trust will work to accommodate the potential for a small number of extremely large custom project proposals should such proposals be brought to the program's attention. In the event that project proposals in FY2018 show potential for significant, cost-effective electricity savings but exceed the existing program incentive limit of $1 million per project, the Trust may work with customers to bring a specific funding request to the Public Utilities Commission (PUC) to be considered for funding through a long-term capacity contract.

Commercial and Industrial Prescriptive Program

The Commercial and Industrial Prescriptive Program (CIP) offers fixed-price financial incentives for a predefined list of "off-the-shelf," widely available efficiency measures. Typical measures promoted through this program include lighting fixtures, heating systems, and sector-specific solutions, such as commercial kitchen appliances and agricultural equipment. These measures have practical applications across the state in commercial, industrial, nonprofit, government, and institutional settings.

Commercial and Industrial Prescriptive Program

Sectors Served

- Commercial and Industrial
- Small Businesses
- Multifamily (≥5 units)

Funds Invested

- Electric Efficiency Procurement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market

FY2017 Activities

The program incentivized a robust mix of energy efficiency solutions, including indoor and exterior lighting, space and water heating systems, cooling systems, agricultural equipment, compressed air equipment, commercial kitchen appliances, and many kinds of controls.

The beginning of the fiscal year focused on re-opening the program to new lighting and other electrical efficiency applications. For all of the prior fiscal year, the program had been closed to new applications for these measures while the backlog of previously approved projects was completed and processed. The Trust engaged with the Qualified Partner (QP) network and other contractors to discuss incentivized measures and program guidelines that had been updated in FY2016. This outreach included in-person workshops held across the state, webinars, and newsletters. Those efforts paid off, with a significant number of new contractors joining the Trust as trade allies and a robust number of projects completed over the course of the year. As in years past, QPs identified potential customers, developed project opportunities, and submitted electronic applications.

The Trust also conducted targeted outreach to customers of specific commercial and industrial (C&I) sectors deemed most likely to have particular efficiency opportunities. For example, the Trust promoted upgrades to parking lot lighting at car dealerships, combining direct mail, outreach to the industry association, and a limited-time incentive bonus. Similarly, the Trust directly marketed efficient commercial kitchen equipment to restaurants across the state. In addition, the Trust reached out to natural gas customers with efficiency opportunities, and collaborated with the gas utilities to provide rebate coupons to prospective natural gas customers as they considered purchasing new gas-fired equipment.

In FY2017, the Trust implemented a number of program changes to CIP. Lighting incentives were transitioned exclusively to LEDs and LED controls at the start of the fiscal year. In addition, the Trust reviewed equipment prices and installation costs to inform quarterly adjustments to incentive levels. The Trust also transitioned from using a rebate approach for incentives for the most common natural gas, compressed natural gas, oil,

and propane heating systems to the use of an instant discount. Under this new approach, the instant discount is applied by the heating distributors, reducing paperwork handled by the contractors and eliminating time delays for a customer to receive the financial incentive.

FY2017 Results

In FY2017, close to 2,000 lighting and other electricity-saving projects were completed, estimated to result in more than 308 million kWh of lifetime energy savings. Many of these measures had a high coincidence with times of peak energy demand. These measures are projected to reduce summer peak demand by more than 5 MW.

In addition to the electric measures, CIP incentivized 538 thermal upgrades (i.e., high-efficiency heating systems and controls). Together, these measures are projected to result in more than 1.7 million MMBtu of lifetime energy savings, or roughly the energy required to heat more than 15,000 homes for one year. In addition to the energy savings, participating businesses will enjoy reduced maintenance costs, increased productivity, and other unquantified benefits.

Table 8: C&I Prescriptive Program Electric Results

Metric	Value
Total Participants	1,454
Total Projects	1,988
Annual kWh Savings	21,395,636
Lifetime kWh Savings	308,319,024
Efficiency Maine Costs	$6,275,157
Participant Costs	$10,260,064
Lifetime Energy Benefit	$29,562,077
Benefit-to-Cost Ratio	1.79

Table 9: C&I Prescriptive Program Thermal Results

	Value	
Metric	Natural Gas	Other Fuels
Total Participants	63	68
Total Projects	70	468
Annual MMBtu Savings	56,355	33,289
Lifetime MMBtu Savings	1,096,537	618,161
Efficiency Maine Costs	$694,979	$830,545
Participant Costs	$212,766	$207,020
Lifetime Energy Benefit	$4,553,679	$5,260,427
Benefit-to-Cost Ratio	5.02	5.07

FY2017 Analysis

Activity for lighting projects was slow to get off the ground as the incentives were reintroduced after the suspension of new electrical efficiency projects in FY2016. At the outset of FY2017, many contractors had stopped "selling" efficiency projects and many contractors and customers believed that the program was shut down. Targeted outreach to contractors, customers, and customer networks and industry associations led to a return to participation levels close to what the Trust had forecast in its Triennial Plan, but there was a significant lag between the start of the fiscal year and expected activity.

In FY2016, the Trust implemented several program and project management changes to reduce the risk of a surge in interest like the one experienced in FY2015. Those changes, including quarterly reviews of incentive amounts and shorter deadlines for project completion, had the desired results: Fewer Trust funds were tied up in prospective projects and the project pipeline became more predictable and manageable.

Uptake of natural gas efficiency measures was higher than in prior years. This result stems from a concerted effort on the part of the Trust and the local distribution companies to inform customers

about efficiency opportunities and available incentives.

Importantly, several heating measures were moved "midstream" in FY2017; the Trust discounted equipment with instant rebates at the distributor level rather than providing rebates after the customer completed the purchase and installation of the project. Many boilers and furnaces are replaced immediately after the existing unit fails. Evidence suggests that the time lag inherent in using a rebate is less effective at influencing the very short time frame of a purchasing decision for a replacement heating unit. Instant discounts, by contrast, are expected to be more effective in the relevant time frame and also to reduce the application burden for contractors.

FY2018 Plans

The program will continue to incentivize a robust mix of energy efficiency solutions. As appropriate, incentives will migrate to midstream discounts to capture more of the emergency replacement market and to reduce the incentive processing time for installing contractors. In FY2018, this shift may extend to some lighting fixtures and HVAC measures. In addition, the Trust will continue to prioritize lighting design and advanced lighting controls to ensure that new LED installations take advantage of the control capabilities inherent in LED technology.

The Trust will continue to monitor program activity to ensure a high level of participation of eligible customers and will market efficiency opportunities directly to Maine businesses. These efforts will include collaborating with the natural gas utilities for ongoing customer identification and education and to target specific sectors with significant natural gas-saving opportunities.

Commercial New Construction Program

The Commercial New Construction Program provides a pathway for achieving significant energy savings in new construction or major renovation projects in commercial buildings. In FY2017, the program continued use of the Maine Advanced Buildings Program (MAB) framework, based on standards from the New Buildings Institute (NBI). MAB offers education and financial incentives to promote and encourage a whole-building, integrated design approach, resulting in projects that exceed baseline code requirements for energy efficiency. The program provides an alternative to the often-used "design-build" approach. Incentives in FY2017 targeted comprehensive energy design and savings rather than individual efficiency measures.

Commercial New Construction Program

Sectors Served

- Commercial and Industrial
- Small Businesses
- Multifamily (≥5 units)

Funds Invested

- Electric Efficiency Procurement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative

FY2017 Activities

As with projects in the Commercial and Industrial (C&I) Custom Program, it typically takes several years to bring high-performance building projects from initial plans to completion. MAB supports building owners, architects, and construction teams at various phases of the design and construction process, from conceptual drawings to air sealing assessments to final walk-through inspections. In FY2017, six completed MAB projects were processed, several new building projects entered the program, and others reached important interim milestones in the construction process. Of note in the program's design, the Trust clarified in FY2017 that multifamily buildings with five or more units (apartments) are eligible for program participation.

In addition to supporting program participants at various stages of the new construction process, the program focused marketing efforts on Maine's architectural and engineering community. These efforts included outreach to professional associations, participation in professional events, and meetings with the primary architecture and engineering firms working in Maine. Architects and engineers, in turn, marketed the program during project proposals and in initial conversations with their clients. Most high-performance building projects must start at the earliest stages of conceptual design to meet energy standards. The Trust has found that the best way to be sure that the program is "at the table" during the design phase of new construction projects is to promote it through the work of design professionals.

FY2017 Results

Six high-performance building projects initiated in prior fiscal years were completed in FY2017: a substantial high school expansion project in Wells; an office building in Lewiston; a multifamily building in Portland; and three community centers in Portland, Belfast, and Presque Isle.

Two of these projects were particularly notable: the Bayside Anchor development in Portland and the Sargent Family Community Center in Presque Isle.

- Bayside Anchor is a mixed-use building co-developed by the Portland Housing Authority (PHA) and Avesta Housing. It includes 45 residential apartments (primarily affordable housing), PHA offices, and a Head Start classroom and daycare center, as well as a community policing center. The building features a highly efficient building shell. The exterior construction included thick insulation and reduced air infiltration, reducing the building's heating load by an estimated 45% compared to a design that meets minimum code requirements. As such, it is able to rely exclusively on ductless heat pumps (DHPs), electric baseboard heating, and ventilation with heat recovery to meet all of its heating needs. The project originated as the winning entry in "Lowering the Cost of Housing," a 2013 national competition organized by Deutsche Bank. In addition to meeting MAB standards, the building was built to Passive House standards. The project is expected to save 128,312 kWh and 3,100 MMBtu per year compared to a conventional building.
- The Sargent Family Community Center in Presque Isle is notable for its lighting design. First, it features an advanced lighting controls system that adjusts lighting levels in response to occupancy and daylight. Second, its optimized daylighting and solar shading features allow for 45% natural illumination, dramatically reducing the building's lighting load. The building also includes noteworthy envelope features: In addition to significant insulation in the foundation, walls, and roof, it boasts a continuous air barrier system to reduce air leakage. With this efficient envelope, the building can be heated with low-temperature hydronic radiant floor heating fed by highly efficient condensing propane boilers. The project also included heat-recovery ventilators with variable refrigerant flow and a number of variable frequency drive applications. All together, these strategies are expected to deliver annual energy savings of 95 MWh compared to a conventional building.

In total, the six projects completed in FY2017 are projected to realize more than $1.13 million in lifetime energy benefit. Each project resulted in either electric savings exclusively, a combination of electric and natural gas savings, or a combination of electric and other fuels savings; the results are summarized separately in Table 10 and Table 11.

Table 10: Commercial New Construction Program Electric Results

Metric	Value
Total Participants	6
Total Projects	6
Annual kWh Savings	1,028,909
Lifetime kWh Savings	20,578,188
Efficiency Maine Costs	$358,264
Participant Costs	$1,201,122
Lifetime Energy Benefit	$962,605
Benefit-to-Cost Ratio	0.62

Table 11: Commercial New Construction Program Thermal Results

	Value	
Metric	Natural Gas	Other Fuels
Total Participants	3	1
Total Projects	3	1
Annual MMBtu Savings	1,638	306
Lifetime MMBtu Savings	32,768	6,128
Efficiency Maine Costs	$167,910	$31,448
Participant Costs	$549,115	$92,523
Lifetime Energy Benefit	$118,721	$57,180
Benefit-to-Cost Ratio	0.17	0.46

FY2017 Analysis

With the adoption of more-stringent assumptions about the long-term avoided costs and the net present value of those costs in FY2017, the final results for the six completed MAB projects yielded a significantly reduced estimated lifetime energy benefit compared to prior years. As reported in Tables 10 and 11, the program's benefit-to-cost ratios fell below the threshold of 1.00.

FY2018 Plans

The Trust plans to suspend acceptance of new applications in MAB in FY2018 because its existing design is no longer cost-effective under current cost-effectiveness calculation assumptions. Program staff will explore alternative ways to identify cost-effective opportunities in commercial new construction. In the meantime, the program will encourage developers and contractors to take advantage of measures offered through the C&I Prescriptive Program when there are suitable opportunities at new construction projects.

Small Business Initiative

The Small Business Initiative (SBI) delivers efficiency retrofits directly to small businesses. Specifically, the initiative combines local marketing, competitive product pricing, and contractor support with streamlined delivery to incentivize customers in targeted geographic areas. This approach is designed to overcome the specific barriers to energy efficiency that small businesses experience. These barriers include the lack of time and in-house expertise to analyze energy options, the relatively low priority contractors place on assessing opportunities at small businesses, and the perceived inconvenience of making arrangements to purchase and install upgraded equipment. This initiative reduces these obstacles by bringing information and technical support to the customer's doorstep, offering enhanced financial incentives (compared to the incentives of the Commercial and Industrial Prescriptive Program), and directly scheduling and executing energy upgrades.

Small Business Initiative

Sectors Served

- Small Businesses

Funds Invested

- Electric Efficiency Procurement

FY2017 Activities

The Trust launched SBI in the fall of 2017 with two significant program updates from the previous year. First, program participation was limited to businesses having electricity demand under 25 kW. Second, as in other programs, lighting incentives were shifted exclusively to LEDs. These program changes enabled the initiative to prioritize the numerous smaller businesses in need of support and to ensure that those upgrades were as efficient as possible.

SBI focused on two large, rural regions in FY2017: the Naples/Bridgton area and the Route 2 corridor from Bethel to Skowhegan. These areas were identified as having a significant number of businesses that are very small and are traditionally underserved by the marketplace for energy services. Dozens of local electricians and lighting contractors were invited to work in the initiative so that businesses across the targeted areas could participate concurrently. Interested customers in each targeted region received a site visit and lighting assessment by the participating local contractor(s) to determine eligibility and scope of work. Those who authorized the projects to move forward were scheduled for turnkey installation of LEDs. Efficiency Maine incentives were applied directly to the contractor's invoice, leaving the participating business to pay only the remaining project costs.

SBI also partnered with local organizations and municipal officials to market the initiative by hosting informational events and directly contacting local businesses. The Trust also spread the word about the offering through local papers, social media, radio, and direct mail. Many of these outreach pieces featured local case studies and success stories.

In the fourth quarter of FY2017, the Trust launched SBI in a third region: the greater Sanford and Berwick area. The initiative ended availability for the Naples and Route 2 regions at the end of that quarter, although many projects remained in the pipeline for completion and will be reported in FY2018.

FY2017 Results

In total, 219 businesses completed 266 projects through SBI in FY2017. The LEDs that were installed are projected to reduce electricity consumption by approximately 16 million kWh over the life of the projects. More than a hundred additional businesses in the regions started projects in FY2017 that will be completed and reported in FY2018. The average participating business will save approximately $860 per year on electric bills at current rates.

Table 12: Small Business Initiative Results

Metric	Value
Total Participants	219
Total Projects	266
Annual kWh Savings	1,106,584
Lifetime kWh Savings	15,998,489
Efficiency Maine Costs	$1,818,995
Participant Costs	$796,189
Lifetime Energy Benefit	$2,333,051
Benefit-to-Cost Ratio	0.89

FY2017 Analysis

To target as many businesses as possible in the participating regions, SBI significantly increased outreach efforts and contractor recruitment. Outreach efforts ranged from digital ads to "lunch-and-learn" workshops to contractors knocking on doors selling efficiency projects. The initiative also purchased commercial mailing lists and outsourced certain marketing activities. This focus on recruitment resulted in more contractors working in the initiative and twice as many participants completing projects in FY2017 than in FY2016.

Although participation increased, the typical project completed through SBI was smaller than in years past due to the initiative's focus on the smallest business customers. The combination of outsourcing much of the outreach and recruitment, and the labor required by more, smaller projects, resulted in an increase in delivery costs.

While individual measures that were promoted through the initiative in FY2017 have the potential to be solidly cost-effective, certain combinations of promoted measures and existing baseline lighting fixtures selected by contractors for a number of actual projects proved to be not cost-effective. Overall, a combination of higher delivery costs and less cost-effective project permutations resulted in a program benefit-to-cost ratio that slipped below the threshold target of 1.0. With respect to delivery costs, it is worth noting that the delay between when costs are incurred and when savings are reported may, as happened in FY2017, result in an initiative-wide benefit-to-cost ratio that does not necessarily reflect the cost-effectiveness of specific projects that were completed or those that began last year and are pending completion. A portion of the Trust's upfront delivery investment in FY2017 will generate energy-saving dividends for projects in the pipeline that are completed in FY2018.

SBI's efforts to work with more contractors in each region helped meet the interest level throughout the targeted region, but the initiative experienced a backlog of projects between the assessment and installation phases. This slow-down will be addressed in FY2018 by targeting smaller geographical regions, scheduling groups of businesses for assessments, and increasing oversight of contractor availability in order to manage a steady stream of businesses at different steps in the process.

In FY2017, the Trust explored moving beyond lighting to add other efficiency measures to SBI. Contractors identified other efficiency opportunities when conducting SBI lighting assessments in these regions. On balance, staff decided that, for the immediate future, simplicity remains

important for generating customer uptake, and the initiative would not extend to other measures. Efficient lighting represents a ubiquitous need, served by a common technology for all businesses. Furthermore, the installation process is relatively simple; including other technologies might require a local contractor base with broader skill sets that is more time consuming to find and schedule. As a subsequent phase of the initiative, other efficiency solutions, including refrigeration measures or ductless heat pumps (DHPs), may be offered to the businesses in regions in which projects were implemented in the past.

FY2018 Plans

In prior years, SBI targeted towns located outside the state's most densely populated markets and the energy efficiency supply chain, or locations (such as Waterville) where efficiency measures will enhance grid reliability. In FY2018, the initiative will complete pending projects in the Naples/Bridgton area and the Route 2 corridor from Bethel to Skowhegan. In addition, work will continue in the Sanford and Berwick area. Depending on funding availability, the Trust will expand to one or more additional regions. For example, staff is working with Emera to explore instituting an on-bill financing option in a region within Emera territory; this would help eliminate upfront cost barriers for participating customers.

Because launching the initiative in new regions can be time-intensive and, like in FY2017, can result in significant upfront administrative costs, the initiative will institute modifications to lower launch costs. One important improvement in this regard is the Trust's ability to have access to electric utility customer data to identify and prioritize potentially eligible small businesses. In FY2017, the initiative relied on paid mailing lists, help from ad agencies, and sponsorship of community events to connect with prospective participants. Going forward, the initiative can take advantage of utility data to show us which potential customers are the appropriate size and use significant amounts of electricity. This will significantly change outreach efforts in FY2018. SBI will target eligible customers with direct sales, organized down to the neighborhood level.

This enhanced identification and outreach to prospective customers may also help SBI be more efficient in its deployment of contractors to perform assessments, which could save overall delivery costs. Additionally, this micro-targeting will allow the initiative to manage interest in the program and create a regular pipeline of projects from sales call to assessment to installation; it will also shorten the lag between launch and project completion that negatively affected the benefit-to-cost ratio in FY2017. The initiative will further cut delivery costs by introducing lower-cost fixtures to take advantage of the changing LED marketplace, and by excluding certain combinations of measures where recent results showed they do not survive the cost-effectiveness screening.

Consumer Products Program

The Consumer Products Program focuses on energy-saving measures that sell in relatively high volumes and that, on average, achieve predictable energy savings. The program leverages relationships with retailers and distributors of energy-efficient products to discount products on the shelf or to distribute rebate information at the point of purchase. Of all the Trust's programs, the Consumer Products Program reaches the largest number of Maine customers; it also serves all sectors of the economy: commercial, industrial, and residential (including low-income) customers.

Consumer Products Program

Sectors Served

- Commercial and Industrial
- Small Businesses
- Multifamily
- Residential
- Low-Income Households

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Maine Power Reliability Program
- Forward Capacity Market

FY2017 Activities

The program rebated high-efficiency clothes washers and heat pump water heaters (HPWHs) from the beginning of FY2017. Room air purifiers were offered through the program starting in the third quarter of the fiscal year. Also in the third quarter, the program adjusted the HPWH incentive amount and added an instant discount for units purchased at distributors. The instant discount was added to reduce the first-cost barrier for potential customers and thus capture more of the water heater market, particularly units purchased by plumbers and those purchased as emergency replacements.

In addition, the program discounted high-efficiency lights at retailers. At the beginning of FY2017, the program ceased incentivizing CFLs and incentivized LED bulbs exclusively. Over the course of the year, a mix of LED types was incentivized, including specialty bulbs and non-ENERGY STAR® bulbs that met high-efficiency standards.

The Trust also conducted an LED bulb price elasticity study. The results of the study, which evaluated the price points at which customers purchase bulbs, is described in detail in the Evaluation, Measurement, and Verification (EM&V) section of this report.

The program also targeted screw-in LED bulb purchases at lighting distributors, where businesses and electrical contractors are able to purchase bulbs for both commercial and residential installations. To capture the potential energy savings of screw-in bulbs purchased through this channel, the program undertook significant direct outreach to distributors, providing training to sales staff and managers. The program also provided in-store signage and information and directly marketed the opportunity to businesses likely to have energy-saving opportunities.

FY2017 Results

In FY2017, the program incentivized more than 4,000 HPWHs, 9,000 clothes washers, and 500 room air purifiers. Despite a slow start to HPWH participation, program numbers significantly increased after adjusting the rebate amount and adding the instant rebate at distributors. The program incentivized nearly 1.2 million high-

efficiency LED bulbs, providing roughly 307 million kWh of lifetime savings. More than 200,000 of those bulbs were incentivized through lighting distributors. Most bulbs purchased through the distributor channel were installed in commercial settings, which yield high energy savings due to their daily hours of use and coincidence with peak power periods. High-efficiency screw-in bulbs in commercial settings are one of the most effective ways that the Trust can reduce peak demand. Indeed, bulbs installed in FY2017 through this channel alone are forecast to reduce peak summer demand by 6,094 kW.

Bulb sales at retailers and distributors resulted in significant energy savings, notwithstanding the reduction in calculated energy savings due to the phase-in of higher efficiency standards established in the 2007 Energy Independence and Security Act (EISA). In addition, the Trust took into account the interactive effect of lighting energy savings: High-efficiency lighting typically reduces cooling load where it is installed, but also results in a modest increase to the heating load.

All told, the energy savings from these high-efficiency appliances and bulbs will be more than 448.5 million kWh over the life of the equipment. This is roughly the equivalent amount of electricity required to power more than 73,000 homes for one year.

Table 13: Consumer Products Program Results

Metric	Value
Total Bulbs	1,249,651
Total Appliances	15,112
Annual kWh Savings	39,583,238
Lifetime kWh Savings	448,554,238
Efficiency Maine Costs	$8,763,814
Participant Costs	$17,493,758
Lifetime Energy Benefit	$52,473,542
Benefit-to-Cost Ratio	2.00

FY2017 Analysis

The uptake of HPWHs in the first two quarters was lower than in previous years, due to a lower incentive amount ($250) than the program had offered in the past ($500). The Trust had hoped that an increased familiarity with the technology and its broad availability would enable a reduced incentive to encourage customers and their contractors to install this technology. It became clear during the fiscal year that the lower incentive was not sufficient to achieve the cost-effective potential for this measure that was reflected in Triennial Plan III. To drive higher participation, the Trust employed two modifications in addition to maintaining aggressive outreach. First, the incentive was increased to an amount that was commensurate with incentives offered in nearby states and had been determined, through a pricing assessment, to be a tipping point for consumers. Second, the Trust added an instant rebate for HPWHs purchased at distributors. The instant rebate enabled the program to capture more of the units installed by plumbers and more of the units purchased as emergency replacements. The combination of a simultaneous mail-in/instant approach recently proved successful in Vermont.

These changes spurred demand, which in turn prompted HPWH manufacturers to lower their prices in Maine, further increasing activity. The instant rebate, combined with the manufacturers' promotional prices, made the technology cost-competitive with electric resistance water heaters for the first time. Like a mail-in rebate, the instant rebate addresses the first-cost barrier for many homeowners interested in switching from a conventional water heater to a HPWH. More importantly, the instant rebate eliminates the need to front the full cost of the HPWH and wait for a rebate check.

HPWHs were still available at retail stores and remained eligible for mail-in rebates. The launch of the distributor instant rebate reduced the volume of retail mail-in rebates, but the number redeemed in FY2017 indicates that retail stores and do-it-yourself (DIY) installations still represent a significant portion of the water heater market.

The Trust began the year with lighting incentives that brought LED bulb prices close to the price of incandescent or halogen bulbs, but still not competitive enough to drive sales. Fewer high-efficiency bulbs were purchased at these price points than had been forecast. To boost sales of cost-effective LEDs, a marketing fee was offered to retailers for promotion of "off-shelf" placement of the bulbs. Among the more common examples of off-shelf merchandising are displays at the end of aisles (end caps) and in-aisle floor displays (wing stacks and pallet displays). By the end of the fiscal year, this shift had resulted in a significant increase in sales of the cost-effective, high-efficiency standard LEDs at Maine's large retail stores.

The Trust's promotion of screw-in LED bulbs at distributors complemented these efforts at retail stores and captured additional screw-in bulb sales to the commercial sector. The instant discounts also incentivized distributors and electrical contractors to target screw-in bulbs as part of their lighting projects.

FY2018 Plans

The Trust will continue to focus on providing an instant HPWH rebate at distributors to complement the mail-in rebates offered at retail locations. In addition, the Trust will continue its plumber and distributor education to ensure that installation contractors are fully versed in the opportunities presented by the technology as well as in HPWH installation criteria. This effort will be complemented by providing a blend of point-of-purchase information, sales associate training, digital advertising, and customer education.

The Trust plans to continue to offer off-shelf marketing fees to retailers for favorable product placement. The program will also continue to monitor and adjust lighting incentives to track changes in market prices and reflect learnings from the elasticity study.

Home Energy Savings Program

The Home Energy Savings Program (HESP) drives market-based home weatherization and efficient heating systems by offering rebates and loans, providing customer education, and developing a vendor network. HESP encourages energy upgrades in single-family homes and multifamily homes with up to four units.

Home Energy Savings Program

Sectors Served

- Multifamily (<5 units)
- Residential
- Low-Income Households

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market
- Federal/Other

FY2017 Activities

Program activity in FY2017 fell into one of four categories of measures: supplemental heating systems, central heating systems, water heating systems, and building envelope improvements.

Despite continued low energy prices, program activity was steady through the course of the year. The program undertook a number of outreach campaigns to maintain customer awareness and demand, particularly in the spring, when HESP activity typically declines. The program published advertisements in newspapers and magazines and continued its robust web campaign. In addition to advertising with online media, the program significantly expanded its social media presence, using videos and digital media to engage viewers and catalyze productive conversations around energy use.

Program staff also made routine visits to communities, attended public events throughout the state, and generated earned media by conducting interviews about the offerings and benefits of the program and of energy efficiency in general. Staff developed materials like the "Energy Assessment Checklist"[5] and the "Collective Purchase Toolkit"[6] to encourage homeowners and municipalities to think about energy efficiency and to help them take the next step. The program also reached out to past participants with "Heat Pump User Tips"[7] to ensure that homeowners were getting the most from their equipment. Program staff engaged the home performance contractor community directly through phone and email communications, as well as through monthly webinars.

HESP implemented several notable incentive changes in FY2017. Due to declining revenue from the Regional Greenhouse Gas Initiative (RGGI), program staff lowered incentives for the RGGI-funded HESP measures in March. Incentives for insulation dropped from $700 per zone to $500 per zone, incentives for selected heating systems (propane, kerosene, oil boilers, and furnaces, as well as wood and pellet stoves) dropped from $500 to $300, and the maximum incentive for ultra-low greenhouse gas (GHG) measures (geothermal heat pumps and pellet boilers) dropped from $5,000 to $3,000.

[5] http://www.efficiencymaine.com/docs/HESP-Energy-Assessment-Checklist.pdf.

[6] https://www.efficiencymaine.com/at-home/collective-purchase/.

[7] https://www.efficiencymaine.com/docs/Heat-Pump-User-Tips.pdf.

While RGGI funding decreased over the course of the year, funding from the electric and natural gas efficiency procurements remained stable. HESP added several new cost-effective measures to help invest these funds, including an additional $250 incentive for a ductless heat pump (DHP) installation in a second zone and a $300 incentive for natural gas water heaters. The program was also able to stabilize insulation incentives for homes heated with natural gas by offsetting the decreased base incentive with an increase in the natural gas "adder" from $700 to $900.

Finally, HESP maintained a variety of loan product offerings in FY2017. These included Property-Assessed Clean Energy (PACE) loans, unsecured energy loans, and micro-loans. These low-interest loans help drive energy efficiency projects by removing first-cost barriers to participation.

FY2017 Results

As with the first three years of program activity, DHPs remained the most popular measure in FY2017. Indeed, the program incentivized nearly 4,800 first-zone residential DHP installations across the state. Additionally, more than 1,200 second-zone DHPs were installed in FY2017, newly eligible for the program in late fall of 2016. Community initiatives also had significant local impact on program activity in FY2017: Bangor saw a 50% increase in completed projects with the Energy Smart Bangor initiative, while Rockland experienced a 200% increase in completed projects with Weatherize Rockland.

In FY2017, Efficiency Maine provided 417 loans supporting $3.2 million worth of home energy upgrade projects; unsecured loans accounted for 92% of dollar volume and 95% of the total number of loans that the Trust issued. The average amount financed per loan was $7,600. Since the Trust started offering loans for home energy upgrades, more than 2,200 projects have been financed, and total funds lent exceed $21.3 million. Less than 0.5% of loans of any type offered under HESP are more than 60 days delinquent.

Table 14 summarizes the electricity savings of DHPs promoted through HESP in FY2017. The year's results are projected to deliver lifetime energy benefit of more than $10.8 million. This initiative resulted in a benefit-to-cost ratio of 2.18. All of the savings attributable to the DHPs installed through HESP and reported in this table are limited to electricity savings.[8]

Table 14: Home Energy Savings Program Electric Results

Metric	Value
Total Participants	4,828
Total Projects	4,964
Annual kWh Savings	11,466,773
Lifetime kWh Savings	206,401,914
Efficiency Maine Costs	$3,619,171
Participant Costs	$1,349,690
Lifetime Energy Benefit	$10,832,043
Benefit-to-Cost Ratio	2.18

Table 15 summarizes the thermal energy-saving results of air sealing, insulation, and non-electric heating system upgrades promoted through HESP. In FY2017, the program completed 2,995 home energy upgrades for a projected lifetime energy benefit of more than $19 million. These energy-saving projects will, over the life of the measures, save Mainers more than 2.2 million MMBtu (equivalent to nearly 16.3 million gallons of heating oil). These savings are significantly

[8] The Trust does not factor avoided use of other heating fuels in its benefit-to-cost analysis for heat pumps installed through HESP. The Trust assumes that homeowners participating in HESP have decided to install an electric heat pump, and the Trust influences the decision between purchasing a standard-efficiency and high-efficiency heat pump.

lowering current energy costs throughout the state and will continue to do so in the future.

Table 15: Home Energy Savings Program Thermal Results

Metric	Value	
	Natural Gas	Other Fuels
Total Participants	384	2,295
Total Projects	429	2,566
Annual MMBtu Savings	13,668	81,797
Lifetime MMBtu Savings	324,268	1,940,590
Efficiency Maine Costs	$571,245	$3,182,759
Participant Costs	$1,279,680	$7,658,274
Lifetime Energy Benefit	$2,741,378	$16,405,840
Benefit-to-Cost Ratio	1.48	1.51

FY2017 Analysis

As in FY2016, the program was popular and continued to spur significant co-investment in home energy upgrades on the part of Maine residents. RGGI budget constraints did, however, pose a challenge for the program. As mentioned above, HESP had to lower incentive levels for RGGI-funded measures; this caused marketplace activity to slow, with a noticeable decline in HESP rebates in June 2017. Staff shifted its focus to promoting other measures that are not RGGI-funded, leading to an increased emphasis on DHPs and natural gas measures. Also, as noted above, the program instituted enhanced incentives for second-zone DHPs, which further drove DHP adoption. Though staff also increased marketing and outreach for natural gas measures, these efforts did not appear to significantly increase program activity.

Community initiatives played an important role for HESP in FY2017. First and foremost, they raised awareness of Efficiency Maine's offerings through word of mouth, press coverage, and other community channels, ultimately driving up local program activity. In some cases, they fostered friendly competition between towns. They also helped further incentivize residents to take on energy efficiency projects by reducing costs, through either collective purchase savings or enhanced rebates. In FY2017, HESP saw more collective purchase efforts than ever before. While not all of these efforts translated into projects, some community initiatives drove sizeable increases in program activity relative to previous years.

FY2018 Plans

Over the course of FY2018, the Trust will continue to monitor RGGI revenues closely. Though program staff expect that incentive levels will remain stable through the year, fluctuations in RGGI revenues may require adjustments to maintain market continuity while staying within the budget of available funds.

In addition to ongoing efforts to promote weatherization, the program will continue to focus on encouraging DHP installations and high-efficiency gas measures in FY2018, expanding outreach through mass marketing and community initiatives. The program will also promote education and outreach around the best practices for DHPs to ensure that Mainers are getting the most from their energy-saving investment. In addition to the ongoing educational activities, the program will explore advanced controls for whole-house heating systems. These advanced controls have the ability to connect with heat pumps as well as central boilers and furnaces, allowing them to use each heating system most efficiently. This capability also helps prioritize the least costly heating source, which, in most cases, is the heat pump.

Finally, HESP is currently undergoing a third-party evaluation. As the results become available in FY2018, program staff will make appropriate changes for HESP to operate as effectively and efficiently as possible.

Low-Income Initiatives

The Trust implements several initiatives that target low-income households. Each initiative has its own approach to providing energy assistance, and each may be subject to different limitations based on its sources of funding. The resulting blend of approaches is designed to overcome obstacles to cost-effective energy efficiency for low-income Mainers.

One approach offered through these initiatives employs the direct installation of efficiency measures, where the Trust covers 100% of the installation cost and oversees contractor support. This type of initiative effectively addresses the customer cost and contractor negotiation barriers to low-income home upgrades, but also entails higher program costs per project and, given the Trust's finite budgets, reaches fewer participants. Direct install projects must include significant energy savings to be cost-effective.

The Trust also offers low-income initiatives that can serve more households with lower administration and installation costs than the direct install approach. In FY2017, the Trust launched a direct mail initiative through which low-income customers receive an offer for small energy-saving devices, at no cost to the customer, along with a postage-paid order form. Additionally, the Trust reaches a large number of low-income households by distributing high-efficiency bulbs and faucet aerators to food pantry customers.

Another low-income initiative involves market-based weatherization and ductless heat pump incentives. This initiative, referred to in FY2017 as the Low Income Home Energy Savings Program, provides greater incentives than HESP, as well as financing, to qualifying low-income residents. Finally, the Trust continued to support the electric utilities' Arrearage Management Program (AMP), which provides electricity use assessments and do-it-yourself (DIY) kits to low-income households that have committed to working off the balances on their past-due electric bills.

Low-Income Initiatives

Sectors Served

- Low-Income Households

Funds Invested

- Electric Efficiency Procurement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program

FY2017 Activities

In FY2017, the Trust's low-income initiatives were the subject of a proceeding at the Public Utilities Commission (PUC) designed to clarify certain elements of the program's design and implementation strategy. As part of this proceeding, the parties discussed alternatives to using the Low-Income Home Energy Assistance Program (LIHEAP)[9] list as the sole means for the Trust to establish eligibility for its electric and natural gas low-income initiatives. The Maine State Housing Authority (MaineHousing) estimates that there are up to 176,000 low-income homes in Maine, yet only 40,000 are enrolled in LIHEAP.[10] In

[9] LIHEAP is a program administered by the U.S. Department of Health and Human Services that provides families with initiatives that assist them with energy costs. The program provides federally funded assistance in managing costs associated with home energy bills, energy crises, and weatherization and energy-related minor home repairs.

[10] Per personal correspondence with MaineHousing staff on August 31, 2017. This figure is based on the number of households that fall below 60% of the county median income

restricting program eligibility to those who signed up for LIHEAP, the Trust has been limited in its ability to help low-income Mainers. To expand access, the settlement proposal suggested including customers who receive any sort of federal, state, or municipal income-based assistance.[11]

In FY2017, the Trust also convened the Low-Income Advisory Group, a gathering of diverse stakeholders, including low-income advocates, local housing authorities, MaineHousing representatives, and more. The idea for this group emerged out of the same PUC low-income settlement proceeding; the parties suggested it would foster more-systematic information sharing. Indeed, the group not only worked to coordinate the Trust's offerings with other low-income programs and resources across the state, but also contributed valuable insights on program design and implementation. Moving forward, this group will meet with the Trust on a quarterly basis.

Direct Install Initiative

Working with electric funding, the direct install initiative focused on heat pump water heaters (HPWHs) in FY2017. As in years past, the initiative targeted LIHEAP-eligible customers. In FY2017, MaineHousing provided the Trust with an updated list of LIHEAP participants. This enabled program staff to direct outreach efforts to households participating in LIHEAP that also have electric water heaters. Beginning in November 2016, each LIHEAP household using an electric heater for its domestic hot water received an offer through the mail for a free HPWH. The first installation occurred in February 2017. In addition to the HPWH, installers concurrently installed LED bulbs and low-flow shower heads and faucet aerators, where appropriate.

FY2017 also marked a strategic shift for the direct install initiative. In the past, the Trust had relied on Community Action Agencies (CAAs) to identify low-income homes suitable for high-efficiency measures and to execute their subsequent installation. In FY2017, however, the Trust worked independently; program staff leveraged the updated LIHEAP list to locate and reach out to prospective participants, and made arrangements directly with private contractors to install the HPWHs. The Trust also continued to work with Native American community governments to identify potential participants.

Another noteworthy advancement in FY2017 relates to the HPWH technology itself. As manufacturers introduced more-efficient models into the supply chain, the HPWH measure became more cost-effective. This enabled the initiative to extend its offerings to one-person households, ultimately expanding service to more low-income Mainers.

In FY2017, the Trust suspended initiatives targeting low-income natural gas customers, primarily due to a limited pool of households participating in LIHEAP. The updated avoided costs associated with Triennial Plan III also restricted the number and/or scope of eligible measures. In FY2016, the direct install initiative for low-income customers on natural gas targeted LIHEAP participants who owned their own homes and paid their own utilities. The Trust contacted more than 150 households meeting these criteria multiple times.

level. LIHEAP has additional eligibility guidelines based on household size and resident health status.

[11] This expanded eligibility was ultimately approved by the Commission after the close of FY2017 for application in the low-income initiatives that target savings of electricity and natural gas.

Facing the narrow universe of prospective natural gas customers, the Trust sought to initiate a second phase of the direct install initiative, one with broader customer eligibility criteria. To that end, the Trust proposed to the PUC that customer eligibility be extended beyond LIHEAP to include customers who demonstrate that they are eligible for various other federal, state, or municipal programs where low-income status is a criterion for participation, as noted above.

Arrearage Management Program

In another of its low-income initiatives, the Trust supported the electric utilities' Arrearage Management Program. AMP initiatives are required of each electric utility by a Maine law enacted in April 2014. The AMP legislation was intended to help reduce the number of low-income customers in arrears on their electric bills and, therefore, lower the "bad debt" burden to ratepayers that is associated with customers who fail to pay their utility bills. Customers who agree to join the program are enrolled in a payment plan with the utilities and are contacted by the Trust with information and analysis about their energy usage, energy-saving options, and a free offer for a DIY electricity-use-reduction kit. Activities by the Trust in FY2017 included ongoing collaboration with utilities to identify program participants, delivery of information about their electricity data, and contact with offers of the DIY kit.

Direct Mail Initiative

Based on the success of AMP's promotion of DIY kits, the Trust decided to offer a similar kit to non-AMP customers in FY2017. Direct mail represents an inexpensive outreach and program implementation strategy compared to the direct install approach. As such, it can be used to maintain the cost-effectiveness of certain efficiency measures. With the updated LIHEAP participant contact list and energy use information from MaineHousing, the Trust sent targeted offers to low-income households. Those with electric water heaters received offers for free LED bulbs and low-flow shower heads and kitchen and bathroom faucet aerators, while those without electric water heaters received an offer for LED bulbs only. Customers were given a postage-paid order form, and requested kits were mailed directly to their homes.

Food Pantry Product Distribution

The Trust also distributed energy-saving measures to food pantries across the state. Food pantries determine eligibility for low-income Mainers to participate in the initiative, stock the energy-efficient products in the pantries, and distribute the products to participants at no cost to the Trust. The program mailed product request forms to food pantries and placed calls to maintain adequate inventory, in addition to conducting regular site visits. In some cases, the Trust's field staff attended food pantry events to help distribute the energy-saving products. In FY2017, the Trust stopped offering CFL bulbs through this channel, switching exclusively to LEDs and adding faucet aerators. The Trust also expanded the number of participating food pantries from 286 to 375 through extensive field-based and phone outreach.

Market-Based Initiative

The Trust offered market-based incentives that required low-income customers to pay a limited contribution toward projects. Micro-loans (up to $4,000) were also available and allowed a higher debt-to-income ratio and lower credit score than other unsecured energy loans. The market-based approach leverages the full network of Efficiency Maine residential contractors to reach low-income residents, including renters and Mainers who are likely to be LIHEAP-eligible but who may not have applied for fuel assistance. In late

FY2016, the program expanded its eligibility criteria to encourage weatherization of the most affordable portions of the housing stock where low-income residents are likely to live, as well as to enable easier identification of eligible homes by homeowners, contractors, and municipalities.[12] Under the new program guidelines, homeowners who own and live in mobile homes or in properties with a total town assessed value of less than $80,000 also qualify for the enhanced incentives for weatherization and ductless heat pumps. In FY2017, the criteria were broadened further to recognize participation in municipal general assistance and other low-income government programs as indicators of low-income eligibility.

In FY2016, by providing a $100 co-pay, low-income participants received an additional $500 worth of energy efficiency work, including a home energy assessment and six hours of air sealing. For an additional $100 co-pay on top of the first $100, a participating customer could receive a second $500 toward an additional primary measure (e.g., spray foam insulation, attic hatch/bulkhead insulation). In FY2017, the program reduced the customer co-pay and expanded the initial project scope to incentivize greater participation and increase the energy savings per customer. For a $50 co-pay, customers received a group of measures called the "Energy Upgrade Bundle" valued at $1,050. The bundle included an energy audit, six hours of air sealing, LED light bulbs, low-flow shower heads and faucet aerators, and an additional primary measure. The program further determined that the $50 co-pay could come from a third party, such as a nonprofit or a municipality, provided that that entity would not profit from the project. The Trust also added enhanced rebates on ductless heat pumps (DHPs) for low-income participants, paying for 80% of the project cost up to $2,000. As with all other HESP customers, low-income participants received an "Energy Assessment Checklist"[13] for all weatherization projects in FY2017. This provided both the customer and the Trust with a better picture of a home's energy profile, as well as a prioritized list of potential efficiency projects. Overall, these program changes resulted in significant growth in low-income participation in FY2017.

Throughout FY2017, the market-based initiative for low-income homes continued activities to raise awareness about this enhanced incentive package in low-income communities. Program staff also promoted that initiative by making presentations at various community events across the state, including a MaineHousing-sponsored gathering of General Assistance Officers from 70 different Maine municipalities.

FY2017 Results

Across all of its low-income initiatives, the Trust installed the following numbers of electricity-saving measures: 560 HPWHs, 703,881 LEDs, 6,303 low-flow shower heads, 6,263 low-flow bathroom aerators, and 24,175 low-flow kitchen aerators. These electric installations are projected to reduce energy consumption by more than 117.6 million kWh and save the participating households more than $17.1 million over the life of the measures.

[12] These program changes are supported with RGGI and MPRP funds.

[13] http://www.efficiencymaine.com/docs/HESP-Energy-Assessment-Checklist.pdf.

Table 16: Low-Income Initiatives Electric Results

Metric	Value
Total Participants	55,409
Total Projects	630,683
Annual kWh Savings	12,024,882
Lifetime kWh Savings	117,636,560
Efficiency Maine Costs	$3,632,885
Participant Costs	$3,363,848
Lifetime Energy Benefit	$17,106,021
Benefit-to-Cost Ratio	2.44

Through the market-based initiative, the Trust completed 669 thermal home energy upgrades. These included 149 DHP[14] installations and 520 weatherization measures. These energy-saving measures are projected to save low-income Mainers almost 379,000 MMBtu (equivalent to more than 2.7 million gallons of heating oil) over the life of the measures, representing a lifetime energy benefit of more than $3.8 million. Finally, the Trust's residential loan program issued 39 micro-loans in FY2017, helping homeowners with a challenged credit history invest $125,000 in more comprehensive, cost-effective energy efficiency upgrades.

Table 17: Low-Income Initiatives Thermal Results*

	Value	
Metric	Natural Gas	Other Fuels
Total Participants	1	442
Total Projects	1	545
Annual MMBtu Savings	33	21,938
Lifetime MMBtu Savings	500	378,206
Efficiency Maine Costs	$2,390	$1,101,090
Participant Costs	$0	$740,128
Lifetime Energy Benefit	$2,349	$3,808,117
Benefit-to-Cost Ratio	0.98	2.07

* One direct install natural gas weatherization project that was initiated in FY2016 closed in FY2017. The Trust did not initiate any new direct install weatherization services to low-income natural gas customers in FY2017.

FY2017 Analysis

The Trust continued to stretch low-income funds as far as possible through a blend of direct installation, DIY, and market-based programs. More low-income households were served this way than would be possible through direct installation alone.

The Trust's experience in FY2016 illuminated opportunities for capturing synergies across the multiple low-income initiatives being administered. With that in mind, in FY2017, the Trust established a dedicated staff member to coordinate low-income outreach and to leverage ways in which one channel or initiative could act as an entry point for others. For example, food pantry customers or AMP participants may be candidates for the market-based incentives for low-income customers. In addition, the Trust placed a greater

[14] In most of its programs, the Trust does not factor avoided use of other heating fuels in its benefit-to-cost analysis for DHPs. The Trust assumes that program participants have decided to install a DHP, and the Trust influences the decision only between purchasing a standard-efficiency and a high-efficiency DHP. However, DHP installations in low-income residential settings represent an exception to this rule: In low-income homes, the Trust assumes that customers would not otherwise have introduced a supplemental heating appliance, costing more than $2,500 installed, into the home absent the significant rebate offered by the Trust. In this case, the cost-effectiveness is calculated by comparing the net present value of the total cost of the equipment and installation to the total energy savings, reflecting both increased electricity use and decreased use of other heating fuels.

emphasis on outreach to low-income advocates and other community organizations to spread the word about all of the Trust's low-income initiatives.

Direct Install Initiative

The Trust attributes some of the success of the FY2017 direct install electric initiative to improved marketing materials. In designing the outreach materials, program staff took into account the findings of a New York State Energy Research and Development Authority (NYSERDA) marketing study about solutions for overcoming the common skepticism surrounding unsolicited offers and the fear of scams among low-income customers.

In shifting toward direct management of the direct install initiative and the deployment of private contractors, the Trust was able to achieve lower installation and administrative costs than in years past. Receiving the updated LIHEAP participant list from MaineHousing enabled program staff to take this more independent approach. Nevertheless, it is important to note that the number of low-income homes in Maine is greater than the number who have taken the steps necessary to apply for LIHEAP. To help all Mainers of low-income status gain meaningful access to the Trust's energy efficiency programs, the Trust will continue to seek alternative ways to identify and reach out to additional eligible low-income households.

Arrearage Management Program

The Trust, the PUC, the utilities, and the Office of the Public Advocate (OPA) continued to work collaboratively in managing AMP in FY2017. In its second year, the program grew from 637 to 1,158 participating households. The Trust continues to track the effectiveness and persistence of these energy savings over time.

Direct Mail Initiative

As mentioned above, the low-income direct mail initiative built on the success of the AMP DIY kit approach. Leveraging a highly targeted list of potential customers while relying exclusively on mail for program outreach and delivery allowed the Trust to keep costs low, resulting in cost-effective energy efficiency investment in low-income homes. Program staff learned that repeated mailings drove results; some participants did not reply to the offer until they had received it multiple times.

Food Pantry Light Bulb Distribution

The Trust's extensive field-based and phone outreach succeeded in expanding the number of participating food pantries in FY2017. This growth in distribution sites allowed the Trust to deliver access to more energy efficiency measures to more low-income households across the state. Continuing to expand to new locations and offering new measures will help ensure that the initiative continues to help more low-income Mainers benefit from energy efficiency through this channel.

Market-Based Initiative

Program changes in FY2017 drove dramatic growth in activity by low-income Mainers in market-based programs to lower their home heating costs; low-income participation in this initiative rose from 40 homes in FY2016 to 674 homes in FY2017. By expanding eligibility criteria, the Trust grew the pool of potential customers and simplified the qualification process, making this approach significantly easier for staff, contractors and community organizations to promote and for participants to access. The addition of enhanced incentives compared to HESP also played an important role in driving program interest and making efficiency measures accessible to this group of customers.

The Trust leveraged multiple channels to spread the word about these program changes. Program staff reached out to the contractor community, which was pleased to have an additional sales tool and an expanded network of potential clients. Program staff also collaborated with municipalities, nonprofits, low-income advocates, and other community partners across the state to promote the program in their respective networks. Finally, the Trust included information about low-income offerings in all of HESP's mass-marketing efforts, including brochures and online advertisements.

As mentioned above, FY2017 marked a notable shift in the primary delivery mechanism for DHP installations in low-income homes, away from the direct install channel and toward a market-based approach. Staff noted a number of positive outcomes resulting from leveraging this approach. First and foremost, the change allowed the Trust to use expanded low-income eligibility criteria, granting it access to a much larger pool of potential customers. Second, requiring a small customer co-pay ensured that participants had a certain level of "skin in the game," thereby increasing the likelihood of the sustained, appropriate use and maintenance of the units installed. Finally, enhanced DHP incentives drove participation in weatherization generally; program staff saw low-income participants enrolling in the weatherization portion of the program in order to access the elevated DHP rebates.

FY2018 Plans

Several aspects of the Trust's various low-income program designs were not finalized in the PUC's initial approval of Triennial Plan III, and were made the subject of continued analysis and process in FY2017. In FY2018, the Trust will continue its efforts to design and implement low-income initiatives in a way that equitably distributes cost-effective energy savings across low-income households. The Trust will pursue more targeted outreach to partner organizations serving the low-income community, including CAAs, General Assistance Officers, and food pantries. In addition, the Trust will continue to advertise low-income program opportunities through the Trust's contractor network, direct mail, and the statewide marketing campaigns.

Direct Install Initiative

In FY2018, the Trust will continue to focus on the direct installation of HPWHs. Program staff will work toward two primary goals: increasing contractor installation capacity and growing customer participation. Because the initiative's current installers were selected through a competitive bid process, their rates for direct install projects are very low, and the Trust has found that plumbers in particular tend to prioritize other market-rate jobs as they come up. Program staff is therefore looking for ways to enroll more installers and to streamline the program to make direct install projects more attractive. On the customer side, the Trust has found that offers for free HPWHs are frequently met with skepticism; LIHEAP participants are occasionally targeted by scams, making them understandably distrustful of these types of offers. Furthermore, replacement of water heaters is not typically a priority for homeowners until the old units stop working. It can therefore be difficult to motivate potential participants to replace their existing, functional water heaters, even for free. In FY2018, program staff will work to refine the message of this initiative in a way that establishes credibility and that articulates a motivating value proposition.

It is unlikely in the year ahead that the Trust will limit its natural gas offerings for low-income residents to those who occupy single-family homes, as it did in FY2017. As mentioned above,

the universe of single-family homes on LIHEAP that rely on natural gas-fired heat is extremely small and has already been contacted multiple times. Going forward, the Trust will explore ways to reach low-income natural gas customers in structures having two or more units.

Arrearage Management Program

In FY2018, the PUC and the Legislature will evaluate AMP to determine whether or not to continue the program. As its name implies, AMP's primary goal is to reduce electricity bill arrearages; the PUC and Maine's electric utilities will be looking to see if a one-time forgiveness of arrearages helps low-income households catch up on their outstanding payments and stay current on an ongoing basis. If the PUC does elect to continue with AMP, the Trust will continue to send electricity usage reports and energy-saving tips as ordered. It will continue offering free DIY kits only as long as they are cost-effective.

Direct Mail Initiative

In FY2018, the Trust will send repeat mailings to those low-income customers on the latest LIHEAP list who have yet to take advantage of the DIY kit offer. FY2018 will likely mark the end of this particular iteration of the direct mail initiative, as the Trust will saturate the message with the current list of customers. The Trust will resume the initiative with a new set of potential participants as new contact lists become available.

Food Pantry Product Distribution

The Trust will continue to engage as many food pantries as possible in the program in FY2018. Additionally, program staff will consider adding additional measures to the current set of offerings as well as shifting to an approach that uses business reply cards, which will provide information for follow-up and evaluation efforts and will monitor the number of measures provided to each customer.

Market-Based Initiative

The market-based initiative will build on its FY2017 momentum through FY2018, continuing to target low-income customers. While the "Energy Upgrade Bundle" and other envelope measures have sufficient budget to accommodate growing participation, the initiative to fund enhanced DHP rebates is limited to funding from the Regional Greenhouse Gas Initiative (RGGI). The demand has been growing for this measure at a rate that will exceed forecasted RGGI revenues in FY2018. In the event that demand surpasses available budget, the Trust will suspend the enhanced rebates. The regular rebates available to all Mainers, regardless of income level, will remain in place.

Renewable Energy Demonstration Grants Program

The Renewable Energy Demonstration Grants Program provides grants to support the promotion, research, design, and demonstration of emerging clean-energy technologies. The program is funded by the Energy Efficiency and Renewable Resource Fund (EERRF), a revenue stream composed of voluntary contributions from electric ratepayers, as well as funds from electricity suppliers who elect to meet their renewable portfolio standard obligations through alternative compliance payments. Past projects have included photovoltaic projects, solar hot-air systems, biomass boilers, and district heating. Projects are selected through a competitive bidding process; grant awards are provided for applications of renewable energy technologies that demonstrate uses for renewable technologies and that support community facilities.[15] Although the Trust is also authorized to offer renewable technology rebates using EERRF, funding levels have so far been insufficient for an ongoing incentive program of this nature. Instead, staff leverage limited funds for periodic projects using the grant award mechanism.

Renewable Energy Demonstration Grants Program

Sectors Served

- Commercial and Industrial (nonprofits and municipalities only)

Funds Invested

- Energy Efficiency and Renewable Resource Fund

FY2017 Activities

As in FY2015 and FY2016, the program did not issue any new requests for proposals (RFPs) for projects in FY2017 due to the limited revenues from the voluntary contributions. As a result, no grants were awarded for research and demonstration and no rebates were offered under this program.

As required by statute, 35% of the EERRF revenues received during the year were passed through to the Maine Technology Institute (MTI) to help promote businesses, whether nonprofit or for-profit, engaged in research and development of renewables.

FY2017 Results

The Trust does not record any savings associated with projects previously awarded through the Renewable Energy Demonstration Grants Program.

FY2017 Analysis

The Trust determined that FY2017 revenues were insufficient to conduct a meaningful solicitation for new projects. Instead, funds were allowed to accumulate so that the Trust may offer a larger solicitation for proposals in FY2018.

FY2018 Plans

The FY2018 plan for the EERRF is to direct the fund's accumulated revenues through competitive solicitations to community demonstration installations of renewable energy technologies and research and development projects. The EERRF received slightly more than $50,000 in total revenue in FY2015, $77,000 in FY2016, and

[15] The cost-effectiveness of the Renewable Energy Demonstration Grants Program is determined using the Modified Participant Cost Test (MCPT). This approach contrasts with all other Trust programs that determine cost-effectiveness using the Total Resource Cost (TRC) test.

$73,000 in FY2017. An amount similar to the FY2017 revenues is forecast for FY2018. Thirty-five percent of the revenues, as directed by statute, will be passed through to MTI to help promote research and development of renewables. Activities over the next year will be targeted to projects that will have the greatest impact on demonstrating the lowest-cost renewable energy options with the greatest end-user payback. The Trust plans to issue an RFP in FY2018 and to award one or more grants by the close of the fiscal year.

Strategic Initiatives

Evaluation, Measurement, and Verification

The purpose of the Trust's evaluation, measurement, and verification (EM&V) activities is to provide research and data-driven analysis to inform program design and delivery strategies, verify program results, and facilitate continuous program and organizational improvement. The Trust carries out these activities using a combination of in-house initiatives and subcontracted, independent third-party reviews performed by firms that specialize in the evaluation of energy efficiency programs.

With a focus on delivering rigorous, objective, and actionable results, the third-party contractors rely on industry-standard evaluation methods and practices to evaluate the Trust's programs. They conduct two types of independent evaluations: impact and process. Impact evaluations, which are conducted periodically on all major programs, focus on verification of energy savings, while process evaluations focus on assessment of program design and delivery methods and are therefore most valuable for new programs and programs that have undergone major evolutions. Each program evaluation typically employs both qualitative and quantitative data and methods. Methods include in-depth interviews with program delivery team members and stakeholders; telephone surveys of program participants and nonparticipants; engineering reviews and analysis of participant data and project files; and site visits, entailing inspections, spot measurements, and/or equipment metering to gather data.

In addition to independent program evaluations,[16] the Trust conducts or issues contracts for various research activities to inform program design, baseline assumptions, costs and benefits, eligibility criteria, parameters used for savings calculations, and impact factors used to adjust savings estimates. General research efforts include literature reviews, forum and webinar participation, internal data analysis, near real-time customer surveys, and commissioned studies. The Trust performs in-house targeted research and analysis of discrete issues and questions on an as-needed and ongoing basis. Commissioned studies have included baseline studies, market research, and equipment data logging.

As part of Triennial Plan III, the Trust committed to implementing more concurrent, supplemental evaluation and measurement with the goal of increasing opportunities for program corrections. In FY2017, the Trust issued a Request for Qualifications (RFQ) to establish a group of prequalified research and evaluation contractors, providing a ready source of support for ongoing research and evaluation activities to complement formal program evaluations.

FY2017 Activities

Business Incentive Program Process Evaluation

In FY2017, the independent process evaluation of the Business Incentive Program (BIP) for the FY2014–FY2015 period was completed.[17] This analysis focused on the program's design, operations, implementation, and service delivery; it did not include verification of the program's energy

[16] All of the Trust's third-party program evaluation reports can be found at efficiencymaine.com in the section of the Library page called "Reports."

[17] In FY2016, BIP evolved and was renamed the Commercial and Industrial Prescriptive Program (CIP), with small custom projects moving to the C&I Custom Program.

savings.[18] Nexant, the third-party evaluator, used program materials, in-depth interviews with staff, participant surveys, and Qualified Partner (QP) surveys to get a sense of the customers' and contractors' experience with the program and its energy-saving benefits.

The evaluation found that the program was relatively straightforward and simple for end-use customers to participate in, and that participants and QPs were generally satisfied. Participants were most satisfied with equipment performance, and relatively less satisfied with the time it took to receive their incentives. QPs found the subcontracted delivery team to be extremely helpful, and marketing materials provided by the Trust to be less helpful. Nexant recommended a series of updates to the Trust's project-tracking database ("effRT") to improve reporting. The evaluation report also outlined the events leading up to the FY2015 suspension of electric incentives driven by significant demand for LEDs, noting that this was a cause for concern among program participants and QPs. Finally, the evaluation measured free-ridership (FR) and spillover (SO), arriving at an average net-to-gross (NTG) ratio of 72% for the program.

Large Customer Program Evaluation

In FY2017, the Trust finalized an independent evaluation of the Large Customer Program for the period between FY2014 and FY2015.[19] The third-party evaluator, Nexant, performed an impact evaluation to verify energy and demand savings and a process evaluation to assess participant experiences. Given the relatively small number of projects, Nexant was able to conduct a comprehensive review; evaluators performed on-site checks for all 9 projects that had reported savings of more than 1 million kWh per year and individual desk reviews for the remaining 13 projects. Nexant's impact evaluation found a realization rate (ratio of evaluated savings to reported savings) of 92.8% for electric projects.

Nexant's process evaluation determined that staff and the subcontracted delivery team had a deep understanding of customers' needs and that the program had a significant impact on customers' decision making. Nexant further determined that the Trust did its due diligence with respect to awarding an incentive to Lincoln Paper and Tissue, noting that, at the time, it was reasonable to believe that the mill would remain open. Ultimately, once the mill closed, the Trust reflected the incentive as a program cost and did not credit any energy savings. Finally, the evaluation measured FR and SO, arriving at an average NTG ratio of 92.5% for the program.

Boothbay Harbor Non-Transmission Alternative Pilot Measurement and Verification

The Public Utilities Commission (PUC) requested additional measurement and verification for the energy efficiency projects initiated through the 2013 Boothbay Harbor Non-Transmission Alternative Pilot (Boothbay NTA). In FY2017, a random sample of 29 projects was selected from an eligible pool of 86 lighting projects. Analysts used data and project files housed within the effRT database to complete a desk review of each site within the sample. They then performed on-site interviews and inspections to determine the accuracy of the effRT data (including baseline lighting inventory, post-retrofit lighting inventory, weekly hours of operation, and annual weeks of operation) and to verify that the incentivized

[18] The BIP impact evaluation was under way in FY2017, and the final report will be published in FY2018.

[19] In FY2016, the Large Customer Program evolved into the Commercial and Industrial Custom Program, which includes both small and large custom projects.

lighting systems remained installed and operational. For 12 of the 29 sampled sites, the on-site interview was followed by installation of light loggers to corroborate the customer-supplied operating schedule.

In summary, the analysis found that the Boothbay NTA saved approximately 226 kW of summer demand, with a realization rate of 96%. The selected sample fell within the acceptable precision and confidence range with ±8% precision at the 80% confidence level for summer demand savings.

LED Pricing Trial

In FY2017, the Trust commissioned an analysis of LEDs sold through retail channels. This analysis looked at incentives, free-ridership, and market adoption rates. The study targeted a small number of key standard and specialty products at two retailers that account for the bulk of program volume. Over the course of four months, the trial cycled through different patterns of a wide range of pricing levels. The study found that as the incentive for screw-in LEDs increased (and the purchase price to the customer decreased), the sales of bulbs went up in a nonlinear fashion. The study also found that stores are more likely to place products in more advantageous locations (e.g., end caps, aisle displays) if those products have been more aggressively discounted. Finally, the data showed that greater discounts lead to lower free-ridership rates and higher benefit/cost ratios, and that lower discounts lead to higher free-ridership rates and lower benefit/cost ratios.

Other EM&V Activities

The Trust's other significant EM&V activities during FY2017 included demonstrating compliance with Forward Capacity Market (FCM) measurement and verification rules; revising the Technical Reference Manuals (TRMs) for each of the retail/residential, commercial/multifamily program sectors; and gathering performance data on distributed generation installations.

The Trust completed its annual FCM Measurement and Verification Compliance Review, with the finding that peak demand savings are estimated at 80% confidence with ±8.70% relative precision at the portfolio level, exceeding the requirement of the Independent System Operator for New England (ISO-NE) that the relative precision of the portfolio be ±10% with 80% confidence.

The Trust's two TRMs — the Retail/Residential TRM and the Commercial/Industrial and Multifamily TRM — provide documentation for the calculation of energy and demand savings from the portfolio of energy efficiency measures. Each TRM serves as a central repository for the methods, formulas, assumptions, and sources that are used to estimate savings from energy efficiency measures and provides a common platform for analyzing energy savings across measures and programs. For each measure, the TRM provides an overview and documentation of gross energy and demand savings algorithms, efficiency assumptions for the baseline and the efficient measures, deemed parameter values or instructions for inputs to savings algorithms, measure life and cost, and impact factors for calculating adjusted gross savings and net savings. In addition to conducting its standard annual TRM update, the Trust adjusted its TRMs periodically throughout FY2017 as new information became available.

Table 18 shows FY2017 EM&V expenditures by project activity type: evaluation, analysis, and market studies.

Table 18: FY2017 EM&V Project Activity

Type	Expenditures
Evaluation	$211,957
Analysis	$17,714
Market Studies	$115,290
Total	**$449,774**

FY2018 Plans

In FY2018, the Trust will receive impact evaluation results for the Home Energy Savings Program (HESP), for BIP, and for heat pump water heaters (HPWHs). Other planned FY2018 research and evaluation activity includes a retail lighting impact evaluation, the creation of an online appliance rebate survey, the Annual FCM Measurement and Verification Compliance Review, and development of updated TRMs for FY2019. Finally, the Trust will begin planning and conducting an updated potential study in preparation for Triennial Plan IV.

Innovation

The Trust's Innovation Program provides modest funding for pilot projects to demonstrate new types of energy efficiency, conservation, or alternative energy measures, or new strategies for promoting existing measures. The program focuses on opportunities that show significant potential to be cost-effective and to provide energy savings or greenhouse gas (GHG) savings, but that are not yet well understood or established in the marketplace. The piloted measures may or may not prove to be cost-effective or popular in the Maine marketplace. Part of the purpose of the Innovation Program is to use smaller pilot projects to generate findings on cost-effectiveness, market demand, and effective promotional strategies before making larger investments on incentives and settling on program designs.

FY2017 Activities

The Trust issued a Request for Information (RFI) in FY2017 to generate a list of potential Innovation Program topics to supplement suggestions from Trust staff. The Trust received responses relating to low-income homes (including net-zero homes and a direct mail program), electric vehicles (including an opportunity study and a program for heavy-duty vehicles), distributive energy resources (including two solar proposals), program strategies (including a strategic energy management program and a home energy reports program), and new technologies (including controls and terrain mapping for snow making equipment). The Trust shared these responses internally and with the Innovation Working Group. The group, composed of members of the Trust's staff and Board, provides technical input on the Innovation Program and reviews the status of ongoing and completed projects. The group held two meetings in FY2017.

The Trust managed two pilots during FY2017, both of which targeted energy-saving opportunities in the commercial sector. The first project is exploring whether heat pump water heaters (HPWHs) in commercial properties can cost-effectively use available waste heat (from the businesses' existing activities) to help generate hot water, creating a more efficient water heating mechanism than was previously in place. The pilot will measure the cost of installation (including labor, material, and equipment), monitor energy usage, track savings data, and record the businesses' experience with the new system. The Trust worked with a HPWH manufacturer to install two commercial HPWHs at two Pratt Abbott facilities, one in a boiler room and one at a laundromat. The HPWHs were installed in November 2016, alongside a number of energy and temperature sensors. The Trust is currently reviewing the results of the data logging and will report on the pilot once a full year of data is available.

The second pilot targets conservation opportunities at long-term care facilities. This pilot seeks to develop and test a strategy for achieving energy savings through two practices: analyzing interval data to identify and verify energy savings from a building tune-up and using performance-based incentives to motivate facility managers to achieve persistent savings over time. The pilot recruited 15 facilities for a detailed energy-use study with help from the Maine Health Care Association. Survey results and interval data analytics were used to select 10 participants for the pilot. Participants will be educated on the value of interval data for assessing a building's

performance and identifying opportunities for a building tune-up. The Trust will also offer financial incentives to encourage the initial tune-up investment and the building management practices required for persistent energy savings. In FY2017, the pilot completed a walk-through at each facility, developing a site-specific scope of work that is eligible for incentives.

FY2018 Plans

Specific plans for the Innovation Program will continue to unfold throughout the year. Certain ideas discussed in the past, such as promoting electric vehicle charging stations as a means for reducing CO_2 emissions, remain on the drawing board and are of interest. Other ideas have already been identified to move forward for implementation.

The Trust is currently working with the long-term care facilities to move their projects forward in the second pilot mentioned above. The pilot is expected to be completed in FY2018 and the Trust will report the results in its next annual report. In addition to continuing work on the Innovation Program pilots discussed above, the Trust will launch several new pilot ideas in FY2018. The Trust plans to leverage the Innovation Program to research rooftop units (RTUs), behavioral programs, integrated thermostats, and other topics.

One response to the RFI encouraged the Trust to design a pilot around exploring the savings opportunity of advanced controls. Much of the installed base of commercial packaged air conditioning and heat pump equipment (also referred to as RTUs) is constant air volume equipment. These systems lack effective controls to operate efficiently at partial-load conditions, which represent the vast majority of run-hours in commercial buildings. In FY2018, the Trust will issue a Program Opportunity Notice (PON) to partner with businesses and contractors to test several of the aftermarket RTU controllers. These controllers can be retrofitted to existing RTUs to improve the operational efficiency through integrated economizing, multispeed fan control, multispeed compressor control, and demand-controlled ventilation.

In another initiative, the Trust will collaborate with Central Maine Power (CMP) to issue a Request for Proposals (RFP) to develop and demonstrate an innovative strategy for using CMP's Energy Manager platform to inform and motivate low-income customers to take steps to reduce their electricity use, lower their electricity bills, and reduce their bad debt. The pilot will build on the work that the Trust and CMP are doing through the Public Utilities Commission's (PUC) Arrearage Management Program (AMP) stakeholder group, as well as the low-income discussions that occurred in connection with the review and finalization of Triennial Plan III. The Trust hopes the pilot will identify new avenues for helping low-income Mainers save energy.

The Trust will also use the Innovation Program to research on optimizing ductless heat pump (DHP) utilization through integrated thermostats that control more than one heating system. The pilot grew out of past research by the Trust and a RFI response by the Governor's Energy Office. The Trust is seeking to work with manufacturers and contractors to define and install thermostat solutions that allow DHPs and central heating systems to work in concert with each other to provide cost-effective comfort.

Finally, in FY2018, the Trust will report the results of the HPWH pilot installed in FY2017 and consider the implications for programs that serve commercial buildings.

Public Information and Outreach

The Trust uses a variety of communications channels to assist residential and commercial consumers who are contemplating building performance projects or new equipment purchases. Information on energy-efficient options, financial benefits, and incentives is disseminated through the Trust's website, printed flyers and brochures, traditional advertising, social media, and other multimedia tools. The Trust also manages targeted training sessions and attends industry events, such as forums and symposiums; conducts education and coordination activities; and convenes stakeholder groups to inform program design and implementation. Additionally, as Maine's leader in energy efficiency, the Trust is frequently called on to participate in energy-related events and to provide input on energy policy issues.

FY2017 Activities

Below are brief descriptions of the Trust's activities related to public information and outreach, organized by category (Events and Training, Call Center, Website, Social Media, and Stakeholder Processes).

Events and Training

In September 2016, the Trust hosted a forum on combined heat and power (CHP) systems. More than 100 participants, including end-users, engineering consultants, contractors, equipment manufacturers, utility staff, and government representatives, attended to learn more about this technology and the significant opportunity for expansion in Maine. In his keynote address, Daniel Peaco of Daymark Energy Advisors spoke to the potential for CHP to save costs in the environment of forecasted electric and natural gas prices. Participants also heard from representatives of facilities that previously implemented successful CHP projects with the help of Efficiency Maine incentives. These panelists led a discussion about their facilities' energy usage needs and patterns, their reasoning for moving toward CHP, the results and savings from their projects, and their experience with the Efficiency Maine Commercial and Industrial Custom Program.

In January 2017, the Trust held its annual Energy Symposium and Awards Ceremony for contractors and customers. Targeting the theme of "Grid Modernization and Distributed Energy Resources," the symposium looked toward the future of the grid and the role of cost-effective distributed energy resources, including energy efficiency, load management, distributed generation, and storage. Laney Brown, Vice President for Grid Modernization Strategy at the Portland-based Modern Grid Partners, gave the keynote speech. Additional panelists gave presentations on smart home appliances, marketing strategies for the intelligent grid, and lighting controls. During the awards ceremony, the Trust recognized Hannaford Brothers for its significant leadership in energy efficiency in Maine and in the grocery industry by granting it the Philip C. Hastings award, which the Trust presents to individuals and organizations whose efforts have furthered Maine's goals of energy efficiency and environmental enhancement.

On other occasions throughout the year, the Trust hosted several workshops and webinars for contractors participating as trade allies. These offerings included Building Operator Certification training, a course that advises facility managers on techniques to improve energy efficiency, reduce electric and other fuel bills, reduce maintenance costs, and enhance building occupant

comfort. Scholarships were also provided for contractors pursuing courses in advanced heat pump installation training; these scholarships are one way that the Trust supports best practices through continuing education for Maine-based installers.

Finally, Trust staff participated as panelists before a variety of gatherings of Maine businesses and residents. At these events, Trust staff was asked to report on energy-efficient technologies and the Trust's program offerings. Hosts for these events included Maine professional associations, the Maine Municipal Association, major Maine businesses, and numerous local "energy committees."

Call Center

One of the Trust's important public information tools is its Call Center. In FY2017, the Trust's Call Center (at the toll-free 866-ES-MAINE [866-376-2463]) was staffed by customer service agents located at Brunswick Landing. The Call Center was used to handle inbound emails and calls related to the Trust's programs; the customer service agents that staff the line during normal working hours provided basic support on all programs. When detailed or more-technical information was needed, the agents made live transfers to Trust staff or specified delivery team contractors. In addition to handling these inbound inquiries, the Call Center conducted outbound calls and surveys in support of evaluation, measurement, and verification (EM&V) activities.

Website

Over the course of FY2017, the Trust added more informational resources, including new case studies, helpful videos, and technology tips, to the pages of its website (www.efficiencymaine.com).

This year, the Trust also launched an initiative to enhance the functionality of its website. A major focus of the initiative was to increase ease of use and functionality for mobile and tablet visitors. This "back-end" development work will be complemented by an update to the face of the website in the next fiscal year. These functional and aesthetic updates should help keep the website relevant to the tens of thousands of Mainers who visit every month to learn about energy efficiency solutions, explore rebates, and download forms.

Social Media

Social media are important for the Trust to provide information and education to potential and existing customers. They enable the Trust to prompt vibrant community discussions where Mainers share their experiences with energy efficiency projects and Efficiency Maine programs. In this way, social media provide a digital platform for "word-of-mouth" information exchange among actual program participants and vendors — a key factor in driving Mainers to adopt energy-efficient technologies. Among the comments about ductless heat pumps (DHP) were these illustrative (and informative) posts:

> *Love my heat pump. Whisper quiet. Got my Efficiency Maine rebate in about two weeks. Did the whole house insulation (including attic and cellar) about two years before that. Got my rebate in NINE days.*

> *I have 2 units and it's the best move I ever made. Warm heat[.] Holds the house to the exact temp you set it to. And this summer never even ran it on a/c. Just used dehumidify and kept the moisture free and felt just like a/c. Avg bill in the winter was $270. Avg bill in the summer was $75. Can't say enough about [DHPs]. I would recommend them to anyone.*

Additionally, social media provide channels for Trust staff to field questions about programs. In FY2017, the Trust promoted the Home Energy Savings Program (HESP), the Small Business Initiative (SBI), and the Consumer Products Program

through a combination of traditional social media posts and advertising.

Ads continue to be a highly cost-effective strategy to reach Mainers: An animated advertisement, which ran for three weeks in February 2017, reached 57,507 Facebook users and prompted 3,664 clicks to the Efficiency Maine webpage — the most clicks generated from a single social media ad. To continue to maximize the effectiveness of these platforms and most efficiently reach potential customers, the Trust developed a number of short videos and content specifically for social media.

Stakeholder Processes

The Trust convened several advisory groups to help guide program design and implementation in FY2017. The Commercial and Industrial Prescriptive Program (CIP) launched a new Lighting Advisory Group that meets quarterly to discuss trends in the lighting market, lighting design, lighting controls, and program innovations. As noted elsewhere in this report, the Low-Income Initiatives relaunched a Low-Income Advisory Group that convenes a diverse stakeholder group of low-income advocates, housing authorities, representatives from the Office of the Public Advocate (OPA), Maine State Housing Authority (MaineHousing) representatives, utility representatives, and others. This group contributes valuable insights on program design and implementation and worked to coordinate the Trust's offerings with other low-income programs and resources.

The Trust also convened a stakeholder group to develop a protocol to handle program eligibility changes stemming from the passage of Legislative Document (LD) 1398, "An Act to Reduce Electric Rates for Maine Businesses," at the Maine State Legislature in late FY2016.

FY2018 Plans

The Trust will launch an updated website in FY2018 that will continue to support its outreach and education goals. The Trust's program outreach efforts will include a focus on outreach to commercial and industrial (C&I) sectors and low-income customers. The Trust anticipates that social media will remain an important vehicle for education and customer outreach. In addition, the staff plans to participate in symposiums, conferences, and industry meetings to share program information with efficiency professionals and potential customers. Finally, the Trust will launch a solicitation on professional training opportunities, specifically training in the installation and management of building automation systems, advanced rooftop controls, and lighting controls. These courses are part of the Trust's efforts to provide valuable industry training for the growing trade ally community and to accelerate the adoption of advanced efficiency technologies.

Finance and Administration

Audit Results

The independent certified public accountant firm of Runyon, Kersteen, Ouellette, Inc. (RKO) issued an audit report on the Trust's activities for the year ended June 30, 2017. The report covered the Trust's internal control over financial reporting and compliance with government accounting standards and financial statements. The report was unanimously accepted by the Board of Trustees on September 27, 2017.

The report of the audit of the Trust's financial statements delivered an "unmodified opinion" and found "no material weaknesses" related to the Trust's internal controls. The auditors wrote:

> *In our opinion, the financial statements … present fairly, in all material respects, the respective financial position of the governmental activities, the major fund, and the remaining fund information of Efficiency Maine Trust, as of June 30, 2017, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.*[20]

As reported in the audit, the Trust's revenues and expenditures presented in the FY2017 Statement of Revenue, Expenditures, and Change in Fund Balance – Governmental Fund and Budgetary Comparison Schedule are $51,067,710 and $41,618,551, respectively, plus another $3,264,238 sent to state agencies, resulting in an increase to fund balance of $6,184,921. The Trust's governmental fund balance as of June 30, 2017 was $47,485,953, of which $26,804,105 is restricted for operations and programs and $20,681,848 is restricted for grant and revolving loan activity. The Trust's net position as of June 30, 2017 was $47,485,953. The term "net position" refers to the difference between assets and liabilities. The change in net position for the year ended June 30, 2017 was an increase of $6,216,128.

The Trust's revenues, expenditures, and fund balance for the 12 months of FY2017 are summarized in Table 19.[21]

[20] Efficiency Maine Trust, "Annual Financial Report for the Year Ended June 30, 2017," prepared by RKO, September 27, 2017, at 2.

[21] Ibid., Statement 4, at 16.

Table 19: Statement of Revenues, Expenditures, and Changes in Fund Balance – Governmental Fund

	Special Revenue Fund
Revenues	
Intergovernmental:	
System Benefit Charges	$ 2,383,407
Alternative Compliance Mechanism	$ 3,018
Interest Income:	
Investments	$ 100,232
Loans	$ 657,919
Other Income	$ 5,990
Electric Procurement	$ 32,306,897
Renewable Resource	$ 88,341
Long-Term Contracts	$ 1,309,880
Maine Power Reliability Program settlement proceeds	$ 1,500,003
Forward Capacity Market credits	$ 5,798,287
Regional Greenhouse Gas Initiative proceeds	$ 6,913,736
Total Revenues	**$ 51,067,710**
Expenditures	
Low-Income Initiatives	$ 3,954,026
Consumer Products Program	$ 8,947,837
Home Energy Savings Program	$ 8,155,893
Commercial and Industrial Prescriptive Program	$ 7,793,748
Commercial and Industrial Custom Program	$ 6,768,852
Commercial Small Business	$ 1,829,674
Commercial New Construction	$ 557,621
Administration and Strategic Initiatives	$ 3,610,900
Total Expenditures	**$ 41,618,551**
Excess of Revenues over Expenditures	$ 9,449,159
Other Financing Uses	
Intra-Entity Grants – State Agencies	$ (3,264,238)
Net change in Fund Balance	**$ 6,184,921**
Fund Balance, beginning of year	**$ 41,301,032**
Fund Balance, End of year	**$ 47,485,953**

Administration

In FY2017, Governor LePage reappointed two members to the Trust's Board of Trustees for three-year terms: Kenneth Fletcher, former Director of the Governor's Energy Office, and David Stapp, Chief Executive Officer/Chief Technology Officer of Peregrine Turbine Technologies in Wiscasset. These members were recommended by the Maine State Legislature's Energy, Utilities and Technology Committee and confirmed by the Senate in April. Finally, the Board elected the following officers toward the end of FY2017:

- Kenneth Fletcher, Chair
- David Stapp, Vice Chair
- Brent Boyles, Treasurer
- Herbert Crosby, Secretary

The Trust also updated its Personnel Manual in FY2017. The substantive changes included updating of the anti-harassment policy, a new category in the "Separation from Employment" section, and various additions and clarifications to the Social Media policy.

Other Initiatives

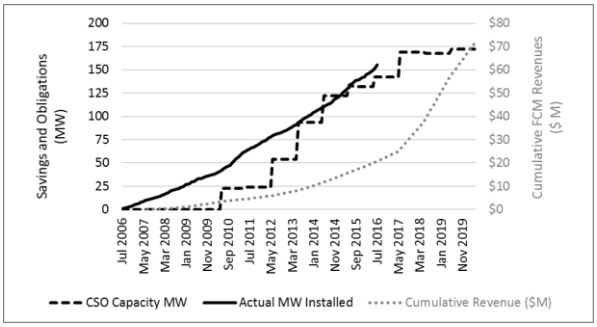
Independent System Operator for New England's Forward Capacity Market

The Trust has participated in the Independent System Operator for New England's (ISO-NE) Forward Capacity Market (FCM) since the market was launched in 2006. The FCM ensures that there is sufficient capacity in the ISO-NE region for reliable operation of the electric grid. The Trust provides demand resources by helping develop energy efficiency and distributed generation projects in Maine that may be used to satisfy regional capacity needs. The Trust and other providers of demand resources offset the need for generation capacity during periods of peak demand, thus allowing transmission planners to meet a portion of forecasted capacity needs through demand resources instead of traditional central station generators. Each year, ISO-NE forecasts the size of the peak demand three years into the future and then holds an auction to procure the amount of capacity needed to meet the forecasted demand. In the auction, 1 MW of capacity demand reduction is given the same value as 1 MW of capacity supplied by a generator. As a market participant, the Trust is responsible for reporting on progress in meeting its existing capacity obligations from prior auctions and showing ISO-NE that the Trust's program results satisfy the ISO-NE measurement and verification protocols.

The Trust reported to ISO-NE on the cumulative amount of capacity that the programs delivered during every month of FY2017. All measures installed with the Trust's incentives are recorded in its project database. The database contains information about how often and at what time of day energy-efficient equipment is in operation, and aggregates these data for reporting to ISO-NE. To ensure the accuracy of this report, ISO-NE requires an annual independent certification to review the processes behind the Trust's monthly reports. All aspects of the Trust's tracking, verification, and reporting activities are reviewed and certified for compliance with the rigorous requirements of ISO-NE's applicable measurement and verification manual.

In FY2017, the Trust participated in the 11th Forward Capacity Auction (FCA). In the auction, the Trust took on an obligation to supply 17.691 MW of summer peak demand savings, for which it will be paid a price of $5.297 per kW per month. The Trust also prepared for the 12th FCA, which will be held in February 2018. To date, the Trust has delivered a total of 173 MW of summer peak demand savings. Figure 1 summarizes the Trust's delivered savings and future obligations.

Figure 1: Summary of the Trust's FCA Actions



CSO = Capacity Supply Obligation.

Regional Greenhouse Gas Initiative Reporting

Each year, the Trust contributes to the Regional Greenhouse Gas Initiative (RGGI) Annual Report. The report is collaboratively prepared by the Department of Environmental Protection, the Public Utilities Commission (PUC), and the Trust. The report is submitted to two legislative committees: the Joint Standing Committee on Environment and Natural Resources and the Joint Standing Committee on Energy, Utilities and Technology.

In the most recent RGGI Annual Report, the Trust described how it invested $13 million of RGGI funds in FY2016. The RGGI funds expended in that year are projected to result in annual savings of 11.6 million kWh, 200,350 MMBtu, and 22,086 tons of carbon dioxide. The report is available on the Maine Department of Environmental Protection's website.

Legislative Recommendations

The Trust's authorizing statute provides that the Annual Report should include "[a]ny recommendations for changes to the laws relating to energy conservation."[22] The Trust has no recommendations for legislative changes at this time.

Low-Income Weatherization Assistance Program by the Maine State Housing Authority

The Trust's authorizing statute requires that it include in the Annual Report:

> *Total funds received and expended by the State on energy efficiency and weatherization pursuant to the Weatherization Assistance for Low-income Persons Program of the United States Department of Energy and the Low-income Home Energy Assistance Program of the United States Department of Health and Human Services.*[23]

In Maine, these federally funded efficiency and weatherization initiatives are administered by the Maine State Housing Authority (MaineHousing). The budgets and expenses of these initiatives are summarized in Table 20, which was prepared by MaineHousing.

[22] Title 35-A, Maine Revised Statutes, §10104(4).

[23] 35-A MRS §10104(5)(B)(4).

Table 20: MaineHousing Weatherization Initiatives

MaineHousing Maine State Housing Authority	GRANT YEAR/PERIOD		PRODUCTION BUDGET	PRODUCTION EXPENSES	UNITS	COMMENTS
LIHEAP WEATHERIZATION						
Weatherization efforts to maximize energy savings and reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to Community Action Agencies (CAAs), then paid directly to contractor for services; per unit average max of $7,105.	2013	10-01-12/09-30-13	$ 2,856,469	$ 2,091,682	266	Production Complete
	2014	10-01-13/11-30-14	$ 3,965,811	$ 3,383,916	436	Production Complete Contract extended to 11/30/2014
	2015	10-01-14/03-31-18	$ 5,362,383	$ 5,139,987	716 Projected	Production in Process Contract extended to 03/31/2018
	2016	10-01-15/03-31-18	$ 5,625,943	$ 1,360,714	440 Projected	Production in Process Contract extended to 03/31/2018
	2017	10-01-16/03-31-19	$ 6,000,000	$ 604,625	475 Projected	Production in Process Contract extended to 03/31/2019
	2018	10-01-17/09-30-18	TBD	TBD	TBD	Funding not yet announced
DEPARTMENT OF ENERGY/WX						
Weatherization efforts to maximize energy savings and reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to CAAs and then paid directly to contractor for services; per unit average max $7,105.	2012	04-01-12/06-30-13	$ 1,998,648	$ 1,901,076	283	Production Complete Grant period extended to continue production through 06/30/2013.
	2013/2014	04-01-13/03-31-15	$ 2,637,114	$ 1,344,984	200	Production Complete Grant for 2013 and 2014 combined by DOE $1.3 million in funding carried over to 2015
	2015	04-01-15/03-31-16	$ 3,462,618	$ 2,777,390	367	Production Complete
	2016	04-01-16/10-31-17	$ 3,306,487	$ 2,796,786	335 Projected	Production in Process Contract extended 10/31/2017
	2017	04-01-17/03-31-18	$ 1,671,487	$ 95,995	177	Projected
WEATHERIZATION SUPPLEMENTAL						
Weatherization efforts to maximize energy savings and reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to CAAs and then paid directly to contractor for services; per unit average max $6,769.	2013	01-01-13/12-31-13	$ 909,117	$ 870,875	172	Production Complete Funded by MaineHousing
	2014	01-01-14/12-31-14	$ 1,174,186	$ 1,062,803	175	Production Complete Funded by MaineHousing

Prepared by gls/MH 09-22-2017

Appendices

Appendix A: Total Energy Savings and Lifetime Avoided Energy Costs

Tables A-1 and A-2 illustrate the total energy savings[24] and lifetime avoided energy costs associated with each of the programs administered by the Trust in FY2017. Each table also shows the summary of the Trust's costs. These figures include the financial incentives given to customers ("participants") and the participants' cost-share to install energy upgrades. The costs also include the Trust's efforts to manage the programs; provide public information and outreach; hold training sessions and provide technical support; and conduct quality control, measurement and verification, and evaluation of each program. The benefit-to-cost ratio indicates the ratio of the financial benefits (from the lifetime avoided energy costs) to the combined costs of the Trust and the participants.

Table A-1: FY2017 Program Impacts – Electric Programs

Program	Annual kWh Savings	Lifetime kWh Savings	Efficiency Maine Costs	Participant Cost	Lifetime Energy Benefit	Cost/kWh (Lifetime)	Benefit-to-Cost Ratio
Commercial and Industrial Custom Program Electric Measures	27,080,585	386,875,264	$3,735,137	$4,297,306	$15,779,564	$0.021	1.96
Commercial and Industrial Prescriptive Program Electric Measures	21,395,636	308,319,024	$6,275,157	$10,260,064	$29,562,077	$0.054	1.79
Commercial New Construction Program Electric Measures	1,028,909	20,578,188	$358,264	$1,201,122	$962,605	$0.076	0.62
Small Business Initiative	1,106,584	15,998,489	$1,818,995	$796,189	$2,333,051	$0.163	0.89
Consumer Products Program	39,583,238	448,554,238	$8,763,814	$17,493,758	$52,473,542	$0.059	2.00
Home Energy Savings Program Electric Measures	11,466,773	206,401,914	$3,619,171	$1,349,690	$10,832,043	$0.024	2.18
Low-Income Initiatives Electric Measures	12,024,882	117,636,560	$3,632,885	$3,363,848	$17,106,021	$0.059	2.44
Strategic Initiatives – Electric			$713,365				
Administration – Electric			$2,180,133				
Total	**113,686,608**	**1,504,363,676**	**$31,096,921**	**$38,761,977**	**$129,048,904**	**$0.046**	**1.85**

[24] Savings values reported in the program summary tables are "adjusted gross savings" unless otherwise indicated. Adjusted gross savings reflect the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted by factors developed through program evaluations. Periodically, the Trust enlists independent third-party contractors to evaluate the savings impacts of major programs. The evaluations help the Trust develop factors to improve the accuracy of gross savings calculations based on installation rates and actual, site-verified savings rates. The evaluations are also used to analyze program attribution, including identifying program participants who would have installed the same or equivalent efficiency measures on their own even if the program had not been offered ("free-ridership" [FR]) and the percentage of efficient equipment installed due to program influences even though no incentive or technical assistance was received ("spillover" [SO]). Factoring in free-ridership and spillover delivers "net savings," which quantifies the savings directly (adjusted gross minus FR) and indirectly (SO) attributable to the program. The Trust publishes the FR and SO factors in the Technical Reference Manuals (TRMs). The lifetime energy benefit is calculated using methodologies and assumptions approved by the PUC as part of the approval process for the Trust's Triennial Plan III. The specific assumptions used to estimate avoided electric energy and capacity costs, and avoided natural gas costs, are consistent with the settled agreement to reflect adjustments made in the Commission's Staff Bench Analysis - High Case (see Commission Staff, Bench Analysis, Docket 2015-00175, February 24, 2016, pp. 15–16), which references forecasts performed for the Commission by London Economics International in June 2015.

Table A-2: FY2017 Program Impacts – Thermal Programs

Program	Annual MMBtu Savings	Lifetime MMBtu Savings	Efficiency Maine Costs	Participant Cost	Lifetime Energy Benefit	Cost/ MMBtu (Lifetime)	Benefit-to-Cost Ratio
Commercial and Industrial Custom Program Natural Gas Measures	18,462	204,284	$298,644	$215,451	$837,615	$2.52	1.63
Commercial and Industrial Custom Program Other Fuels Measures	251,871	3,125,655	$2,937,021	$3,727,324	$19,239,992	$2.13	2.89
Commercial and Industrial Prescriptive Program Natural Gas Measures	56,355	1,096,537	$694,979	$212,766	$4,553,679	$0.83	5.02
Commercial and Industrial Prescriptive Program Other Fuels Measures	33,289	618,161	$830,545	$207,020	$5,260,427	$1.68	5.07
Commercial New Construction Program Natural Gas Measures	1,638	32,768	$167,910	$549,115	$118,721	$21.88	0.17
Commercial New Construction Program Other Fuels Measures	306	6,128	$31,448	$92,523	$57,180	$20.23	0.46
Low-Income Initiatives Natural Gas Measures	33	500	$2,390	–	$2,349	$4.78	0.98
Low-Income Initiatives Other Fuels Measures	21,938	378,206	$1,101,090	$740,128	$3,808,117	$4.87	2.07
Home Energy Savings Program Natural Gas Measures	13,668	324,268	$571,245	$1,279,680	$2,741,378	$5.71	1.48
Home Energy Savings Program Other Fuels Measures	81,797	1,940,590	$3,182,759	$7,658,274	$16,405,840	$5.59	1.51
Renewable Energy Demonstration Grants Program			$0				
Strategic Initiatives – Thermal			$73,224				
Administration – Thermal			$646,110				
Total	**479,359**	**7,727,097**	**$10,537,366**	**$14,682,282**	**$53,025,298**	**$3.26**	**2.10**

Two different cost tests are used to assess a program's cost-effectiveness, one from the perspective of all utility customers (participants and nonparticipants) (the Total Resource Cost [TRC] test) and one from the perspective of the program administrator (utility, government agency, or third-party implementer) (the Program Administrator Cost Test [PACT]). The criteria for the two cost tests are as follows[25]:

- **TRC test:** The TRC test compares combined program administrator and customer costs to utility resource savings. The TRC test measures the benefits of the energy efficiency program for the region. Costs included in the TRC test are those used to purchase and install energy efficiency measures, including the costs incurred by program participants and the costs of running the energy efficiency program. The benefits included are the avoided costs of energy, demand, and water.
- **PACT:** The PACT compares program administrator costs to supply-side resource savings. A positive PACT (>1) indicates that an energy efficiency program is a lower-cost approach to meeting load growth than a wholesale energy purchase and new generation resources (including delivery and system costs). The PACT includes only costs incurred by the program administrator and not customer contributions.

[25] TRC and PACT are defined in accordance with "Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers, A Resource of The National Action Plan for Energy Efficiency," November 2008, (https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf), as updated and modified by the CA PUC, "Energy Efficiency Policy Manual V 3.1" in a Memorandum filed Dec. 20, 2007, at Attachment 1.

Table A-3: Benefit-to-Cost Ratios – Electric Programs

Program	Adjusted Gross Benefit-to-Cost Ratio		Last Evaluation	Net-to-Gross Ratio	Net Benefit-to-Cost Ratio	
	TRC	PACT			TRC	PACT
Commercial and Industrial Custom Program Electric Measures	1.96	4.22	2017	87%	1.72	3.69
Commercial and Industrial Prescriptive Program Electric Measures	1.79	4.71	2016, Note 5	74%	1.56	3.47
Commercial New Construction Program Electric Measures	0.62	2.69	Note 3	100%	0.62	2.69
Small Business Initiative	0.89	1.28	Note 4	75%	0.72	0.96
Consumer Products Program	2.00	5.99	2017	77%	1.81	4.55
Home Energy Savings Program Electric Measures	2.18	2.99	2011, Note 2	76%	1.75	2.24
Low-Income Initiatives Electric Measures	2.44	4.71	2014, Note 3	100%	2.44	4.71
Total	**1.85**	**4.15**		**80%**	**1.65**	**3.32**

Table A-4: Benefit-to-Cost Ratios – Thermal Programs

Program	Adjusted Gross Benefit-to-Cost Ratio		Last Evaluation	Net-to-Gross Ratio	Net Benefit-to-Cost Ratio	
	TRC	PACT			TRC	PACT
Commercial and Industrial Custom Program Natural Gas Measures	1.63	2.80	2017	92%	1.51	2.59
Commercial and Industrial Custom Program Other Fuels Measures	2.89	6.55	2017	93%	2.68	6.08
Commercial and Industrial Prescriptive Program Natural Gas Measures	5.02	6.55	2016, Note 3	64%	3.59	4.17
Commercial and Industrial Prescriptive Program Other Fuels Measures	5.07	6.33	2016, Note 3	55%	3.06	3.49
Commercial New Construction Program Natural Gas Measures	0.17	0.71	Note 3	100%	0.17	0.71
Commercial New Construction Program Other Fuels Measures	0.46	1.82	Note 3	100%	0.46	1.82
Low-Income Initiatives Natural Gas Measures	0.98	0.98	2014	100%	0.98	0.98
Low-Income Initiatives Other Fuels Measures	2.07	3.46	Note 2	100%	2.07	3.46
Home Energy Savings Program Natural Gas Measures	1.48	4.80	2011, Note 2	75%	1.34	3.60
Home Energy Savings Program Other Fuels Measures	1.51	5.15	2011, Note 2	75%	1.38	3.87
Total	**2.10**	**5.03**		**81%**	**1.88**	**4.06**

Note 1 New program, not yet evaluated. Program evaluation currently being planned.
Note 2 Currently being evaluated.
Note 3 Evaluation not scheduled.
Note 4 Evaluation to begin in FY2019.
Note 5 Process evaluation completed in FY2016. Impact evaluation report to be published in FY2018.

Appendix B: Program Expenditures

Table B-1: Electric Program Expenditures

Program	Incentive	Delivery	Total
Commercial and Industrial Custom Program Electric Measures	$2,985,884	$749,253	$3,735,137
Commercial and Industrial Prescriptive Program Electric Measures	$5,481,092	$794,065	$6,275,157
Commercial New Construction Program Electric Measures	$320,620	$37,643	$358,264
Small Business Initiative	$1,403,565	$415,429	$1,818,995
Consumer Products Program	$6,648,576	$2,115,238	$8,763,814
Home Energy Savings Program Electric Measures	$2,701,250	$917,921	$3,619,171
Low-Income Initiatives Electric Measures	$2,973,204	$659,681	$3,632,885
Strategic Initiatives – Electric			$713,365
Administration – Electric			$2,180,133
Total	**$22,514,192**	**$7,023,396**	**$31,096,921**

Table B-2: Thermal Program Expenditures

Program	Incentive	Delivery	Total
Commercial and Industrial Custom Program Natural Gas Measures	$210,544	$88,100	$298,644
Commercial and Industrial Custom Program Other Fuels Measures	$2,755,016	$182,005	$2,937,021
Commercial and Industrial Prescriptive Program Natural Gas Measures	$612,537	$82,442	$694,979
Commercial and Industrial Prescriptive Program Other Fuels Measures	$701,053	$129,493	$830,545
Commercial New Construction Program Natural Gas Measures	$146,577	$21,333	$167,910
Commercial New Construction Program Other Fuels Measures	$24,698	$6,750	$31,448
Low-Income Initiatives Natural Gas Measures	$765	$1,625	$2,390
Low-Income Initiatives Other Fuels Measures	$806,208	$294,882	$1,101,090
Home Energy Savings Program Natural Gas Measures	$464,394	$106,851	$571,245
Home Energy Savings Program Other Fuels Measures	$2,779,174	$403,585	$3,182,759
Strategic Initiatives – Natural Gas and Other Fuels			$73,224
Administration – Natural Gas and Other Fuels			$646,110
Total	**$8,500,965**	**$1,480,291**	**$10,537,366**

Appendix C: Amended Budget

Table C-1: Efficiency Maine Trust FY2018 Amended Budget as of 9/27/2017

	EMT ADMIN FUND	REGIONAL GREENHOUSE GAS INITIATIVE	ELECTRIC EFFICIENCY PROCUREMENT	MAINE POWER RELIABILITY PROGRAM SETTLEMENT	FORWARD CAPACITY MARKET	NATURAL GAS EFFICIENCY PROCUREMENT	ENERGY EFFICIENCY & RENEWABLE RESOURCE FUND	LONG-TERM CONTRACTS	REVOLVING LOAN FUNDS	FY 2018 TOTAL BUDGET
TOTAL REVENUES & USE OF FUND BALANCE	**651,500**	**1,251,493**	**9,091,892**	**34,072,592**	**2,839,176**	**18,338,031**	**4,924,842**	**275,874**	**203,337**	**71,648,738**
EXPENDITURES										
LOW INCOME INITIATIVES	**-**	**585,620**	**4,357,904**	**920,082**	**260,692**	**672,526**	**-**	**-**	**-**	**6,796,824**
CONSUMER PRODUCTS	**-**	**-**	**6,488,592**	**332,279**	**4,687,561**	**-**	**-**	**-**	**-**	**11,508,432**
HOME ENERGY SAVINGS PROGRAM	**-**	**2,111,752**	**6,264,537**	**-**	**1,366,785**	**765,541**	**-**	**-**	**605,000**	**11,113,615**
Home Energy Savings Program	-	2,111,752	6,264,537	-	1,366,785	765,541	-	-	-	10,508,615
Revolving Loan Support	-	-	-	-	-	-	-	-	355,000	355,000
Loan Loss Reserve	-	-	-	-	-	-	-	-	250,000	250,000
C&I PRESCRIPTIVE PROGRAM	**-**	**654,025**	**5,313,344**	**289,675**	**4,466,918**	**1,888,872**	**-**	**-**	**-**	**12,612,834**
C&I CUSTOM PROGRAM	**-**	**1,578,333**	**5,157,154**	**1,060,023**	**5,601,081**	**837,207**	**-**	**203,337**	**-**	**14,437,135**
COMMERCIAL SMALL BUSINESS	**-**	**-**	**2,556,587**	**-**	**-**	**-**	**-**	**-**	**1,000**	**2,557,587**
Commercial Small Business	-	-	2,556,587	-	-	-	-	-	-	2,556,587
Commercial Loan Support	-	-	-	-	-	-	-	-	1,000	1,000
COMMERCIAL NEW CONSTRUCTION/MAB	**-**	**860,568**	**700,595**	**-**	**-**	**424,514**	**-**	**-**	**-**	**1,985,677**
RENEWABLES	**-**	**-**	**-**	**-**	**-**	**-**	**257,874**	**-**	**-**	**257,874**
INNOVATION	**-**	**40,000**	**583,451**	**30,000**	**320,295**	**42,559**	**-**	**-**	**-**	**1,016,305**
PUBLIC INFORMATION	**-**	**31,627**	**145,340**	**12,117**	**86,830**	**16,978**	**-**	**-**	**-**	**292,892**
EM&V	**-**	**145,766**	**864,434**	**75,000**	**411,755**	**106,402**	**-**	**-**	**-**	**1,603,357**
ADMINISTRATION	**1,221,493**	**454,200**	**1,439,518**	**105,000**	**996,114**	**148,964**	**-**	**-**	**30,200**	**4,395,489**
INTER-AGENCY TRANSFERS	**30,000**	**2,630,000**	**201,136**	**15,000**	**140,000**	**21,280**	**18,000**	**-**	**-**	**3,055,416**
Public Utilities Commission	-	15,000	201,136	15,000	140,000	21,280	-	-	-	392,416
RGGI Rate Relief	-	2,500,000	-	-	-	-	-	-	-	2,500,000
RGGI Inc Operating Costs	-	85,000	-	-	-	-	-	-	-	85,000
Department of Environmental Protection	-	30,000	-	-	-	-	-	-	-	30,000
Governor's Energy Office	30,000	-	-	-	-	-	-	-	-	30,000
DECD (Maine Technology Institute)	-	-	-	-	-	-	18,000	-	-	18,000
TOTAL EXPENDITURES	**1,251,493**	**9,091,892**	**34,072,592**	**2,839,176**	**18,338,031**	**4,924,843**	**275,874**	**203,337**	**636,200**	**71,633,438**
RESERVED FUND BALANCE	**-**	**112,248**	**1,220,000**	**-**	**480,000**	**212,970**	**-**	**-**	**20,681,848**	**22,707,066**

Appendix D: Public Utilities Commission Assessments and Revenue Collections

Table D-1: Public Utilities Commission Assessments and Revenue Collections

PUC Assessments and Revenue Collections - FY 2017					
Electric Efficiency Procurement					
Procurement Quarter:	**Jul-Sep 2016**	**Oct-Dec 2016**	**Jan-Mar 2017**	**Apr-Jun 2017**	**Total - FY 2017**
Billing Date:	**11-Jul-16**	**1-Oct-16**	**1-Jan-17**	**1-Apr-17**	
Name					
Central Maine Power Co	$ 6,347,155	$ 6,347,155	$ 6,347,155	$ 6,347,155	$ 25,388,621
Eastern Maine Electric Coop	$ 78,174	$ 78,174	$ 78,174	$ 78,174	$ 312,696
Emera (Bangor Hydro/MPS)	$ 1,461,967	$ 1,461,967	$ 1,461,967	$ 1,461,967	$ 5,847,870
Fox Island Electric Coop	$ 8,272	$ 8,272	$ 8,272	$ 8,272	$ 33,087
Houlton Water Co	$ 57,435	$ 57,435	$ 57,435	$ 57,435	$ 229,741
Kennebunk Light & Power	$ 88,830	$ 88,830	$ 88,830	$ 88,830	$ 355,320
Madison Electric Works	$ 21,292	$ 21,292	$ 21,292	$ 21,292	$ 85,167
Swan's Island Electric	$ 1,724	$ 1,724	$ 1,724	$ 1,724	$ 6,897
Van Buren Light & Power Co	$ 11,875	$ 11,875	$ 11,875	$ 11,875	$ 47,498
Totals	**$ 8,076,724**	**$ 8,076,724**	**$ 8,076,724**	**$ 8,076,724**	**$ 32,306,897**

Revenue Forecast	**FY 2018**
Central Maine Power Co	$ 17,722,938
Eastern Maine Electric Coop	$ 213,298
Emera	$ 4,059,714
Fox Island Electric Coop	$ 23,203
Houlton Water Co	$ 160,315
Kennebunk Light & Power	$ 254,091
Madison Electric Works	$ 60,958
Swan's Island Electric	$ -
Van Buren Light & Power Co	$ 32,732
Total	**$ 22,527,249**

Natural Gas Efficiency Procurement		
	Total - FY 2017	**Revenue Forecast - FY 2018**
Name		
Northern Utilities - Unitil		
Bangor Natural Gas	*Confidential*	*Confidential*
Maine Natural Gas		
Summit Natural Gas		
Totals	**$ 2,383,407**	**$ 2,383,407**

Alternative Compliance Mechanism (ACM)		
Assessment Timeframe:	**Jul '16-Jun '17**	**Total - FY 2017**
Billing Date:	**13-Sep-16**	
Name		**Total - FY 2017**
Electricity Maine, LLC	$ 3,018	$ 3,018
Totals	**$ 3,018**	**$ 3,018**

Appendix E: Glossary

Adjusted Gross Savings: The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted for installation rates and savings rates verified through program evaluations.

Affected Customer: One of the 16 energy-intensive manufacturers in Maine that receive a portion of the state's Regional Greenhouse Gas Initiative (RGGI) revenues in the form of a disbursement. These businesses were identified by the Maine Public Utilities Commission (PUC) in an Order issued on October 21, 2016, in Docket No. 2016-00143.

Arrearage: Unpaid debt or overdue payments.

Avoided Energy Costs: Costs that would have been incurred had a utility and/or energy supplier otherwise been required to supply the power that was avoided through the installation of an energy efficiency or distributed generation project. The avoided costs include the wholesale cost of energy and capacity, the costs of complying with renewable energy and climate policies, plus the marginal costs of adding future transmission and distribution (but not the retail cost of transmission and distribution).

Benefit-to-Cost Ratio: The ratio of the net present value of the quantifiable financial benefits (from the lifetime avoided energy costs) to the costs of an efficiency measure. The benefits and costs included in the calculation are dependent on what test is being used. See glossary entries of Program Administrator Cost Test (PACT) and Total Resource Cost (TRC) test.

Community Action Agency (CAA): Nonprofit private and public organizations established under the U.S. Economic Opportunity Act of 1964 to reduce poverty. CAAs deliver emergency services, education, training, housing, weatherization services, and more.

Design-Build Approach: An approach to construction that bundles design and construction services under one contract.

Free-Rider: A program participant who, in the determination of third-party evaluators, would have installed equivalent efficiency measures independent of the Trust's program or its incentives.

Lifetime Energy Benefit: The net present value of the avoided energy supply cost of energy and demand savings over the measure life.

Maximum Achievable Cost-Effective (MACE): An energy efficiency industry term that refers to the full universe of potential cost-effective energy efficiency projects that could realistically be installed given technical and economic constraints and assumed adoption rates based on offered incentives.

Measure Life: The length of time that a measure is expected to be functional. Measure life is a function of: (1) *equipment life*, the number of years that a measure is installed and operates until failure, and (2) *measure persistence*, which takes into account business turnover, early retirement of installed equipment, and other reasons that measures might be removed or discontinued. Measure life is sometimes referred to as expected useful life.

Midstream: Incentive programs for energy-efficient products are characterized as midstream, upstream, or downstream depending on who receives the incentives. Upstream programs provide incentives for manufacturers to make more-efficient products and downstream programs provide rebates for consumers, encouraging them to purchase more-efficient products. A midstream program provides incentives at the retailer or distributor level, encouraging them to stock and sell more high-efficiency equipment models.

Modified Participant Cost Test (MPCT): This cost-effectiveness test, applied by the Trust only to certain renewable energy projects, compares a participant's costs after application of any rebate or tax incentives to the lifetime electricity/fuel savings based on the retail prices in place at the time of project commencement. A positive MPCT (>1) indicates that lifetime benefit achieved by a renewable energy project is lower than the funds invested by the customer.

Net Position: An accounting term referring to the variance between assets and liabilities.

Net Savings: An estimate of the amount of adjusted gross savings that can be directly and indirectly attributed to a program based on program participants' motivation. Participants who, in the determination of the evaluators, would have installed equivalent efficiency measures independent of the program and its incentives are considered "free-riders." To calculate net savings, the impacts of savings attributed to free-riders are excluded. By contrast, savings realized by program participants through the installation of *additional* efficiency measures due to program influences, even though no incentive or technical assistance (TA) was received (called "spillover"), are added.

Net-to-Gross (NTG) Ratio: The ratio of net savings to adjusted gross savings. The NTG ratio is defined as 1 minus the free-ridership (FR) rate plus the spillover (SO) rate (NTG ratio = 1 − FR + SO).

Program Administrator Cost Test (PACT): This cost-effectiveness test compares Efficiency Maine Trust's costs to supply-side resource savings. A positive PACT (>1) indicates that an energy efficiency program is a lower-cost approach to meeting load growth than a wholesale energy purchase and new generation resources (including delivery and system costs). The PACT includes only costs incurred by the program administrator and not customer contributions.

Qualified Partner: A term used to describe the network of contractors and vendors working with Efficiency Maine's Commercial & Industrial Prescriptive Program (CIP).

Spillover: Savings realized by program participants through the installation of *additional* efficiency measures due to program influences, even though no incentive or technical assistance (TA) was received.

Total Resource Cost (TRC) Test: This cost-effectiveness test captures the perspective of all utility customers—both participants and nonparticipants. It is the comparison of program administrator and customer costs to utility resource savings. The TRC test measures the benefits of the energy efficiency program for the region as a whole. Costs included in the TRC test are those used to purchase and install the energy efficiency measure, including the costs incurred by program participants and the costs of running the energy efficiency program. The benefits included are the avoided energy supply cost.