

Matter Number 16-00681, In the Matter of the Clean Energy Fund
Investment Plan

Clean Energy Fund Investment Plan: Resource Acquisition Transition Chapter

**Submitted by the New York State Energy Research and Development
Authority**

Revised November 27, 2018

Clean Energy Fund Investment Plan:
Resource Acquisition Transition Chapter

Revision Date	Description of Changes	Revision on Page(s)
February 22, 2016	Original Issue	Original Issue
December 30, 2016	<p><u>Industrial:</u> Revised table 2.2.7 to correct errors in Customer Bill Savings</p> <p><u>Anaerobic Digester:</u> Revised table 2.11.7 to correct errors in Customer Bill Savings</p> <p><u>Solar Thermal:</u> Revised table 2.14.7 to correct errors in Customer Bill Savings</p>	Multiple
June 23, 2017	<p><u>Table 1 (TRC for Energy Efficiency Programs)</u> has been revised to show updated benefit cost ratios, reflecting budget and benefit changes described below.</p> <p><u>Commercial:</u> The Commercial Implementation Assistance Program has been closed, effective April 2017. The Flexible Technical Assistance Program has been extended through 2019, with funding added for the additional year. Text and tables 2.1.6, 2.1.7, and 2.1.8 have been updated to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Industrial:</u> Program has been extended through 2019, with funding added for the additional year. Total participant values have been adjusted downward based on applications received since the program launched. Text and tables 2.2.6, 2.2.7, and 2.2.8 have been revised to reflect this revision, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Agriculture:</u> Total MMBTU savings have been reduced due to the incorporation of additional data from the Agriculture Energy Audit program into benefit modeling. The program has also been extended through 2018, with no change to the overall funding level. Text and tables 2.3.6, 2.3.7, and 2.3.8 have been revised to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Multifamily Market Rate:</u> This program is being closed as of July 2017. The text and Tables.4.6, 2.4.7, and 2.4.8 have been revised to reflect 2017 actual values and program activity.</p> <p><u>Single Family Market Rate:</u> The initiative has been extended through 2018, and the budget has been increased to provide additional to support improved data analysis, performance management, technical assistance, and marketing and outreach. Text and tables 2.5.6, 2.5.7, and 2.5.8 have been revised to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>LMI Single Family:</u> This initiative has been moved to the LMI chapter.</p> <p><u>LMI Multifamily:</u> This initiative has been moved to the LMI chapter.</p>	Multiple

	<p><u>Commercial New Construction:</u> Program has been extended through 2018 with funding added for the additional year. Changes have been made to encourage deep energy savings and zero net energy projects, removal of the participation threshold to offer technical support to smaller conventional projects and providing support for projects following an Integrated Project Delivery protocol. Text and tables 2.8.6, 2.8.7, and 2.8.8 have been revised to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Low-Rise Residential New Construction:</u> Program has been extended through 2018 with funding added for the additional year. Incentives for cooperative advertising, first plan review, and first rating incentives will no longer be offered. The revised 2017 and additional 2018 savings are now calculated based on a baseline of NYS Energy Conservation Construction Code (ECCC) of NYS adopted in October 2016 (which was not released when the original metrics were calculated) as the baseline reference. Text and tables 2.9.6, 2.9.7, and 2.9.8 have been revised to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Multifamily New Construction:</u> Program has been extended through 2018 with funding added for the additional year. Revised program to adjust per project incentive caps and the per dwelling unit incentives to align with the Low-rise Residential New Construction Program. The revised 2017 and additional 2018 savings are now calculated based on a baseline of NYS Energy Conservation Construction Code (ECCC) of NYS adopted in October 2016 (which was not released when the original metrics were calculated) as the baseline reference. Text and tables 2.10.6, 2.10.7, and 2.10.8 have been revised to reflect these revisions, 2016 actual values, and a shift in timing of the overall budget and benefits.</p> <p><u>Anaerobic Digesters:</u> Program has been revised to shift away from standard offer incentives to a competitive selection process. Text and table 2.11.7 have been updated to reflect this revision.</p> <p><u>Fuel Cells:</u> Program never launched and has been removed from the chapter in this revision.</p> <p><u>Small Wind:</u> Total projected benefits have been reduced to reflect a smaller project size than was estimated in the original calculation of benefits. Text and table 2.13.7 have been revised to reflect this revision and 2016 actual values.</p> <p><u>Solar Thermal:</u> Tables 2.14.6 and 2.14.7 have been revised to reflect 2016 actual values.</p>	
July 17, 2017	<p><u>Multifamily Market Rate:</u> This program will be closed thirty days after approval of this revised chapter. The text and Tables 2.4.6, 2.4.7, and 2.4.8 have been revised to reflect 2017 actual values and program activity, as well as the necessary budget to cover the thirty-day notice period.</p>	Multiple

	<u>CHP:</u> Table 2.15.7 has been updated to correct the 2016 private investment value and to reflect the correct amount of natural gas usage by the CHP systems.	
September 4, 2018	<u>CHP:</u> Program has been extended through 2019 with funding added for 2018 and the additional year. The measure life has been revised to reflect 20-years. Further decreases in the incentive rate have been enumerated, including a pivot to a steeper decline trajectory. The resiliency benefits of CHP have been enumerated. The presentation of the Market Transformation of Marketplace benefits was revised to align with the presentation of indirect benefits in other CEF chapters.	Multiple
September 11, 2018	<u>ADG:</u> Additional funds added to be used to support refurbishment of previously installed digester systems. An ADG program was not offered in 2017, therefore, text and tables were adjusted to shift budget and benefits into 2018. Tables 2.11.6 and 2.11.7 have been updated to account for the expanded budget and the associated impacts. <u>CHP:</u> Corrected total values in Table 2.15.7	Multiple
November 27, 2018	<u>Single Family Market Rate:</u> Extended program through December 31, 2019. Added budget and benefits for the additional year, reflected in Tables 2.5.5 and 2.5.6.	Multiple

1 Introduction

Pursuant to the Order Authorizing the Clean Energy Fund Framework issued by the New York State Public Service Commission (the “Commission”) on January 21, 2016 (the “CEF Order”), the New York State Energy Research and Development Authority (NYSERDA) files this Clean Energy Fund (CEF) Investment Plan.¹

The CEF is the next evolution of state clean energy programs and is part of a strategy to build a cleaner, more resilient, and affordable energy infrastructure for New York State. The CEF is a key pillar of Governor Andrew M. Cuomo’s Reforming the Energy Vision (REV) strategy, which refocuses NYSERDA’s strategic priorities in the energy marketplace through the deployment of new and redesigned programs and initiatives. While the REV Regulatory Proceeding, a complementary REV pillar, redirects the market by creating rules that facilitate and reward investment in a cleaner, more resilient and affordable energy system, the CEF will engage with the many market actors so they are best able to provide the clean, resilient and bill-reducing technologies that consumers will be able to choose through a REV-enabled marketplace. These two key pillars, alongside the third - New York Power Authority’s (NYPA’s) ‘lead by example’ approach to clean energy expansion- will work together to transition to the new clean energy marketplace that REV seeks to enable.

The CEF will serve as an integral component in advancing clean energy goals, as stated in the 2015 New York State Energy Plan² (the “2015 State Energy Plan”):

- Achieving 40% greenhouse gas (GHG) emissions reductions by 2030 in the energy sector;
- Meeting 50% of electricity demand by 2030 with renewable energy; and
- Realizing 600 TBtu of energy efficiency by 2030.

The CEF initiatives will enable NYSERDA to work with consumers and market participants to contribute to these statewide goals by managing the CEF to advance four primary outcomes:

- Reduce GHG emissions
- Reduce customer energy bills
- Increase statewide deployment of energy efficiency and renewable energy
- Mobilize private investment in clean energy technologies and solutions

The CEF’s success will be apparent in the appearance of: (1) a more dynamic “supply side” of clean energy service providers, including energy service companies, financing institutions, product suppliers, and contractors/installers who develop new models (or improve existing models) for delivering and financing energy services and solutions to consumers, and (2) a better informed “demand side” customer base that seeks innovative energy services and effective energy solutions,

¹ Case 14-M-0094 – Proceeding on Motion of the Commission to Consider a Clean Energy Fund. *Order Authorizing the Clean Energy Fund Framework* issued January 21, 2016.

² See <http://energyplan.ny.gov/>.

which collectively catalyze flourishing clean energy markets leading to clean energy investments at greater scale and impact.

This Investment Plan covers only the Market Development and Innovation & Research portfolios of the CEF; NY-Sun and New York Green Bank (NYGB) activities will continue to be described within their individual operating plan and business plan, respectively.³

The Market Development portfolio will focus on facilitating the market for on-site, behind-the-meter clean energy solutions including energy efficiency, distributed generation, renewable thermal, and energy storage. The Market Development portfolio will also include activities to facilitate Large-Scale Renewables (LSRs), in addition to any role(s) or activities NYSERDA may assume under successor programs to the RPS Main Tier program, which has historically provided direct individual project support.

A core premise of the Market Development portfolio is the recognition that, in the absence of a fully functioning market, initiatives are needed to spur solutions and innovations that accelerate the transition to market mechanisms. NYSERDA's new approach recognizes that different clean energy solutions face different barriers. For some clean energy technologies, high hard costs (e.g., manufacturing and equipment costs) lead to poor economics that dampen demand. For other clean energy technologies, high soft costs (e.g., customer acquisition, permitting, and financing costs) stand in the way of greater scale. Many other solutions are cost competitive today yet remain under-deployed. This implies that the main barrier to increased penetration of clean energy may not be wholly financial and indicates that direct grants and incentives may not always be the most effective means to spur adoption when solely aimed at overcoming financial barriers. Non-monetary barriers can include, but are not limited to:

- Burdensome permitting and local approval processes;
- Limited and uneven consumer awareness;
- Lack of trust in technology performance by customers and financial institutions;
- Inertia, capacity and implementation constraints; and
- Limited access to financing.

These barriers are unresolved, receive insufficient focus from other market actors, increase soft costs, impeded self-sustaining markets, and are high-potential opportunities to accelerate adoption if resolved.

The Market Development portfolio will address the diverse barriers to clean energy deployment. Bridge incentives, including those identified in the Resource Acquisition Transition Chapter, will be deployed alongside new techniques that spur self-sustaining clean energy markets and seek to mobilize capital to create the greatest opportunity for market penetration of energy efficiency and

³ See CEF Order at page 26.

distributed generation. Fundamentally, Market Development initiatives will employ the following strategies to reduce soft costs and other non-monetary barriers:

- **Provide information, data, and education** for customers and service providers to raise awareness and demand, reduce customer acquisition costs, train clean energy workforces, and improve customer confidence.
- **Offer technical assistance**, and provide **standardized and simple, robust tools** for clean energy partners, including service providers, contractors, and energy-decision makers such as code officials and local government leaders to lower soft costs and address implementation constraints.
- **Provide quality assurance** for proposed clean energy solutions and deliver performance validation, monitoring, and verification of new clean energy technologies to improve customer confidence.
- **Pilot, demonstrate, and replicate** new technologies and business models to advance innovative, scalable, and cost-effective solutions.
- **Enable aggregation** of different customer types (e.g. residences, municipalities, businesses, real estate portfolios) to reduce costs through economies of scale and leverage peer pressure to break through inertia.

The Innovation and Research portfolio focuses on Technology and Business Innovation with a goal of accelerating and catalyzing the most valuable innovations that will create low-GHG solutions, system and customer benefits, and a vibrant clean energy industry in New York. The Innovation and Research portfolio will also support energy-related environmental research that provides objective information on the environmental impacts of energy technologies, helping to inform policy making and identify strategies to mitigate environmental impacts.

In delivering the Technology and Business Innovation programs, NYSERDA will be strategic, focused and capital efficient, addressing pressing needs and opportunities in New York. Investments will complement the REV regulatory proceeding by advancing new clean energy solutions for a distributed energy system. The programs will address key points where commercialization can stall, and the private sector is less likely to fill gaps, paying careful attention to the path to the market for new innovations.

Structure of this Investment Plan

This Investment Plan employs a chapter approach in which the portfolio is progressively built over the initial year of the CEF. Individual chapters are appended/updated and filed with the Commission as NYSERDA is prepared to initiate the activities within them.

The Budgets Accounting and Benefits Chapter provides an up to date compilation of budgets and benefits for all initiatives contained within the Investment Plan. A Resource Acquisition Transition chapter details program offering pertaining to continued operation and transitioning of programs from legacy portfolios. A Market Characterization and Design chapter will outline market research and characterization activities that will be necessary for NYSERDA to engage in to adequately

understand target markets and tailor offerings to them. A Low-to-Moderate Income (LMI) chapter will outline offerings and activities developed specifically for LMI customers. An Energy-Related Environmental Research chapter will identify research activities to provide objective information on the environmental impacts of energy technologies. Multiple individual Market Transformation Intervention chapters within the Market Development and Innovation & Research portfolios will describe new initiatives that NYSERDA will offer to target particular segments of the market. An Innovation Chapter will outline strategies to advance technology and business innovation in strategic priority areas.

2 Resource Acquisition Transition

This Resource Acquisition Transition chapter provides a description of program offerings within the CEF pertaining to continued operation and transitioning of programs from legacy portfolios. Sections 2.1 through 2.10 include transition programs from the Energy Efficiency Portfolio Standard (EEPS), sections 2.11 through 2.14 include transition programs from the Renewable Portfolio Standard (RPS) Customer-Sited Tier (CST), and section 2.15 includes the transition of the CHP program from the Technology & Market Development (T&MD) portfolio.

In accordance with the CEF Order, a program level benefit cost analysis (BCA) using the Total Resource Cost (TRC) approach was performed for each energy efficiency program for informational purposes and is summarized in Table 1 and presented within. An analysis of those energy efficiency programs in aggregate resulted in a portfolio level TRC of 1.9, which meets the Commission's requirement of a portfolio level TRC greater than 1.0.

Table 1. TRC for Energy Efficiency Programs⁴

	2016 - 2019
Commercial	
Benefits (million 2015\$)	\$187.71
Costs (million 2015\$)	\$78.30
Benefit Cost Ratio	2.4
Industrial	
Benefits (million 2015\$)	\$608.85
Costs (million 2015\$)	\$172.65
Benefit Cost Ratio	3.5
Agriculture	
Benefits (million 2015\$)	\$9.70
Costs (million 2015\$)	\$9.34
Benefit Cost Ratio	1.0
Multifamily Market Rate	
Benefits (million 2015\$)	\$1.30
Costs (million 2015\$)	\$0.41
Benefit Cost Ratio	3.2
Single Family Market Rate	
Benefits (million 2015\$)	\$47.13
Costs (million 2015\$)	\$62.15
Benefit Cost Ratio	0.8
Commercial New Construction	
Benefits (million 2015\$)	\$82.46
Costs (million 2015\$)	\$107.85
Benefit Cost Ratio	0.8

⁴ Costs defined as all costs associated with the energy efficiency program, including program specific costs, Administration, Cost Recovery Fee (CRF), and evaluation, measurement, and verification, as well as customer costs.

Low Rise New Construction	
Benefits (million 2015\$)	\$30.13
Costs (million 2015\$)	\$39.08
Benefit Cost Ratio	0.8
Multifamily New Construction	
Benefits (million 2015\$)	\$44.58
Costs (million 2015\$)	\$47.18
Benefit Cost Ratio	0.9
Total Energy Efficiency Portfolio	
Total Benefits (million 2015\$)	\$1,009.55
Total Costs (million 2015\$)	\$511.63
Portfolio Benefit Cost Ratio	2.0

2.1 Commercial

The Flexible Technical Assistance Program (FlexTech) component of the Resource Acquisition Transition has been extended through 2019. This extension is a result of market feedback uncovering a continued need for reliable, objective technical assessments of clean energy options for facilities. In addition, local utilities have discontinued or reduced their study assistance programs and are coordinating with NYSERDA to direct the marketplace to this Program.

The Commercial Implementation Assistance component of the Resource Acquisition Transition plan did not meet its 2016 projected targets. The Commercial Implementation Assistance Program was intended to provide the marketplace with a transition from NYSERDA's previous Existing Facilities Program to local utility incentive programs funding only items that the local utility programs could not. As evidenced by the lack of participation in this Program and increased participation in local utility programs, vendors and customers had already made this transition. Program revisions made in Fall 2016 also did not result in increased participation. As a result, the Program closed at the end of April 2017. The budgets and benefits in sections 2.1.6 and 2.1.7 have been updated to reflect actual program performance.

2.1.1 Program Description

The Commercial Facilities Programs aimed to provide a statewide commercial offering for existing buildings that increased market uptake of high-impact, comprehensive projects, and emerging clean energy technologies and systems in the commercial sector through support for credible and objective technical assistance and installation of projects aiming to achieve deep energy savings.

Flexible Technical Assistance (FlexTech) will offer cost-sharing of eligible technical assistance study costs. This program is expected to run through the end of 2019 or until all funds are committed. The cost share is typically 50% with a per project cap specified in the program offering. This program is a continuation of the current FlexTech Program with modifications on project caps and eligibility updates enacted in Q3 2015.

Commercial Implementation Assistance offered cost-sharing up to 50% or \$150,000 per project for all commercial/institutional customers who applied for utility incentives for eligible energy efficiency measures and needed additional financial support to implement more comprehensive savings projects than their utility supports. This program ran through April 2017. This effort replaced the previous Existing Facilities Program at NYSERDA.

Program Delivery

Applicants include both eligible customers and service providers on behalf of eligible customers. Service providers have historically represented the majority of applicants and this is expected to continue. Applicants will submit required documentation to be reviewed by NYSERDA to determine eligibility of the project. Each project will receive a purchase order prior to execution of work. Cost-sharing will be administered by NYSERDA after proof of project completion.

This commercial offering will be open-enrollment. Funding will be provided on a first-come first-served basis.

Personnel and Roles

- **NYSERDA staff:** Program management, project eligibility review, general project management, and project payments.
- **Third party technical reviewers:** Technical documentation review, any measurement and verification (M&V) needed for projects.

2.1.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market for the FlexTech Program includes all commercial/ institutional customers who need additional information to:

- Explore an advanced technology or system
- Create a long-term energy plan for their facility, and/or
- Develop diverse and/or deep energy savings projects

The target market for the Commercial Implementation Assistance Program included all commercial/institutional customers who applied for available utility incentives for eligible energy efficiency measures and were pursuing diverse and/or deeper energy savings projects with additional project elements not eligible to be funded through the utility program that achieve incremental energy savings.

Eligibility

Eligible participants include New York State commercial facilities which include but are not limited to: office buildings, retail, colleges and universities, health care facilities, state and local governments, not-for-profit and private institutions, and public and private K-12 schools who are New York State electricity distribution customer of a participating utility company who pay into the System Benefits Charge (SBC). Fuel switching is not eligible. On-site and renewable generation are not eligible for installation incentives through this offering. Inquiries and applications regarding these types of projects will be referred to other programs as appropriate.

The following eligibility requirements applied to the Commercial Implementation Assistance Program:

- Projects that were eligible for funding through their electric or gas distribution utility program were required to consult the utility program prior to application to this Program. NYSERDA worked in close coordination with the respective utility to review the project details and avoid overlap.
- Project elements listed on previous NYSERDA Pre-Qualified Measure Worksheets were not eligible even if a utility didn't offer a rebate. These worksheets represented proven

technologies that are highly cost effective without an incentive (e.g., Energy STAR LED exit sign, T5 and high performance T8 systems, motors meeting or exceeding the NEMA premium nominal efficiencies, high efficiency chillers). These worksheets were available to potential applicants via the NYSERDA website and upon request.

- Projects needed a simple payback period that was ≥ 4 years AND ≤ 14 years (greater than four years, AND less than fourteen years, *excluding* NYSERDA incentives). Please see the equation below for reference:

$$SPB = \frac{PC}{ACS}$$

SPB = Simple Payback
PC = Project Cost
ACS = Annual Cost Savings

- New facilities, those that have undergone substantial renovations, or change of use, had to be occupied for more than one year to be eligible for this Program. Major renovation projects were eligible under the NYSERDA Commercial New Construction Program.

2.1.3 Incentives/Services Offered

The existing FlexTech Program will be extended past its current end date of February 29, 2016 to December 31, 2019. The Program will offer cost-sharing, typically at 50% per technical assistance study or project. The program will run through the end of 2019 or until all funds are committed, whichever comes first. The previous Program provided cost-sharing up to 50% or \$500,000 per technical assistance study or project, whichever was lower. This revised program reduced the cost-share cap to \$250,000 in 2016. This cost-share cap may be altered based on funding availability and market feedback and will be communicated through the program offering.

The Commercial Implementation Assistance Program launched in March 2016. The Program offered cost-sharing, up to 50% or \$150,000 per project for all commercial/institutional customers who applied for utility incentives for eligible energy efficiency measures and needed additional financial support to implement more comprehensive savings projects than their utility supports. The program ran through April 2017. The retired Existing Facilities Program incentives are shown in Table 2. Program revisions made in 2015 previously retired pre-qualified, fluorescent lighting, and gas efficiency measure incentives and required a minimum of two energy conservation measures, with no single measure allowed to be responsible for more than 75% of energy savings. These changes removed highly cost-effective eligible measures.

Table 2. Incentives for the Retired Existing Facilities Program

Performance-Based Electric Efficiency Incentives		
<i>Tier</i>	<i>Description</i>	<i>Incentive Rate</i>
1	The electric efficiency improvements cause annual kWh reductions less than or equal to 30% of current annual usage at the Facility.	\$0.10/kWh
2	The electric efficiency improvements cause annual kWh reductions greater than 30% but less than or equal to 50% of current annual usage at the Facility.	\$0.12/kWh
3	The electric efficiency improvements cause annual kWh reductions greater than 50% of current annual usage at the Facility.	\$0.15/kWh

Applicants may not obtain financial support for the same energy efficiency measure through other NYSERDA programs or from programs offered by their local utility. No single entity (e.g. service provider, building owner, etc.) can receive or apply for more than 5% of total available incentives. With the requested budget herein, this would represent a \$1,000,000 cap in the FlexTech offer and a \$550,000 cap in the Commercial Implementation Assistance Program. The entirety of the customer’s portion of the cost-share must be a cash contribution. In-kind contributions of any type are not allowed as matching funds.

2.1.4 Performance Management

Overall, NYSERDA will regularly review program participation and project performance to determine whether changes in incentives, caps or eligible projects are needed to improve efficacy of program implementation.

For the FlexTech Program, NYSERDA Project Managers review all proposed scopes of work prior to approval to ensure eligibility. NYSERDA contracted Technical Reviewers review completed reports to ensure completion of scope of work and quality of recommendations.

For the Commercial Implementation Assistance Program, NYSERDA Project Managers and NYSERDA contracted Technical Reviewers reviewed application materials prior to approval to ensure eligibility, overlap avoidance and quality of each proposed project. The NYSERDA contracted Technical Reviewer reviewed estimated energy savings and confirmed project installation. Across the program, a sample of participants with large potential energy savings were subject to NYSERDA inspection, data collection, and M&V. The size of the sample was determined based on type of project proposals received.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. For FlexTech, metrics have been initially estimated and estimated impacts will be reported based on a historical NYSERDA FlexTech adoption rate of 65%.

For the FlexTech Program, independent evaluation efforts will focus on determining the actual adoption rate of recommended measures and the associated energy savings and other benefits. The actual adoption rate will be used to adjust reported values. Methods will include surveys and may

also include site visits of a sample of program participants. Evaluation surveys will also inquire whether adoption was supported by utility incentive programs.

For the Commercial Implementation Assistance Program, an independent evaluation effort will review data from program site inspections, data collection and M&V to verify energy benefits as needed. Additional impact evaluation work, such as verification site visits, metering and monitoring, will only occur as needed to verify energy and other benefits.

To draw a sample and conduct an analysis that is representative and robust, evaluation measurement and verification (EM&V) has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.1.5 Relationship to Utility Programs

The FlexTech Program provides technical assistance services across the state to eligible entities and works alongside utility technical assistance programs. Participants can apply to utility implementation programs for installation funds.

The Commercial Implementation Assistance Program worked alongside proposed utility programs/rebates to support: (1) project elements that are not eligible for utility incentives but that offer incremental energy/GHG emission reduction savings; and (2) deeper energy savings additive to what utilities are supporting.

Projects that are eligible for funding through their electric distribution utility program should apply to the utility program prior to application to this Program. NYSERDA will work in close collaboration with the respective utility to review the project eligibility to offer the most effective incentive package. Upon applying to the Program, the Applicant will authorize the NYSERDA and its designated representatives to access any utility program application pertaining to the facility and engage in conversations with the utility for the purpose of discussing and confirming project eligibility. Eligible projects will vary depending on the specific project element's potential energy savings and costs and the customer's utility territory program offerings. NYSERDA incentives will not be provided for project elements that utility incentives support.

2.1.6 Budgets & Expenditures^{5,6}

Budget		2016	2017	2018	2019	Total
FlexTech	Incentives & Services	\$1,800,000	\$6,100,000	\$6,100,000	\$6,000,000	\$20,000,000
	Program Implementation	\$640,000	\$790,000	\$790,000	\$780,000	\$3,000,000
	Sub-Total	\$2,440,000	\$6,890,000	\$6,890,000	\$6,780,000	\$23,000,000
Commercial Implementation Assistance	Incentives & Services	-	\$3,000,000	-	-	\$3,000,000
	Program Implementation	\$32,500	\$360,000	-	-	\$392,500
	Sub-Total	\$32,500	\$3,360,000	-	-	\$3,392,500
Total		\$2,472,500	\$10,250,000	\$6,890,000	\$6,780,000	\$26,392,500

Expenditures	2016	2017	2018	2019	2020	2021	2022
Total	1%	10%	20%	22%	27%	15%	5%

2.1.7 Performance Metrics⁷

Primary Metrics ⁸		2016	2017	2018	2019	TOTAL
Energy Efficiency	MWh Annual	7,500	37,100	33,000	32,000	109,600
	MWh Lifetime	124,000	612,000	545,000	528,000	1,809,000
	MMBtu Annual	61,000	339,000	290,000	290,000	979,500
	MMBtu Lifetime	1,000,000	5,590,000	4,790,000	4,790,000	16,170,000
	MW	-	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-	-
	MWh Lifetime	-	-	-	-	-
	MW	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		7,460	39,000	34,000	33,700	114,200
CO2e Emission Reduction (metric tons) Lifetime		123,000	647,000	565,000	556,000	1,891,000

⁵Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁶ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

⁷ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life for electric and 18-year measure life for heating.

⁸ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

Customer Bill Savings Annual (\$ million)	\$1.62	\$8.41	\$7.37	\$7.23	\$24.63
Customer Bill Savings Lifetime (\$ million)	\$26.80	\$139.00	\$122.00	\$119.00	\$406.80
Private Investment (\$ million)	\$7.20	\$36.40	\$24.40	\$24.00	\$92.00

Additional Performance Tracking Metrics		2016	2017	2018	2019	Total
Participants	Technical Assistance	53	100	100	67	320
	Implementation Assistance	-	20	-	-	20
	Total	53	120	100	67	340

2.1.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.⁹ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.¹⁰ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, Cost Recovery Fee (CRF), and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Commercial	
Benefits (million 2015\$)	\$187.71
Costs (million 2015\$)	\$78.30
Benefit Cost Ratio	2.4

Consistent with the CEF, NYSERDA intends to offer this commercial transition program in a fuel neutral manner, offering cost-sharing to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the

⁹Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

¹⁰The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$230, compared to a cost of \$420 in an electric only scenario.¹¹

2.2 Industrial

The Industrial Resource Acquisition Transition Program did not meet its 2016 projected targets. Market uptake for the new industrial clean energy initiatives is progressing, but at a slower pace than anticipated, signaling the need to extend this strategy. The initiative has been revised to add an additional year of incentive funding (2019) and the total number of participants has been reduced to consider the number of applications and project sizes the program has seen so far. This will allow for continuity and minimal disruption to the sector stakeholders and market actors while delivering outreach and education on new clean energy offerings, continuing coordination with utilities, and launching additional industrial initiatives. The values in sections 2.2.6 and 2.2.7 have been updated to reflect 2016 actuals, as well as updating the timing for the overall budget and performance metrics.

2.2.1 Program Description

The Industrial Transition program offering provides technical and financial support to assist industrial and data center facilities with process improvement projects to help link energy and their core mission.

Industrial and Process Efficiency (IPE) Program offers performance-based incentives to manufacturers and data centers implementing cost effective process efficiency improvements IPE's goal is to help manufacturers and data centers increase product output and improve data processing as efficiently as possible.

FlexTech for manufacturers and data centers offers cost-sharing of eligible technical assistance study costs that evaluate the energy savings associated with potential process improvements.

This is a continuation of the current IPE and FlexTech Programs through the end of 2019, or until all funds are committed. Additional initiatives to support the Industrial and Data Center sectors will be available in 2019 and beyond.

Program Delivery

Applicants will submit required documentation to be reviewed by NYSERDA to determine eligibility of the project. Each project will receive a purchase order upon approval. Installation is completed by firms/ vendors that the customer retains on their own. Technical Review is conducted by NYSERDA

¹¹To determine the cost-effectiveness, it was assumed all program incentives would achieve MWh savings in an electric-only scenario. In a fuel-neutral scenario some program funds achieve MMBtu savings, and some achieve MWh. The cost to achieve the MWh savings remains the same as there is adequate demand for electric only projects.

contracted Technical Reviewers. Cost-sharing or incentives will be administered by NYSERDA after proof of project completion and collection of final deliverables.

The Industrial Transition offerings will be open-enrollment. Applications will be accepted on a first-come, first-served basis dependent on funding availability.

Personnel and Roles

- **NYSERDA staff:** Program management, key account management, project eligibility review, general project management, and project payments
- **Third party technical reviewers:** Technical documentation analysis and review, and measurement and verification (M&V) as needed for projects
- **Outreach contractors:** Program outreach, lead development, application assistance, key account management

2.2.2 Target Market & Customer/Project Eligibility Rules

Target Market

The IPE and FlexTech Programs are available to the manufacturing sector in New York State and targets key industries such as: chemicals and pharmaceuticals; primary metals, non-metallic minerals; pulp and paper; automotive; computers and electronics; food processing; and forest products. It includes manufacturing facilities, or support operations such as warehousing and distribution sites. Mining and extraction, as well as water and wastewater, are also included. Data centers are eligible under the IPE and FlexTech Programs and are found in nearly every sector. ¹²

The IPE Program offering focuses on projects that improve manufacturing process productivity and data center efficiency by offering capital incentives and technical assistance while recognizing the importance of sustaining reliability and maximizing uptime.

The FlexTech Program supports manufacturing and data center facilities that need additional information to:

- Explore an advanced technology or process
- Create a long-term energy plan for their facility, and/or
- Develop diverse and/or deep energy savings projects
- Address energy as a component of process efficiency improvements for companies engaged in continuous improvement activities such as Lean, 6-Sigma, or Total Quality Management (TQM)

¹² Data centers include standalone facilities for data storage and processing, as well as on-site data center equipment, which can be found across a number of types industrial and commercial facilities.

Eligibility

Eligible participants include:

- All New York State manufacturing, industrial, and data center facilities who are New York State electricity distribution customers of a participating utility company who pay into the SBC.
- Both existing and new facilities are eligible to participate.
- Industrial projects may receive incentives for process improvement projects (metric links the process to energy consumption), including expansion projects.
- Data center projects may receive incentives for process and process-related projects.
- All non-process implementation projects are referred to the appropriate utility.

2.2.3 Incentives/Services Offered

These IPE and FlexTech Programs were launched in March 2016 and will run through end of 2019 or until all funds are committed, whichever comes first. Details regarding incentive rates and program caps can be found on the NYSERDA website.¹³

2.2.4 Performance Management

For the IPE portion of the program, NYSERDA will assign a technical reviewer to assist in the NYSERDA process and calculate the energy savings for each project. A pre-installation inspection is conducted to understand the project and document the base case. Energy savings calculations are completed based upon data supplied by the customer. For process efficiency projects, production data is also collected. An M&V plan is developed by the technical reviewer, customer, and NYSERDA project manager.

Upon approval of all final deliverables, NYSERDA issues the full incentive payment for projects not requiring M&V to the Applicant, and partial incentive payment for projects requiring M&V. At NYSERDA's discretion, M&V may be required or waived for any project.

For the FlexTech portion of the program, NYSERDA Project Managers review all proposed scopes of work prior to approval to ensure eligibility. NYSERDA contracted Technical Reviewers review completed reports to ensure completion of scope of work and quality of recommendations.

Overall, NYSERDA will regularly review program participation and project performance to determine whether changes in incentives, caps or eligible projects are needed to improve efficacy of program implementation.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. For the FlexTech portion of the program, metrics have been developed and estimated

¹³ PON 2456 Industrial and Process Efficiency Program. <https://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2456-Industrial-and-Process-Efficiency>

impacts will be reported based on a historical NYSERDA FlexTech adoption rate of 65%. An independent evaluation effort will review data from program site inspections and program M&V to verify energy benefits. Additional impact evaluation work, such as verification site visits, metering and monitoring, will only occur as needed to verify energy and other benefits. NYSERDA will also continue to conduct targeted pre-installation evaluation M&V for a small sample of projects, as has been done in the past for the EEPISPE Program, to support accurate baseline and other estimates.

For the FlexTech portion of the program, independent evaluation efforts will focus on determining the actual adoption rate of recommended measures and the associated energy savings and other benefits. The actual adoption rate will be used to adjust reported values. Methods will include surveys and potentially site visits of a sample of program participants. Evaluation surveys will also inquire whether adoption was supported by utility incentive programs.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.2.5 Relationship to Utility Programs

Utility Energy Efficiency Transition Implementation Plans (ETIPs) for Commercial/Industrial sector include prescriptive and custom paths for electric and gas efficiency improvements. Typical utility programs focus on building system improvements such as lighting, heating, ventilation, and air conditioning (HVAC), variable frequency drives (VFDs), and have shied away from process efficiency improvements and data center efficiency projects. NYSERDA will coordinate with utilities as they develop and evolve their ETIPs for the industrial and data center marketplace.

Energy projects involving basic building system improvements such as lighting, HVAC, building controls are referred to existing utility offerings for their support. Established collaboration with the utilities ensures proper transition for the customer. As utility offerings evolve referrals will continue to be made to utilities as appropriate.

The FlexTech Program provides technical assistance services to eligible entities and works alongside utility technical assistance programs. Participants can apply to utility implementation programs for installation funds.

2.2.6 Budgets & Expenditures^{14,15}

Budget		2016	2017	2018	2019	Total
FlexTech	Incentives & Services	\$500,000	\$500,000	\$500,000	\$500,000	\$2,000,000
	Program Implementation	\$43,750	\$43,750	\$43,750	\$43,750	\$175,000
	Sub-Total	\$543,750	\$543,750	\$543,750	\$543,750	\$2,175,000
IPE	Incentives & Services	\$10,452,000	\$15,069,727	\$15,954,040	\$15,954,040	\$57,429,807
	Program Implementation	\$1,615,250	\$4,228,914	\$2,502,267	\$1,611,694	\$9,958,125
	Sub-Total	\$12,067,250	\$19,298,641	\$18,456,307	\$17,565,734	\$67,387,933
Total		\$12,611,000	\$19,842,391	\$19,000,057	\$18,109,484	\$69,562,933

Expenditures	2016	2017	2018	2019	2020	2021	2022
Total	2%	20%	24%	24%	15%	10%	5%

2.2.7 Performance Metrics¹⁶

Primary Metrics		2016	2017	2018	2019	TOTAL
Energy Efficiency	MWh Annual	153,000	92,400	88,000	88,000	421,700
	MWh Lifetime	2,299,000	1,390,000	1,320,000	1,320,000	6,325,000
	MMBtu Annual	740,000	1,890,000	480,000	480,000	3,586,000
	MMBtu Lifetime	11,100,000	28,300,000	7,200,000	7,200,000	53,790,000
	MW	-	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-	-

¹⁴Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

¹⁵ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

¹⁶ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life.

	MWh Lifetime	-	-	-	-	-
	MW	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		119,000	259,000	71,800	71,800	521,400
CO2e Emission Reduction (metric tons) Lifetime		1,790,000	3,880,000	1,080,000	1,080,000	7,821,000
Customer Bill Savings Annual (\$ million)		\$20.2	\$20.6	\$11.7	\$11.7	\$64.12
Customer Bill Savings Lifetime (\$ million)		\$303	\$308	\$175	\$175	\$961.8
Private Investment (\$ million)		\$157	\$176	\$213	\$215	\$761.1

Additional Performance Tracking Metrics	2016	2017	2018	2019	Total
IPE	58	56	52	52	218
FlexTech	20	20	20	20	80
Total	78	76	72	72	298

2.2.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.¹⁷ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.¹⁸ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Industrial	
Benefits (million 2015\$)	\$608.85
Costs (million 2015\$)	\$172.65
Benefit Cost Ratio	3.5

¹⁷Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

¹⁸The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

Consistent with the CEF, NYSEDA intends to offer the Industrial Transition program in a fuel neutral manner, offering incentives to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$133/ton, compared to a cost of \$314/ton in an electric only scenario.¹⁹

2.3 Agriculture

The Agriculture Resource Acquisition Transition Program did not meet its 2016 projected targets. The program has been extended to 2018 due to a longer program ramp up in the market and to inform future Clean Energy Fund agriculture best practices. The values in sections 2.3.6 and 2.3.7 have been updated to reflect 2016 actuals, as well as updating the timing for the overall budget, performance metrics, and reducing the total estimated MMBTU savings due to the incorporation of additional data from the Agriculture Energy Audit Program into the modeling.

2.3.1 Program Description

The Agriculture Energy Audit Program provides farms and on-farm producers with no-cost energy audits containing information on specific energy efficiency measures, including estimated energy savings, implementation costs and payback, enabling the farms to make well-informed investment and implementation decisions. In addition, the audits include information on implementation incentives available for recommended measures through utility or federal programs.

The Agriculture Energy Audit Program provides no-cost energy audits to eligible farms and on-farm producers based upon the level of complexity desired by the applicant. The energy audits are segmented by three levels:

- Level 1 – Walk thru energy audit
- Level 2 – Detailed energy audit
- Level 3 – System Specific energy audit

This program is expected to operate through the end of 2018 or until all funds are committed, whichever comes first.

¹⁹To determine the cost-effectiveness, it was assumed all program incentives would achieve MWh savings in an electric-only scenario. In a fuel-neutral scenario some program funds achieve MMBtu savings, and some achieve MWh. It is assumed that the cost would be the same for an electric-only program as a fuel-neutral program.

This program modifies the Agriculture Energy Efficiency Program (AEEP) which closed in January 2014. AEEP consisted of providing outreach and customer enrollment, no-cost energy audits and hard cost incentives to off-set the cost for implementing energy efficiency measures. NYSERDA will continue to provide outreach and customer enrollment and no-cost energy audits but will eliminate hard cost incentives and refer farms to utility and federal programs for possible implementation assistance.

Program Delivery

Applicants submit required documentation to be reviewed by NYSERDA to determine eligibility. Each applicant is assigned a FlexTech Consultant to perform the audit. NYSERDA pays the cost of the audit directly to the FlexTech Consultant.

This agriculture offering is open-enrollment. Funding is provided on a first-come first-serve basis.

Personnel and roles

- **NYSERDA staff:** Application acceptance, eligibility review, FlexTech Consultant assignments and payments, general program management, management of implementation contractor
- **Implementation Contractor:** Outreach, education and marketing; direct program implementation including: program enrollment assistance, customer support and participant tracking; technical review and quality assurance of audits; audit follow-up and assistance to farms accessing utility, federal or other implementation programs.

2.3.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market for this offering is dairy farms. Milk processing is energy intensive and responsible for the majority of energy consumption, primarily electricity, on dairy farms. Greenhouses follow due to the energy consumed by lighting and heating the growing space.

Eligibility

Eligible participants include all farms and on-farm producers, including but not limited to dairies, orchards, greenhouses, vegetables, vineyards, grain dryers, and poultry/egg, that are New York State electricity distribution customers of a participating utility company who pay into the SBC.

2.3.3 Incentives/Services Offered

The Agriculture Energy Audit Program launched in March 2016 as a revised component of FlexTech. The Program provides no-cost energy audits to eligible farms and on-farm producers based upon the level of complexity desired by the applicant. The energy audits are segmented by three levels.

- **Level 1:** The FlexTech Consultant visits the farm to conduct a walk thru audit and provide a limited evaluation of energy conservation measures and energy efficiency recommendations. A simple payback and cost estimate range is provided for measures. The deliverable is a

summary letter of feasible energy efficiency measures. This level has a funding cap of \$1,500 and energy audit dollars are to be paid directly to the FlexTech Consultant completing the farm energy audits.

- **Level 2:** The FlexTech Consultant visits the farm and provide a detailed energy audit with calculated evaluations of appropriate energy conservation measures including simple payback. The deliverable is an energy audit report. This level has a funding cap of \$2,500 and energy audit dollars are to be paid directly to the FlexTech Consultant completing the farm energy audits.
- **Level 3:** The FlexTech Consultant conducts an energy audit focused on specific systems or measures with a more detailed analysis of such measures, including renewable energy production. The deliverable is a system specific energy analysis report. This level has a funding cap of \$6,000 and energy audit dollars are to be paid directly to the FlexTech Consultant completing the farm energy audits. The previously offered AEEP provided hard cost incentives up to 75% of eligible project costs, capped at \$250,000 for farms to implement electric and natural gas energy efficiency measures.

2.3.4 Performance Management

NYSERDA regularly reviews program participation to determine whether changes are needed to improve efficacy of program implementation.

Metrics associated with recommended energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. Metrics have been initially estimated and estimated impacts will be reported based on a historical NYSERDA FlexTech and AEEP adoption rates. Independent evaluation efforts will focus on determining the actual adoption rate of recommended measures and the associated energy savings and other benefits. The actual adoption rate will be used to adjust reported values. Evaluation methods will include surveys and potentially site visits of a sample of program participants, depending on the level of adoption found in surveys. Evaluation surveys will also inquire whether adoption was supported by federal or utility incentive programs.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.3.5 Relationship to Utility Programs

Farm energy audits will reference utility incentive programs for installation funds on recommended energy efficiency measures.

2.3.6 Budgets & Expenditures^{20,21}

Budget	2016	2017	2018	Total
Incentives & Services	\$592,200	\$837,800	\$770,000	\$2,200,000
Program Implementation	\$999,500	\$400,500	-	\$1,400,000
Total	\$1,591,700	\$1,238,300	\$770,000	\$3,600,000

Expenditures	2016	2017	2018	2019
Total	16%	36%	35%	13%

2.3.7 Performance Metrics²²

Primary Metrics²³		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	4,000	5,000	5,000	14,000
	MWh Lifetime	60,000	75,000	75,000	210,000
	MMBtu Annual	1,000	3,000	3,000	7,000
	MMBtu Lifetime	15,000	45,000	45,000	105,000
	MW	-	-	-	0
Renewable Energy	MWh Annual	-	-	-	0
	MWh Lifetime	-	-	-	0
	MW	-	-	-	0
CO ₂ e Emission Reduction (metric tons) Annual		2,000	3,000	3,000	8,000
CO ₂ e Emission Reduction (metric tons) Lifetime		30,000	45,000	45,000	120,000
Customer Bill Savings Annual (\$ million)		\$0.59	\$0.75	\$0.75	\$2.09
Customer Bill Savings Lifetime (\$ million)		\$8.85	\$11.3	\$11.3	\$31.35
Private Investment (\$ million)		\$3.49	\$ 4.56	\$ 4.19	\$12.24

²⁰Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

²¹ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

²² Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life.

²³ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants ²⁴	218	285	262	765

2.3.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.²⁵ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.²⁶ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Agriculture	
Benefits (million 2015\$)	\$9.70
Costs (million 2015\$)	\$9.34
Benefit Cost Ratio	1.0

Consistent with the CEF, NYSERDA intends to offer the Agriculture Energy Audit Program in a fuel neutral manner, offering technical assistance to encourage more efficient use of all fuel types. Offering the program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$450 compared to a cost of \$490 in an electric only scenario²⁷.

2.4 Multifamily Market Rate

The Multifamily Performance Program (MPP) – Market Rate did not meet its 2016 projected targets. Due to a lack of market uptake, the program will be closed in August 2017 after a thirty-day notice period.

2.4.1 Program Description

The Multifamily Performance Program (MPP) – Market Rate (MR) continued under the CEF as Version 7.0. MPP to provide support to market rate building owners and the service providers who

²⁴ Participants are the number of applicants (audits provided).

²⁵ Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

²⁶ The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

²⁷ Program is only audits; therefore, the assumption is that the cost would be the same for an electric only program as the fuel neutral program.

serve them. This version of MPP included two (2) components designed to accomplish the following objectives:

A Targeted Option to support single measure installations with no minimum energy reduction target. This Option provided building owners a set of minimum performance criteria for a variety of building improvements that could be used to choose more efficient equipment than they may have been considering. The Targeted Option was expected to:

- Introduce building owners that have not traditionally pursued energy efficiency and may not be ready to engage in comprehensive improvements to NYSEERDA and the benefits of energy efficient equipment.
- Connect NYSEERDA to the contractors and businesses that typically work with these types of building owners to perform these system and equipment upgrades, i.e. HVAC installers, electricians, plumbers, etc.
- Support enhanced customer service by working with these building owners and contractors to explore additional opportunities in their buildings by considering other, deeper improvements.
- Work with the utilities to include program incentives for measures they do not currently support.

The Targeted Option did not provide incentives on any measure supported by a utility program and worked closely with all utilities to understand which measures they do encourage and why they might not assist others. The purpose of this Option was to determine what type of demand might exist for measures utilities do not currently support and work to collect the information they need to incorporate those measures into their programs.

A High Performance Offering to support deep energy retrofit projects by offering significant incentives capped at 50% of the project cost was also intended to be offered, but never launched. Owners would have worked with NYSEERDA-approved energy consultants to help assess their building and develop a proposal that meets the requirements of the Program. This Option was expected to:

- Create new opportunities for cutting edge building owners and energy professionals to demonstrate deep energy retrofit possibilities in existing multifamily buildings.
- Gain experience with deep energy projects that can be used to encourage greater adoption of successful strategies and efforts.
- Collect data to highlight successful deep energy projects to convince building owners, regulatory agencies, and financial institutions about the benefits and performance of deep energy projects.

This program was a continuation of the Multifamily Performance Program with modifications to project eligibility requirements and the incentive schedule. Market rate projects would no longer be required to meet a minimum energy target.

Program Delivery

The Targeted Option was delivered through building owners, contractors, and energy consultants. Participants were educated on the Option's minimum performance requirements and any building owner or their designated representative may submit applications requesting incentives for work done. The High-Performance Offering was intended to be delivered through a network of Multifamily Building Solution Providers. This network would have built upon the previous Multifamily Performance Partner Network included energy firms, consultants, engineering firms, and others vetted and pre-approved by NYSERDA. These firms would have been selected through an open, ongoing application process and building owners would have been required to use a network Provider to submit a proposal to the High-Performance Offering.

The Targeted Option was open-enrollment. Funding was provided on a first-come first-served basis. The High-Performance Offering was intended to be offered through an annual competitive solicitation requesting proposals for deep energy retrofit projects.

Personnel and Roles

- **NYSERDA staff:** Program management, project eligibility review, general project management, and project payments.
- **Multifamily Building Solutions Providers (previously MPP Partners):** Customer recruitment, building assessment and project development, Program paperwork and documentation submittals, and installation oversight.
- **Implementation contractor:** Project management and oversight, document review/desk audit, Solutions Provider support, and program document development and maintenance.
- **Quality Assurance/Technical Assistance contractor:** Support industry standards development, conduct field verification for designated percentage of projects, savings analysis, prepare technical guidance on new systems and equipment for Solutions Providers, analysis of the effectiveness of Program rules and processes, and provision of building baselining services (development of weather-normalized building energy consumption based on utility data to be used by Solutions Providers in project development).
- **Marketing contractor:** Development of branded promotional materials, outreach events, communications strategies, and technical transfer efforts, e.g. case studies, press releases, etc.

2.4.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market included owners and management companies of market rate properties defined as those that do not meet the definition of affordable housing. The two program components were designed to support multiple sub-segments of the multifamily market, i.e. building owners interested in only single measure replacements and those building owners who wanted to push the envelope of possible existing building energy retrofits.

Eligibility

Eligible participants included owners and management companies of properties that do not meet the definition of low-to-moderate income and that were New York State electricity distribution customers of a participating utility company who pay into the SBC.

Specific to the Targeted Option, measures that are not supported by the local utility program were eligible for incentives under this Option. Applications could be initiated by any entity approved by the building owner, including, but not limited to, the building owner, a management company, a Multifamily Building Solution Provider or an installation contractor.

For the High-Performance Offering, projects were intended to be selected through a competitive solicitation based on a variety of criteria including, but not limited to, the cost-effectiveness of the project, the depth of the projected energy savings, and its potential impact on the knowledge gained regarding deep energy, existing building retrofits. If any of the measures included in a project proposal received incentives under another program (either NYSERDA or utility), the value of that incentive would have been deducted from the MPP High Performance Offering incentive.

2.4.3 Incentives/Services Offered

NYSERDA launched MPP V7.0 in the second quarter of 2016 with the Targeted Option. The solicitation for the High-Performance Offering is projected was never launched.

For the Targeted Option, incentives were provided to support installation of high-efficiency equipment. There were no requirements to meet a specific energy reduction target if the new equipment met the Program's efficiency standards. The initial incentives were \$3/MMBtu and \$0.03/kWh, capped at \$100/unit per building.

For the High-Performance Offering, incentives were to be provided to cost-share improvements needed to achieve deep energy savings in existing multifamily buildings. Projects would have been selected competitively through an annual solicitation and eligible to receive a payment of \$2,500/unit capped at 50% of the project cost.

If a project received an incentive from another program (NYSERDA or utility), the value of that incentive was subtracted from the MPP incentive.

2.4.4 Performance Management

Overall, NYSERDA regularly reviewed program participation and project performance to determine whether changes in incentives or eligible projects were needed to improve efficacy of program implementation.

Application packets for the Targeted Option were reviewed for completeness and accuracy. During the installation phase, these projects were inspected periodically to ensure that work was progressing appropriately.

Projects using the Targeted Option were sample inspected to ensure that the application submittals are sufficient representations of the projects. Additionally, Data Release Authorization Forms, which authorize NYSERDA to collect utility consumption data on the project, were submitted with the application packet for these projects (limited to forms for the owner accounts) and, would have been submitted with proposals for the High-Performance projects (including forms for all owner accounts as well as forms from a 10% sample of apartments). These forms will be used to assess building performance post-installation on an annual basis to gauge building performance before and after participation in the Program.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. An independent evaluation effort will verify energy benefits using methods such as engineering review and analysis, pre/post billing analysis, modeling and on-site metering and monitoring, as needed. Independent impact evaluation will first utilize program data from technical reviews and other sources to offset primary data collection or additional analysis where possible.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.4.5 Relationship to Utility Programs

To prevent direct conflict between MPP’s incentives associated with the Targeted Option and the utility’s incentives, MPP did not provide an incentive on any measure supported by a utility program. NYSERDA and the utilities collaborated to cross-promote their programs with the purpose of directing customers towards the appropriate resource for the work they intend to do. NYSERDA worked with the utilities to encourage support of additional measures in their programs if demand for such measures was demonstrated through MPP.

2.4.6 Budgets & Expenditures^{28,29}

Budget	2016	2017	2018	Total
Incentives & Services	\$-	\$31,354	-	\$31,354
Program Implementation	\$46,554	\$78,720	-	\$125,274
Total	\$46,554	\$110,074	-	\$156,628

Expenditures	2016	2017	2018	2019	2020
Total	30%	70%	0%	0%	0%

2.4.7 Performance Metrics³⁰

Primary Metrics³¹		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	-	41	-	41
	MWh Lifetime	-	617	-	617
	MMBtu Annual	-	9,870	-	9,870
	MMBtu Lifetime	-	148,000	-	148,000
	MW	-	-	-	-
	MWh Annual	-	-	-	-

²⁸Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

²⁹ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA’s behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

³⁰ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life.

³¹ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA’s programs.

Renewable Energy	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		-	598	-	598
CO2e Emission Reduction (metric tons) Lifetime		-	8,970	-	8,970
Customer Bill Savings Annual (\$ million)		-	\$0.11	-	\$0.11
Customer Bill Savings Lifetime (\$ million)		-	\$1.63	-	\$1.63
Private Investment (\$ million)		-	\$0.42	-	\$0.42

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants	-	186	-	186

2.4.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.³² The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.³³ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Single Family Market Rate	
Benefits (million 2015\$)	\$1.30
Costs (million 2015\$)	\$0.41
Benefit Cost Ratio	3.2

Consistent with the CEF, NYSERDA offered the Multifamily Performance Program – Market Rate program in a fuel neutral manner, offering incentives to encourage more efficient use of all fuel types. This helped develop the market at the scale needed to achieve New York State’s clean energy

³²Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

³³The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

goals. Offering the program on a fuel neutral basis allowed us to achieve a ton of carbon savings at a cost of \$262, compared to a cost of \$848 in an electric only scenario.³⁴

2.5 Single Family Market Rate

The Single-Family Residential Program did not meet its 2016 projected targets due to lower than anticipated program participation. NYSERDA has added funding to support improved data analysis and performance management, technical assistance resources, as well as consumer education, events, and marketing activities to improve existing program activities, while beginning the process of transitioning to a market-based approach for this sector. NYSERDA has also extended the program through 2019 to support the market in the transition out of the program and while other CEF initiatives aimed to increase customer demand and reduce barriers to contractors are being developed. Accordingly, the values in sections 2.5.6 and 2.5.7 have been updated to reflect 2016 and 2017 actual commitments and improved projections of the timing for the overall budget and benefit values to reflect the actual rate of program uptake.

Program Description

NYSERDA's Single Family Residential Program is designed to reduce the energy use in the State's existing one-to-four family and low-rise multifamily residential buildings and to capture heating fuel and electricity-related savings. NYSERDA is a sponsor of the national Home Performance with ENERGY STAR® Program, which helps homeowners improve the energy efficiency and comfort of their homes by using a whole house diagnostic approach to identify and address needed building shell, heating and cooling system, lighting, and appliance improvements. NYSERDA will offer incentives under this Program through December 31, 2019. Incentives will be reduced over time as NYSERDA focuses on market transformation initiatives.

The Single-Family Residential Program deployed under the CEF replaces the Home Performance with ENERGY STAR (HPwES) Program implemented under EEPS and the Regional Greenhouse Gas Initiative (RGGI).

Program Delivery

The Program uses a network of home performance contractors to complete home energy audits, which includes diagnostic testing and an inventory of the home's current conditions. The audit allows the contractors to recommend improvements that are comprehensive, and that maximize the energy savings in each home. The contractor and customer will review the recommendations and come to agreement on the final project scope based on the priorities and needs of the customer. Participating contractors are trained and certified to complete the audits and energy efficiency upgrades.

³⁴The electric only scenario assumes that only the Targeted Option would be offered as comprehensive projects would not be feasible without fuel savings. In order to attract sufficient applicants without a fuel incentive, the electric only incentive would need to be increased to \$0.15/kWh.

This residential offering will be open-enrollment for customers and home performance contractors. Funding for incentives will be provided on a first-come, first-served basis and will be reduced over time as market transformation activities become NYSERDA's focus in this sector. Third party implementers and technical support services will be procured through a competitive solicitation and will be cost-shared with the low-income components of the program.

Personnel and Roles

- **NYSERDA staff:** Program management, general project management, and project payments.
- **Independent Home Performance Contractors:** Customer recruitment, energy audits, installation, program paperwork and documentation submissions, installation oversight.
- **Implementation contractors:** Customer eligibility review and application processing, review of project submissions for technical and eligibility review, incentive processing
- **Software support:** Maintains program management database for project processing (automated to the extent possible) and program tracking
- **Technical support:** Technical support for contractors (desk audit and limited field support)
- **Standards & Quality Assurance:** Support industry standards development, conduct field verification of completed projects
- **Marketing contractor:** Development of branded promotional materials, communications strategies, and technical transfer efforts, e.g. case studies, press releases, etc.

2.5.1 Target Market & Customer/Project Eligibility Rules

Target Market

The target market includes owners of one-to four-family and low-rise residential buildings in service territories of electric utilities contributing to the CEF. The secondary target market is home performance contractors.

Eligibility

Projects must include measures approved by NYSERDA and deemed to be cost effective or have important health, safety, or comfort benefits. Projects must be installed by a participating home performance contractor designated as a GoldStar Contractor by the Building Performance Institute, or equivalent qualifications, and must follow all applicable codes, standards and laws. Participants must be New York State electricity distribution customers of a participating utility company who pay into the SBC.

2.5.2 Incentives/Services Offered

During the initial 6-month period through August 2016, the program incentive offerings included the incentives offered under the legacy incentive programs, including:

- Free/Reduced-cost audits.³⁵
- Consumer incentive of 10% of the cost of the approved energy efficiency measures
- Contractor incentive of 5% of the cost of the approved energy efficiency measures
- Contractor incentive of 2% of the cost of approved energy efficiency measures that are referred to another participating contractor of a different trade
- Contractor incentives for targeted electric reduction measures.
- Midstream contractor incentives including – Cooperative advertising, equipment incentives, Building Performance Institute (BPI) certification and accreditation reimbursement
- One-time Contractor incentive for implementing HPXML compliant software, enabling further process streamlining and more effective data management

NYSERDA implemented the first set of programmatic changes on September 1, 2016. These changes included:

- Streamlined project approval processes
- Retirement of the following incentives:
 - Consumer incentive of 10% of the cost of the approved energy efficiency measures (consumers may be eligible for utility incentives)
 - Contractor incentive of 2% of the cost of approved energy efficiency measures that are referred to another participating contractor of a different trade
 - Contractor incentives for targeted electric reduction measures
 - Midstream contractor incentives including – Cooperative advertising and equipment incentives
- An increase of the project-based contractor incentive from 5% to 10% of project cost. This change gives contractors flexibility in their business models. This can enable the contractor to use these funds as needed to increase their business, such as offering discounts to customers or undertaking marketing and outreach activities. NYSERDA anticipates this flexibility will increase the conversion rate from audits to completed retrofit work.

The remaining incentives will be evaluated over the course of the first three years of the CEF and adjusted/reduced as appropriate in response to streamlining of program processes and to NYSERDA's market transformation efforts.

The Program is also supported by the Green Jobs – Green New York Residential Financing Program.

2.5.3 Performance Management

Overall, NYSERDA will regularly review program participation, customer motivation factors and project performance to determine whether changes in incentives, eligible projects, or program processes are needed to improve efficacy of program implementation. In addition to program metric and performance tracking, stakeholder input will be solicited and discussed on a periodic basis.

³⁵ Funding for free/reduced-cost home energy audit for the moderate-income sector will be funded through CEF once RGGI funds are exhausted.

It is anticipated that quality assurance will be provided to 10% of completed market rate projects on average across the program. A rational sampling approach allows contractors with high quality scores and who prove to have well defined and effective internal quality assurance and quality control practices to benefit from lower inspection rates. The Program average inspection rate will not be reduced to less than 5%.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. Independent evaluation efforts will focus on determining the adoption rate of recommended measures for those customers who receive an audit but do not go through the incentive program and the associated energy savings and other benefits. Methods will include surveys and potentially site visits of a sample of program participants. Evaluation surveys will also inquire whether adoption was supported by utility incentive programs.

For projects receiving direct incentives, an independent evaluation effort will verify energy benefits using methods such as pre/post billing analysis and site visits as needed. Billing analysis typically includes a census of customers whose utility usage data meets the requirements of the analysis method (e.g., adequate number of actual meter reads during the pre and post periods). Where methods other than billing analysis are used, a sampling approach is expected to be employed.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.5.4 Relationship to Utility Programs

The Single-Family Residential Program will seek to coordinate projects with utility rebates and programs when they are available. The NY Home Performance Portal offers a flexible project tracking and management tool that is available to participating contractors, customers, constituency-based organizations (CBOs), implementation contractors and financing providers. We will explore coordinating utility rebates through the Portal to complement NYSERDA's program and financing options. This coordination will ensure no consumer incentives will be paid for by both NYSERDA and utility programs. In addition, some utilities are enabling, or expect in the future to enable, home performance contractors to offer their services through the utility residential marketplaces.

2.5.5 Budgets & Expenditures^{36,37}

Budget	2016	2017	2018	2019	Total
Direct Incentives & Services	\$6,189,835	\$4,845,490	\$3,658,455	\$2,106,295	\$16,800,075
Tools, Training, and Replication	\$0	\$4,048	\$3,102	\$5,000	\$12,150
Implementation Support	\$1,694,265	\$4,333,019	\$1,209,193	\$286,487	\$7,522,964
Total	\$7,884,100	\$9,182,557	\$4,870,750	\$2,397,782	\$24,335,189

Expenditures	2016	2017	2018	2019	2020
Total	17%	26%	23%	24%	10%

2.5.6 Performance Metrics³⁸

Primary Metrics³⁹		2016	2017	2018	2019	TOTAL
Energy Efficiency	MWh Annual	1,290	938	852	727	3,807
	MWh Lifetime	19,400	14,100	12,800	10,900	57,200
	MMBTu Annual	67,100	51,300	65,500	56,000	239,900
	MMBTU Lifetime	1,680,000	1,280,000	1,640,000	1,400,000	6,000,000
Renewable Energy	MW	-	-	-	-	-
	MWh Annual	-	-	-	-	-
	MWh Lifetime	-	-	-	-	-
	MW	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		4,650	3,530	4,320	3,690	16,190
CO2e Emission Reduction (metric tons) Lifetime		109,000	83,300	104,000	88,500	384,800
Customer Bill Savings Annual (\$ million)		\$1.17	\$0.89	\$1.08	\$0.92	\$4.06
Customer Bill Savings Lifetime (\$ million)		\$27.10	\$20.60	\$25.50	\$21.80	\$95.00
Private Investment (\$ million)		\$19.30	\$19.60	\$21.00	\$17.90	\$77.80

Additional Performance Tracking Metrics	2016	2017	2018	2019	Total
Participants ⁴⁰	2,484	3,408	2,620	2,238	10,750

³⁶Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

³⁷ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

³⁸ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life for electric and 25-year measure life for heating.

³⁹ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

⁴⁰ Completed energy efficiency projects.

2.5.7 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.⁴¹ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.⁴² Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Single Family Market Rate	
Benefits (million 2015\$)	\$47.13
Costs (million 2015\$)	\$62.15
Benefit Cost Ratio	0.8

Consistent with the CEF, NYSEDA intends to offer the Single-Family Residential program in a fuel neutral manner, offering incentives to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the program on a fuel neutral basis will allow NYSEDA to achieve a ton of carbon savings at a cost of \$1,440, compared to a cost of \$5,142 in an electric only scenario.⁴³

2.6 LMI Single Family

This section has been moved to the LMI chapter.

2.7 LMI Multifamily

This section has been moved to the LMI chapter.

⁴¹Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

⁴²The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

⁴³ The residential market rate segment offers limited demand for a program designed to only achieve electric savings without rich consumer incentives. Historic program data was used to calculate the energy savings that could be achieved in the market for a program focused on lighting improvements, select cost-effective appliance replacements, and shell work on homes with central air conditioning.

2.8 Commercial New Construction

The Commercial New Construction Program tracked closely to its 2016 projected targets and exceeded projected commitments in annual MMBtu and annual greenhouse gas reductions. While applications were somewhat lower than anticipated, the average square footage per application was approximately 50% higher than initial estimates. The Program is expected to maintain course during 2017. Applicants have shown interest and are participating in the deep energy savings/zero net energy early technical support which was offered for the first time in Commercial New Construction; however, prospective applicants of smaller projects have also expressed interest in participating. Due to the continued interest and feedback from market participants, NYSERDA is extending the program through 2018. The Program extension is being crafted to further encourage deep energy savings and zero net energy projects, and the participation threshold is being removed to offer technical support to smaller conventional projects. In response to lessons learned during 2016, including the importance of including all stakeholders during programming and design phases of deep savings and zero net energy projects; and in response to reduced funding availability, the 2018 Program extension will provide support for projects following an Integrated Project Delivery (also known as Integrated Design) protocol. Funding for the Integrated Project Delivery opportunity will be partially funded through removal of incentives for green building certification. The values presented in the tables below have been updated to reflect 2016 commitments as well as revised projections for 2017 and additional funds and related metrics for 2018.

2.8.1 Program Description

The 2016-2018 Commercial New Construction Program will provide an offering for new buildings, and for substantial renovations to existing buildings, that increases market uptake of high-impact, comprehensive projects, and emerging clean energy technologies and systems through support for credible and objective technical assistance and installation of projects designed to achieve deep energy savings. The program will:

- Increase awareness of and demand for design and construction of highly efficient buildings.
- Strengthen the capacity of the design and construction community to deliver highly efficient buildings.
- Extend the existing Commercial New Construction Program through 2018 or until all funds are committed, whichever comes first.

Program Delivery

The program is offered as an open enrollment solicitation where NYSERDA provides program development, maintenance and applicant support. Technical support is provided through Energy Modeling Partners, who engage with the applicant and the applicant's design team to provide energy guidance and analysis. Financial support is also provided to help cover the project design, construction, and commissioning costs.

In response to market feedback the program revisions are focused on expanding support for deep energy savings and zero net energy projects and restoring technical support for smaller custom measure projects.

2.8.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market includes owners, tenants, developers, and design teams for non-residential new building and substantial renovation projects, which include, but are not limited to, office buildings, retail, colleges and universities, health care facilities, state and local governments, not-for-profit and private institutions, and public and private K-12 schools.

Eligibility

To be eligible for program participation an applicant must be, or be capable of and intend to be, a New York State electricity distribution customer of a participating utility company who pays into the SBC.

Projects must be for new construction or substantial renovation. To be eligible for enhanced support applicants must be willing to pursue and incorporate deep energy savings or zero net energy goals into their project programming.

Project design targets must be at least 10% better than State Energy Code requirements for basic technical support, and at least 40% better than code for enhanced technical support and financial support. The targets may be updated based on market feedback and conditions during the program.

2.8.3 Incentives/Services Offered

Technical Support

A NYSERDA approved Energy Modeling Partner works with the applicant's design team to identify opportunities and equipment choices to improve the energy efficiency of their new building or substantial renovation project.

The technical support is based on a negotiated scope of work with the applicant. For basic technical support services NYSERDA cost shares 50-50 with the applicant. NYSERDA's contribution for basic services is capped based on project complexity and potential energy savings opportunities.

Applicants who are pursuing deep energy savings or zero net energy projects typically require additional early technical support to guide the early project programming, design concept and operational decisions that are critical to the success of the project. To encourage these projects NYSERDA will currently require no technical support cost share from an applicant and the NYSERDA contribution will currently be capped at a higher level. The technical support terms and opportunities may be updated based on market feedback and conditions during the program.

Integrated Project Delivery Support

Larger, deep savings projects and zero net energy projects benefit from close involvement of the owner's team, the design team, construction professionals and other project stakeholders

throughout the project design. To encourage this holistic approach, referred to as Integrated Project Delivery, NYSERDA offers financial support.

Capital Financial Support

For deep energy savings and zero net energy projects NYSERDA offers financial support to offset a portion of the applicant's incremental (additional) costs for high performance equipment and systems and building commissioning services.

Capital financial support is currently based on the projected energy performance of the building above an energy analysis baseline (currently ASHRAE 90.1-2013 Appendix G with addenda) as identified through energy modeling provided through the Technical Support. Incentives are based on the predicted reduction in greenhouse gas emissions. The capital financial support terms and opportunities may be updated based on market feedback and conditions during the program.

Commissioning is recognized as an important service to ensure a building is performing as intended. A study of building commissioning by Lawrence Berkeley National Laboratory found that commissioned new buildings achieved energy savings approximately 13% higher than equivalent un-commissioned projects.⁴⁴ Currently, NYSERDA will provide additional financial support to offset a portion of the applicant's cost for commissioning services.

On-site and/or renewable generation are currently not eligible for capital financial support through this offering, and applicants are not restricted by participation in this offering from receiving incentives from NY-Sun or other renewable offerings. Generally, customers cannot receive incentives from two programs for the same measure.

2.8.4 Performance Management

Overall, NYSERDA will regularly review program participation and project performance to determine whether changes in incentives, caps or eligible projects are needed to improve efficacy of program implementation. NYSERDA will provide guidance and technical review of assistance provided through the energy modeling partners. NYSERDA will provide quality assurance of equipment and systems installation as described in the technical support report and NYSERDA offer letter.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. An independent evaluation effort will review data from projects to verify energy benefits. NYSERDA will update program services and offerings to be responsive to the results of these program performance reviews. Additional impact evaluation work, including potentially engineering analysis, site visits and building modeling, will occur as needed to further verify energy and other benefits. Validating baseline assumptions and as-built conditions will be important aspects of ensuring rigorous and defensible energy savings for new construction.

⁴⁴ Building Commissioning – A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions, Evan Mills, Ph.D., Lawrence Berkeley National Laboratory, July 21, 2009

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.8.5 Relationship to Utility Programs

To the extent utility companies' support activities in commercial new construction, particularly new buildings and substantial renovations, NYSERDA will collaborate to identify synergistic approaches that move the construction market towards higher performance, minimize market disruption, and avoid market confusion.

2.8.6 Budgets & Expenditures^{45,46,47}

Budget	2016	2017	2018	Total
Incentives & Services	\$10,313,336	\$13,538,572	\$5,415,100	\$29,267,032
Program Implementation	\$542,224	\$289,843	\$584,900	\$1,416,967
Total	\$10,855,584	\$13,828,415	\$6,000,000	\$30,683,999

Expenditures⁴⁸	2016	2017	2018	2019	2020	2021
Total	1%	18%	25%	30%	23%	3%

2.8.7 Performance Metrics⁴⁹

Primary Metrics⁵⁰		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	19,613	18,387	28,183	66,183

⁴⁵Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁴⁶ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

⁴⁷ Program incentives for 2016 are based on committed applications (paid, encumbered and pre-encumbered) as of 12/31/2016 and do not include future cancellations.

⁴⁸Expenditures are estimated based on the typical design and construction schedules for commercial sector projects, and on the timing of NYSERDA application within that process. While it is anticipated the vast majority of projects will be completed within the time frame shown, the expenditure projections do not indicate a 5-year project completion requirement.

⁴⁹ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 20-year measure life.

⁵⁰ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

	MWh Lifetime	392,260	367,740	563,660	1,323,660
	MMBtu Annual	36,193	14,036	54,927	105,156
	MMBtu Lifetime	723,860	280,720	1,098,540	2,103,120
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		12,238	10,418	17,741	40,397
CO2e Emission Reduction (metric tons) Lifetime		244,760	208,360	354,820	807,940
Customer Bill Savings Annual (\$ million)		\$2.81	\$2.55	\$4.05	\$9.41
Customer Bill Savings Lifetime (\$ million)		\$56.2	\$51.1	\$81.0	\$188.3
Private Investment (\$ million)		\$17.1	\$20.4	\$4.57	\$42.11

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants	45	55	47	147

2.8.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.⁵¹ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.⁵² Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Commercial New Construction	
Benefits (million 2015\$)	\$82.46

⁵¹Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

⁵²The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

Costs (million 2015\$)	\$107.85
Benefit Cost Ratio	0.8

Consistent with the CEF, NYSERDA intends to offer the Commercial New Construction Program in a fuel neutral manner, offering incentives to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State’s clean energy goals. Offering the program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$760/ton, compared to a cost of \$881/ton in an electric only scenario.⁵³ This represents a 30% improvement in \$/ton for the 2016-2018 Program as compared to the original 2016-2017 Program. The drivers for the high carbon savings costs per ton are the same as those identified for the low benefit cost ratio result.

2.9 Low Rise Residential New Construction

The Low-rise Residential New Construction Program did not meet all its 2016 projected targets. General market uncertainty and the expectation that reduced incentives would be offered under the CEF version of this program resulted in a surge in participation during the few months just prior to closure of the EEPS2-funded program on February 29, 2016. This surge resulted in fewer projects seeking CEF support for the balance of 2016. However, when taken together, the projects offered EEPS2 funding in January and February 2016, in combination with those projects supported by the CEF through the remainder of 2016, would have met or surpassed the projected 2016 CEF performance targets. Incentives for cooperative advertising, first plan review, and first rating incentives will no longer be offered due to several factors, including limited market interest, NYSERDA’s desire to reduce program complexity, and because some of the intended outcomes associated with these incentives are no longer being achieved. The values presented in sections 2.9.6, 2.9.7 and 2.9.8 have been updated to reflect 2016 commitments as well as revised projections for 2017 and additional funds and related metrics for 2018 to reflect the increased participation now projected, accommodating those factors detailed above. While the 2016 performance metrics were calculated relative to the then-current 2010 NYS Energy Conservation Construction Code (ECCC) of NYS, the revised 2017 and 2018 metrics rely on the ECCC of NYS adopted in October 2016 as the reference baseline.

2.9.1 Program Description

The 2016-2018 Low-rise Residential New Construction Program focuses on:

⁵³ The electric only scenario was calculated by deducting the impacts of gas savings measures from the program. The program budget is likely to remain the same since no gas incentives are offered and the cost for the technical analysis to support gas measures is minimal once a whole building energy model has been created.

- Increasing information on, awareness of, and demand for deep energy savings and zero net energy construction for new and gut rehab in, generally, building up to three-stories in height, in both the market-rate and LMI sectors
- Strengthening the capacity of clean energy partners in the building design, construction and performance verification.
- Supporting New York State (NYS) and New York City (NYC) housing agencies, funding authorities, and municipalities in their efforts to secure the most efficient, durable, resilient and healthy housing, based on technical and economic feasibility, while striving to maximize effective use of the resources available to achieve those goals. These activities are significantly but not exclusively targeting the LMI housing sector.
- Identifying and promoting integrated design solutions which are replicable, with a focus on cost optimization analysis, financing strategies which recognize operational costs and savings, and management of perceived risks.
- Extending the existing Low-rise Residential New Construction Program, now structured to closely align with the Multifamily New Construction Program.

Program Delivery

- An open enrollment approach that delivers technical oversight and administrative services in a manner closely aligned with the Multifamily New Construction Program, while supporting market-based delivery of qualified technical services through recognition of third party certifications and licensing.
- Technical assistance to projects seeking to achieve high performance energy efficiency.
- Program incentives to housing developers and builders and RESNET-accredited Rating Quality Assurance Providers as direct recipients.
- Targeted technical support, available to architects, engineers, designers, and third-party verifiers or other technical consultants. More extensive support will be targeted to developers, design professionals and projects willing to pursue higher building performance, inclusive of net zero energy (NZE) performance.
- Technical support and collaboration with other NYS agencies and entities.
- Program Quality Assurance (QA) services through third parties such as RESNET-accredited Rating Quality Assurance Providers, or qualified certifiers/verifiers to one of the Passive House standards. NYSERDA staff responsibilities include: oversight for tracking participant status and incentive processing, as well as the final determination of project eligibility.

2.9.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market includes market rate and LMI single family homes and multi-unit residential buildings, generally up to three-stories in height, across the Market-Rate and LMI sectors, and inclusive of gut rehab projects.

Eligibility

Eligible participants include builders and developers who intend to deliver high performance housing projects. To be eligible for program participation, an applicant must be, or be capable and intend to be, a New York State electricity distribution customer of a participating utility company who pays into the SBC.

2.9.3 Incentives/Services Offered

Program support and incentives will be provided in three tiers:

- Tier 1: Requires energy performance at least equivalent to the U.S. Environmental Protection Agency (EPA) ENERGY STAR Certified Homes Program Version 3.0. For certain gut rehabilitation projects, requirements not deemed economically justified may be waived and the modified performance requirements would support the Energy \$mart⁵⁴ designation. Incentives will not be provided for Tier 1; however, the Tier is being maintained to provide Program technical support, oversight and verification on projects to validate performance, thereby increasing confidence by housing agencies and financial underwriting institutions that projects will deliver as promised.
- Tier 2: Requires energy performance at least equivalent to the EPA ENERGY STAR Certified Homes Program Version 3.1 with the following exception: for certain gut rehabilitation projects, requirements not deemed economically justified may be waived and the modified performance requirements would support the Energy \$mart designation. Tier 2 performance criteria and the related incentives will initially match those as currently published by NYSERDA⁵⁵. Adjustments may be adopted to reflect advancements in the market's capacity to cost-effectively achieve increasing levels of performance or other market conditions, as well as to reflect changes to the ECCC.
- Tier 3: Requires energy performance that meets Tier 2 requirements plus an enhanced HERS Index or equivalent measure of performance which, inclusive of installed photovoltaics, indicates deep energy savings or near net-zero performance will be achieved.⁵⁶ Tier 3 performance criteria and the related incentives will initially match those published by NYSERDA⁵⁷. Adjustments may be adopted to reflect advancements in the market's capacity to cost-effectively achieve increasing levels of performance or other market conditions, as well as to reflect changes to the NYSECCC.

Other Incentives

⁵⁴The Energy \$mart designation is a Program designation offered for certain gut rehabilitation projects, where meeting the EPA ENERGY STAR Certified Homes criteria such as the envelope and water management requirements may not be economically justified.

⁵⁵ NYSERDA's <https://www.nyserda.ny.gov/newconstruction-Res> webpage offers summary information as well as hyperlinks to details specific to the current Low-rise Residential New Construction Program.

⁵⁶ On-site and/or renewable generation are not eligible for installation incentives through this offering and are not restricted by participation in this offering from receiving incentives through NY-Sun or other renewable offerings.

⁵⁷ NYSERDA's <https://www.nyserda.ny.gov/newconstruction-Res> webpage offers summary information as well as hyperlinks to details specific to the current Low-rise Residential New Construction Program.

An incentive per qualified dwelling unit is offered to RESNET-accredited Providers, as currently published by NYSERDA.⁵⁸ Depending on market needs, this offer may be continued, modified, or extended to other third-party entities deemed by NYSERDA to can deliver the required services to the market and to NYSERDA.

2.9.4 Performance Management

NYSERDA will monitor a sampling of projects and analyze the resulting data. The results of this monitoring and analysis, as well as any changes to NYS energy code, and participation levels, will inform if/when adjustments to the Program are necessary.

Technical assistance may be offered to participating builders, developers and to HERS raters involved in the construction of high-performance projects.

Quality Assurance will be performed by RESNET-accredited Providers based on Residential Energy Services Network (RESNET) technical standards. Other third-party entities deemed by NYSERDA to be capable of delivering the required services to the market and to NYSERDA may additionally be relied on to deliver quality assurance.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. An independent evaluation effort will review data from projects to verify energy benefits. Additional impact evaluation work, including potentially engineering analysis, site visits and modeling, will occur as needed to further verify energy and other benefits. Validating baseline assumptions and as-built conditions will be important aspects of ensuring rigorous and defensible energy savings for new construction.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.9.5 Relationship to Utility Programs

Utilities currently do not offer new construction programs for this sector at this time.

Utilities offer rebates and incentives for equipment on existing buildings. For gut rehabilitation projects, there is potential for replacement of existing equipment to receive capital incentives through a utility incentive program. Utility rebates are paid to the homeowner, incentives available through the Program are paid to the builders and developers.

⁵⁸ NYSERDA's <https://www.nyserda.ny.gov/newconstruction-Res> webpage offers summary information as well as hyperlinks to details specific to the current Low-rise Residential New Construction Program.

To the extent utility companies' support activities in these areas, NYSERDA will collaborate to identify synergistic approaches that move the construction market towards higher performance, minimize market disruption, and avoid market confusion.

2.9.6 Budgets & Expenditures^{59,60}

Budget		2016	2017	2018	Total
Market Rate	Incentives & Services	\$1,230,000	\$1,020,000	\$1,270,000	\$3,520,000
	Program Implementation	\$107,000	\$562,000	\$648,000	\$1,317,000
	Sub-Total	\$1,337,000	\$1,582,000	\$1,918,000	\$4,837,000
LMI	Incentives & Services	\$1,290,000	\$2,340,000	\$3,150,000	\$6,780,000
	Program Implementation	\$107,000	\$625,000	\$975,000	\$1,707,000
	Sub-Total	\$1,397,000	\$2,965,000	\$4,125,000	\$8,487,000
Total		\$2,743,000	\$4,547,000	\$6,043,000	\$13,324,000

Expenditures⁶¹	2016	2017	2018	2019	2020
Total	5%	20%	35%	25%	15%

2.9.7 Performance Metrics⁶²

Market Rate

Primary Metrics⁶³		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	2,030	2,210	2,770	7,010
	MWh Lifetime	40,700	44,300	55,300	140,300

⁵⁹Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁶⁰ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

⁶¹Expenditures are estimated based on the typical design and construction schedules for single family and low-rise multifamily projects, and on the timing of NYSERDA application within that process. While it is anticipated the vast majority of projects will be completed within the time frame shown, the expenditure projections do not indicate a 2-year project completion requirement.

⁶² Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 20-year measure life.

⁶³ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

	MMBtu Annual	22,500	25,900	30,500	78,900
	MMBtu Lifetime	450,000	517,000	610,000	1,577,000
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		2,260	2,540	3,070	7,870
CO2e Emission Reduction (metric tons) Lifetime		45,300	50,700	61,400	157,400
Customer Bill Savings Annual (\$ million)		\$0.54	\$0.60	\$0.73	\$1.86
Customer Bill Savings Lifetime (\$ million)		\$10.7	\$11.9	\$14.6	\$37.20
Private Investment (\$ million)		\$4.5	\$5.9	\$7.4	\$17.73

LMI

Primary Metrics ⁶⁴		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	1,600	2,470	3,700	7,700
	MWh Lifetime	31,900	49,300	74,000	155,200
	MMBtu Annual	15,800	21,300	29,800	66,900
	MMBtu Lifetime	315,000	425,000	596,000	1,336,000
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		1,680	2,420	3,530	7,630
CO2e Emission Reduction (metric tons) Lifetime		33,500	48,500	70,600	152,600
Customer Bill Savings Annual (\$ million)		\$0.40	\$0.59	\$0.87	\$1.86
Customer Bill Savings Lifetime (\$ million)		\$8.1	\$11.8	\$17.4	\$37.25
Private Investment (\$ million)		\$5.8	\$8.6	\$11.3	\$25.73

⁶⁴ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

Additional Performance Tracking Metrics		2016	2017	2018	Total
Participants ⁶⁵	Market Rate	723	993	1,210	2,926
	LMI	1,292	1,810	2,227	5,329
	Total	2,015	2,803	3,437	8,255

2.9.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.⁶⁶ The benefit estimate includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.⁶⁷ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Low Rise New Construction	
Benefits (million 2015\$)	\$30
Costs (million 2015\$)	\$39.08
Benefit Cost Ratio	0.8

Consistent with the CEF, NYSERDA intends to offer incentives in a fuel neutral manner, with the intent to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$859, compared to a cost of \$1,046 in an electric only scenario.⁶⁸

⁶⁵Dwelling units.

⁶⁶Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

⁶⁷The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

⁶⁸Electric only cost scenario figure was calculated by deducting the Gas portion of the proposed Builder Home Incentive total from the combined Market Rate and LMI Program budgets (exclusive of admin and CRF) and program budget to calculate the \$/MWh.

2.10 Multifamily New Construction

The Multifamily New Construction Program did not meet its 2016 projected targets. The most significant factors influencing lower 2016 participation include market uncertainty and impacts associated with the expiration of the New York City-focused property tax abatement program⁶⁹ formerly known as 421-a, as well as NYSERDA's later than anticipated program launch. NYS and NYC have re-authorized a property tax abatement opportunity intended to encourage development of mixed income multifamily buildings; specific market response is not yet clear, but increased NYC-based housing development is anticipated. In addition, NYSERDA learned that the per project incentive caps imposed on market rate projects were found by the market to be too restrictive in certain instances, therefore adjustments to those caps will be made to more equitably reward larger projects and the per dwelling unit incentives may be adjusted to align with the Low-rise Residential New Construction Program. The number of 2016 participants committing to achieving higher building performance or Tier 3 was higher than anticipated, relative to those willing to commit to the lower performance or Tier 2, resulting in increased savings per dwelling unit, but at the higher per dwelling unit incentive and associated project cost.

While 2016 performance metrics were calculated relative to the then-current ECCC of NYS, the revised 2017 and 2018 metrics rely on the ECCC of NYS adopted in October 2016 as the reference baseline. The subsequent changes to energy code drove down the overall savings, as the baseline the incremental savings are being calculated against is more energy efficient. These factors have been incorporated within the revised projections and values shown in sections 9.10.6, 9.10.7 and 9.10.8, to reflect 2016 commitments, the revised projections for 2017, as well as the additional funding and related metrics for 2018.

2.10.1 Program Description

The 2016-2018 Multifamily New Construction program focuses on:

- Increasing awareness of, information about, and demand for deep energy savings and zero net energy performance in the multifamily new construction and gut rehabilitation markets.
- Strengthening the capacity of clean energy professionals to deliver design and construction services to this market sector.
- Support NYS and NYC housing agencies, funding authorities, and municipalities in their efforts to secure the most efficient, durable, resilient and healthy housing, based on technical and economic feasibility, while striving to maximize effective use of the resources

available to achieve those goals. These activities are significantly but not exclusively targeting the LMI housing sector.

- Identify and promote integrated design solutions which are replicable, with a focus on cost optimization analysis, financing strategies which recognize operational costs and savings, and management of perceived risks.

Offering technical assistance, a multi-tiered incentive structure separated into two “per dwelling unit” categories, and potentially offering targeted incentives to support development of market-based quality assurance. This Program replaced the legacy Multifamily Performance Program’s (MPP) new construction component, a program that previously served high-rise residential new construction and gut rehabilitation projects. The multi-tiered incentive structure currently offered replaced the MPP singular “per dwelling unit” incentive, focusing support and incentives toward promotion of higher levels of comprehensive building and energy performance, up to and inclusive of net zero energy performance. In contrast to MPP, the new Program encourages photovoltaics and other renewables to be layered onto a project to achieve savings thresholds. The Program structure is closely aligned with the Low-rise Residential New Construction Program, delivering technical oversight and administrative support services through a common process, thereby creating a more unified market signal for the multifamily new construction sector.

Program Delivery

The Program will be open enrollment program, delivering technical oversight and administrative support services in a manner closely aligned with the Low-rise Residential New Construction Program, supporting market-based delivery of qualified technical services through recognition of third party certifications and licensing. Housing developers and builders will be direct recipients of program incentives.

Targeted technical support will be available to architects, engineers, designers, and third-party verifiers or other technical consultants. More extensive support will be targeted to developers, design professionals and projects willing to pursue higher building performance, inclusive of NZE performance. Technical support and collaboration with other NYS agencies and entities will be offered.

Validated performance thresholds and third-party standards will be incorporated by explicit and implicit reference within NYSERDA’s program structure.

Capital Incentives will be provided.

2.10.2 Target Market & Customer/Project Eligibility Rules

Target Market

According to recent U.S. Census data, building permits for low-, mid- and high-rise multifamily housing reached an all-time high of 50,000 dwelling units through the 3rd quarter of 2015, more than double the number issued in all of 2014. Mid- and high-rise multifamily buildings, defined as buildings 4 or more stories in height, incorporate approximately 60 percent of that total, or 30,000

dwelling units. Program activities and efforts will focus on both market rate and LMI buildings and projects within this market sector which can achieve a higher level of performance.

Eligibility

Housing developers and builders will be required to deliver completed buildings and projects which meet the minimum performance criteria outlined below, in the Incentives/Services section. Project eligibility will be fuel-neutral. To be eligible for Program participation, an applicant must be, or be capable of and intend to be, a New York State electricity distribution customer of a participating utility company which pays into the SBC.

2.10.3 Incentives/Services Offered

Technical Program Support and incentives will be provided in three tiers:

- Tier 1: Requires energy performance at least equivalent to the U.S. Environmental Protection Agency (EPA) ENERGY STAR Multifamily High-Rise program, reflecting a predicted 15% utility cost savings above the current International Energy Conservation Code (IECC) – Commercial Provisions. For certain gut rehabilitation projects, requirements not deemed economically justified may be waived and the modified performance requirements would support the Energy \$mart designation. Technical support and access to NYSERDA’s compliance review would be available for LMI projects but no direct incentives will be offered. Tier 1 is being maintained to provide Program technical support, oversight and verification on projects to validate performance, thereby increasing confidence by housing agencies and financial underwriting institutions that projects will deliver as promised.
- Tier 2: Requires energy performance at least equivalent to the EPA ENERGY STAR Multifamily High-Rise program requirements, additionally requiring a minimum of 20% predicted utility cost savings above ASHRAE 90.1 2010, or 15% above the relevant NYS commercial energy code, whichever is greater. For certain gut rehabilitation projects, requirements not deemed economically justified may be waived and the modified performance requirements would support the Energy \$mart designation. Technical support and direct incentives will be available, with LMI projects eligible for higher levels of incentives. Tier 2 performance criteria will initially match those as currently published by NYSERDA⁷⁰. Future adjustments may be adopted to reflect advancements in the market’s capacity to cost-effectively achieve increasing levels of performance or other market conditions, as well as to reflect future changes to the NYS Energy Conservation Construction Code (ECCC).
- Tier 3: Projects must meet or exceed performance criteria which qualifies as deep energy savings, inclusive of near net-zero performance. This level of performance will be established by demonstrating the building will achieve a NYSERDA-determined minimum percentage of energy cost savings above the relevant NYS commercial energy code. As

⁷⁰ NYSERDA’s <https://www.nyserda.ny.gov/newconstruction-Res> webpage offers summary information as well hyperlinks to details specific to the current Multifamily New Construction Program.

alternatives, certification under high performance third-party energy performance standards such as PHIUS+ or the German-based Passive House Institute, may be deemed to be acceptable by NYSERDA. Technical support and direct incentives will be available, with LMI projects being eligible for higher levels of incentives.⁷¹ Tier 3 performance criteria will initially match those as currently published by NYSERDA.⁷⁰ Future adjustments may be adopted to reflect advancements in the market's capacity to cost-effectively achieve increasing levels of performance or other market conditions, as well as to reflect future changes to the NYS ECCC.

Other Incentives:

- Depending on market needs and NYSERDA's goals related to market development in this area, an incentive per qualified dwelling unit may be offered to RESNET-accredited Providers, similar to offer as currently published by NYSERDA⁷⁰ for projects receiving support through the Low Rise Residential New Construction Program. Depending on market needs, targeted incentives may additionally be extended to other third-party entities deemed by NYSERDA to be capable of delivering the required services to the market and to NYSERDA as a mechanism to support development of market-based quality assurance.

2.10.4 Performance Management

Overall, NYSERDA will regularly review program participation and project performance, as well as expected updates to the New York State Energy Conservation Construction Code, to determine whether changes in incentives, caps or eligible projects are needed to improve efficacy of program implementation. Program staff and contractors will provide guidance and review of building designs, energy models, and construction practices; while also directing support toward and leveraging third party verifiers and certification organizations which target high performance design and construction. Directed quality assurance and support will be provided by program staff and contractors, while leveraging third party verifiers and certification organizations which target high performance building design and construction.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting. An independent evaluation effort will review data from projects to verify energy benefits. Additional impact evaluation work, including potentially engineering analysis, site visits and modeling, will occur as needed to further verify energy and other benefits. Validating baseline assumptions and as-built conditions will be important aspects of ensuring rigorous and defensible energy savings for new construction.

⁷¹ Although on-site and/or renewable generation are not eligible for installation incentives through this offering, integration or use of renewable generation will be strongly encouraged for projects aiming to meet Tier 3 NYSERDA-determined energy performance thresholds. The resulting on-site and and/or renewable generation solutions are not restricted by participation in this Program from receiving incentives through NY-Sun or other renewable offerings.

To draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.10.5 Relationship to Utility Programs

Utilities currently do not offer new construction programs at this time. Utilities do offer rebates and incentives for equipment on existing buildings. For gut rehabilitation projects, there is potential for replacement of existing equipment to receive capital incentives through a utility incentive program.

To the extent utility companies' support activities in these areas, NYSERDA will collaborate to identify synergistic approaches that move the construction market towards higher performance, minimize market disruption, and avoid market confusion.

2.10.6 Budgets & Expenditures^{72,73}

Budget		2016	2017	2018	Total
Market Rate	Incentives & Services	\$480,000	\$624,000	\$882,000	\$1,986,000
	Program Implementation	\$165,000	\$310,000	\$273,000	\$748,000
	Sub-Total	\$645,000	\$934,000	\$1,155,000	\$2,734,000
LMI	Incentives & Services	\$2,950,000	\$2,790,000	\$3,280,000	\$9,020,000
	Program Implementation	\$309,000	\$600,000	\$950,000	\$1,859,000
	Sub-Total	\$3,259,000	\$3,390,000	\$4,230,000	\$10,879,000
Total		\$3,904,000	\$4,324,000	\$5,385,000	\$13,613,000

⁷²Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁷³ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

Expenditures⁷⁴	2016	2017	2018	2019	2020	2021
Total	5%	5%	20%	30%	25%	15%

2.10.7 Performance Metrics^{75,76}

Market Rate

Primary Metrics⁷⁷		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	571	1,960	2,740	5,271
	MWh Lifetime	11,400	39,300	54,900	105,600
	MMBtu Annual	3,780	8,910	15,800	28,490
	MMBtu Lifetime	75,500	178,000	316,000	569,500
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		501	1,510	2,280	4,291
CO2e Emission Reduction (metric tons) Lifetime		10,000	30,100	45,600	85,700
Customer Bill Savings Annual (\$ million)		\$0.10	\$0.31	\$0.45	\$0.86
Customer Bill Savings Lifetime (\$ million)		\$1.9	\$6.2	\$9.0	\$17.19
Private Investment (\$ million)		\$2.7	\$7.5	\$10.6	\$20.82

⁷⁴Expenditures are estimated based on the typical design and construction schedules for multifamily projects, and on the timing of NYSERDA application within that process. While it is anticipated the vast majority of projects will be completed within the time frame shown, the expenditure projections do not indicate a 4-year project completion requirement.

⁷⁵ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 20-year measure life.

⁷⁶ The 2016 performance metrics were calculated relative to the then-current ECCC of NYS. The revised 2017 and 2018 metrics reflect reliance on the ECCC of NYS adopted in October 2016 as the reference baseline.

⁷⁷ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

LMI

Primary Metrics⁷⁸		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	5,120	4,910	5,490	15,520
	MWh Lifetime	102,000	98,200	110,000	310,200
	MMBtu Annual	27,200	22,300	31,600	81,100
	MMBtu Lifetime	544,000	446,000	632,000	1,622,000
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO ₂ e Emission Reduction (metric tons) Annual		4,130	3,760	4,560	12,450
CO ₂ e Emission Reduction (metric tons) Lifetime		82,700	75,300	91,300	249,300
Customer Bill Savings Annual (\$ million)		\$0.83	\$0.78	\$0.90	\$2.51
Customer Bill Savings Lifetime (\$ million)		\$16.6	\$15.5	\$18.1	\$50.20
Private Investment (\$ million)		\$22.4	\$18.9	\$21.1	\$62.40

Additional Performance Tracking Metrics		2016	2017	2018	Total
Participants ⁷⁹	Market Rate	289	1,000	1,400	2,689
	LMI	2,557	2,500	2,800	7,857
	Total	2,846	3,500	4,200	10,546

2.10.8 Benefit Cost Analysis

The BCA summarized in the table below represents a total resource cost test, consistent with the benefit cost analysis framework described in the January 21, 2016 Order.⁸⁰ The benefit estimate

⁷⁸ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

⁷⁹ Dwelling units.

⁸⁰Case 14-M-0101, Proceeding on the Motion of the Commission in Regard to Reforming the Energy Vision. Order Establishing the Benefit Cost Analysis Framework. Issued and Effective January 21, 2016.

includes avoided energy (electricity, natural gas, and oil), generation capacity, distribution capacity, and social cost of carbon.⁸¹ Costs are defined as all costs associated with the energy efficiency program, including program specific costs, Administration, CRF, and evaluation, measurement, and verification, as well as customer costs. The analysis calculated the following benefit cost ratios:

	2016 - 2018
Multifamily New Construction	
Benefits (million 2015\$)	\$45
Costs (million 2015\$)	\$47.18
Benefit Cost Ratio	0.9

Consistent with the CEF, NYSERDA intends to offer incentives in a fuel neutral manner, with the intent to encourage more efficient use of all fuel types. This will help develop the market at the scale needed to achieve New York State’s clean energy goals. Offering the program on a fuel neutral basis will allow us to achieve a ton of carbon savings at a cost of \$813, compared to a cost of \$913 in an electric-only scenario. The costs for the electric-only scenario costs were determined by calculating weighted average of the electric-only LMI and Market Rate \$/MWh values, and an assumed incentive level which targets a comprehensive building approach to achieving electric-only savings, ensuring electric space conditioning and other end uses were incorporated, while relying on the full program budget to estimate MWh savings potential.

2.11 Anaerobic Digesters

NYSERDA launched the Anaerobic Digester Resource Acquisition transition program in 2016 as a first-come, first-served formula-based incentive program, consistent with the prior Renewable Portfolio Standard Customer-Sited Tier program. A total of \$4 million was committed in 2016, representing 2 projects and 1.13 MW. At the initiation of the CEF in 2016, NYSERDA intended to pivot the format of the program in 2017 to a competitive selection format to strategically source pilot projects that have the potential to yield improved economic value and thereby proceed at reduced incentives from the ratepayers. Subsequently, this pivot was postponed to 2018 while additional marketplace exploration was conducted in 2017 and early 2018. As a result, in addition to the competition to select projects to build new Anaerobic Digester Gas (ADG)-to-Electricity systems, the program will include an open-enrollment/standard offer feature to cost-share the refurbishment of historically farm-related ADG-to-Electricity systems which began operation prior to January 1, 2015, the majority of which were on farms.

To further address the clean energy needs of New York’s agricultural sector, NYSERDA and New York State Department of Agriculture and Markets continue to co-chair a “Clean Energy for

⁸¹The social cost of carbon is an estimate of the monetized damages to global society associated with an incremental increase in carbon emissions in a given year. It is intended to include changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change, etc.

Agriculture Task Force,” which delivered recommendations to increase deployment of renewable energy and energy efficiency on farms, including ADG-to-Electricity, in March 2017.

The work of the Clean Energy for Agriculture Task Force has helped NYSERDA formulate concepts for shifting strategy to initiatives and pioneering projects that offer the prospect of reducing costs, improving performance and value, and developing and demonstrating sustainable business models that will enable projects to pursue market-based compensation to be available via REV. Therefore, NYSERDA is now pivoting the ADG-to-Electricity program to provide support for analysis and coaching regarding cost-reduction and revenue-enhancement strategies, and incentives for competitively-selected projects to pilot a number of installations that demonstrate such features. Additionally, to seek continuing operation of some legacy digesters, NYSERDA will also offer cost-sharing for refurbishment of systems.

2.11.1 Program Description

The ADG-to-Electricity Incentive program offering for 2018 will continue to provide financial support to assist typically rural facilities with projects to install on-site renewable distributed generation equipment to help reduce their energy expenses as well as their carbon footprint, but the incentives will now be offered via a competition.

NYSERDA anticipates that one or more project developers, each building a cluster of projects in close geographic proximity, can provide economy-of-scale to reduce various costs (e.g., customer acquisition, design/engineering, equipment procurement, and construction mobilization).

Furthermore, the scale represented by a cluster of projects can lead to:

- Achievement of long-term, stable relationships with sources of organic substrates (such as food wastes) that can benefit projects via revenues for tipping fees, as well as increasing the amount of biogas and the resultant electricity that the projects can generate
- Administrative efficiencies and economic gains associated with marketing of the ADG-to-Electricity outputs, such as environmental attributes, “green” branding, and digested solids

NYSERDA envisions acting in the role of convener, to help create meet-and-greet events where prospective host sites, food waste suppliers, project developers, and other stakeholders, can explore formation of teams leading to clusters of projects. Additionally, NYSERDA will work with stakeholders to provide support for analysis and coaching regarding cost-reduction and revenue-enhancement strategies. NYSERDA will simultaneously develop a solicitation with one competitive category to invite proposals that seek incentive funds to install a pilot project and one standard offer category for formula-based cost-sharing for refurbishment of legacy digester systems; such solicitation will likely be issued in Q3 of 2018 with proposals/applications due before the end of 2018.

Program Delivery

Proposers/Applicants will submit required documentation in accordance with a due date. For the competitive category to build new systems, the proposals will be reviewed by a Technical Evaluation Panel consisting of NYSERDA and non-conflicted external experts, to determine

eligibility of and preference for the project. Eligibility review will include, but is not limited to, ensuring that the project proposes to use commercially-mature equipment, and that the host sites pay the System Benefits Charge on their electric bill. Additionally, the preference review will include, but is not limited to, relative magnitude of subsidy (dollars-per-megawatt-hour), pioneering aspects to reduce costs and enhance revenues, and the skills and capability of proposing team to successfully demonstrate innovative project aspects. Teams whose proposals are selected by NYSERDA to receive an award will be offered a contract specifying deliverables that would need to be achieved in order to be eligible to submit an invoice to NYSERDA (NYSERDA will disburse funds after proof of successful completion of project milestones). The contract can be established such that NYSERDA incentive payments can be made to the project developer/installer, the host customer, or a third party. For the standard offer category to refurbish legacy systems, the applicant can choose to refurbish one or more of their components (i.e., the engine, gas clean-up, or digester). Following acceptance into the program, the applicant will produce a Refurbishment Plan for NYSERDA's review and approval, then implement actions in accordance with their plan as approved.

Personnel and Roles

- **NYSERDA staff:** Program management, Technical Evaluation Panel review, general project management, and project payments.
- **Third party technical reviewers:** Participate directly on the Technical Evaluation Panel review.
- **Third party technical contractors:** Assist NYSERDA staff with preparation for NYSERDA staff participation on the Technical Evaluation Panel review as needed based on project complexity and/or workload, and conduct project site inspections during and/or after construction as directed by NYSERDA.
- **Outreach contractors:** Through a competitive solicitation, NYSERDA has previously selected a team led by Cornell University to provide Anaerobic Digester Assistance (also referred to as ADG Ombudsman services). The remaining term of this contract will enable this service into 2019.

NYSERDA has provided many years of incentive support to ADG-to-Electricity systems, but, for various reasons, ADG systems continue to have very low penetration in the marketplace and relatively high costs. For example, the adoption of NYSERDA's Anaerobic Digester Gas-to-Electricity program has progressed slowly despite multiple potential applications and business model solutions. NYSERDA's ADG Ombudsman can provide guidance to dairy farmers during their exploration and implementation of ADG-to-Electricity. With the recent acquisition of market insights that have pinpointed meaningful intervention strategies (such as via the report from the Clean Energy for Agriculture Task Force⁸²), NYSERDA is now ready to pivot away from the general features of the historic incentive program structure (rolling admission first-come-first-served incentives) in favor of a competitive-selection program structure.

⁸² <https://www.nyserda.ny.gov/-/media/Files/Publications/CEATF-Strategic-Plan.pdf>

In 2018, NYSERDA is shifting strategy to initiatives and pioneering projects that offer the prospect of reducing costs, improving performance and value, and developing and demonstrating sustainable business models through demonstration projects that will highlight best practices (such efforts will strive to determine and inform marketplace participants of ADG-to-Electricity project attributes that can maximize the value to be available via REV⁸³) -- in 2016 and 2017 NYSERDA conducted a small amount of initial exploration of these opportunities and believes that such an adjustment will provide more impact toward CEF goals.

NYSERDA coached the utilities to each establish a utility employee to serve as a Distributed Generation Ombudsman for their territory, an important role that has been successfully demonstrated at Con Edison.

2.11.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market for the installation of new systems includes all eligible customers seeking to have an ADG-to-Electricity system installed in a grid-connected manner. The ADG-to-Electricity system must consist of commercially-available technologies and the system design must be well-conceived (e.g., the digester portion is appropriate for the amount and type of organic feedstock, and the electric generator portion is appropriate for the producible quantity and characteristic of biogas), and the ADG biogas fuel must be derived from eligible biomass feedstocks.

The target market for refurbishment of legacy systems includes existing historically farm related digesters with associated electricity production that began operating prior to January 1, 2015, and that are in need of significant overhaul in order to remain in operation.

Eligibility

Participants seeking to serve as the host site for installation of a new ADG-to-Electricity project must be New York State electricity distribution customers of a participating utility company who pay the SBC (it is expected that such host sites will be members of a proposal that addresses a cluster of projects, as opposed to a proposal that represents a single site, in order to leverage the economic values that can be derived from clustering and thereby compete effectively in relation to other proposals that NYSERDA may receive). Host sites can be, but are not limited to, dairy farms, wastewater treatment plants, and sources of food wastes (such as food processing industries, colleges, hospitals, prisons, etc.). Participants for the refurbishment activities are limited to historically farm related ADG-to-Electricity systems which began operation prior to 1/1/2015. The available incentive budget in 2016 was \$4,000,000 and was fully-awarded to projects. NYSERDA

⁸³In a broader perspective, New York State is pursuing the Reforming the Energy Vision (REV) strategies, an effort which, through regulatory reform, is intended to provide appropriate compensation for the value that distributed energy resources bring to the localized and overall management of the electric grid. Distributed generation, including but not limited to ADG-to-Electricity systems, are a type of distributed energy resource that will find opportunities for improved value propositions under REV. NYSERDA is engaged with the REV proceeding and will provide information and insights throughout the process to help establish a marketplace where distributed energy resources can leverage their particular values. Through REV, the standby tariff, and the rules for electrical interconnection (Standard Interconnection Requirement -- SIR) are being assessed for improvements, and this is expected to provide important benefits to distributed generation, including but not limited to ADG-to-Electricity systems.

anticipates the solicitation to be issued in Q3 of 2018 to offer a total of \$16 million of which, \$7.75 million would be earmarked for the competition to build new systems, \$0.25 million would be earmarked to conduct best practices studies and other market engagement, and \$8 million would be earmarked for refurbishment of legacy digesters, with the ability to shift funds from one category to another in response to the quantity and quality of applications received.

2.11.3 Incentives/Services Offered

There were no significant changes in 2016 compared to the previous NYSERDA offering. For 2016, the NYSERDA incentive was a combination of capacity incentives, interconnection support incentives, and performance-based incentives. The maximum incentive available was \$2,000,000 per project/site.

Changes to the program for 2018 will be as generally described herein and will be further detailed in a solicitation, anticipated to be issued in Q3 of 2018. The solicitation will take into consideration feedback from stakeholders gathered throughout the latter half of 2017, and will specify the combination of features of the incentives (e.g., whether the incentive structure will consist of one or more aspects such as capacity incentives, interconnection support incentives, performance-based incentives, or other styles of incentives), and whether a maximum incentive per project/per site should be incorporated and if so what those limits should be.

Noting that NYSERDA's pivot to a competitive solicitation for building new systems is intended to strategically source pilot projects that can proceed at lower cost to ratepayers, it is expected that the magnitude of subsidy requested by a proposal (dollars-per-megawatt-hour) should be significantly lower than the dollar-per-megawatt-hour cost to ratepayers experienced in the prior ADG-to-Electricity program. NYSERDA may establish, and withhold from publication, a maximum dollars-per-megawatt-hour "upset price" above which projects would not be awarded.

2.11.4 Performance Management

NYSERDA has regularly monitored market interest and uptake of available funds to inform program adjustments as needed based on market response. NYSERDA will also monitor project completion timelines to ensure installation and commissioning of all equipment generally occurs within 24-to-36 months of a fully executed contract with NYSERDA (projects failing to meet this timeline may be subject to termination). Metrics associated with energy generation, capacity installed, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting.

Program plans include a NYSERDA site inspection for each project, hourly-interval data collection on system performance, and site-level measurement and verification. This data will be used to monitor performance of installed systems (and to support performance-based incentive payments if such feature gets specified in the solicitation). An independent evaluation effort will review data from the program site inspections, data collection and M&V to verify energy benefits. Additional impact evaluation work will only occur as needed to verify energy and other benefits.

In order to draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation

operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit.

2.11.5 Relationship to Utility Programs

In the past, utilities have not administered programs to incentivize installation of ADG-to-Electricity systems, and it is expected that utilities will not commence administration of programs to incentivize installation of ADG-to-Electricity systems.

2.11.6 Budgets & Expenditures^{84,85}

Budget	2016	2017	2018	Total
Incentives & Services	\$4,000,000	\$-	\$16,000,000	\$20,000,000
Program Implementation	\$50,000	\$-	\$100,000	\$150,000
Total	\$4,050,000	\$-	\$16,100,000	\$20,150,000

Expenditures	2016	2017	2018	2019	Further Out Years⁸⁶
Total	5%	5%	5%	10%	75%

⁸⁴Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁸⁵ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

⁸⁶ The program has, and may continue to, disburse a portion of the award in the form of performance-based payments that will occur over a ten-year duration.

2.11.7 Performance Metrics⁸⁷

Primary Metrics⁸⁸		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MMBtu Annual	-	-	-	-
	MMBtu Lifetime	-	-	-	-
	MW	-	-	-	-
Renewable Energy	MWh Annual	7,440	-	78,700	86,140
	MWh Lifetime	74,400	-	495,000	569,400
	MW	-	-	-	-
CO ₂ e Emission Reduction (metric tons) Annual		3,920	-	41,600	45,920
CO ₂ e Emission Reduction (metric tons) Lifetime		39,200	-	263,000	302,200
Customer Bill Savings Annual (\$ million)		\$0.99	-	\$10.50	\$11.49
Customer Bill Savings Lifetime (\$ million)		\$9.99	-	\$66.00	\$75.99
Private Investment (\$ million)		\$19.0	-	\$82.70	\$101.70

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants	2	-	34	36

2.11.8 Fuel Neutrality

The majority of program efforts will be electric focused (i.e., incentives for installation of ADG-to-Electricity systems and/or refurbishment of such systems). The program may conduct a small amount of initial exploration of market transformation activities, which may, or may not, involve

⁸⁷ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 10-year measure life. Incentive commitments in 2017 and 2018 will be through a competition; NYSERDA currently has limited insight to the competitive pricing that could be achieved, therefore, a presumed improvement (compared to previous experience in 2016, for a given financial incentive borne by the ratepayers, a doubling of the benefits produced by projects) is herein used to create projections but may be subject to revision as NYSERDA gains more experience.

⁸⁸ Benefits in annual columns are rounded to three significant figures; in total column are rounded to four significant figures. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

fuel-neutral-type projects. If fuel-neutral type projects are considered, they will be assessed on a case-by-case basis to ensure conformance with CEF requirements regarding fuel neutrality.

2.12 Fuel Cells

NYSERDA did not move forward with the Fuel Cell Resource Acquisition Transition Program as planned. NYSERDA is currently working with stakeholders and equipment vendors and evaluating options for the fuel cell market and will reflect fuel cell activities in a future revision.

2.13 Small Wind

The Small Wind Program did not meet its 2016 projected targets. The Small Wind Program was intended to provide the marketplace with support for turbines ranging in size 2 MW and smaller, where the electricity produced would primarily be used behind the customer's meter(s) via net metering or remote net metering. As evidenced in 2016 by the size of turbines matched to customers' loads who have participated in this Program, a very small turbine (size 10 kW) was predominantly chosen. As a result, since the Program's incentive formula provides a sliding-scale dollar-per-megawatt rate which is highest for these very small turbines (rate is lower for larger turbines which can benefit from economy-of-scale), the Program underachieved in 2016 for acquired megawatts relative to committed budget, and this trend is expected to continue in 2017 and 2018. The benefits in section 2.13.7 have been updated to reflect 2016 actuals, as well as revising the 2017 and 2018 anticipated performance metrics.

2.13.1 Program Description

The Small Wind Incentive program offering provides financial support to assist typically rural facilities with projects to install on-site renewable distributed generation equipment to help reduce their energy expenses as well as their carbon footprint.

This program will be an extension of the previous RPS CST Small Wind program.

Program Delivery

Applicants will submit required documentation to be reviewed by NYSERDA to determine eligibility of the project (a list of Eligible Equipment is maintained by NYSERDA). Each project will receive a purchase order upon approval. Installation is completed by firms/vendors (on NYSERDA's list of Eligible Installers) that the customer retains on their own. Technical Review is conducted by NYSERDA staff. Cost-sharing or incentives will be administered by NYSERDA after proof of successful completion of project milestones. NYSERDA incentive payments will be made to the project's Eligible Installer, who must pass the incentive along in its entirety to the host customer).

The Small Wind program offering will be open-enrollment. Applications will be accepted on a first-come, first-served basis dependent on funding availability.

Personnel and Roles

- **NYSERDA staff:** Program management, project eligibility review, general project management, and project payments.

NYSERDA's experience with small wind turbines over the past eight years confirms the persistence of a long-time horizon until these solutions approach cost-competitiveness. To provide some market stability and bridge until acquisition of market insights can pinpoint meaningful intervention strategies, the general features of the historic incentive program structure (rolling admission first-come-first-served incentives) for Small Wind will continue, subject to the outcome of current discussions with stakeholders. The budget level will be commensurate with the recent historic actual uptake experienced during the planning cycle of the CEF.

By 2017, NYSERDA anticipates shifting strategy to initiatives and pioneering projects that offer the prospect of reducing soft costs, improving performance and value, and developing and demonstrating sustainable business models through demonstration projects and best practices studies (such efforts will strive to determine and inform marketplace participants of small on-site wind turbine project attributes that can maximize the value to be available via REV⁸⁹) -- in 2016 and 2017 NYSERDA will conduct a small amount of initial exploration of these opportunities. If, in consultation with stakeholders, NYSERDA determines that such an adjustment will provide more impact toward CEF goals, we will file an amendment outlining the new strategies.

NYSERDA will coach the utilities to each establish a utility employee to serve as a Distributed Generation Ombudsman for their territory, an important role that has been successfully demonstrated at Con Edison.

2.13.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market includes all eligible customers seeking to have an eligible wind turbine installed by an eligible installer in a grid-connected manner. A list of eligible wind turbines up to a given size is maintained by the Interstate Turbine Advisory Council (ITAC) (<http://www.cesa.org/projects/ITAC/itac-unified-list-of-wind-turbines/>); commercially-available turbines larger than those assessed by ITAC, but not exceeding 2,000 kW nameplate rating, will be assessed for program eligibility by NYSERDA on a case-by-case basis considering various factors including but not limited to proven record for power performance, reliability, safety, and acoustics. A list of eligible installers is maintained by NYSERDA.

⁸⁹In a broader perspective, New York State is pursuing the Reforming the Energy Vision (REV) strategies, an effort which, through regulatory reform, is intended to provide appropriate compensation for the value that distributed energy resources bring to the localized and overall management of the electric grid. Distributed generation, including but not limited to small on-site wind turbines, are a type of distributed energy resource that will find opportunities for improved value propositions under REV. NYSERDA is engaged with the REV proceeding and will provide information and insights throughout the process to help establish a marketplace where distributed energy resources can leverage their particular values. Through REV, the standby tariff, and the rules for electrical interconnection (Standard Interconnection Requirement -- SIR) are being assessed for improvements, and this is expected to provide important benefits to distributed generation, including but not limited to small on-site wind turbines.

Eligibility

The Small Wind Incentive program is eligible to all sectors, including but not limited to residential, commercial, industrial, agricultural, institutional, educational, not-for-profit, and government-owned facilities. Participants must be New York State electricity distribution customers of a participating utility company who pay into the SBC.

2.13.3 Incentives/Services Offered

There will be no significant changes in 2016 to the previous NYSERDA offering. Changes to the program for 2017 will be detailed in a subsequent plan, to be issued prior to such changes.

For 2016, the NYSERDA incentive will be based on the expected annual energy output (AEO) of the proposed wind energy system, at the proposed location. If multiple wind turbines are installed at a site, the NYSERDA incentive is based on the AEO of all wind turbines combined in aggregate (not to exceed 2,000 kW) and is not based on the AEO of each individual wind turbine. The AEO must be calculated by a NYSERDA-approved wind resource assessment tool. NYSERDA will apply a retro-graded formula to the AEO in order to compute the magnitude of the incentive (i.e., a higher incentive rate will be applied to the first block of production within the AEO, and a lower incentive rate will be applied to the next block of production within the AEO, etc.). The maximum incentive available is \$1,000,000 per site/customer. The maximum total equipment size is 2 MW (2,000 kW) per site/customer. The NYSERDA incentive will not exceed 50% of the total installed cost of the wind energy system.

2.13.4 Performance Management

NYSERDA will regularly monitor market interest and uptake of available funds and will make adjustments as needed based on market response. NYSERDA will also monitor project construction timelines; all the wind energy system components should be delivered to the customer's site within 120 days of the NYSERDA-contract starting date (projects failing to meet this timeline may be subject to termination).

Metrics associated with energy generation, capacity installed, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting.

All implementation assistance projects, as part of this program, will be reviewed by a NYSERDA technical reviewer prior to approval and payment. This Program is not intended to provide technical review services for in-eligible projects.

In addition to the technical review services stated above, all participants will be subject to NYSERDA inspection, and a sampling of projects will undergo project-level data collection and M&V. An independent evaluation effort will review data from site inspections, project-level data collection and M&V to verify energy benefits. Additional impact evaluation work will only occur as needed to verify energy and other benefits.

In order to draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with

the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.13.5 Relationship to Utility Programs

In the past, utilities have not administered programs to incentivize installation of small on-site wind turbines, and it is expected that in 2016 utilities will not commence administration of programs to incentivize installation of small on-site wind turbines.

2.13.6 Budgets & Expenditures^{90,91}

Budget	2016	2017	2018	Total
Incentives & Services	\$2,000,000	\$2,000,000	\$2,000,000	\$6,000,000
Program Implementation	\$30,000	\$30,000	\$30,000	\$90,000
Total	\$2,030,000	\$2,030,000	\$2,030,000	\$6,090,000

Expenditures	2016	2017	2018	2019
Total	17%	33%	33%	16%

⁹⁰Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

⁹¹ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

2.13.7 Performance Metrics⁹²

Primary Metrics ⁹³		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MMBtu Annual	-	-	-	-
	MMBtu Lifetime	-	-	-	-
	MW	-	-	-	-
Renewable Energy	MWh Annual	1,000	2,000	2,000	5,000
	MWh Lifetime	18,000	32,000	32,000	82,000
	MW	0.4	0.7	0.7	1.8
CO2e Emission Reduction (metric tons) Annual		1,000	1,000	1,000	3,000
CO2e Emission Reduction (metric tons) Lifetime		10,000	17,000	17,000	44,000
Customer Bill Savings Annual (\$ million)		\$0.16	\$0.28	\$0.28	\$0.72
Customer Bill Savings Lifetime (\$ million)		\$3.2	\$5.6	\$5.6	\$14.40
Private Investment (\$ million)		\$1.6	\$2.8	\$2.8	\$7.20

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants	29	50	50	129

2.14 Solar Thermal

2.14.1 Program Description

The Solar Thermal Program provided financial incentives for the installation of new Solar Thermal hot water systems. The program was only available for electrically heated domestic hot water and was made available from March 1, 2016 to December 31, 2016.

This Program replaced the Solar Thermal Program that was funded under RPS. The Solar Thermal did not meet 2016 goals. The values in section 2.14.6 and 2.14.7 have been updated to reflect 2016 actuals. The remaining unspent budget from this initiative will be repurposed to fund a new solar

⁹² Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 20-year measure life.

⁹³ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

thermal pilot in the Renewable Heating and Cooling Chapter, in the Heat Pumps and Solar Thermal Initiative.

Program Delivery

The incentives were available on a first-come, first-served basis, and were applied to the total project cost based on displaced kWh, provided directly to the participating contractor.

2.14.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market included all eligible customers seeking to have a solar thermal system installed by an eligible installer.

Eligibility

The Solar Thermal program was eligible to residential, commercial, agricultural, not-for-profit, and government-owned facilities. Participants must have been New York State electricity distribution customers of a participating utility company who pay into the SBC.

Projects identified the method used for establishing the existing thermal load, and displaced energy usage calculated in kWh. System offset cannot exceed 80% of existing domestic hot water (DHW) load.

Installers calculated all potential system output losses (kWh, or equivalent BTU for fossil fuel-based systems, generated after all losses associated with shading, system orientation, tilt angle, etc. are applied. System must be installed in accordance with the design and solar hot water system components submitted in the application and approved by NYSERDA.

2.14.3 Incentives/Services Offered

This Solar Thermal Incentive program is a one-year extension, or until the money runs out, of the solar thermal program previously offered under the Renewable Portfolio Standard Customer Sited Tier (CST). Effective March 1, 2016 the Solar Thermal Incentive will be reduced to the following levels, ensuring that the NYSERDA incentive is not more than half of the system cost:

- Residential installations: \$1.00/kWh offset per year up to \$5,000.
- Commercial/Industrial: \$0.30/kWh offset per year up to \$75,000.
- Agricultural/Not-for-Profit/Government: \$0.40 per kWh offset per year up to \$75,000.
- Incentives may be adjusted in the future, based on market uptake, system costs and funding availability.

2.14.4 Performance Management

NYSERDA regularly monitored market interest and uptake of available funds by end use sector in order to make adjustments to the incentive offerings as needed based on market response. NYSERDA will also monitor project completion timelines. In addition, growth and geographic

representation of the list of eligible installers was monitored to ensure the installer network can support consumer demand.

All technical and implementation assistance projects, as part of this program, will be reviewed by a NYSERDA technical reviewer prior to approval and payment.

Metrics associated with energy savings, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects in development and installed and will be included, in aggregate, in CEF reporting. An independent evaluation effort will review data from these programmatic site inspections, data collection and M&V to verify energy benefits. Additional impact evaluation work will only occur as needed to verify energy and other benefits.

In order to draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.14.5 Relationship to Utility Programs

Utilities do not currently have programs supporting solar hot water installations.

2.14.6 Budgets & Expenditures^{94,95}

Budget	2016	2017	2018	Total
Incentives & Services	\$299,000	-	-	\$299,000
Program Implementation	\$100,000	-	-	\$100,000
Total	\$399,000	-	-	\$399,000

Expenditures	2016	2017
Total	87%	13%

⁹⁴Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit. By 2017, NYSERDA anticipates shifting strategy to initiatives that offer the prospect of reducing soft costs, improving value, demonstrating sustainable business models, and potentially integrating multiple renewable heating and cooling options into one market offering. If in consultation with stakeholders, NYSERDA determines that such an adjustment will provide more Impact toward CEF goals, we will file an amendment outlining the new strategies.

⁹⁵ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

2.14.7 Performance Metrics⁹⁶

Primary Metrics ⁹⁷		2016	2017	2018	TOTAL
Energy Efficiency	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MMBtu Annual	-	-	-	-
	MMBtu Lifetime	-	-	-	-
	MW	-	-	-	-
Renewable Energy	MWh Annual	830	-	-	830
	MWh Lifetime	12,500	-	-	12,500
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		437	-	-	437
CO2e Emission Reduction (metric tons) Lifetime		6,550	-	-	6,550
Customer Bill Savings Annual (\$ million)		\$0.11	-	-	\$0.11
Customer Bill Savings Lifetime (\$ million)		\$1.66	-	-	\$1.66
Private Investment (\$ million)		\$0.82	-	-	\$0.82

Additional Performance Tracking Metrics	2016	2017	2018	Total
Participants ⁹⁸	42	-	-	42
Eligible Installers	20	-	-	20

2.15 Combined Heat & Power for Resiliency

Combined Heat and Power (CHP) is a clean and efficient method for improving a building's resiliency by producing electricity at or near an end-user site and recycling the byproduct heat for beneficial purposes. In addition to CHP being a good fit for the needs of an individual building, in numerous cases CHP has been chosen to serve as the backbone of a resilient microgrid⁹⁹. Whether deployed at a single site or at a microgrid, CHP contributes enhanced resiliency to those customers

⁹⁶ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 15-year measure life.

⁹⁷ Benefits are rounded to the nearest 1,000. Totals may not sum. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

⁹⁸ Number of systems installed.

⁹⁹ One-hundred percent (all eleven) of the NY-Prize Microgrid Phase Two studies will explore CHP as an integral part of their microgrid design. Furthermore, CHP can be paired with and facilitate deployment of other important distributed energy resources -- CHP is the key component of "hybrid" systems for delivering extended-duration resiliency because of its energy density (i.e., meaningful resiliency can be achieved via CHP even when available footprint space is minimal).

because of its ability to operate at full output continuously day-and-night throughout a multi-day prolonged grid outage. This was proven during Superstorm Sandy (and in its aftermath), when the South Oaks Hospital CHP system operated flawlessly continuously for 15 days in “island mode” as a load-relief courtesy to the Long Island Power Authority (LIPA) during their period of grid restoration¹⁰⁰.

The ever-increasing frequency and strength of natural disasters has focused attention on reinforcing critical infrastructure for national or regional security, economic continuity, and public health and safety. Critical infrastructure, such as hospitals, schools, and places of refuge, need uninterrupted electricity and heating or cooling services, and CHP has been proven effective and reliable in ensuring such uninterrupted electric and thermal services through multiple major disasters. In 2016, the United States Department of Energy launched the CHP for Resiliency Accelerator Partnership to support and expand the consideration of CHP solutions by states, communities and utilities for their critical infrastructure needs. This partnership is helping develop plans for communities to capitalize on CHP’s strengths as a reliable, high efficiency, lower emissions electricity and heating source for critical infrastructure. This Partnership is an outgrowth of compelling documentation which confirms that CHP is a high-value technology for enhancing resiliency¹⁰¹.

While the Resource Acquisition Transition chapter was characterized in the CEF Order as to “generally reflect a merging and updating of NYSERDA’s EEPS and RPS-Customer Sited Tier (CST) Operating Plans...”, the CHP Program, a previous T&MD offering, is also included herein. Prior to the CEF, the CHP program included both resource acquisition and market transformation¹⁰² strategies; these will be continued and transitioned together under the CEF.¹⁰³ On July 17, 2017, the

¹⁰⁰ Combined Heat and Power: Enabling Resilient Energy Infrastructure for Critical Facilities (ORNL March 2013) https://www.energy.gov/sites/prod/files/2013/11/f4/chp_critical_facilities.pdf

¹⁰¹ Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings (USDOE, USEPA, HUD, September 2013) https://www.energy.gov/sites/prod/files/2013/11/f4/chp_for_reliability_guidance.pdf This guide supports the *August 2013 Hurricane Sandy Rebuilding Strategy* by providing an overview of CHP and examples of how this technology can help improve the resiliency and reliability of key infrastructure. In response to Executive Order 13632, in August 2013, the Federal Hurricane Sandy Rebuilding Task Force published a *Hurricane Sandy Rebuilding Strategy* that describes how CHP played a successful role in keeping a number of college campuses, multifamily housing, critical medical facilities, sewage treatment plants and other facilities running during the storm and its aftermath.

¹⁰² Market transformation approaches are ongoing and will continue to be based on a theory of change: a collection of interventions will advance a modular CHP market which will reduce soft costs and development time and increase penetration of CHP. A goal/stable end-state is to achieve a CHP market that has adequate and readily-accessible information to spur decision making, shows signs of becoming self-sustaining spanning a sufficient swath of localities and project sizes, and becomes readily deployable either for meeting the needs of an individual building or for serving as the heart of a community microgrid. A well-functioning CHP market will support State Energy Plan goals for energy, emissions and building energy use reduction. A testable hypothesis is that scale-up of market penetration of CHP will occur through migration to preference for modular CHP, which will occur by continuing to build: sufficient data proving the economic and performance value of CHP to show how it can work for prospective customers; awareness of the availability and value of using turnkey solutions for CHP of all size ranges; and a means for prospective customers to easily access qualified vendors.

¹⁰³ Market readiness for continuation of these market transformation activities is displayed by the extensiveness of existing and emerging partners, which indicates that the market is ready to take this on. There are currently 13 enrolled vendors of modular CHP packages and interest expressed by 2 additional vendors of modular CHP packages. There are also 13 Original Equipment Manufacturers of “prime mover” subcomponent of modular CHP packages, as well as 11 other CHP project developers active in NYS. Approximately two dozen consultants with expertise in site-specific CHP feasibility studies are active in NYS, some of which are currently enrolled in NYSERDA’s FlexTech program. Allies

CHP performance metrics in section 2.15.7 was updated to correct an error in the value used to calculate the natural gas required to run CHP systems. The section has been updated further to account for an increase in the measure life from 15 to 20 years¹⁰⁴ and a revised capacity factor, as well as adding additional funding and corresponding benefits. The revised carbon and bill savings metrics take this updated natural gas value, capacity factor, and measure life into account.

2.15.1 Program Description

The proposed interventions will advance a modular CHP market which will reduce soft costs and development time and increase penetration of CHP. The major activity will focus on continuing to provide cost-shared incentives to support the installation of CHP equipment at eligible host site locations. Additionally, and to a lesser extent, the program will continue to provide cost-shared incentives to support site-specific feasibility studies. Also, the program will continue to procure a variety of technical outreach services to raise awareness of the opportunity for and value of CHP among good-prospect candidate sites. In order to monitor progress towards the initiative's intended outcomes, NYSERDA will conduct a Longitudinal Market Evaluation to assess the current penetration rate of CHP as a benchmark of current market conditions.

As a resource acquisition activity, the incentive program will be a continuation/modification of NYSERDA's previous CHP Acceleration and Aggregation Program and CHP Performance Program. These two separate previous programs will be merged into a single offering and will be issued as NYSERDA's CHP Program and labeled as PON 2568.

Program Delivery

The resource acquisition activity program delivery method will consist of formula-based incentives tailored to the project's site-specific conditions (NYSERDA will provide cost sharing that will encompass implementation assistance in installing projects; for one subset of projects NYSERDA incentive payments will be made to the project developer, for another subset of projects NYSERDA incentive payments can be made to the project developer/installer, the host customer, or a third party); project procurement method will be open-enrollment; NYSERDA staff will receive applications, determine their eligibility, issue contracts, and approve and issue payments.

The market transformation activities will continue to strive to reduce soft costs, reduce cycle times, and increase monetization of values, by simplifying and accelerating customer acquisition, facilitating project replication through standardized model contract terms and conditions, and establishing consensus-based methodologies for calculating/analyzing costs/savings data and for assigning a monetized value to the enhanced resiliency provided by CHP. Best practices studies will strive to determine and inform marketplace participants of CHP project attributes that can maximize the value to be available via REV. Key milestones/proof points will be tracked to ensure

providing tools and free services for CHP self-study/initial screening/detailed feasibility analysis: USDOE's Northeast Regional CHP Technical Assistance Partnership Program, USEPA's CHP Partnership Program.

¹⁰⁴ A 20-year measure life is being used to reflect consistency with CHP vendor expectations, and IRS guidance (for depreciation schedules) encoded in Publication 946 "How To Depreciate Property, For use in preparing 2016 Returns" at page 100 which characterizes equipment used in the production of electricity with rated total capacity in excess of 500 kW as having a class life of 22-years.

that these market transformation activities are continuing to be effective¹⁰⁵. Measures of success will be used to determine when market transformation has adequately occurred to enable NYSERDA to exit¹⁰⁶.

- Analysis of NYSERDA-cost-shared CHP projects shows that the marketplace has achieved a 30% reduction in average project development cycle time (from approval of project to operation date) for projects over a span of the past ten years. As a quantified projection of benefits to customers, the continuation of these market transformation activities will seek to more-quickly achieve the next 30% compression of cycle time, expected to be achieved over the next five years.
- Analysis of NYSERDA-cost-shared CHP projects shows that the marketplace has achieved a 25% reduction in installed cost (for comparable projects based on size, utilization, and capability), over a span of the past ten years (the average total cost has been reduced from \$6.23 per Watt to \$4.64 per Watt, in 2015 constant-year dollars). As a quantified projection of benefits to customers, the continuation of these market transformation activities will seek to more-quickly achieve the next 25% reduction of installed costs, expected to be achieved over the next five years.
- Additional benefits to customers are expected, including but not limited to the following: A continuation of improved marketplace dynamics with projects providing greater level of value and certainty to consumer, with 5-year warranty on new systems, a performance guarantee not historically provided to the market; emergence of Power Purchase Agreements among a substantial portion of projects; and customer realizes reduced payback with incentives (from 5-6 years to 3-4 years), warranty, shorter development cycle, easier decision-making, all leading to steady market growth.
- Extensive stakeholder engagement was conducted to elucidate the previous launch and planned continuation of these market transformation strategies, including but not limited to messaging and coordination with stakeholders at conferences and webinars; meetings with NECHPI;

¹⁰⁵ Proof Point 1: Convincing reference cases developed -- CHP Coach accelerates market by capturing, consolidating, and transferring lessons learned; NYSERDA, in coordination with industry partners, standardizes methodologies for calculating/analyzing costs and savings data; aggregated data sets are robust enough to develop technical and financial screenings to enable quick progression from Learner to Shopper, and cited as influential by decision makers. Proof Point 2: Guidance documents deliver value in customer decision making process. Proof Point 3: Qualified vendors easily accessible by customers -- Qualified vendors have customers in queue, ready for CHP installation; open qualified list attracts new vendors to the New York State market, and evolution to a regional/national list of qualified vendors further attracts additional solution providers to the New York State market. Proof Point 4: System performance/delivery of benefits -- Declining number and/or severity of deficiencies found during recommissioning efforts, indicating that vendors are internalizing lessons learned and best practices; protocols for monetization of the enhanced resiliency of CHP become accepted in the marketplace, thus improving the cost-effectiveness of CHP.

¹⁰⁶ NYSERDA will base exit decisions for incentives and certain other activities on progress for each of the four market segments - smaller than 50 kW, 50-500 kW, 500-5000 kW, and larger than 5000 kW. These segments align with range of focus of service providers and serve as proxies for their target customer groups. Progress will be defined as: (1) establishment of conditions that can support a well-functioning marketplace which can persist in the absence of NYSERDA-issued incentives, and (2) actual traction in the marketplace demonstrates achievement of desirable benchmarks and trends.

meetings with CHP vendors; meeting with the Real Estate Board of New York (REBNY) (as consortium that is representative of a class of customers).

2.15.2 Target Market & Customer/Project Eligibility Rules

Target Market

The target market for Implementation Assistance includes all eligible customers seeking a CHP system installed in a grid-connected manner. The CHP system must consist of commercially-available technologies, the system design must be well-conceived, and the system must be fueled using pristine/unadulterated gaseous fuels (e.g., pipeline natural gas, compressed natural gas, propane).

Eligibility

Implementation Assistance is eligible to all sectors, including but not limited to residential, commercial, industrial, agricultural, institutional, educational, not-for-profit, and government-owned facilities. Participants must be New York State electricity distribution customers of a participating utility company who pay into the SBC.

In general, Market Transformation efforts and activities will continue to be broad-based and applicable throughout New York State (for example, such as the development of best practices guidebooks, and learner/shopper/buyer tutorial literature/webcasts). In general, these efforts will continue to be conducted via competitively-selected technical assistance contractors who can demonstrate expertise with identification and characterization of the target market reflecting knowledge of the technology, consumers, potential savings, market readiness, and other key market features.

2.15.3 Incentives/Services Offered

Resource Acquisition

There are a few significant changes beginning March 1, 2016 and persisting through 2019, compared to the previous NYSEDA offering: the two offerings will be merged into a single offering; the size range of the “packaged” CHP systems will consist of systems size 3 MW and smaller with no minimum size limit; the size range of the “custom engineered” CHP systems will consist of systems size 1 MW and larger with no maximum size limit; in the overlap range of 1 MW to 3 MW applicants can choose a packaged system or a custom-engineered system and the incentive will be identical regardless of chosen option; custom-engineered systems will receive all payments in the form of capacity-based incentive payments that will be disbursed in a series of milestone payments (the program will no longer format a fraction of the payments as performance-based style).

The maximum incentive available is \$2,500,000 per eligible project (a site, such as a campus, may conduct one project as a centralized installation that serves the entire campus, or may conduct multiple projects for example one in each building serving just that building). Two types of bonuses will be offered (Target Zones, and Critical Infrastructure), not to exceed the maximum cap of \$2,500,000. Incentives will periodically be reduced along a declining glide path commensurate

with other replacement sources of revenues (and/or project cost reductions attributable to market simplifications). Initial glide path will be as follows (further visibility of reductions to be made public with approximately 6-month advance notice to the extent practicable):

Percent Reduction from Original Incentive	Applicable to Complete Applications Received
5%	9/1/2016 through 2/28/2017
10%	3/1/2017 through 8/31/2017
15%	9/1/2017 through 2/28/2018
20%	3/1/2018 through 8/31/2018
25%	9/1/2018 through 12/14/2018
35%	12/15/2018 through 6/14/2019
45%	6/15/2019 through 12/14/2019
55%	12/15/2019 through 12/31/2019

Market Transformation

Several strategies have been ongoing and will continue to be pursued, such as initiatives and pioneering projects that offer the prospect of reducing soft costs, improving performance and value, and developing and demonstrating sustainable business models, including but not limited to the following:

- Matchmaking -- further expand the existing list of qualified vendors offering vetted CHP packages (i.e., a CHP Catalog), and continue to facilitate interactions between prospective customers and vendors (e.g., Expos, etc.).
- Information for customers and vendors.
 - Publish customer-centric Learner/Shoppper/Buyer Guidance document: Why is CHP good? What is right for me? How do I down-select among vendors and negotiate a contract?
 - Publish vendor-centric Targeting/Pitching/Closing Guidance document: mapping to help identify good prospects, best practices for system design and economic assessment, explanation and benchmarking of contract terms and conditions.
 - Compile/create guidance regarding equitable standard terms and conditions for CHP contracts (e.g., for various types of transactions, such as buy, lease, power purchase agreement, performance contracting, etc.).
- Technical assistance -- continue to provide free unbiased coaching to prospective customers during preliminary screening phase, provide cost-sharing and referrals for site-specific feasibility studies conducted by FlexTech consultants.
- Quality assurance -- continue to fund project recommissioning to assess and improve project persistence of performance, compile and archive performance data, and apply data analytics to the portfolio of recommissioned projects to discern and then disseminate lessons learned and thereby further raise the competency of market actors.

- Recommissioning services market capability -- demonstrate the value proposition of CHP recommissioning, and create and disseminate protocols for CHP recommissioning.
- Market research
 - Continue to discern opportunities for cost reductions (primarily across soft costs, such as permits and approvals -- e.g., interconnection, building permits, construction codes, etc.), and opportunities for increasing revenues (such as demand response value, resiliency value, etc.),
 - Maintain extensive stakeholder engagement to ensure responsiveness to needs of the marketplace and voice of customer, and
 - Continue to field test and validate niche-filling emergent commercial products.
- Replication support in key market segments
 - Building Fleets – continue to conduct dedicated outreach to decision makers that own a fleet of similar buildings (e.g., a chain of supermarkets, a chain of hotels, a chain of fast-casual restaurants, etc.) to nurture their initial trial of one/few installations with intent for subsequent wider-scale rollout of replicates if initial trial proves convincing.
 - Process Fleets – continue to identify and facilitate focus on highly-replicable immediate opportunities for the marketplace (e.g., existing packages A, B, and C are each excellent fit for high-volume activity automobile car washes).
 - Other Replication Opportunities -- strategies to identify and support opportunities for replication in other key market segments will continue to be explored.

2.15.4 Performance Management

NYSERDA will regularly monitor market interest and uptake of available funds and will make adjustments as needed based on market response. NYSERDA will also monitor project completion timelines to ensure installation and commissioning of all equipment generally occurs within 12 months of a fully executed contract with NYSERDA (projects failing to meet this timeline may be subject to termination). Other indicators to be monitored by NYSERDA include:

- Number of CHP Vendors enrolled in NYSERDA program
- Number of CHP Vendors with projects and measure of projects per vendor (assess concentration/spread)
- Number of projects using modular approach
- Time compression of implementation timeline for participants
- Reduction in soft costs
- Total electrical interconnections (to be used to discern trends in broader marketplace beyond those systems directly incentivized)

Metrics associated with energy generation, capacity installed, energy bill savings, emission reductions and private investment/funds leveraged will be tracked for all projects and will be included, in aggregate, in CEF reporting.

All implementation assistance projects, as part of this program, will be reviewed by a NYSERDA technical reviewer prior to approval and payment. This Program is not intended to provide technical review services for in-eligible projects. In addition to the technical review services, program plans include a NYSERDA site inspection for each project, hourly-interval data collection on system performance, and a sampling of projects will undergo project-level measurement and verification. This data will be used to monitor performance of installed systems. An independent evaluation effort will review data from site inspections, data collection and M&V to verify energy benefits. Additional impact evaluation work will only occur as needed to verify energy and other benefits.

Market Transformation Performance Management will also be pursued via Longitudinal Market Evaluation (secondary data and primary data collection through surveys of key market actors) to assess: (1) current penetration rate of CHP within construction of buildings in identified target markets, including identifying and quantifying (#, \$, MW, etc.) replication outside of program, the proportion of modular CHP and number of portfolios implementing CHP; (2) CHP vendor market change including number of vendors, activity level (concentration/spread), revenue; (3) soft cost characterization and quantification, (4) sales process effectiveness and time compression, including trend of the number of good prospects that become aware of the value of CHP, trend of the conversion rate from awareness to action-taking, and trend of timeframes of the progression from unaware to aware, and from aware to action. NYSERDA will develop and implement an overall evaluation strategy that draws on the logic model and tests the assumptions of the intervention design against measured market results.

In order to draw a sample and conduct an analysis that is representative and robust, evaluation M&V has traditionally been conducted after enough project completions and post-installation operating time have occurred. NYSERDA will employ strategies to balance the need for data with the priority to have evaluation M&V work done on a timely basis to produce the greatest benefit. Pre-retrofit M&V review work and rolling M&V samples are two such strategies that will be applied, as appropriate to the program, in developing M&V plans.

2.15.5 Relationship to Utility Programs

In the past, utilities have not administered programs to incentivize installation of CHP systems, and it is expected that in 2016-2019 utilities will not commence administration of programs to incentivize installation of CHP systems. The one exception so far has been a recent joint partnership between NYSERDA and Con Edison for CHP projects to be installed in the Brooklyn-Queens Demand Management territory (BQDM), where Con Edison is seeking to provide supplemental incentives to CHP projects that qualify for NYSERDA incentives.

Utility-run Energy Efficiency programs (conducting a “building tune-up”) will complement subsequent consideration of CHP. There is a need to work with utilities to encourage them to:

- Furnish data on total number of CHP electrical interconnections occurring over time.

- Assist with outreach to prospective customers.
- Streamline of the customer's access to their load data for sharing with solution providers of their choice.
- Establish utility employees serving as DG Ombudsmen.
- Map of how well the utility infrastructure will accommodate CHP (push -- emphasis is vendor vantage point -- it appears to be buildable at these sites).
- Map of where the utility infrastructure will benefit the most from CHP (pull -- emphasis is utility vantage point -- impending utility price spikes appear to make these sites more cost-competitive).
- Simplify/streamline electrical interconnection process.
- Simplify/streamline natural gas interconnection process.

NYSERDA will provide advising support for utility progress toward regulatory tariff changes on standby rates, and CHP-related components of utility DSIP plans.

2.15.6 Budgets & Expenditures^{107,108}

Budget ¹⁰⁹		2016	2017	2018	2019	Total
Installations	Incentives & Services	\$22,000,000 ¹¹⁰	\$9,000,000 ¹¹¹	\$22,900,000 ¹¹²	\$5,500,000 ¹¹³	\$59,400,000
	Program Implementation	\$50,000	\$50,000	\$50,000	\$-	\$150,000
	Sub-Total	\$22,050,000	\$9,050,000	\$22,950,000	\$5,500,000	\$59,550,000
Market Transformation of Marketplace	Market Transformation Project Procurements ¹¹⁴	\$3,950,000	\$3,950,000	\$3,950,000	\$-	\$11,850,000
	Program Implementation	\$50,000	\$50,000	\$50,000	\$-	\$150,000
	Sub-Total	\$4,000,000	\$4,000,000	\$4,000,000	\$-	\$12,000,000
Total		\$26,050,000	\$13,050,000	\$26,950,000	\$5,500,000	\$71,550,000

Expenditures	2016	2017	2018	2019	2020
Total	8%	25%	28%	28%	11%

¹⁰⁷Incentives & Services defined as incentives/rebates paid to customers/participants and payments made directly to contractors in lieu of payment from customers for services such as an energy audit.

¹⁰⁸ Program Implementation defined as all non-incentive program costs including costs associated with contractors implementing programs on NYSERDA's behalf or other costs associated with the implementation of the program. Does not include EM&V, Administrative or CRF Costs which will be represented at the portfolio level.

¹⁰⁹ NYSERDA reserves the right to adjust budget allocations within this CHP program among categories of efforts and/or among budget years, in response to changing market conditions, and in particular if more-impactful approaches that offer the prospect of reducing soft costs, improving performance and value, and developing and demonstrating sustainable business models are confirmed earlier than anticipated.

¹¹⁰ Of the \$22,000,000 budget, \$19,750,000 is earmarked for incentives for installation of CHP equipment (and, no more than \$9,000,000 of this is to be available for projects larger than 3 MW), and the remaining \$2,250,000 is earmarked for site-specific CHP feasibility studies.

¹¹¹ Of the \$9,000,000 budget, \$7,200,000 is earmarked for incentives for installation of CHP equipment (none of this is to be available for projects larger than 3 MW), and the remaining \$1,800,000 is earmarked for site-specific CHP feasibility studies.

¹¹² Of the \$22,900,000 budget, \$22,000,000 is earmarked for incentives for installation of CHP equipment (none of this is to be available for projects larger than 3 MW), and the remaining \$900,000 is earmarked for site-specific CHP feasibility studies.

¹¹³ The entire \$5.5 million is earmarked for incentives for installation of CHP equipment (none of this is to be available for projects larger than 3 MW), furthermore none of the \$5.5 million is earmarked for site-specific CHP feasibility studies.

¹¹⁴ Market Transformation-style Projects defined as expenditures made to increase the understanding of market forces with the intent of revealing self-sustaining business models that can be broadly shared with and adopted by market actors.

2.15.7 Performance Metrics¹¹⁵

Resource Acquisition Metrics (Direct Impacts)¹¹⁶

Primary Metrics ¹¹⁷		2016	2017	2018	2019	TOTAL
Energy Efficiency	MWh Annual	158,000	28,900	106,000	27,400	320,300
	MWh Lifetime	3,160,000	579,000	2,130,000	547,000	6,416,000
	MMBtu Annual	-	-	-		-
	MMBtu Lifetime	-	-	-		-
	MW	30.0	5.5	20.2	5.2	60.9
Renewable Energy	MWh Annual	-	-	-		-
	MWh Lifetime	-	-	-		-
	MW	-	-	-		-
CO2e Emission Reduction (metric tons) Annual		32,400	5,940	21,800	5,620	65,760
CO2e Emission Reduction (metric tons) Lifetime		648,000	119,000	436,000	112,000	1,315,000
Customer Bill Savings Annual (\$ million)		\$15.7	\$2.88	\$10.6	\$2.7	\$31.9
Customer Bill Savings Lifetime (\$ million)		\$315.0	\$57.7	\$212.0	\$54.5	\$639.2
Private Investment (\$ million)		\$176.0	\$14.0	\$38.0	\$10.0	\$238.00

Benefits shown in the Table below represent the estimated indirect market effects expected to accrue over the longer term as a result of this investment and follow on market activity. The indirect benefits that accrue from this investment will be quantified and reported based on a Market Evaluation study designed to validate these forecasted values. Market Evaluation may occur within one year (-/+) of the year noted in the table. Indirect impact across NYSERDA initiatives may not be additive due to multiple initiatives operating within market sectors. The values presented

¹¹⁵ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 20-year measure life.

¹¹⁶ Energy Efficiency values represent MWh savings from the use of CHP systems; natural gas required to run CHP systems (1,939,000 MMBtu cumulative annual and 38,810,000 MMBtu lifetime) is netted out of the emission reduction and customer bill savings values shown in this table. Emission reductions and customer bill savings are net, including both MWh that add to the benefits and additional natural gas required to run CHP systems that subtract from the benefits.

¹¹⁷ Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

below are not discounted, however NYSERDA has applied a discount of 50% to the overall portfolio values in the Budget Accounting and Benefits chapter.

Estimated Indirect Market Impacts¹¹⁸

Indirect Impact		2020
Energy Efficiency	MWh Cumulative Annual	63,200
	MW	12.0
Renewable Energy	MWh Cumulative Annual	-
	MW	-
CO2e Emission Reduction (metric tons) Cumulative Annual		13,000

Additional Performance Tracking Metrics	2016	2017	2018	2019	Total
Participants (Installations)	43	27	56	13	139
Project Cost Reductions	Market transformation activities will seek to more-quickly achieve the next 25% reduction of installed costs, expected to be achieved over the next five years.				
Project Timeline Compressions	Market transformation activities will seek to more-quickly achieve the next 30% compression of cycle time, expected to be achieved over the next five years.				

¹¹⁸ Energy Efficiency values represent MWh savings from the use of CHP systems; natural gas required to run CHP systems (382,000 MMBTU cumulative annual and 7,640,000 MMBTU lifetime is netted out of the emission reduction. Emission reductions are net, including both MWh that add to the benefits and additional natural gas required to run CHP systems that subtract from the benefits.