

# Clean Energy Fund

## Compiled Investment Plans

Case Number 14-M-0094

Filed November 1, 2022

*Correction Issued November 9, 2022*

## **NYSERDA's Promise to New Yorkers:**

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

### **Our Vision:**

New York is a global climate leader building a healthier future with thriving communities; homes and businesses powered by clean energy; and economic opportunities accessible to all New Yorkers.

### **Our Mission:**

Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

## **Abstract**

NYSERDA's Compiled Investment Plan documents the strategy, activities, funding, expected benefits, and measurement plans for all Clean Energy Fund Market Development and Innovation & Research portfolio initiatives as governed by the September 9, 2021 Public Service Commission Order Approving Clean Energy Fund Modifications.<sup>1</sup> This document provides a detailed roadmap for these two portfolios NYSERDA is managing to help New York State reach the ambitious climate goals embodied in the historic Climate Leadership and Community Protection Act (Climate Act), which became effective in January 2020. Stakeholders will find plans organized by Focus Areas (market sector groupings), making it easy to gather a comprehensive view of the work NYSERDA is doing to transform markets through the investment of ratepayer funds.

## **Keywords**

Clean Energy Fund; CEF; New York State Energy Research and Development Authority; NYSERDA; Climate Leadership and Community Protection Act; Climate Act; clean energy; energy efficiency; low-income; disadvantaged communities; carbon-free electricity; greenhouse gas reductions; New Efficiency; New York; New York State Clean Heat; renewable energy; renewables; Clean Energy Dashboard; Market Development; Innovation & Research; technology development; technology demonstration; market transformation; Clean Heating & Cooling; Codes and Standards, & Other Multisector Initiatives; Commercial/ Industrial/ Agriculture; Communities; Low-to-Moderate Income; Multifamily Residential; New Construction; Renewables/ Distributed Energy Resources (DER); Single Family Residential; Transportation; Workforce Development; Buildings Innovation; Clean Transportation Innovation; Climate Resilience Innovation; Energy Focused Environmental Research; Gas Innovation; Grid Modernization; Negative Emissions Technologies; Renewables Optimization; Technology to Market

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<sup>1</sup> NYS Public Service Commission, Order Approving Clean Energy Fund Modifications, Cases 19-E-0735, 18-M-0084, 14-M-0094 and 13-M-0412, Issued and Effective September 9, 2021.

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# **NYSERDA's Clean Energy Fund Compiled Investment Plans**

## *Introduction*

In 2016, the Public Service Commission (Commission) established the Clean Energy Fund (CEF) to promote clean energy and efficiency measures, acknowledging that scaled deployment of such measures holds significant potential to address environmental and energy challenges, while creating economic opportunity for New York State. The CEF was designed with four program portfolios that are administered by the New York State Energy Research and Development Authority (NYSERDA). The portfolios include Market Development; Innovation & Research; New York-Sun (NY-Sun); and the NY Green Bank (NYGB). Collectively, these portfolios foster innovation in energy markets by testing new business models, facilitating new customer engagement and choice for clean energy services, and extracting value from distributed energy resources that improve system efficiency and reduce consumer energy costs, all while attracting private capital to New York State energy markets. In its September 9, 2021 Order, Approving Clean Energy Fund Modifications<sup>2</sup>, the Commission took action to further refine and support the CEF as a critical component necessary to achieve New York State's ambitious clean energy and environmental objectives.

The historic Climate Leadership and Community Protection Act (Climate Act), which became effective in January 2020, presents a new and increasingly ambitious policy context within which the CEF is operating. Ratepayer-supported programs have been and will continue to be instrumental in advancing the State's climate and energy policies. In its September 9, 2021 Order, the Commission acknowledged that the CEF's four distinct portfolios provide foundational strategies that serve as the underpinnings of New York State's ambitious climate goals including:

- Achieving a carbon-free electricity system by 2040 and reducing greenhouse gas (GHG) emissions at least 85% below 1990 levels by 2050.
- Codifying the New Efficiency: New York goal to achieve 185 trillion British thermal units (TBTU) onsite energy savings by 2025.
- Doubling the State's distributed solar goal to 6 GW by 2025 (and now 10 GW by 2030)
- Strengthening the State's energy storage target of 3 GW by 2030.
- Targeting no less than 35%, with a goal of 40%, of the overall benefits of investments to disadvantaged communities.
- Supporting renewable energy goals to achieve 70% renewables by 2030 and 100% clean power by 2040, including 9 gigawatts (GW) of offshore wind.

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<sup>2</sup> Department of Public Service document matter management system Case number 14-M-0094: <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

NYSERDA submits this CEF Compiled Investment Plan (CIP) for the Market Development and Innovation & Research portfolios, pursuant to the Commission’s September 9, 2021 Order. The CIP has been prepared by NYSERDA according to the Department of Public Service Staff (Staff) guidance and in keeping with the Commission’s priority to “clearly describe a sound investment strategy identifying the level of funding over the period the activities will be undertaken, the projected outcomes/milestones, and how NYSERDA plans to verify the outcomes, and the impact of the various initiatives.”

At this stage in the CEF, the Market Development and Innovation & Research portfolios are well-established, as they have programmed most of their authorized funding. However, the CIP will be a living document as it represents a point-in-time snapshot of the planned use of funds and associated outcomes, and as NYSERDA continues to actively manage and evaluate the programs. The CIP will be filed with the Commission at least annually, each year on November 1, but also in the interim as needed so that NYSERDA programs can adapt, respond, and reflect market needs. One key area of continued evolution will be program designs that drive toward greatest impact on the Climate Act goals, especially the goal related to serving disadvantaged communities. As the Commission directs, NYSERDA will make a filing within 60 days of finalization for the Climate Justice Working Group criteria related to disadvantaged communities, in consultation with Staff, describing how the criteria will be integrated into CEF operations, and the methods to be utilized in tracking benefits delivered to these communities.

While the included plans are holistic from an all-year(s) budget and benefits standpoint, those interested in understanding NYSERDA’s impact to date should look to the ongoing quarterly and annual reporting, available through [NYSERDA’s website](#) and filed with the Commission, as well as the publicly available [New York Clean Energy Dashboard](#) for in-depth information on performance to date.

# Clean Energy Fund

## Compiled Investment Plans

# Section I

## Market Development Portfolio

### Focus Areas

Low-to-Moderate Income  
Single Family Residential  
Multifamily Residential  
Commercial/ Industrial/ Agriculture  
New Construction  
Communities  
Transportation  
Clean Heating & Cooling  
Workforce Development  
Codes and Standards, & Other Multisector Initiatives  
Renewables/ Distributed Energy Resources

### Funding

\$2,354M

98% of authorized CEF  
Market Development  
funding programmed  
as of this filing.

# Low-to-Moderate Income (LMI) Focus Area

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- Budget details associated with this CIP revision:
  - As part of regular anticipated project closeout activities related to the Multifamily Performance Program, the **LMI Multifamily** initiative budget is revised from \$164.2M to \$162.1M (-2.1M)
  - **New Construction - LMI** initiative budget revised from \$124.6M to \$134.6M (+10.0M), with additional funding being added to support pipeline of affordable multifamily applications received through NYSERDA's recently closed Standard Offer program. Benefits plan adjusted accordingly.
  - Modified Focus Area Budget revised from \$780.3M to \$788.2M (+7.9M); Ordered Focus Area Budget of \$761.2M exceeded by \$27.0M in total. This revision has been addressed with funding from the Renewables/DER Focus Area as noted in CIP Appendix A. Prior Focus Area Budget adjustments noted below.
- **LMI Multifamily** benefits forecast updated to reflect updated cost profiles of direct injection projects.
- **RetrofitNY - LMI** benefits forecast updated to reflect updated cost profiles of demonstration pilots.
- Updates made to Evaluation Studies status in Section 3.

#### August 16, 2022

- Since the *Statewide Low- and Moderate-Income Portfolio Implementation Plan* (Statewide LMI Plan) was launched in 2020 NYSERDA has been excluding four previously approved Market Development initiatives from inclusion in Statewide LMI Plan accounting of budgets and benefits. For simplicity of tracking and analysis, these four initiatives will now be categorized and reported as all other LMI initiatives within NYSERDA’s portfolio: all LMI expenditures and benefits acquired between 2016 and 2019 are not considered part of the Statewide LMI Plan while all budgets and benefits from 2020

and beyond are considered part of the Statewide LMI Plan, no exclusions. Two additional columns have been added to the Initiative Budget tables in Section 1 to clarify this funding breakdown.

- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Low Rise New Construction Transition - LMI** budget revised from \$8.2M to \$8.0M (-0.15M); **Multifamily New Construction Transition - LMI** budget revised from \$9.1M to \$8.4M (-0.65M)
  - **Single Family – Moderate Income** budget revised from \$97.8M to \$102.8M (+5.0M) to continue supporting market demand for Assisted Home Performance.
  - **New Construction – LMI** budget revised from \$123.8M to \$124.6M (+0.8M) to strengthen support for Housing and Single Family components of the initiative.
  - Modified Focus Area Budget revised from \$775.3M to \$780.3M (+5.0M); Ordered Focus Area Budget of \$761.2M exceeded by \$19.1M in total with this and prior revisions and addressed with funding from the Market Development Reserve as noted in CIP Appendix A.

### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Low-Income Forum on Energy (LIFE)** renamed to **LMI Outreach & Engagement** to better reflect the more diverse set of efforts that now exist within it.
- A new initiative called **Regional Clean Energy Hubs** was created to unify similar activities and funding from elsewhere in the portfolio to engage the market in a more effective and streamlined manner.
- On April 29, 2022 NYSERDA and the Utilities jointly filed an update to the *Statewide Low- to Moderate-Income Portfolio Implementation Plan*. All budgets and benefits reflected in this CIP filing align with the joint filing.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Low Rise New Construction Transition - LMI** budget revised from \$8.5M to \$8.1M (-0.4M); **Multifamily New Construction Transition - LMI** budget revised from \$10.9M to \$9.1M (-1.8M).
  - **REVitalize** budget revised from \$0.31M to \$0.29M (-0.02M) as part of regular project closeout activities.
  - **Multifamily** initiative budget for this Focus Area eliminated (-10.0M); pilots that were anticipated under this initiative and supporting this Focus Area are no longer part of the scope.
  - **Single Family – Moderate Income** budget revised from \$89.8M to \$97.8M (+8.0M) to continue supporting market demand for Assisted Home Performance.
  - **Solar For All** budget revised from \$21.2M to \$13.0M (-8.2M) as this initiative is no longer active in the market.
  - **New Construction – LMI** budget revised from \$138.8M to \$123.8M (-15.0M); this funding will be used under **LMI Multifamily** in support of direct injection programming.
  - **LMI Multifamily** budget revised from \$128.8M to \$164.2M (+35.4M); increased investments made with housing agency partnerships to integrate technical assistance and efficiency and electrification incentive funding directly into affordable housing finance applications with NYS HCR and New York City Department of Housing Preservation and Development (“NYC HPD”), positioning the housing agencies to require high-performance all-electric design for affordable housing new construction and preservation projects ahead of anticipated mandates and regulatory requirements
  - **LMI Outreach & Engagement** budget revised from \$44.5M to \$8.5M (-36.0M); this funding will be invested under **Regional Clean Energy Hubs** with the purpose noted above.
  - **Regional Clean Energy Hubs** budget established for \$42.0M.

- Modified Focus Area Budget revised to \$775.3M (+14.1M); Ordered Focus Area Budget of \$761.2M exceeded by \$14.1M and addressed with funding from the Market Development Reserve as noted in CIP Appendix A.

## 1. Focus Area Overview

NYSERDA’s portfolio of initiatives that serve Low-to-Moderate Income New Yorkers has been carefully coordinated with the efforts of all investor-owned utilities and is now jointly presented in the **Statewide Low- and Moderate-Income Portfolio Implementation Plan** (Statewide LMI Plan). This document is a response to the January 16, 2020 Order *Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025* which is updated periodically.

The current plan which covers the years 2020-2025 is accessible on the Department of Public Service (DPS) [Document Matter Management system under the Case number 18-M-0084](#), filed on April 29, 2022.

The information contained within this focus area plan is for completeness and reference only and contains all years of LMI programming since the CEF launched in 2016. NYSERDA will continue to maintain and report on all LMI initiatives consistent with historic CEF reporting and in accordance with the guidance provided by DPS. An annual report, filed jointly with the utilities on April 1<sup>st</sup> of each year, provides additional detail as well as progress against the goals established.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$761.2	\$788.2	\$780.3	+ 7.9	\$788.2	100%

Initiatives that serve multiple Focus Areas across NYSEERDA's CEF portfolio are listed with asterisk (\*).

Initiatives Active in The Market	Pre-Statewide LMI Plan (2016-2019) (\$M)	Statewide LMI Plan (2020+) (\$M)	Total LMI Funding (\$M)	Period
LMI Multifamily	\$4.7	\$157.4	\$162.1	2016 -
Single Family - Low Income	\$97.9	\$137.7	\$235.6	2016 -
Single Family - Moderate Income	\$36.9	\$65.8	\$102.8	2016 -
LMI Outreach & Engagement	\$0.3	\$8.2	\$8.5	2017 -
New Construction - LMI	\$0.7	\$133.9	\$134.6	2017 -
RetrofitNY - LMI	\$1.6	\$28.9	\$30.5	2017 -
NYS Healthy Homes Value Based Payment Pilot	\$0.0	\$9.8	\$9.8	2019 -
Heat Pumps Phase 2 (2020)*	\$0.0	\$30.0	\$30.0	2020 -
LMI Pilots	\$0.0	\$2.4	\$2.4	2021 -
Regional Clean Energy Hubs	\$0.0	\$42.0	\$42.0	2021 -
<b>Total Active Funding</b>	<b>\$142.1</b>	<b>\$616.2</b>	<b>\$758.3</b>	

Completed/Inactive Initiatives	Pre-Statewide LMI Plan (2016-2019) (\$M)	Statewide LMI Plan (2020+) (\$M)	Total LMI Funding (\$M)	Period
Low Rise New Construction Transition - LMI	\$3.2	\$4.8	\$8.0	2016 - 2019
Multifamily New Construction Transition - LMI	\$1.8	\$6.6	\$8.4	2016 - 2019
Healthy Homes Feasibility Study	\$0.2	\$0.0	\$0.2	2017 - 2020
REVitalize	\$0.2	\$0.1	\$0.3	2017 - 2021
Solar for All	\$1.3	\$11.7	\$13.0	2017 - 2021
<b>Total Inactive Funding</b>	<b>\$6.7</b>	<b>\$23.2</b>	<b>\$29.9</b>	
<b>Total Focus Area Funding</b>	<b>\$148.8</b>	<b>\$639.4</b>	<b>\$788.2</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired (MMBtu) <sup>2</sup>	4.8	10.5
Cumulative Annual Electricity EE Savings (MWh)	0.2	0.4
Cumulative Annual Natural Gas EE Savings (MMBtu)	3.3	7.1
Cumulative Annual Other Fuels EE Savings (MMBtu)	1.0	2.2
Renewable Energy (RE) Distributed Solar Capacity (MW)	0.0	0.0
Mobilized Clean Energy Investment (Leveraged Funds)	\$1,258	\$1,863

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted by 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## **2. Initiatives Serving the Focus Area**

A brief description of each initiative's current market focus is provided on the next page for reference.

Initiative Name	Initiative Focus
<b>LMI Multifamily</b> <i>Existing Affordable Multifamily Buildings</i>	Work to address the first cost barriers experienced by owners of low-to-moderate income properties, increase access to energy efficiency solutions through statewide energy efficiency programs offered jointly by utilities and NYSERDA. Activities funded by NYSERDA include technical service and direct partnerships with affordable housing agencies to provide clean energy resources and funding through affordable housing financing processes.
<b>Single Family - Low Income</b> <i>Existing 1-4 Family Homes</i>	EmPower NY: This program provides no-cost energy efficiency improvements for low-income customers (60% of State Median Income).
<b>Single Family - Moderate Income</b> <i>Existing 1-4 Family Homes</i>	Assisted Home Performance with ENERGY STAR: This program provides incentives for energy efficiency improvements for moderate-income customers (up to 80% of Area Median or State Median Income, whichever is greater).
<b>LMI Outreach &amp; Engagement</b> <i>Customer Awareness, Outreach &amp; Engagement</i>	Previously referred to as “Low-Income Forum on Energy”, this initiative supports information exchange and collaboration amongst the organizations and individuals that serve low-income consumers through annual meetings, conferences, webinars, newsletters, marketing and outreach efforts including the development of New York Energy Advisor website.
<b>New Construction – LMI</b> <i>Affordable New Construction</i>	Increase the adoption of high-performance building practices and technologies through incentives and services directly within the public housing agencies; and the development of new tools to make building designs more consistent and reliable, reduce costs, and increase the confidence in high-performance and Net Zero construction.
<b>RetrofitNY - LMI</b> <i>Existing Affordable Multifamily Buildings</i>	Spearhead the creation of standardized, scalable solutions and processes that improve the aesthetics, comfort, and energy performance of New York’s LMI housing stock.
<b>NYS Healthy Homes Value Based Payment Pilot</b> <i>Healthy Homes VBP</i>	The New York State Healthy Homes Value-Based Payment Pilot seeks to develop a replicable model for implementing a healthy homes approach (energy efficiency and weatherization plus asthma trigger reduction and home injury prevention measures) to residential building improvements under the New York State Medicaid value-based payment framework.
<b>Heat Pumps Phase 2 (2020)</b> <i>Electrification</i>	In support of the NYS Clean Heat Program goals established in the Public Service Commission January 2020 Order, these market development activities seek to rapidly accelerate market capacity and adoption of heat pumps across New York including training the electrification workforce, targeting priority populations and residents of historically marginalized communities with training and job placement support; consumer awareness and community campaigns; technology innovation and demonstration; and developing a long-term electrification roadmap. In Q3 2022, funding has been allocated for Community Thermal Energy Networks serving LMI housing.
<b>LMI Pilots</b> <i>Pilots and Demonstrations</i>	Pilots and demonstration of new technologies and approaches to make electrification solutions more available and economical for LMI customers and communities, including clean thermal energy networks/community heat pumps.
<b>Regional Clean Energy Hubs</b> <i>Customer Awareness, Outreach &amp; Engagement</i>	NYSERDA will establish Regional Clean Energy Hubs (“Hubs”), one in each of the ten economic development regions across the state, with the exception of the New York City region where up to three hubs will be established, to assist communities and residents with accessing clean energy programs and solutions. Investment in the establishment of Hubs is intended to build capacity at the local level and position historically marginalized communities to participate in and benefit from the clean energy economy.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Low- to Moderate Income	Single Family – Low Income, Single Family – Moderate Income	HPwES/Res Transition/EmPower - Impact - Program Years 2017, 2018, and Q1 2019	Impact	PY 2017-2019	2020 Q3	2022 Q2	Complete
MD - Low- to Moderate Income	NYS Healthy Homes Value Based Payment Pilot	Healthy Homes - Consulting on Pilot - years 2020-2024	Market	PY 2020-2024	2020 Q4	2024 Q4	In Progress
MD - Low- to Moderate Income	Various	Disadvantaged Community Benefits Framework	Impact	N/A	2021 Q4	2022 Q4	In Progress
MD - Low- to Moderate Income	Solar for All	Solar PV and Energy Storage Evaluation	Market and Impact	PY 2018-2024	2022 Q1	2025 Q2	In Progress
MD - Low- to Moderate Income	REVitalize	Revitalize - Impact - Program Years TBD	Impact	TBD	2022 Q1	2023 Q1	Upcoming
MD - Low- to Moderate Income	RetrofitNY - LMI	RetrofitNY - Market Update 1 PY TBD	Market	TBD	2022 Q3	2023 Q1	Upcoming
MD - Low- to Moderate Income	LMI Multifamily	Multifamily Performance Program & Market Rate Transition - Impact - Program Years 2017 to 2022	Impact	PY 2017-2022	2022 Q2	2023 Q1	Upcoming
MD - Low- to Moderate Income	Various	Low-Income Bill and Usage Study	Impact	N/A	2022 Q2	2023 Q1	Upcoming

**LMI Multifamily**

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	89,664
Energy Efficiency MMBtu - Natural Gas	2,303,260
Energy Efficiency MMBtu - Other Fuels	799,994
Energy Efficiency MW	4
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	1,522,084,250

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	82,663
Energy Efficiency MMBtu - Natural Gas	2,787,660
Energy Efficiency MMBtu - Other Fuels	967,857
Renewable Energy MWh	-
Renewable Energy MW	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	14
Direct Energy Usage MMBtu - Natural Gas	(18,631)
Direct Energy Usage MMBtu - Other Fuels	(0)
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

Expenditure Budget	Total
Incentives and Services	127,124,316
Implementation	22,354,518
Research and Technology Studies	3,000,000
Tools, Training and Replication	9,617,236
Business Support	-
<b>Total</b>	<b>162,096,070</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	889	3,134	11,293	9,016	5,384	11,295	22,577	17,207	8,870	-	-	-
-	-	-	19,841	35,875	61,369	129,944	223,301	318,333	692,603	452,286	369,708	-	-	-
-	-	-	(0)	844	2,503	26,467	74,924	108,252	241,901	181,821	163,282	-	-	-
-	-	-	0	0	4	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	2,618,151	12,224,823	23,046,309	4,875,709	263,180,640	353,235,177	365,602,269	351,236,651	146,064,521	-	-	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	1,857	7,685	8,041	9,263	13,971	12,115	10,258	9,887	9,586
-	-	-	-	-	-	77,307	248,373	317,464	405,345	466,813	389,506	312,200	296,738	273,914
-	-	-	-	-	-	19,327	75,464	92,737	143,238	156,999	137,672	118,345	114,480	109,595
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	(2)	(1)	16	-	-	-	-	-	-	-	-	-
-	-	-	(871)	(2,212)	(15,548)	-	-	-	-	-	-	-	-	-
-	-	-	(0)	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	16,020	86,397	423,931	6,054,736	5,157,769	3,563,298	8,741,478	21,620,884	35,634,305	24,533,810	21,291,688	-	-	-
123,041	622,222	1,581,986	1,837,807	1,805,658	1,630,351	1,591,281	2,650,893	4,620,319	2,579,082	2,202,116	1,109,762	-	-	-
-	-	-	-	-	-	-	-	600,000	600,000	600,000	600,000	600,000	-	-
-	-	-	-	44,069	474,133	950,000	1,350,003	2,378,000	2,313,500	1,948,281	159,250	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
123,041	638,242	1,668,383	2,261,738	7,904,463	7,262,253	6,104,579	12,742,374	29,219,203	41,126,887	29,284,207	23,160,700	600,000	-	-

# Single Family - Low Income

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		19,861	2,610	2,592	2,801	3,330	1,683	3,202	3,385	257	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		543,355	51,520	57,806	84,711	83,949	69,302	92,131	96,600	7,337	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		220,098	16,705	28,962	28,235	37,883	29,994	40,721	34,944	2,654	-	-	-	-	-	-	-
Energy Efficiency MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	(65)	-	(3)	(1)	(9)	(26)	(23)	(3)	(3)	(0)	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	(4,231)	(676)	(961)	(684)	(572)	(478)	(226)	(588)	(45)	(45)	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	(2,229)	(304)	(492)	(301)	(300)	(149)	(323)	(336)	(26)	(26)	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	203,649,713	12,985,070	22,119,552	23,999,365	29,257,876	29,972,095	34,702,075	42,336,000	8,277,681	-	-	-	-	-	-	-	-
Implementation	31,102,740	1,085,352	3,415,002	2,252,117	2,816,494	4,740,718	4,886,459	9,750,000	2,156,598	-	-	-	-	-	-	-	-
Research and Technology Studies	250,000	-	-	-	-	-	-	-	250,000	-	-	-	-	-	-	-	-
Tools, Training and Replication	375,000	-	-	-	-	-	4,167	10,000	360,833	-	-	-	-	-	-	-	-
Business Support	250,000	-	-	-	-	-	-	50,000	200,000	-	-	-	-	-	-	-	-
<b>Total</b>	<b>235,627,453</b>	<b>14,070,422</b>	<b>25,534,554</b>	<b>26,251,482</b>	<b>32,074,370</b>	<b>34,712,813</b>	<b>39,592,700</b>	<b>52,146,000</b>	<b>11,245,112</b>	<b>-</b>							

# Single Family - Moderate Income

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		4,985	1,020	611	483	376	530	1,122	574	153	115	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		239,430	38,841	29,076	21,200	24,358	27,173	57,257	28,296	7,560	5,670	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		174,731	21,723	19,134	20,288	19,218	22,858	38,058	22,794	6,090	4,568	-	-	-	-	-	-
Energy Efficiency MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds		94,655,190	7,634,319	9,907,525	8,871,761	9,581,439	12,540,459	27,998,202	12,348,060	3,299,100	2,474,325	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh		(2,481)	(55)	(66)	(87)	(135)	(514)	(1,161)	(314)	(84)	(63)	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas		(15,128)	(6,972)	(1,604)	(1,368)	(1,058)	(1,169)	(1,150)	(1,231)	(329)	(247)	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels		(43,185)	(6,808)	(6,287)	(7,406)	(6,798)	(5,976)	(5,834)	(2,777)	(742)	(557)	-	-	-	-	-	-
Indirect Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services		86,535,596	5,089,696	9,127,254	8,050,840	9,578,267	10,608,755	24,746,932	13,675,000	3,242,802	2,416,050	-	-	-	-	-	-
Implementation		15,518,239	322,078	1,058,401	2,136,761	1,539,298	2,416,815	2,936,568	3,250,000	1,725,000	133,319	-	-	-	-	-	-
Research and Technology Studies		150,000	-	-	-	-	-	-	-	150,000	-	-	-	-	-	-	-
Tools, Training and Replication		448,000	-	-	-	-	-	4,167	15,000	343,000	85,833	-	-	-	-	-	-
Business Support		100,000	-	-	-	-	-	-	-	75,000	25,000	-	-	-	-	-	-
<b>Total</b>		<b>102,751,836</b>	<b>5,411,774</b>	<b>10,185,655</b>	<b>10,187,601</b>	<b>11,117,565</b>	<b>13,025,570</b>	<b>27,687,667</b>	<b>16,940,000</b>	<b>5,535,802</b>	<b>2,660,202</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# LMI Outreach & Engagement

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Indirect Benefits - Annual</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Energy Usage - Annual</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Expenditure Budget</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Incentives and Services	4,126,526	-	-	132,975	97,029	470,981	530,665	525,000	757,500	1,064,021	548,356	-	-	-	-	-	
Implementation	4,134,646	11,591	66,950	(68,614)	14,422	275,784	1,150,752	868,525	815,235	500,000	500,000	-	-	-	-	-	
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	206,229	34,022	62,182	29,911	25,150	54,964	-	-	-	-	-	-	-	-	-	-	
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>8,467,401</b>	<b>45,613</b>	<b>129,132</b>	<b>94,272</b>	<b>136,601</b>	<b>801,729</b>	<b>1,681,417</b>	<b>1,393,525</b>	<b>1,572,735</b>	<b>1,564,021</b>	<b>1,048,356</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	

# New Construction - LMI

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	73,434
Energy Efficiency MMBtu - Natural Gas	470,003
Energy Efficiency MMBtu - Other Fuels	17,477
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	135,272,764

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	59	297	1,457	1,210	1,250	7,629	12,090	14,850	14,332	14,475	3,857	1,929
-	-	-	638	1,340	12,596	12,600	12,750	56,348	85,413	99,675	84,857	73,250	20,357	10,179
-	-	-	-	1,633	-	-	-	2,303	2,438	3,175	3,571	2,750	1,071	536
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	169,095	1,047,563	4,240,392	3,540,000	3,650,000	17,125,000	32,855,000	36,860,000	24,857,143	10,928,571	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	37,513
Energy Efficiency MMBtu - Natural Gas	213,126
Energy Efficiency MMBtu - Other Fuels	10,261
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	6,974	2,594	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105
-	-	-	-	48,209	14,392	16,725	16,725	16,725	16,725	16,725	16,725	16,725	16,725	16,725
-	-	-	-	2,537	758	774	774	774	774	774	774	774	774	774
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	125,282,057
Implementation	2,789,136
Research and Technology Studies	-
Tools, Training and Replication	6,560,169
Business Support	-
<b>Total</b>	<b>134,631,362</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	23,554	1,556,593	3,001,574	9,770,000	4,550,000	14,750,000	22,904,000	29,860,922	22,000,000	16,865,414	-	-
-	6,461	132,302	460,812	362,144	421,695	369,964	284,699	267,356	213,211	200,000	70,491	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	79,599	211,334	389,387	211,505	550,000	950,000	1,200,000	1,209,047	1,009,297	750,000	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	6,461	132,302	563,965	2,130,071	3,812,657	10,351,469	5,384,699	15,967,356	24,317,211	31,269,969	23,079,788	17,615,414	-	-

**RetrofitNY - LMI**

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	1,264
Energy Efficiency MMBtu - Natural Gas	19,112
Energy Efficiency MMBtu - Other Fuels	4,778
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	51,147,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	93	-	137	146	732	155	-	-	-
-	-	-	-	-	-	2,328	-	1,970	2,099	10,494	2,222	-	-	-
-	-	-	-	-	-	582	-	492	525	2,623	556	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	4,232,000	-	5,795,000	5,820,000	29,400,000	5,900,000	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	153,825
Energy Efficiency MMBtu - Natural Gas	2,204,154
Energy Efficiency MMBtu - Other Fuels	551,040
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	107	-	-	2,435	10,130	17,826	28,152	41,109	54,066
-	-	-	-	-	-	-	-	-	34,910	145,258	255,606	403,674	589,460	775,246
-	-	-	-	-	-	-	-	-	8,728	36,315	63,902	100,918	147,365	193,812
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	25,500,000
Implementation	4,483,869
Research and Technology Studies	-
Tools, Training and Replication	519,630
Business Support	-
<b>Total</b>	<b>30,503,500</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	318,750	365,770	956,161	355,384	834,332	4,836,332	10,118,332	7,001,332	713,608	-	-	-	-
-	196,977	296,643	429,700	511,468	414,289	415,999	353,519	596,135	667,336	393,896	207,907	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	17,500	204,516	163,532	57,532	57,532	19,018	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	196,977	615,393	795,471	1,467,628	787,174	1,454,847	5,353,383	10,771,999	7,726,200	1,126,522	207,907	-	-	-

# NYS Healthy Homes Value Based Payment Pilot

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		300	-	-	-	-	-	0	15	150	135	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		8,200	-	-	-	-	-	-	400	4,100	3,700	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		1,800	-	-	-	-	-	-	100	900	800	-	-	-	-	-	-
Energy Efficiency MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Indirect Benefits - Annual</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Energy Efficiency MWh - Electric		56,000	-	-	-	-	192	-	-	-	-	-	-	4,858	-	-	50,950
Energy Efficiency MMBtu - Natural Gas		1,496,000	-	-	-	-	5,120	-	-	-	-	-	-	129,280	-	-	1,361,600
Energy Efficiency MMBtu - Other Fuels		374,000	-	-	-	-	1,280	-	-	-	-	-	-	32,320	-	-	340,400
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Energy Usage - Annual</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Direct Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Expenditure Budget</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Incentives and Services		137,248	-	-	-	-	-	4,074	16,805	116,370	-	-	-	-	-	-	-
Implementation		366,835	-	-	-	1,628	55,867	81,319	9,440	75,000	75,000	68,581	-	-	-	-	-
Research and Technology Studies		9,287,211	-	-	-	-	864,995	200,000	595,434	3,588,766	3,515,620	522,396	-	-	-	-	-
Tools, Training and Replication		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>		<b>9,791,294</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,628</b>	<b>920,862</b>	<b>285,393</b>	<b>621,679</b>	<b>3,780,136</b>	<b>3,590,620</b>	<b>590,976</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# Heat Pumps Phase 2 (2020)

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	26,654,968	-	-	-	-	-	-	3,043,400	2,000,000	4,000,000	5,000,000	7,699,193	4,912,375	-	-	-	-
Implementation	2,345,032	-	-	-	-	12,889	788,785	250,000	380,000	380,000	283,358	250,000	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	1,000,000	-	-	-	-	-	12,551	30,000	200,000	257,449	250,000	250,000	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>30,000,000</b>	-	-	-	-	12,889	3,844,736	2,280,000	4,580,000	5,637,449	8,232,551	5,412,375	-	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Low-to-Moderate Income** Focus Area. See the **Clean Heating & Cooling** and **Single Family Residential** Focus Area plans for additional information.

**LMI Pilots**

Active

<b>Direct Benefits - Annual</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Indirect Benefits - Annual</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Energy Usage - Annual</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Expenditure Budget</b>			<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,443,533	-	-	-	-	-	-	213,166	639,499	397,717	397,717	397,717	397,717	397,717	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>2,443,533</b>	-	-	-	-	-	-	<b>213,166</b>	<b>639,499</b>	<b>397,717</b>	<b>397,717</b>	<b>397,717</b>	<b>397,717</b>	<b>397,717</b>	-	-	-

# Regional Clean Energy Hubs

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	2,893,000	2,893,000	-	-	-	-	27,840	409,813	750,230	680,890	655,893	368,334	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	39,107,000	39,107,000	-	-	-	-	-	4,242,410	8,722,885	8,715,985	8,715,985	8,709,735	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>42,000,000</b>	<b>42,000,000</b>	-	-	-	-	-	<b>27,840</b>	<b>4,652,223</b>	<b>9,473,115</b>	<b>9,396,875</b>	<b>9,371,878</b>	<b>9,078,069</b>	-	-	-	-

# Low Rise New Construction Transition - LMI

Inactive

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		7,926	4	152	1,084	2,142	1,939	1,655	250	250	450	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		98,351	102	2,149	13,620	19,608	37,338	20,234	1,400	1,400	2,500	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		1,215	-	-	-	903	312	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds		20,561,555	15,642	449,854	3,406,658	5,701,053	5,676,282	3,512,066	500,000	500,000	800,000	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services		6,518,958	1,800	116,700	951,100	1,566,100	1,821,000	1,279,650	200,000	250,000	332,608	-	-	-	-	-	-
Implementation		1,451,418	38,582	197,975	168,497	150,740	206,074	197,209	203,182	125,000	141,264	22,895	-	-	-	-	-
Research and Technology Studies		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>		<b>7,970,376</b>	<b>40,382</b>	<b>314,675</b>	<b>1,119,597</b>	<b>1,716,840</b>	<b>2,027,074</b>	<b>1,476,859</b>	<b>403,182</b>	<b>375,000</b>	<b>473,872</b>	<b>22,895</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# Multifamily New Construction Transition - LMI

Inactive

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		10,714	-	-	-	-	110	605	1,500	1,500	3,000	4,000	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		97,231	-	-	-	-	839	3,392	15,000	18,000	28,000	32,000	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds		34,780,999	-	-	-	-	663,985	4,117,014	4,000,000	6,000,000	10,000,000	10,000,000	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services		6,493,995	-	25,000	224,228	254,432	718,953	1,173,471	500,000	750,000	1,500,000	1,347,911	-	-	-	-	-
Implementation		1,926,987	79,298	498,640	459,345	268,576	157,941	153,609	140,000	60,000	59,578	50,000	-	-	-	-	-
Research and Technology Studies		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>		<b>8,420,981</b>	<b>79,298</b>	<b>523,640</b>	<b>683,573</b>	<b>523,008</b>	<b>876,894</b>	<b>1,327,081</b>	<b>640,000</b>	<b>810,000</b>	<b>1,559,578</b>	<b>1,397,911</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# Healthy Homes Feasibility Study

Inactive

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Indirect Benefits - Annual</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Energy Usage - Annual</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Expenditure Budget</b>		<b>Total</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	212,147	92,374	45,933	38,819	-	2,156	32,865	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>212,147</b>	<b>92,374</b>	<b>45,933</b>	<b>38,819</b>	<b>-</b>	<b>2,156</b>	<b>32,865</b>	<b>-</b>									

**REVitalize**

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	9,000
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	4,629,714

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	9,000	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1,574,000	2,027,857	1,027,857	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	18,000
Renewable Energy MW	14

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	18,000	-	-	-	-	-	-	-	-	-	-
-	-	-	-	14	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	240,500
Implementation	2,271
Research and Technology Studies	-
Tools, Training and Replication	48,652
Business Support	-
<b>Total</b>	<b>291,424</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	97,500	84,500	58,500	-	-	-	-	-	-	-	-	-	-
-	1,660	440	143	112	(84)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	18,248	30,404	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	19,908	128,344	84,643	58,612	(84)	-	-	-	-	-	-	-	-	-

# Solar for All

Inactive

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	11,639,368	-	-	-	-	676,896	1,093,173	821,250	1,200,000	1,200,000	1,148,048	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000	-
Implementation	1,371,678	-	-	3,999	386,142	231,389	189,405	73,634	100,000	100,000	100,000	100,000	87,108	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>13,011,046</b>	-	-	<b>3,999</b>	<b>386,142</b>	<b>908,286</b>	<b>1,282,578</b>	<b>894,885</b>	<b>1,300,000</b>	<b>1,300,000</b>	<b>1,248,048</b>	<b>1,200,000</b>	<b>1,187,108</b>	<b>1,100,000</b>	<b>1,100,000</b>	<b>1,100,000</b>	-

# Single-Family Residential Plan

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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### Appendix: Single-Family Residential Budgets and Benefits by Initiative

#### Plan Record of Revisions

##### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- **Consumer Awareness** initiative now considered inactive as of this filing.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Single Family Market Rate Transition** initiative budget revised from \$23.5M to \$23.5M (-2,375).
  - **Consumer Awareness** initiative budget revised from \$2.8M to \$2.3M (-0.6M) as market facing activities have concluded. Remainder of funding will be utilized elsewhere in the portfolio.
- **Residential** Section 2.2 updated to reflect new activities and updates to measure targets that were previously not defined. Benefits plan updated to address an error identified in the energy savings model that did not forecast energy audits properly.
- Updates made to Evaluation Studies timing & status for several initiatives in Section 3.

##### August 16, 2022

- Budget details associated with this CIP revision:
  - **Pay for Performance** budget revised from \$21.8M to \$9.4M (-12.4M) with updates to plan contents noted below
  - **Residential** budget revised from \$49.6M to \$57M (+7.4M) with updates to plan contents noted below
  - Modified Focus Area Budget revised from \$109.8 to \$109.2M (-0.6M) and is once again consistent with Ordered Focus Area Budget of \$109.2M; \$0.6M returned to Market Development Reserve as noted in CIP Appendix A

- Focus Area Description in Section 1 updated to align strategy with current Climate Action Council Draft Scoping Plan decarbonization goals.
- Current State of the Market in Section 1 updated to align with current data sources and analysis supporting the Climate Action Council’s Draft Scoping Plan.
- Pay for Performance plan updated in Section 2.1 to reflect reduced funding and focus on National Grid partnership
- Residential plan updated in Section 2.2 to reflect modified strategy encompassing multiple related sub-initiatives including: Consumer Awareness & Education, Energy Assessments, Market Support Tools & Activities, and Comfort Home.
- Moved Activity “Increase awareness and education of available home energy improvements among New York State’s residents” from Section 2.3 Consumer Awareness to Section 2.2 Residential (Market Rate)
- Updates made to Evaluation Studies planned start/end dates in Section 3.

### May 20, 2022

- Initial filing of NYSEDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- Subsequent to the issuance of NYSEDA’s *Petition Regarding CEF Triennial Review*<sup>1</sup> in which CEF Focus Area Funding Authorizations were proposed and later confirmed in the September 2021 CEF Order<sup>2</sup>, several revisions to Market Development portfolio initiatives were filed throughout 2021. Those revisions impacted Single Family Residential Focus Area plans as follows: **Single Family Market Rate Transition** revised to \$23.8M (-0.3M); \$1.1M from **Consumer Awareness** added to this Focus Area (previously categorized as Commercial).
- Budget details associated with this CIP revision:
  - **Single Family Market Rate Transition** budget revised from \$23.8 to \$23.5M (-0.3M) as part of regular anticipated Resource Acquisition Transition closeout activities
  - Modified Focus Area Budget revised from \$109.2M to \$109.8M (+0.6M); Ordered Focus Area Budget of \$109.2M exceeded by \$0.6M and addressed with funding from the Market Development Reserve as noted in CIP Appendix A.

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<sup>1</sup> Petition was filed 12/29/2020 and can be found under Case 14-M-0094 at the following link:

<https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

<sup>2</sup> Order Approving Clean Energy Fund Modifications was filed 9/9/2021 and can be found under Case 14-M-0094 at the following link: <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

## 1. Focus Area Overview

### Focus Area Description

NYSERDA seeks to facilitate significant scaling of the residential market for providers of energy efficiency and clean energy services by introducing new business strategies, technical tools, market outreach, and other resources designed to accelerate the rate at which homeowners adopt energy efficiency and clean energy technologies such as heat pumps. Through the implementation of this plan, NYSERDA will engage customers at key decision points in the home ownership life cycle by providing customized energy information for homeowners based on their home's needs and their personalized home investment goals. This includes offering remote/virtual energy assessments, electrification-focused energy audits, and access to standard packages of measures to help a customer's decision-making process and encourage home energy improvement investments oriented toward each customer's individualized goals. In order to fully engage moving the residential market toward a decarbonized future, a variety of approaches is needed to reach more customers and create clean energy pathways for homeowners and residents that are easily accessible to the general public. This plan seeks to lay the groundwork for increasing customer demand, improving customer and contractor confidence, and de-risking business investments in support of achieving New York's 2 million climate-friendly homes goal by 2030.

### Current State of Market

There are approximately 5.4 million residential units in the one- to four-unit housing stock in New York State. The majority are occupied by low-to-moderate income (LMI) households with roughly 2.6 million market rate households.<sup>3</sup> In New York State, 70% of existing homes were built prior to adoption of the first NYS Energy Conservation Construction Code in 1979, which indicates a need for widespread building envelope improvements to reduce building energy loads and home energy consumption associated with space heating and cooling and to improve resident comfort in preparation for a transition from fossil fuel heating to electric heat pumps.

To date, New York State's energy efficiency programs supported by the Clean Energy Fund have prioritized funding and program offerings for LMI households through NYSERDA's EmPower and Assisted Home Performance programs. In July 2020, NYSERDA and New York State's investor-owned utilities announced a collaborative partnership and increased investment of nearly \$1 billion through 2025 to increase access to energy efficiency and clean energy solutions for LMI households, including increased funding for LMI programs, community-based outreach and capacity building, and other resources. More information can be found in the LMI Implementation Plan that NYSERDA jointly administers with the Utilities<sup>4</sup>.

For market-rate residential customers, NYSERDA has historically offered energy audits and low-cost financing, in addition to utility-provided equipment and appliance rebates. Still, only a small segment of customers have made efficiency improvements to their homes. For context, NYSERDA's legacy flagship

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<sup>3</sup> Defined as households making more than 80% of the area median income. Source: American Community Survey, U.S. Census Bureau, based on 4.3 million total occupied households statewide.

<sup>4</sup> Statewide LMI Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084 <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

market rate residential program, Home Performance with ENERGY STAR, resulted in approximately 60,000 homes receiving energy efficiency improvements over its entire 20-year course. In its highest production years, the market-rate HPwES program never completed more than 5,000 projects over a 12-months calendar year.

In contrast, current estimates indicate a need to ramp up production to more than 200,000 homes per year across all income sectors by 2030 to succeed in achieving the state's decarbonization goals. This level of production represents a 10-fold multiplier against NYSERDA's recent production levels of approximately 20,000 projects annually for both LMI and market rate customers combined. As a result, NYSERDA is seeking to accelerate and amplify the call to action and simplify access to energy efficiency services and beneficial electrification for the residential sector while significantly reducing overhead and administrative soft costs and project cycle times.

### **Intervention Strategies**

The initiatives for the single-family residential sector are a critical part of NYSERDA's enablement goals for building electrification, as they focus on strategies that increase consumer awareness of electrification options and benefits, save energy directly, and reduce thermal loads aimed at mitigating demand peaks. Strategies are expected to improve comfort for occupants and reduce the customer's first cost of investing in a heat pump, by making the home "heat pump ready."

NYSERDA's Residential Focus Area targets the following key audiences and strategies:

- **For individual consumers:** Free and streamlined energy assessments, including remote and virtual options and access to financing to help customers get on their own path to a clean energy future through energy efficiency and electrification.  
This includes access to low-cost financing for all homeowners including low- to moderate-income residents and other disadvantaged communities as defined by the Climate Act.
- **For home improvement contractors:** Standardized packages of envelope improvement measures, business mentoring and tools that simplify customer acquisition through segmentation and targeting and increase sales by helping to inform customers that envelope improvements can help them save on their energy bill while reducing the cost of future investments in clean energy equipment. These streamlined program improvements and contractor support services will be integrated across NYSERDA's residential program offerings, including low-to-moderate income programs.
- **For HVAC companies:** Create qualified leads and heat pump ready homes primed for heat pump sales as well as providing training, tools, and resources that companies can use to build their businesses, build confidence in heat pump technology and de-risk business transitions to support heat pump installations, adopt new customer engagement models, and deliver quality installations of clean energy solutions.
- **For other market actors:** Work with manufacturers, distributors, trade associations, and other market actors throughout the supply chain to clear barriers, facilitate dissemination of technical support resources, and address other gaps in market knowledge and support to facilitate market acceptance of heat pump sales and quality installations.

- **For the public at large:** Combine awareness campaigns, targeted marketing, and easily accessible customized home energy assessments to help homeowners establish their own clean energy goals, connect homeowners with contractors to do the work, and encourage them to get on a path toward their own clean energy future.

As the residential services offerings from utilities statewide continues to evolve, NYSERDA will continue to act as a collaborative partner providing technical and program design assistance and supplying a variety of market enabling tools designed to help those programs succeed in achieving their goals.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$109.2	\$109.2	\$104.8	- \$0.6	\$104.2	95%

Initiatives that serve multiple focus areas across NYSERDA’s CEF portfolio are listed with asterisk (\*).

Initiatives Active in The Market	Funding (\$M)	Period
Pay for Performance*	\$9.4	2018 -
Residential	\$57.0	2018 -
Heat Pumps Phase 2 (2020)*	\$12.0	2020 -
<b>Total Active Funding</b>	<b>\$78.4</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
Single Family Market Rate Transition	\$23.5	2016 – 2019
Consumer Awareness	\$2.3	2019 - 2022
<b>Total Inactive Funding</b>	<b>\$25.8</b>	
<b>Total Focus Area Funding</b>	<b>\$104.2</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	1.1	1.2
Cumulative Annual Electricity EE Savings (MWh)	0.05	0.1
Cumulative Annual Natural Gas EE Savings (MMBtu)	0.7	0.7
Cumulative Annual Other Fuels EE Savings (MMBtu)	0.4	0.5
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$194	\$194

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technical assistance, information and education and/or defrays the cost of installing energy efficient, electrification or clean energy technologies intended to reduce buildings' energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

NYSERDA invests funding from this focus area to support the NYS Clean Heat Market Development Plan, working to advance the electrification of buildings across New York State. Reference the Clean Heating & Cooling focus area plan for more detailed information on this strategic priority.

In addition to the investments listed above, NYSERDA has also committed Single Family Residential funding to support the Statewide Low- and Moderate-Income Portfolio Implementation Plan, an effort jointly administered with all utilities<sup>5</sup>. This plan is updated annually under the referenced case number.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

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<sup>5</sup> Statewide LMI Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084 <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

## 2.1 Pay for Performance

Traditional energy efficiency programs, whether sponsored by utilities or entities like NYSERDA, secure energy savings from small- and medium-sized commercial and residential customers primarily through measure-level rebate programs. Payments are generally set as a cost share, with estimated savings based on deemed results. Many energy efficiency businesses across the country have structured their customer offerings and built business models around such utility programs. Pay for Performance (P4P) structures or shared savings contracts, which have been successfully deployed for larger customers, have the potential to drive scale across a wider range of market segments. This P4P strategy uses the CalTRACK<sup>6</sup> methodology to measure energy savings. The method defines how to calculate site-based, weather-normalized, metered energy savings by comparing an existing condition baseline to post-retrofit data from utility meters in a transparent manner. When all parties use the same standardized set of methods for calculating energy savings, a robust energy efficiency market is possible.

By calculating savings from meter data, NYSERDA would expect to achieve more accurate savings estimates and measurements, and higher realization rates than existing program models. Testing this approach provides the opportunity to determine whether the contractual alignment of the performance-based requirements between the program administrator and the service provider is necessary, or whether an open market design would sufficiently serve to transfer risk and align payments with performance. This market design test is expected to enable greater participation from service providers and customers and encourage wider investment. While NYSERDA has been working with National Grid to co-administer a residential P4P pilot since 2018, market developments and challenges have led to reopening the dialogue between NYSERDA and National Grid on the best course of action for this approach and a filing modification is expected in early 2023 that will address future plans in the context of the broader residential strategy.

### Participants, Barriers, and Objectives

Target Market Participants	
Aggregators	Contractors and service providers
End use customers, namely building owners and homeowners	Utilities
Financiers and insurers	

Target Market Barriers	
Low customer uptake of energy efficiency in the market.	Lack of market for procuring energy efficiency (current program model constrained by cost-effectiveness requirements).
High customer acquisition costs.	Existing energy efficiency program model puts project performance risk on utilities, and by extension ratepayers.
Site-level energy savings are highly variable and have a lower confidence than portfolio level savings.	Installation contractors are not rewarded or responsible for energy efficiency project performance.
Lack of standard methodology for measuring normalized energy savings in a consistent and credible way.	

<sup>6</sup> CalTRACK (<https://www.caltrack.org/>) was originally developed in California through a stakeholder process with funding and leadership from the California Energy Commission, California PUC, and PG&E.

<b>Initiative Objectives</b>
Achieve customer uptake through simpler, less risky offerings.
Deliver reliable savings to the customer and system.
Measure savings reliably and credibly.
Grow the base of energy efficiency service providers and financiers.
Begin to determine whether such an approach can work at cost-effective compensation levels for steady state, post-pilot programs.
Begin to determine key parameters and contract terms for steady state, post-pilot programs.

## Key Activities + Measurements

<b>Activity:</b>						
Continue working with utilities to pilot the procurement model approach to P4P, whereby a competitive selection process identifies specific portfolio managers/aggregators to secure customers and deliver savings for a set implementation period and be paid over a longer performance period.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Launch residential sector pilot with National Grid.			*			
Milestone: Support PSEG LI in release of their procurement effort for portfolio manager(s) for P4P pilot.		*				
Milestone: Provide technical and platform support for PSEG LI to launch their P4P pilot.		*				
Output: Number of participating aggregators (baseline = 0).		-	1	-	-	-
Output: Total number of projects implemented in residential sector (baseline = 0).		-	50	300	600	1000
Output: Number of datasets published in OpenNY (baseline = 0).		-	-	1	-	-
Outcome: Number of additional market actors involved in P4P pilot (non-aggregator involvement such as financial institutions, subcontractors, etc) (baseline = 0).		-	4	10	-	-
Outcome: Number of utilities committed to offering P4P programs post pilot (baseline = 0).		-	-	-	1	-
<b>Related Notes</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Residential

The Residential initiative is designed to “meet the customer where they are” by providing the information needed to make sound choices while putting them on a path toward carbon neutrality in the context of their individual goals. Strategies will leverage home investment decisions already taking place to promote energy efficiency and clean energy improvements in addition to promoting proactive engagement with NYSERDA’s tools (e.g. virtual/remote audits) and contractors. NYSERDA will implement pilots to test proof of concepts, make adjustments to improve impact as needed, and engage utilities in collaborative approaches. At the conclusion of the pilots, NYSERDA will deploy incentives, tools and other market interventions to expand successful activities statewide via the gas and electric utilities or the market itself. Program investments and activities will be informed via continued engagement with stakeholders and subject matter experts. NYSERDA will seek to expand and replicate partnerships already in play in both the Consolidated Edison and National Grid gas service territories to engage with more utilities in coordinated co-invest/co-save models.

### Participants, Barriers, and Objectives

Target Market Participants	
Homeowners, Rental Property Owners, Renters, Home Buyers, Homeowners experiencing their first winter in their new home	Manufacturers and Distributors
Home Improvement Contractors, System Installers, Aggregators	Real Estate Professionals, Home Inspectors, Trade Associations
Community Leaders, Local Governments, Chambers of Commerce, Affinity Groups, etc.	Technical Solutions Providers
Utilities, Program Administrators	Financial Institutions

Target Market Barriers	
Lack of consumer awareness and understanding of energy usage patterns and savings opportunities.	Lack of interest and training among home services market actors
Concern about value and payback of EE improvements	Competing consumer home improvement priorities
Lack of credible home energy performance data	Customer acquisition challenges and related costs

Initiative Objectives	
Increase adoption of energy efficiency and clean energy improvements by providing homeowners with clear, relevant, well timed, and actionable information regarding their homes’ energy performance.	
Improve contractor sales processes through reduced customer acquisition costs, faster sales process, and increased consumer adoption of energy efficiency home improvements by targeting contractor marketing of simplified measure packages.	
Accelerate adoption of clean energy business models of residential supply chain actors by providing information from trusted market partners, deploying tools, and resources to reduce transactional friction, and effective demonstrations to improve market confidence.	

## Key Activities + Measurements

### Activity: Consumer Awareness & Education

- Spur participation in Comfort Home and other single-family residential programs by maintaining and updating campaign landing pages driving target segments to program-specific content.
- Funnel targeted customers via Life Moments campaign to campaign landing pages and relevant content on the NYSERDA website that compels them to take on-site actions to either find a participating contractor or educate them on actions they can take to make their homes more energy efficient.
- Explore driving customers in Comfort Home markets to campaign landing pages via contractor support materials, track materials with unique URLs to test, measure and adjust strategy
- Educate consumers on energy efficiency measures they can take regardless of fuel type to reduce energy consumption.
- Test different means of providing consumers with clear, relevant, actionable information about the energy performance of their homes.
- Develop complementary strategies with consumer awareness and community-based campaigns to drive participation in energy audits and standard packages of envelope improvements via the Comfort Home “heat pump ready” pilot.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Relaunch Life Moments marketing campaign based on learning and findings of the 2021 campaign.			*			
Milestone: Measure/Analyze assets, adjust to optimize campaign performance.		*			*	
Milestone: Deploy targeted consumer awareness digital outreach to drive participation in energy audits and Comfort Home pilot.						
Output: count of unique users who interact with NYSERDA’s campaign websites each year (baseline = 0)		177,211	191,452	200,000	TBD	TBD
Outcome: increase in percentage of consumers who favor heat pumps (baseline = 59%)		70%	70%	70%	75%	80%
Output: Increase prospective air sealing and insulation package customers through Comfort Home (baseline = 2,051).		2,051	3,000	6,000	8,000	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity: Energy Assessments</b>						
<ul style="list-style-type: none"> <li>Support updated home energy assessments practices through Green Jobs - Green New York audits, including field testing of remote and virtual assessment strategies and deployment of electrification-focused assessment procedures.</li> <li>Coordinate with utilities to align audit approaches with utility operated online customer engagement tools and enable sharing of leads to access all incentive and financing offers.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Close out ratings pilot and develop and distribute resources supporting home energy ratings as part of home sales.			*			
Milestone: Implement a remote energy audit available to all consumers.				*		
Milestone: Reach agreement with utilities on delivery of statewide energy audit offer.				*		
Milestone: Develop and deploy a consumer-facing online engagement platform to support remote/virtual audits and assist in homeowner goal-setting.					*	
Output: count of remote and onsite assessments/audits (baseline = 0)		3,208	7,700	18,700	38,700	61,200
Output: count of participant companies providing assessments/audits (baseline = 0)		85	100	120	140	160
Outcome: increase in private investment in electrification-ready measures for audit projects (baseline = TBD)		NA	TBD	TBD	TBD	TBD
Outcome: increase in electrification and electrification-ready measure adoption rate for assessments and audits (baseline = TBD)		NA	TBD	TBD	TBD	TBD
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity: Market Support Tools &amp; Activities</b>						
<ul style="list-style-type: none"> <li>Support and facilitate stakeholder engagement forums including continued support for the Residential Market Advisory Group and relevant trade organizations.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: count of companies engaging with the Single Family Residential initiatives in voluntary efforts such as stakeholder meetings and work groups (baseline = 0)		-	200	220	265	320
Output: count of users who have engaged with resources whose development has been supported by NYSERDA (baseline = 0)		-	25	50	125	200
Outcome: increase in contractor confidence that heat pumps and/or building electrification/decarbonization efforts deliver benefits (baseline = TBD)		-	TBD	TBD	TBD	TBD
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						
b. There are currently no milestones associated with the activity described here.						

**Activity: Comfort Home**

- Market and implement Comfort Home pilot to demonstrate standardized package offer and facilitate optimized heat pump equipment selection and design.
- Develop a toolkit or playbook of best practices, tools, and lessons learned resulting from the Comfort Home pilot as a resource for utilities and other market actors to replicate successful strategies.
- Provide contractor support to facilitate innovative service models using data-driven market segmentation, targeting, and streamlined sales processes.
- Collaborate with utilities to align energy efficiency and heat pump programs and support rapid expansion and statewide deployment.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Complete data collection from Comfort Home pilot and distribute results and resources to utilities to support intervention adoption.					*	
Output: Count of Comfort home projects completed (baseline = 0)		630	2,130	5,130	7,815	-
Outcome: increase in utilities and other organizations that adopt tools and models introduced by NYSERDA for market targeting and sales of measure packages. (baseline = 0)		1	3	5	6	6

**Related Notes:**

- Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 Heat Pumps Phase 2 (2020)

Across its component initiatives, the NYS Clean Heat Market Development Plan aims to build market capacity to deliver building electrification solutions including cold climate air-source heat pumps (ccASHP), water- and ground-source heat pumps (GSHP), and heat pump water heaters. Advancing the market for these technologies is needed to meet the following central goals by 2025:

- Help achieve the State’s energy savings targets from the installation of heat pumps.
- Increase the pool of skilled labor needed to grow a quality-oriented industry, training 14,000 workers across the heat pump supply chain, including 4,200 workers to sell, design, and install systems.
- Reduce the cost of heat pump installations by at least 25% against a 2019 baseline and adjusted for COVID-related market impacts on labor and material costs.
- Increase stocking of heat pumps by 50% above 2019 industry shipments and increase penetration of high-performance cold climate heat pumps to 90% of all heat pumps shipped for space conditioning in New York State.

The NYS Clean Heat Market Development Plan is designed to address critical barriers and market needs through a multitude of market interventions. Initiatives supporting that plan are more fully described in the Clean Heating & Cooling Focus Area plan and appear within several focus areas across the Market Development portfolio.

The Single-Family Residential Focus Area includes the Clean Energy Supply Chain initiative which will gather insights and market intelligence to guide strategic investments in key intervention points across the supply chain. Interventions will be designed to be directly responsive to the value propositions and align with the business models of one or more supply chain actors, including manufacturers, distributors, and contractors, to stimulate and accelerate the deployment of clean energy solutions. Activities will be initially focused on the residential sector; successful strategies would also be applied for commercial applications. NYSERDA will seek to coordinate and leverage CEF investments in these activities with utility investments in midstream and upstream interventions and will coordinate with regional and national partners to maximize impact.

### Participants, Barriers, and Objectives

Target Market Participants	
Homeowners, Rental Property Owners, Renters, and Home Buyers	Manufacturer suppliers
Manufacturers	Home Improvement Contractors and System Installers
Distributors	Business development providers
Technical support providers	

**Target Market Barriers**

Lack of businesses across the HVAC supply chain providing clean heating and cooling products and solutions to consumers.	Lack of business best practices to ensure product and service availability to support wide-scale deployment of heat pumps and related technologies across NYS.
Lack of confidence in cold climate heat pump performance.	Cost of system design, equipment and components, and installation.

**Initiative Objectives**

Critical Market Need: Make products available when and where consumers need them by building the clean heat supply chain.

**Key Activities + Measurements**

This plan includes broader market progress metrics, which will be supported collectively by all of NYSERDA’s electrification market development activities that extend beyond this singular initiative. NYSERDA will measure market progress broadly, rather than for each specific initiative with progress reported collectively within the Statewide Heat Pump Program Annual Report in April each year.

See activities, next page.

**Activity:**

Draw a larger pool of companies across the supply chain into business activities that make clean heating products and solutions available when and where consumers need them, and support and accelerate heat pump adoption to enable wide-scale deployment.

- Conduct regional roundtables with distributors, vendors, and OEMs to define and describe the value proposition to the market through “value maps” and “market maps.”
  - Supply Chain Value Map to provide a foundational understanding of the drivers, challenges, and interdependencies for all actors within the NY HVAC supply chain and identify specific areas of NYSERDA support to accelerate adoption of heat pumps
  - Market Actor Roundtables with Manufacturers, Distributors, Contractors, Drillers, and others in the NY Supply Chain to assess needs and areas of business model expansion and support a robust Clean Heat industry
- Build and support the activities of a network of trade allies to support the technical transfer and dissemination of training, tools, and resources to a wide range of contractor markets.
- Provide business development support and technical resources to help companies transition to building electrification solutions, focusing first on larger HVAC companies (25+ employees).
- Deploy a campaign to build awareness and confidence in heat pump technology by creating opportunities for HVAC technicians and the public at large to experience heat pumps firsthand and share their experiences virally.
- Support improvements to stocking practices and explore midstream interventions in coordination with utilities. NYSERDA will gather best practices from the utilities, such as Con Edison, that are currently offering midstream incentives and have established relationships with distributors.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Establish a network of trade allies.		*				
Milestone: Launch Business Support tools and tactics to the marketplace to provide business development support and technical resources.		*				
Milestone: Conduct market insight research including supply chain actor roundtables and develop a market map identifying key intervention points.		*				
Milestone: Develop and deploy strategic intervention workplan, informed by market map and insights research.			*			
Output: Businesses provided with tools, technical support, and business development assistance (baseline = 0).		50	75	125	150	200
Outcome: Increase stocking of heat pumps above HARDI 2019 shipments (baseline = 0).		0	20%	30%	40%	50%
Outcome: Increase penetration of high-performance cold climate heat pumps as a percent of all heat pumps shipped for space conditioning in New York (baseline = 61%). <sup>a</sup>		61%	70%	75%	85%	90%
Output: count of demonstration sites in the Experience Clean Heat initiative (baseline = 0)		0	0	30	65	115
Output: count of partners signed on to participate in the Clean Heat Connect program (baseline = 0)		10	10	15	20	20
Outcome: increase in consumer confidence (among those targeted by marketing campaign) that heat pumps deliver benefits)		63%	63%	65%	68%	70%

**Related Notes:**

- a. Source: 2018 Heating Air conditioning and Refrigerator Distributors International (HARDI) ASHP data. The remaining baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work. Note that Market Rate studies detailed below may be bolstered by other studies performed for Low-to-Moderate Income initiatives serving this same market sector. Reference the Low-to-Moderate Income Focus Area Plan.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Single Family Residential	Pay for Performance	Pay for Performance Non-Routine Event evaluation – Program Year 2022	Impact	PY 2022-2023	2022 Q2	2024 Q4	In Progress
MD - Single Family Residential	Residential	HPwES/Res Trans/EmPower (Res Retrofit)- Impact - Program Years 2017 - Q1 2019	Impact	PY 2017-2019	2020 Q3	2022 Q2	Complete
IR - Grid Modernization, IR - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	Residential	Market Dev. & I&R - Case Studies - program years 2016-2020	Impact	PY 2016-2020	2021 Q1	2022 Q4	In Progress
MD - Single Family Residential	Residential	Home Energy Ratings and Residential Audit & Rating MAR - Impact - years 2019-2021	Impact	PY 2019-2022	2021 Q1	2023 Q4	In Progress
MD - Single Family Residential	Residential	Comfort Home -Impact - Program Years 2020 and 2021	Impact	PY 2020-2021	2022 Q3	2023 Q3	Upcoming
MD - Single Family Residential	Residential	HPwES/Res Transition/EmPower - Impact - Program Years 2021	Impact	PY2021	2022 Q3	2024 Q1	Upcoming
MD – Single Family Residential	Residential	Residential Building Stock Assessment Update	Building Stock and Potential Studies	PY 2023	Q4 2022	Q2 2024	Upcoming

# Pay for Performance

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	450
Energy Efficiency MMBtu - Natural Gas	42,920
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	7,300,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	23	113	135	180	-	-	-	-	-
-	-	-	-	-	-	2,146	10,730	12,876	17,168	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	365,000	1,825,000	2,190,000	2,920,000	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	7,068,534
Implementation	1,640,167
Research and Technology Studies	-
Tools, Training and Replication	721,462
Business Support	-
<b>Total</b>	<b>9,430,163</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	50,000	1,500,000	2,000,000	2,000,000	1,518,534	-	-	-	-
-	-	6,162	89,763	144,724	139,333	300,186	300,000	260,000	200,000	200,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	80,661	113,004	60,417	100,000	100,000	100,000	100,000	67,381	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	6,162	170,423	257,728	199,750	450,186	1,900,000	2,360,000	2,300,000	1,785,915	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the the **Single Family Residential** Focus Area. See the **Commercial/Industrial/Agriculture** Focus Area plans for additional information.

# Residential

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	50,082
Energy Efficiency MMBtu - Natural Gas	551,490
Energy Efficiency MMBtu - Other Fuels	378,408
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	99,596,820

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	10	1,067	1,231	1,265	10,507	14,711	16,130	5,161	-	-	-	-
-	-	-	381	23,083	34,715	59,799	120,996	141,990	136,777	33,750	-	-	-	-
-	-	-	108	5,636	7,162	15,542	87,084	112,500	116,625	33,750	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	42,720	1,484,758	4,334,092	15,750,000	31,500,000	27,615,000	18,870,250	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	1,332
Energy Efficiency MMBtu - Natural Gas	65,520
Energy Efficiency MMBtu - Other Fuels	28,080
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	222	222	222	222	222	222
-	-	-	-	-	-	-	-	-	10,920	10,920	10,920	10,920	10,920	10,920
-	-	-	-	-	-	-	-	-	4,680	4,680	4,680	4,680	4,680	4,680
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(38,489)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	(193)	(116)	(69)	(8,197)	(11,966)	(13,462)	(4,487)	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	22,392,991
Implementation	8,520,792
Research and Technology Studies	-
Tools, Training and Replication	24,998,655
Business Support	1,086,424
<b>Total</b>	<b>56,998,862</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	9,857	455,631	1,021,615	2,876,888	6,813,500	7,718,125	3,122,375	375,000	-	-	-	-
-	-	175,406	1,068,492	797,966	(387,988)	916,423	2,304,329	1,705,220	1,480,778	460,165	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	44,053	913,291	594,757	2,327,268	896,771	5,100,000	6,084,250	5,476,106	3,562,160	-	-	-	-
-	-	-	-	20,100	48,471	76,667	375,000	390,000	126,186	50,000	-	-	-	-
-	-	219,459	1,991,640	1,868,454	3,009,366	4,766,748	14,592,829	15,897,595	10,205,445	4,447,325	-	-	-	-

# Heat Pumps Phase 2 (2020)

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	4,000,000	-	-	-	-	-	-	-	300,000	1,300,000	1,900,000	500,000	-	-	-	-
Implementation	1,547,152	-	-	-	-	178,339	156,220	70,745	250,000	300,000	500,000	91,849	-	-	-	-
Research and Technology Studies	1,000,000	-	-	-	-	-	-	-	50,000	400,000	400,000	150,000	-	-	-	-
Tools, Training and Replication	4,452,848	-	-	-	-	-	279,222	615,463	1,000,000	1,100,000	1,100,000	358,162	-	-	-	-
Business Support	1,000,000	-	-	-	-	-	-	-	100,000	250,000	500,000	150,000	-	-	-	-
<b>Total</b>	<b>12,000,000</b>	-	-	-	-	<b>178,339</b>	<b>435,443</b>	<b>686,208</b>	<b>1,700,000</b>	<b>3,350,000</b>	<b>4,400,000</b>	<b>1,250,011</b>	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the the **Single Family Residential** Focus Area. See the **Clean Heating & Cooling** and **Low-to-Moderate Income** Focus Area plans for additional information.

# Single Family Market Rate Transition

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	4,064	1,228	908	869	884	170	4	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	93,263	41,228	17,490	14,308	16,949	3,289	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	102,158	27,814	28,144	18,923	22,338	4,939	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	87,348,846	16,191,974	19,595,906	21,066,118	25,913,341	4,556,576	24,931	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	(419)	(141)	(83)	(125)	(59)	(10)	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	(13,236)	(8,317)	(1,950)	(1,618)	(1,207)	(144)	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	(15,348)	(3,869)	(3,945)	(3,450)	(3,048)	(1,036)	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	16,909,088	3,617,356	3,899,593	3,996,494	4,440,320	950,907	4,418	-	-	-	-	-	-	-	-	-
Implementation	6,621,308	1,087,388	1,948,521	1,407,324	1,372,257	702,608	88,884	14,327	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>23,530,396</b>	<b>4,704,744</b>	<b>5,848,114</b>	<b>5,403,818</b>	<b>5,812,577</b>	<b>1,653,515</b>	<b>93,301</b>	<b>14,327</b>	-	-	-	-	-	-	-	-

# Consumer Awareness

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,251,671	-	-	-	12,733	924,424	948,689	365,825	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>2,251,671</b>	-	-	-	<b>12,733</b>	<b>924,424</b>	<b>948,689</b>	<b>365,825</b>	-	-	-	-	-	-	-	-

# Multifamily Residential Plan

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- **Multifamily Low-Carbon Pathways** benefits forecast updated to better reflect the mix of projects that have come into the program to date; these projects are pursuing more envelope and multiple measure packages than originally estimated.
- **Technical Services** benefits forecast updated to reflect updated cost profiles of low carbon capital planning projects.
- Updates made to Evaluation Studies planned start/end dates in Section 3.

#### August 16, 2022

- Budget details associated with this CIP revision:
  - Modified Focus Area Budget remains \$74.6M; Ordered Focus Area Budget of \$71.2M exceeded by \$3.5M and addressed with \$3.1M funding from the Market Development Reserve and \$0.4M budget from Codes and Standards, & Other Multisector Initiatives Focus Area as noted in CIP Appendix A.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area plan.

- Subsequent to the issuance of NYSERDA’s *Petition Regarding CEF Triennial Review*<sup>1</sup> in which CEF Focus Area Funding Authorizations were proposed and later confirmed in the September 2021 CEF Order<sup>2</sup>, several revisions to Market Development portfolio initiatives were filed throughout 2021. Those revisions impacted Multifamily Residential Focus Area plans as follows: **Energy Management Technology** revised to \$14.1M (+6.3M); **Technical Services** revised to \$25.7M (+13.2M); \$10M from **Multifamily** recategorized to the Low-to-Moderate Income Focus Area.
- **Multifamily** initiative name updated, now **Multifamily Low Carbon Pathways**
- Budget details associated with this CIP revision:
  - **Multifamily Low Carbon Pathways** budget revised from \$27.1M to \$24.6M (-2.5M); pilots that were anticipated under this initiative are no longer part of the scope. Section 2.4 updated accordingly.
  - Modified Focus Area Budget revised to \$74.6M; Ordered Focus Area Budget of \$71.2M exceeded by \$3.5M and addressed with funding from the Market Development Reserve as noted in CIP Appendix A

## 1. Focus Area Overview

### Focus Area Description

The multifamily market is highly varied, fragmented, and complex. Variations include the age of the buildings, state of repair, energy performance, ownership and decision-making structures, energy cost/consumption accountability and control, housing regulations, and the complexity or simplicity of building systems. New York State’s existing multifamily building stock houses 24% of the State’s population, comprised of 2.5 million dwelling units—1.7 million affordable (66%) and 0.8 million market-rate—and accounts for 21% of the State’s energy consumption. Most housing units are in the New York City metropolitan area and therefore subject to greenhouse gas emissions limits under NYC’s Local Law 97 of 2019.

Serving the affordable multifamily market is a top priority for NYSERDA. In July 2020, NYSERDA and New York State’s investor-owned utilities jointly announced the Statewide Low- and Moderate-Income (LMI) Portfolio Implementation Plan<sup>3</sup>, a collaborative partnership and increased investment of nearly \$1 billion through 2025 to increase access to energy efficiency and clean energy solutions for low-to-moderate income (LMI) households and affordable multifamily buildings, through new, streamlined LMI incentive programs, community-based outreach and capacity building, and other resources.

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<sup>1</sup> Petition was filed 12/29/2020 and can be found under Case 14-M-0094 at the following link: <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

<sup>2</sup> Order Approving Clean Energy Fund Modifications was filed 9/9/2021 and can be found under Case 14-M-0094 at the following link: <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

<sup>3</sup> Joint Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084 <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

## **Current State of Market**

Market-rate multifamily property owners tend to invest incrementally in their buildings based on financial events such as tenant turnover, equipment replacement/failure, compliance-driven improvements (e.g., façade upgrade requirement), sale, acquisition, and repositioning. Few multifamily owners have capital plans to guide these investments and those with capital plans often do not consider the performance of the building in terms of energy use and emissions. Building owners lack a clear path for how to leverage incremental investments over time to reduce emissions while meeting return on investment (ROI) and other critical investment criteria. For a large segment of the multifamily market, property managers, retained engineering firms, and/or heating, cooling and air conditioning (HVAC) maintenance contractors have significant influence over the work that gets done in a building.

Most of the energy efficiency improvements for this sector have been driven by replacement of failed equipment with new, more efficient models, in some cases, driven by utility rebates. There is a small segment of early adopters undertaking comprehensive efficiency improvements, particularly but not exclusively among large portfolios, that are pursuing ambitious climate or corporate environmental, social and governance goals, by undertaking deep energy retrofits and testing technologies. There are also instances of naturally occurring building electrification upgrades happening in multifamily buildings, mostly in smaller (<20-unit) buildings, driven by a variety of factors. These include a desire to shift heating costs to residents, the marketing appeal of improved climate control, comfort, and indoor air quality, and in certain cases, to resolve or avoid a protracted building-level gas service shut-off resulting from a reported gas leak.

Building owners in New York City are starting to grapple with how to comply with NYC's Local Law 97 of 2019, and New York State's Climate Act, which requires the buildings sector to nearly eliminate on-site emissions by 2050. NYSERDA will advance the market for low-carbon and high-performance solutions in the multifamily sector to enable the transformation in a way that minimizes additional cost, maximizes useful life of investments, and leads to healthier, more comfortable, and easier to operate buildings. Activities to support this goal will target energy management systems and services, low-carbon capital planning tools and services, and low-carbon demonstrations and market challenges. The objective is to streamline replication of proven solutions and practices within large, influential real estate portfolios, among their peers, and across the broader multifamily market.

## **Intervention Strategies**

Initiatives described in this plan will target the needs of the market-rate segment of the multifamily market but remain open and available to all multifamily buildings including regulated and naturally occurring affordable multifamily buildings. Initiatives targeting affordable multifamily housing can be found in the Joint Utility-NYSERDA LMI Implementation Plan noted earlier. This plan is updated and published annually.

The initiatives in this plan will advance the market for efficiently operated, low-carbon multifamily buildings by: providing planning tools, resources and project development support to help owners plan for and undertake investments that reduce building emissions over time; de-risking design and

installation of low-carbon solutions as part of planned investments and demonstrating the business case; working with large portfolio companies and property management firms to enable the replication of low-carbon solutions that meet decision-making criteria such as ROI, tenant satisfaction and other high-value co-benefits; spotlighting the retrofit market opportunity and solution gaps to spur product innovation and investment from solution providers in other markets; and stimulating multifamily building owners to invest in energy management systems and services to efficiently operate building systems that reduce cost and operational downtimes, and provide insights to inform future investments.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan's Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$71.2	\$74.6	\$74.6	-	\$74.6	100%

Initiatives that serve multiple focus areas across NYSEERDA's CEF portfolio are listed with a asterisk (\*).

Initiatives Active in The Market	Funding (\$M)	Period
Energy Management Technology*	\$14.1	2019 -
Technical Services*	\$25.7	2020 -
Market Challenges*	\$10.0	2020 -
Multifamily Low Carbon Pathways	\$24.6	2021 -
<b>Total Active Funding</b>	<b>\$74.5</b>	

Inactive Initiatives (where applicable)	Funding (\$M)	Period
Multifamily Market Rate Transition	\$0.15	2016 - 2018
<b>Total Inactive Funding</b>	<b>\$0.15</b>	
<b>Total Focus Area Funding</b>	<b>\$74.6</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	2.5	6.8
Cumulative Annual Electricity EE Savings (MWh)	0.2	0.3
Cumulative Annual Natural Gas EE Savings (MMBtu)	1.6	4.6
Cumulative Annual Other Fuels EE Savings (MMBtu)	0.3	1.0
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$148	\$201

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technical assistance and/or defrays the cost of installing energy efficient, electrification or clean energy technologies intended to reduce buildings' energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

NYSERDA invests funding from this focus area to support the NYS Clean Heat Market Development Plan, working to advance the electrification of buildings across New York State. Reference the Clean Heating & Cooling focus area plan for more detailed information on this strategic priority.

In addition to the investments listed above, NYSERDA has also committed Multifamily funding to support the Statewide Low- and Moderate-Income Portfolio Implementation Plan, an effort jointly administered with all utilities<sup>4</sup>. This plan is updated annually under the referenced case number.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#)

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<sup>4</sup> Joint Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084 <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1. Energy Management Technology

Energy Management (EM) is an enabling technology that allows for the management of building energy consumption from a combination of building data collection systems (e.g., meters, sensors, equipment feeds), analytics, and building data information services. The EM Technology strategy builds on NYSERDA’s reputation as a source of objective and credible technical information. It spurs demand for EM services by providing independent technical advisement to building owners; gathering, analyzing, and sharing learning and successes related to use of the technology; and demonstrating the value proposition to stimulate investor confidence and replication. EM systems and services that meet the unique needs of building owners help catalyze private investment to improve energy performance.

The EM Technology strategy is being deployed in the Commercial and Multifamily sectors. For the Multifamily sector, NYSERDA supports the deployment of EM solutions across a range of use cases from single-system monitoring of central heating to complex multiple-system management and control. NYSERDA collaborates with utilities to share lessons learned and market opportunities for continued support of EM systems and services.

### Participants, Barriers, and Objectives

Target Market Participants	
EM system providers	Building Operators
EM service providers	Engineering companies
Building owners/management firms	

Target Market Barriers
Customers uncertain of necessary vendor qualifications or best approach to procure.
Lack of unbiased information on qualifications and performance.
Difficulty in assessing site-specific design requirements, associated cost, and return on investment.
Challenge of integrating multiple systems.

Initiative Objectives
Reduce soft costs (e.g., customer acquisition, project development) for a broad segment of building owners interested in obtaining information about their building energy performance.
Assist in the development of the capabilities and business models of the RTEM service vendor community to meet the range of EM needs across multifamily.
Leverage natural market growth by addressing upfront risk and downstream returns.
Improve the predictability of returns from RTEM investments by engaging in studies/pilots which provide replicable approaches.

## Key Activities + Measurements

<b>Activity:</b> Stimulate the market to invest in EM for multifamily buildings and enhance the success rate of these installations.						
<ul style="list-style-type: none"> <li>• Create a qualified vendor list for vendors that have capabilities to integrate multiple building systems onto RTEM platform.</li> <li>• Provide open enrollment incentives for EM systems and services for qualified vendors with eligible RTEM projects.</li> <li>• Provide independent expert EM advisory services and training to building owners, management firms, and operators</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue revised open enrollment incentives for EM systems and services that support Multifamily market.		*				
Output: Number of qualified providers on NYSERDA list serving Multifamily sector (2018 baseline = 0).		20	30	-	-	-
Output: Number of multifamily buildings participating in incentive program (baseline = 0).		300	400	500	-	-
Outcome: large multifamily portfolio owners deploy RTEM across four or more of their buildings (baseline = 1 owner).		-	-	3	5	10
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Apply the knowledge and experience gained from initial installations to replicate success and build market confidence in EM investment for all participants.						
<ul style="list-style-type: none"> <li>• Publish case studies, technical guidance and datasets that demonstrate effectiveness of EM systems and services</li> <li>• Incentivize pilot and demonstration projects that provide greater insight into EM, leveraging these projects to publish case studies</li> <li>• Establish data warehousing to collect project and system level EM performance metrics.</li> <li>• Analyze trends in identified energy efficiency opportunities, persistence, and common practices to share with the marketplace to spur replication.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: NYSERDA makes publicly available anonymized RTEM project data to support market confidence in performance of RTEM systems and services.			*			
Milestone: NYSERDA releases case studies and publicly available aggregated data sets of RTEM projects documenting energy savings achieved in Multifamily buildings, proving out cost-effectiveness.					*	
Output: Number of comprehensive building specific data sets submitted to NYSERDA (baseline = 0).		-	50	100	-	-
Output: Number of pilots complete (baseline = 0).		-	-	5	-	-
Outcome: Size of market as indicated by vendor sales (baseline = \$10M).		-	\$40M	-	-	-
Outcome: Awareness of EM among building owners/managers (baseline = TBD).		-	-	40%	50%	-
Outcome: Persistence of EM service contracts (i.e., how many customers extend their subscription with an RTEM provider beyond 5 years).		-	-	-	40%	60%
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Technical Services

This activity engages energy consultants, solution providers and building owners to provide objective, decision-quality analyses, building-level, and portfolio-level capital planning services, and project pre-development support to advance efficiency, electrification and electrification-readiness solution assessment, scoping, implementation, and replication. This initiative serves the Commercial, Industrial, Agriculture, and Multifamily sectors.

In the Multifamily sector, NYSERDA will provide tools, technical assistance and capital planning services to help building owners incorporate low-carbon upgrades as part of planned investments to meet emission reduction targets. These tools and services will reduce the cost of project scoping and help building owners and managers integrate low-carbon improvements into building and portfolio capital plans that meet ROI criteria. Activities will include: working with market partners to develop technical/financial playbooks for prevalent multifamily building typologies, that identify implementation pathways and financial considerations for packages of measures that leverage common investment milestones; funding building and portfolio-level low-carbon capital planning services and project development services; and developing other tools such as “pre-fab” starter energy models, sample bid documents, and equipment specifications that streamline replication of proven solution and reduce project development costs.

### Participants, Barriers, and Objectives

Target Market Participants	
Energy-focused firms	New York State investor-owned utilities
Professional and industry associations as applicable to each sector.	Trade Associations
End users served by the programs including multifamily residential dwellings.	

Target Market Barriers	
Lack of information.	Seasonality
Competing priorities	Lack of comprehensive energy efficiency and information
General market uncertainty	Site specificity

Initiative Objectives
Build the clean energy and energy management capacity, capability, and interest of consultants, energy service companies, and other energy-focused firms to serve the market and provide objective and credible guidance.
Prove the efficacy of the approaches listed herein through participation rates.
Increase the rate at which clean energy technologies are identified through studies or best practices.

## Key Activities + Measurements

<b>Activity:</b> Continue providing building and portfolio-level assessments of low-carbon solutions to drive clean energy adoption through its successful FlexTech Program. Participants engaged include multifamily building owners and property management firms, A&E firms and energy service providers.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by participants from baseline of 65% <sup>c</sup> .		-	65%	65%	65%	65%
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by non-participants (2020 baseline = 25%) <sup>d</sup> .		-	30%	30%	30%	30%
<b>Related Notes:</b>						
<ul style="list-style-type: none"> <li>a. Technical Services is an initiative that spans multiple focus areas/market sectors. As such, some of the measures associated with this initiative reflect overall market measures and are not specific to one focus area or sector. See the Commercial Focus section 2.6 within the Commercial/Industrial/Agriculture focus area plan for additional detail.</li> <li>b. There are currently no other milestones or outputs associated with this activity.</li> <li>c. The baseline metric identified here can be found in the final FlexTech Impact Evaluation completed March 2012 and posted <a href="#">here</a>.</li> <li>d. The baseline metric identified here can be found in the NYSERDA 2007 to 2010 Commercial and Industrial Existing Facilities Sector Nonparticipant Spillover and Market Effects Study Impact Evaluation Report linked <a href="#">here</a>.</li> </ul>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 Market Challenges

Large multifamily buildings in New York State are being compelled by their investors, residents and state and local laws to take more action to limit their carbon footprint. The Market Challenges initiative seeks to fund high-profile pilot projects that address difficult-to-decarbonize energy use and have the potential for replicability and scale. The initiative intersects with the multifamily market via the Empire Building Challenge, which targets portfolios that include Multifamily buildings, with a focus on serving affordable Multifamily. Retrofit strategies emerging from this initiative are being shared with the utilities.

### Participants, Barriers, and Objectives

Target Market Participants	
Large building and facility owners, managers, and operators.	Energy-focused firms such as consultants, energy service companies, developers, vendors, and financiers.
Original equipment manufacturers of low carbon technologies.	MEP engineering firms

Target Market Barriers
Resource constraints on capital and staff time.
Limited examples of deep energy retrofits for big, tall buildings in NY climate zones.
Uncertainty of project benefits and lack of confidence in value proposition.

Initiative Objectives
By catalyzing portfolio owners to make public commitments to achieving carbon neutral buildings and publishes data on retrofit needs and market opportunity, OEMs, energy-focused firms, and engineering companies will invest in innovation and product development to address market gaps.
By providing independent verification of low-carbon solutions, portfolio owners will have improved confidence in the benefits of low carbon solutions and will replicate proven approaches throughout their portfolio of buildings in NYS.

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Conduct global scans to identify and catalog low carbon technologies that can support low carbon retrofits for big, tall buildings</li> <li>• Convene real estate portfolio owners to develop a shared definition of “carbon neutral” for big, tall buildings.</li> <li>• Compile and publish market data that provides OEMs, energy-focused firms, and engineering companies better visibility on the needs and market potential for low carbon solutions for big, tall buildings.</li> <li>• Develop a pool of real estate portfolio owners partnering with NYSERDA towards the goal of achieving carbon neutral buildings.</li> <li>• Fund demonstration projects of low carbon retrofits in tall buildings through a competitive solicitation and leverage projects to share learnings with stakeholders.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Announce the participating real estate owners and their public commitments from round 1 of solicitation.		*				
Milestone: Announce the partnering of real estate owners and their public commitments from round 2 of solicitation.			*			
Milestones: Announce awards following the release of competitive solicitation.			*			
Output: Increase in number of portfolio owners in multifamily sector with a public commitment to achieving carbon neutral buildings by 2035 (baseline = 0 companies).		4	4	10	-	-
Outcome: Multifamily replication projects within portfolios as measured by total household units served (baseline = 0).		-	-	500	1,500	2,500
<b>Related Notes:</b>						
a. Baseline values for the output and outcome presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.4 Multifamily Low-Carbon Pathways

While the Market Challenges initiative provides funding for deep decarbonization projects in a select number of big, tall, harder-to-electrify buildings, NYSERDA will offer a complementary program to fund packages of commercially available but under-utilized low carbon solutions. These include electrification of heating or hot water, advanced envelope solutions, and integrated HVAC solutions that fit within common investment points throughout a building’s lifecycle. The initiative will target New York’s most common multifamily building types to achieve low-carbon performance over time at lower incremental cost. To build confidence in low-carbon solutions and stimulate replication, NYSERDA will gather data and insight to demonstrate the feasibility, economics and co-benefits (e.g., noise reduction, improved indoor air quality) that drive investment decisions. Where possible, NYSERDA will work with the Utilities to ensure that data and insights gained from the Multifamily Low-Carbon Pathways initiatives inform future strategies and program design.

### Participants, Barriers, and Objectives

Target Market Participants	
Large portfolio owners and property management firms subject to NYC’s LL97.	Architecture and Engineering (A&E) firms
Energy service providers	Utilities

Target Market Barriers
Uncertainty about what measures to install.
Lack of confidence in low carbon technologies’ performance.
High costs

Initiative Objectives
De-risk design and installation of low-carbon solution packages.
Demonstrate the business case on basis of decision-makers’ primary criteria (e.g., ROI, tenant satisfaction, regulation compliance) to enable replication within a portfolio.

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>Develop technical and financial playbooks with multifamily building owners to provide implementation pathways for prevalent multifamily building typologies to achieve low carbon performance over time and that leverage common capital planning milestones. Participants engaged include large portfolio owners and property management firms, A&amp;E firms, and energy service providers.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Identify market need for and create technical assistance tools and resources (e.g., comprehensive cost-benefit analysis frameworks, sample bid documents, ‘starter’ energy models, standard specifications).			*			
Milestone: Update playbooks based on market feedback on additional topics needed, such as hybrid approaches to electrification and resilience considerations.				*		
Output: Publish low carbon playbooks for a total of five prevalent multifamily building typologies.		5	-	-	-	-
<b>Related Notes:</b>						
a. There are currently no outcomes associated with the activity described here.						

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>Fund demonstrations of high-performance and low carbon solutions (e.g., electrification of heating or hot water, advanced envelope solutions, integrated HVAC solutions, etc.) to develop early proof points to demonstrate the feasibility of implementing these solutions in prevalent multifamily building typologies.</li> <li>Gather data and insights from projects to help build the business case for replicating these solutions within and across building portfolios. Participants engaged include large portfolio owners and property management firms, A&amp;E firms, energy service providers, and utilities</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Publish case studies with owners for first cohort of low carbon demonstration projects.			*			
Output: Number of low carbon technology demonstrations in units (baseline = 0 units).		96	1,141	3,314	6,696	11,274
Outcome: Number of multifamily buildings with awareness of low carbon implementation pathways and non-energy benefits of high-performance technologies (baseline = 0).		-	-	-	-	19,002 <sup>a</sup>
Outcome: Number of multifamily buildings adopting high-performance retrofits (baseline = 0).		-	-	-	-	3,040 <sup>a</sup>
<b>Related Notes:</b>						
a. These targets are subject to change with more accurate population data.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

**Activity:**

Implement a pilot program related to non-energy benefits (NEBs) that have potential to increase adoption of energy efficiency, electrification and other low carbon solutions, Pilot projects will help building decision-makers more confidently consider benefits beyond utility bill and operational savings.

- Initially conduct research to review existing literature studying NEBs and engage with multifamily stakeholders (e.g., owners, managers, building operations, service providers, brokers) to determine whether and which NEBs have the ability to impact capital improvement decision-making to support the adoption of carbon-reducing technologies
- Validate the results from market research with experts and market participants to assess the impacts of NEBs and determine if there is a viable path to monetization. If this assessment is positive, evaluate NEBs as part of case studies for low carbon demonstrations.

Participants engaged include large portfolio owners and property management firms, A&E firms and energy service providers.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Develop preliminary method of collecting information from multifamily stakeholders on the value of non-energy benefits and their connection with low carbon retrofits.		*	*			
Milestone: Collect and review data from preliminary market stakeholder assessments to determine need and design considerations for a non-energy benefits pilot.			*	*		
Output: Number of non-energy benefit pilot projects (baseline = 0).			TBD	TBD	TBD	TBD

**Related Notes:**

- There are currently no outcomes associated with the activity described here.
- The baseline value for the output presented in this table is not derived from evaluation studies.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work. Note that Market Rate studies detailed below may be bolstered by other studies performed for Low-to-Moderate Income initiatives serving this same market sector. Reference the Low-to-Moderate Income Focus Area Plan.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Multifamily	Multifamily Low Carbon Pathways	Low Carbon Pathways Tenant Survey	Market	n/a	2022 Q1	2022 Q4	In Progress
MD - Multifamily	Various - Multifamily	Multifamily Building Stock Assessment	Building Stock and Potential Studies	n/a	2020 Q4	2023 Q1	In Progress
MD - Multifamily	Multifamily Low Carbon Pathways	Low Carbon Pathways Tenant Survey	Impact	TBD	2022 Q4	TBD	Upcoming

# Energy Management Technology

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	153,118
Energy Efficiency MMBtu - Natural Gas	510,647
Energy Efficiency MMBtu - Other Fuels	195,209
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	111,007,412

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	3,932	3,033	910	20,000	20,000	22,101	27,714	27,714	27,714	-	-	-
-	-	-	62,229	21,944	5,625	35,000	38,500	45,612	104,779	98,479	98,479	-	-	-
-	-	-	3,598	9,583	1,665	15,000	16,500	19,548	44,905	42,205	42,205	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	5,239,463	24,018,395	11,561,932	7,684,930	11,527,395	11,527,395	14,956,625	12,000,000	12,000,000	491,277	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	127,000
Energy Efficiency MMBtu - Natural Gas	1,787,819
Energy Efficiency MMBtu - Other Fuels	766,209
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	1,000	2,000	4,000	8,000	16,000	24,000	32,000	40,000
-	-	-	-	-	-	-	10,343	16,204	214,200	277,937	194,680	111,246	111,246	851,963
-	-	-	-	-	-	-	4,433	6,945	91,800	119,116	83,434	47,677	47,677	365,127
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	12,616,938
Implementation	872,300
Research and Technology Studies	-
Tools, Training and Replication	610,000
Business Support	-
<b>Total</b>	<b>14,099,239</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	110,219	1,370,023	1,420,979	1,343,166	1,100,000	2,000,000	2,500,000	1,800,000	972,551	-	-	-	-
-	11,181	57,878	56,492	194,821	240,290	60,319	76,026	100,000	75,292	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	32,740	93,158	109,812	100,000	150,000	100,000	24,290	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	11,181	168,097	1,459,255	1,708,959	1,693,268	1,260,319	2,226,026	2,700,000	1,899,582	972,551	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the the **Multifamily Residential** Focus Area. See the **Commercial/Industrial/Agriculture** Focus Area plans for additional information.

# Technical Services

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	36,116
Energy Efficiency MMBtu - Natural Gas	1,608,122
Energy Efficiency MMBtu - Other Fuels	225,321
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	8,492,767

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	390	1,480	1,751	3,341	4,359	5,036	6,560	5,036	3,357	3,022	1,785
-	-	-	-	(24,590)	26,422	80,294	151,339	202,480	235,914	307,282	235,914	157,276	141,549	94,240
-	-	-	-	33,260	4,037	10,831	22,544	24,407	26,213	34,142	26,213	17,475	15,728	10,471
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	50,000	1,305,232	562,996	1,726,326	1,183,951	1,096,102	1,037,070	807,319	459,502	264,268	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	35,078
Energy Efficiency MMBtu - Natural Gas	1,634,620
Energy Efficiency MMBtu - Other Fuels	191,172
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	1,522	2,469	4,226	5,229	6,745	5,229	3,558	3,223	2,876
-	-	-	-	-	-	70,746	114,982	196,856	243,832	314,856	243,832	165,539	149,880	134,098
-	-	-	-	-	-	8,482	13,522	23,116	28,336	36,227	28,336	19,636	17,896	15,621
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(388)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	(388)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	19,361,651
Implementation	5,038,348
Research and Technology Studies	1,350,000
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>25,749,999</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	74,980	751,552	1,204,294	4,393,655	3,908,988	3,018,662	2,441,094	1,863,527	782,668	922,231	-
-	-	-	-	39,581	384,765	230,046	1,229,211	885,032	688,358	590,021	491,684	196,674	302,975	-
-	-	-	-	-	19,045	15,000	205,000	330,955	299,000	221,000	260,000	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	114,561	1,155,362	1,449,340	5,827,866	5,124,975	4,006,020	3,252,116	2,615,211	979,342	1,225,206	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the the **Multifamily Residential** Focus Area. See the **Commercial/Industrial/Agriculture** Focus Area plans for additional information.

# Market Challenges

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	13,132
Energy Efficiency MMBtu - Natural Gas	19,840
Energy Efficiency MMBtu - Other Fuels	4,960
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	30,000,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	13,132	-	-	-	-	-	-
-	-	-	-	-	-	-	-	19,840	-	-	-	-	-	-
-	-	-	-	-	-	-	-	4,960	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	15,000,000	15,000,000	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	78,780
Energy Efficiency MMBtu - Natural Gas	119,040
Energy Efficiency MMBtu - Other Fuels	29,760
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	8,666	17,594	10,504	10,504	10,504	10,504	10,504
-	-	-	-	-	-	-	-	13,094	26,586	15,872	15,872	15,872	15,872	15,872
-	-	-	-	-	-	-	-	3,274	6,646	3,968	3,968	3,968	3,968	3,968
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	8,500,000
Implementation	500,000
Research and Technology Studies	-
Tools, Training and Replication	1,000,000
Business Support	-
<b>Total</b>	<b>10,000,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	288,376	736,812	1,000,000	4,000,000	2,474,812	-	-	-	-	-
-	-	-	-	-	228,253	98,000	77,024	50,000	46,723	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	134,091	233,385	250,000	200,000	149,569	32,954	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	650,721	1,068,197	1,327,024	4,250,000	2,671,104	32,954	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the the **Multifamily Residential** Focus Area. See the **Commercial/Industrial/Agriculture** Focus Area plans for additional information.

# Multifamily Low Carbon Pathways

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	82,394
Energy Efficiency MMBtu - Other Fuels	9,155
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	51,699,615

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	6,740	8,239	16,479	24,718	26,218	-	-	-
-	-	-	-	-	-	-	749	915	1,831	2,746	2,913	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	993,294	-	8,842,500	5,070,632	10,141,264	15,211,896	11,440,028	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	51,272
Energy Efficiency MMBtu - Natural Gas	1,212,880
Energy Efficiency MMBtu - Other Fuels	134,764
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	234	468	1,310	3,733	6,059	8,247	9,974	9,229	7,270	4,749
-	-	-	-	-	5,533	11,066	30,986	88,310	143,333	195,079	235,936	218,319	171,972	112,345
-	-	-	-	-	615	1,230	3,443	9,812	15,926	21,675	26,215	24,258	19,108	12,482
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(3,617)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	(296)	(362)	(723)	(1,085)	(1,151)	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	12,334,851
Implementation	3,793,462
Research and Technology Studies	1,534,000
Tools, Training and Replication	6,975,702
Business Support	-
<b>Total</b>	<b>24,638,016</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	1,920	65,510	1,070,619	1,888,496	2,480,321	3,004,692	2,187,550	1,635,743	-	-	-
-	-	-	-	13,269	140,130	301,071	550,616	836,230	960,775	604,561	347,921	38,889	-	-
-	-	-	-	-	-	120,000	350,100	383,500	283,500	206,800	190,100	-	-	-
-	-	-	-	-	12,878	157,388	1,111,742	1,524,945	1,761,111	1,183,539	1,185,212	38,889	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	15,189	218,517	1,649,078	3,900,954	5,224,995	6,010,078	4,182,450	3,358,976	77,778	-	-

# Multifamily Market Rate Transition

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	829	-	36	793	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	70,547	-	69,691	856	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	2,487	-	109	2,378	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	153,727	46,554	77,905	29,268	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>156,214</b>	<b>46,554</b>	<b>78,014</b>	<b>31,645</b>	-	-	-	-	-	-	-	-	-	-	-	-

# Commercial/Industrial/Agriculture Plan

## Market Development Portfolio Focus Area

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Industrial Transition** initiative budget revised from \$55.4 M to \$48.2M (-7.2M).

- **Market Challenges** budget revised from \$106.0M to \$113.0M (+7.0M) to support additional Commercial & Industrial Carbon Challenge projects; benefits plans adjusted accordingly. Section 2.3 also updated with minor changes to existing activities & associated measures.
- **Technical Services** (Commercial) budget revised from \$71.6M to \$76.6M (+5.0M) to support additional studies; benefits plans adjusted accordingly.
- **Energy Management Technology** initiative budget remains \$108.3M, however funding allocations have been adjusted with \$10M now directed to support high efficiency Energy Recovery Ventilators (ERV), which allow for the recovery and re-utilization of waste heat from buildings. Section 2.1 of the plan has been updated accordingly including additional activities.
- Modified Focus Area Budget revised from \$524.0M to \$528.9M (+4.8M); Ordered Focus Area Budget of \$501.2M is exceeded by \$27.6M in total. This revision has been addressed with funding from the Renewables/DER Focus Area as noted in CIP Appendix A. Prior Focus Area Budget adjustments noted below.
- **REV Campus Challenge** benefits forecast updated to reflect results of evaluation study which resulted in substantial increases to the projected impact of this initiative.
- Updates made to Evaluation Studies timing & status for several initiatives in Section 3.

#### August 16, 2022

- Budget details associated with this CIP revision:
  - **Market Challenges** budget revised from \$101.0M to \$106.0M (+5.0M) to support additional Empire Building Challenge market demonstration projects of replicable retrofit approaches that decarbonize tall, existing buildings.
  - Modified Focus Area Budget revised from \$519.0M to \$524.0M (+5.0M); Ordered Focus Area Budget of \$501.2M is exceeded by \$22.8M in total with this and prior revisions and addressed with funding from the Market Development Reserve as noted in CIP Appendix A
- **Greenhouse Lighting and Systems Engineering** outcome description updated from number of provisional patents filed to number of intellectual properties or technology disclosures filed.
- Updates made to Evaluation Studies planned start/end dates in Section 3.

#### May 20, 2022

- Initial filing of NYSERDA's Compiled Investment Plan (CIP) and this Focus Area Plan.
- Subsequent to the issuance of NYSERDA's *Petition Regarding CEF Triennial Review*<sup>1</sup> in which CEF Focus Area Funding Authorizations were proposed and later confirmed in the September 2021 CEF Order (link), several revisions to Market Development portfolio initiatives were filed throughout 2021. Those revisions impacted Commercial/Industrial/ Agriculture Focus Area plans as follows: **Energy Management Technology** revised to \$108.3M (+49.5M); **Technical Services** revised to \$71.6M (+22.0M); **Real Estate Tenant** revised to \$15.8M (-9.7M) and designated inactive; **Industrial Transition** revised to \$61.2M (-4.8M).
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Industrial Transition** revised from \$61.2M to \$55.4M (-5.7M); **Commercial Transition** revised from \$12.58M to \$12.56M (-0.02M)
  - **Market Challenges** budget revised from \$95.2M to \$101.0M (+5.7M) as part of expanding support for the Empire Building Challenge, allowing for a broader set of market stakeholders to replicate and build on the retrofit strategies for big buildings that are emerging from the initiative. Plans revised accordingly.

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<sup>1</sup> Petition was filed 12/29/2020 and can be found under Case 14-M-0094 at the following link: <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-M-0094&CaseSearch=Search>

- Modified Focus Area Budget revised to \$519.0M (+17.8M); Ordered Focus Area Budget of \$501.2M exceeded by \$17.8M and addressed with funding from the Market Development Reserve as noted in CIP Appendix A
- Plan details (target market, activities, etc.) pertaining to each Commercial, Industrial, and Agriculture market segment has been organized separately as noted in the Table of Contents for ease of viewing.
- **REV Campus Challenge** outputs and outcomes measures refined to reflect only most relevant targets and progress metrics. Other measures will continue to be tracked for additional market analysis and insight. Section 2.2 updated accordingly.
- As of this filing, **Energy Management Practices** is redeploying funding within the initiative from Strategic Energy Management (SEM) to support more Onsite Energy Management (OSEM) efforts and incorporating other program design changes to expand eligibility and increase participation through a rolling solicitation. The SEM approach has been severely limited by COVID.
- **2030 GLASE** initiative name updated, now **Greenhouse Lighting and Systems Engineering**.
- **Advancing Agricultural Energy Technologies** updated benefits plans, using recent results from completed projects to improve forecast accuracy.
- **Consumer Awareness** was originally categorized as (partly) supporting the Commercial sector and was later determined to be fully Residential, therefore that initiative will only be included in the Single Family Residential Focus Area plan going forward.

## 1. Focus Area Overview

### Focus Area Description

The Commercial/Industrial/Agriculture Focus Area addresses the roughly one million existing buildings and facilities in New York State that are not used primarily for housing. Systems and processes within these buildings range from simple to the very complex and vary based on energy use intensity. In addition to lighting, HVAC systems, and domestic water, these buildings often contain a variety of business-specific equipment and many house industrial processes. Large commercial, industrial buildings and facilities, and some agricultural processes, represent most of the largest energy users and carbon emitters in the State.

The primary ways that this focus area will support NYS goals to serve disadvantaged community regions with environmental justice concerns will be to decarbonize the buildings which provide services to these communities, such as schools, and to reduce site-based emissions from large emitters with facilities located within these communities. NYSERDA is making significant increases to investments that decarbonize schools in underserved communities and leverage all state and federal funding. NYSERDA is also promoting and prioritizing decarbonization located in these communities in demonstrations such as the Commercial and Industrial carbon challenge.

Since the buildings and facilities in these sectors are often designed for a specific purpose, the path to efficiency and carbon neutrality needs to be organized by building use, typology, and presence of process equipment. Solutions, economics, and barriers tend to be similar where the purpose of the facilities and building typology is the same. Funding demonstrations that prove the performance and economics of clean energy solutions, and then replicating the solution across the domain of similar facilities and buildings is a key part of the strategy.

## **Current State of Market**

**Commercial:** The commercial sector in New York State is dominated by a few building typologies including office, retail, education, healthcare, and hospitality. Campuses may contain mixtures of buildings and central heating systems. There are vast differences in the commercial building stock between Upstate New York and New York City's Metropolitan Area. Factors include economic growth, land prices, and climate zones. Buildings in Upstate New York tend to be less than 50 feet tall and encompass mid-rise and some high-rise buildings in urban areas. While there are also many low-rise buildings in New York City's Metropolitan Area, the square footage of commercial space is dominated by mid-rise and high-rise buildings.

New York State has the highest concentration of leased commercial space in the country, most of which is in New York City. NYSERDA's energy-related solutions for leased spaces must address the energy used by tenants and the relationship between tenants and owners in terms of investment and energy use. New York City also has the highest concentration of super-tall buildings outside of Asia. Due to their size and complexity, these buildings require new solutions to achieve carbon neutrality. Simply electrifying the current heating load and shape does not necessarily work for either building performance or economics. It also poses a challenge for the electric grid, as these buildings have very high energy demand. Retaining heat, thermal storage, and other thermal load shifting and reduction strategies are essential with these large commercial buildings.

Local Law 97 in New York City is driving efficiency and emissions reduction investments in large commercial buildings and NYSERDA is well positioned to take advantage of the momentum and opportunity to help building owners and managers meet the goals of the Local Law. In addition, there are approximately 1,600 buildings in New York City on the Con Edison steam system. The future path for de-carbonization of these buildings will be greatly determined by the future of the steam system and its de-carbonization.

NYSERDA activities in the commercial buildings sector, as described in this Focus Area, will work in conjunction with the Codes, Standards and Other Multisector Focus Area to explore and implement energy benchmarking and emission reduction standards. Providing tools and assistance to building owners will be an important role of the Commercial team.

**Industrial:** New York State has a broad mix of industrial facilities. The larger sectors include pulp and paper, chemicals, food, warehousing/distribution, data centers, and wastewater treatment. Cement and metals are among the largest emitters.

NYSERDA's investments for the industrial sector extend beyond buildings to include energy savings and carbon reductions in both industrial processes and process equipment. The energy and thermal load of industrial processes pose a challenge to electrification of all industrial loads; low-to-zero carbon fuels will need to be part of the solution set. Facilities in this sector pose an additional challenge as they often have high-energy demand. Retaining heat, thermal storage, and other thermal load-shifting and reduction strategies are essential with these large industrial facilities.

In addition to the energy profile, most of the industrial base outside of warehousing/distribution and wastewater treatment is trade exposed and thus constrained in its ability to pass higher costs of doing business in New York State on to their customers. NYSERDA’s support for cost-effective decarbonization solutions is of utmost importance for these types of industries.

**Agriculture:** New York State has a broad mix of agricultural operations with some of the larger sectors identified as dairy, fruit, vegetables, and grains. The use of controlled environment indoor growing, which extends the growing season and is used for high-value produce, is an expanding sector with its own set of energy challenges. In addition, NYSERDA has invested in the design of lighting and greenhouse energy management in the expanding area of controlled environment indoor growing. While not as trade exposed as the industrial sector, this area is still very sensitive to costs and often unable to pass on higher costs of production.

**Intervention Strategies**

NYSERDA has designed its activities to work in conjunction with programs and incentives available through the utilities. NYSERDA has positioned its services in three specific complimentary areas which apply across the commercial, industrial, and agriculture sectors: identifying and developing investment-grade clean energy projects for buildings, facilities, and processes; using technology to better understand and control how buildings, facilities, and processes use energy; and supporting deep, comprehensive de-carbonization projects that can serve as models for replication. Several initiatives that serve this focus area work in concert to serve similar but uniquely-tuned needs of other focus areas across the portfolio.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$501.2	\$528.9	\$524.0	+ \$4.8	\$528.9	100%

Initiatives that serve multiple focus areas across NYSERDA’s CEF portfolio are listed with asterisk (\*).

Initiatives Active in the Market	Funding (\$M)	Period
Energy Management Technology*	\$108.3	2016 -
Greenhouse Lighting and Systems Engineering	\$5.0	2016 -
REV Campus Challenge	\$21.7	2016 -
Energy Management Practices	\$28.9	2017 -
Market Challenges*	\$113.0	2018 -
P-12 Schools	\$57.6	2018 -
Pay for Performance*	\$34.0	2018 -
Technical Services*	\$76.6	2018 -
Advancing Agricultural Energy Technologies	\$3.8	2019 -
<b>Total Active Funding</b>	<b>\$448.7</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
Agriculture Transition	\$3.6	2016 – 2019
Commercial Transition	\$12.6	2016 – 2019
Industrial Transition	\$48.2	2016 – 2019
Real Estate Tenant	\$15.8	2016 – 2021
<b>Total Inactive Funding</b>	<b>\$80.2</b>	
<b>Total Focus Area Funding</b>	<b>\$528.9</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	26.5	41.2
Cumulative Annual Electricity EE Savings (MWh)	3.6	5.6
Cumulative Annual Natural Gas EE Savings (MMBtu)	10.8	18.0
Cumulative Annual Other Fuels EE Savings (MMBtu)	10.7	11.6
Renewable Energy (RE) Distributed Solar Capacity (MW)	0.0	0.0
Mobilized Clean Energy Investment (Leveraged Funds)	\$2,257	\$2,831

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technical assistance and/or defrays the cost of installing energy efficient, electrification or clean energy technologies intended to reduce building or industrial energy consumption

and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the building/industrial facility energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

NYSERDA invests funding from this focus area to support the NYS Clean Heat Market Development Plan, working to advance the electrification of buildings across New York State. Reference the Clean Heating & Cooling focus area plan for more detailed information on this strategic priority.

Some CEF initiatives are strategically partnered with Regional Greenhouse Gas Initiative (RGGI) funding to maximize the reach and impact of these collective efforts. As it relates to this CEF focus area NYSERDA also invests RGGI funding that bolsters the following CEF initiatives: P-12 Schools.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

# Commercial Focus

## 2.1 Energy Management Technology

Energy Management (EM) are enabling technologies that allow for the management of building energy consumption and decarbonization of building operations over time. EM technologies include Real Time Energy Management (RTEM) systems which are a combination of building data collection systems (e.g., meters, sensors, equipment feeds), analytics, and building data information services; as well as high efficiency energy recovery ventilators (ERV) which allows for the recovery and re-utilization of waste heat from a building. The EM Technology strategy builds on NYSERDA’s reputation as a source of objective and credible technical information. It spurs demand for EM services by providing independent technical advisement to building owners that invest in EM gathering, analyzing, sharing learning and successes related to the technology, and demonstrating the value proposition to stimulate investor confidence and replication. EM systems and services that meet the unique needs of building owners, help catalyze private investment to improve energy performance. The EM Technology strategy is being deployed in the Commercial, Industrial and Multifamily sector. For the Commercial sector, NYSERDA is supporting the deployment of EM solutions to support tenant energy management in commercial office buildings as well as the deployment of high efficiency ERV solutions for commercial buildings statewide through vendor qualification and support for retrofit planning and design work. In Q1 2021, NYSERDA’s initial Real Time Energy Management (RTEM) base building offering for the commercial sector concluded and it is now in active collaboration with the utilities to share lessons learned and market opportunities for continued support of EM systems and services.

### Participants, Barriers, and Objectives

Target Market Participants	
EM system providers	Building owners/management firms
EM service providers	Building operators
ESCOs	Office tenants

Target Market Barriers	
Customers uncertain of necessary vendor qualifications or best approach to procure.	Lack of unbiased information on qualifications and performance.
Difficulty in assessing site-specific design requirements, associated cost, and return on investment.	Challenge of integrating multiple systems.

Initiative Objectives	
Reduce soft costs (e.g., customer acquisition, project development) for a broad segment of building owners interested in obtaining information about their building energy performance.	
Assist in the development of the capabilities and business models of the RTEM service vendor community to meet the range of EM needs across commercial.	
Leverage natural market growth by addressing upfront risk.	
Improve the predictability of returns from RTEM investments by engaging in studies/pilots which provide replicable approaches.	

## Key Activities + Measurements

### Activity:

Apply the knowledge and experience gained from initial installations to replicate success and build market confidence in EM investment.

- Publish case studies, technical guidance and datasets that demonstrate effectiveness of EM systems and services.
- Provide open enrollment incentives to support EM systems and services for small to medium businesses.
- Incentive pilots and demonstration projects that provide greater insight into EM, leveraging these projects to publish case studies
- Establish data warehousing to collect project and system level EM performance metrics. Analyze trends in identified energy efficiency opportunities, persistence, and common practices to share with the marketplace to spur replication.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Make publicly available anonymized RTEM project data to support market confidence in performance of EM systems and services.			*			
Milestone: Create open enrollment incentives for EM systems and services that support RTEM projects in small to medium businesses.		*				
Output: Number of comprehensive building specific data sets submitted to NYSERDA (baseline = 0).		200	400	-	-	-
Output: number of pilots complete (baseline = 0).		-	10	-	-	-
Output: number of small to medium business RTEM projects supported by NYSERDA (baseline = 0).		-	10	80	200	-
Output: number of qualified providers on NYSERDA list (baseline = 0).		90	100	120	-	-
Outcome: Awareness of EM among building owners/managers (baseline = 0).		-	40%	-	-	-
Outcome: Persistence of EM service contracts (i.e., how many customers extend their subscription with an RTEM provider beyond 5 years) (baseline = 0).		-	60%	-	-	-
Outcome: Percent of EM projects that institute an energy efficiency goal (baseline = 0).		-	65%	-	-	-
Outcome: Size of market as indicated by vendor sales (baseline = \$10M) <sup>a</sup> .		-	\$40M	-	-	-

### Related Notes:

- Baseline metrics identified here can be found in the final Energy Management Technology Market Evaluation completed December 2018 and posted [here](#). The remaining baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

<b>Activity:</b> Stimulate the market to invest in EM for tenant spaces and enhance the success rate of these installations:						
<ul style="list-style-type: none"> <li>• Create qualified vendor list for vendors that have capabilities to integrate multiple building systems and support tenant energy management.</li> <li>• Provide open enrollment incentives for EM systems and services for qualified vendors that serve commercial building owners and tenants.</li> <li>• Provide independent expert EM advisory services and training to building owners, management firms, operators and tenants.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Create a qualified vendor list for vendors that have capabilities to integrate building systems and meet advanced EM system and service capability and performance standards.		*				
Milestone: Create open enrollment incentives for EM systems and services that extend into tenant spaces.		*				
Milestone: Publish case studies and publicly available aggregated data sets of RTEM + Tenants projects documenting energy savings achieved.					*	
Output: number of commercial real estate portfolio owners deploying RTEM + Tenants projects within their buildings (baseline = 0).		1	3	7	15	-
Output: total square feet (millions) of RTEM + Tenants project supported by NYSERDA (baseline = 0).		1	5	15	30	-
Output: # of qualified vendors with capabilities of providing EM services for tenant spaces (baseline = 0).		5	10	15	25	-
Outcome: % of RTEM + Tenants projects that monitor at least 75% of a building's tenant energy consumption (baseline = 0).		-	-	10%	15%	25%
Outcome: % of commercial portfolio owners who invest in EM systems and services for Local Law compliance (baseline = 0).		-	-	5%	15%	25%
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Stimulate the market to invest in high efficiency Energy Recovery Ventilators (ERV) for commercial building retrofits and build customer awareness of and confidence in enhanced ventilation						
<ul style="list-style-type: none"> <li>• Create qualified vendor list of manufacturers that meet standards of high efficiency energy recovery ventilation systems</li> <li>• Provide open enrollment funding to reduce the upfront design and engineering costs for ERV retrofits in commercial buildings</li> <li>• Produce design templates and provide independent expert advisory services and training to design engineers, building owners, management firms, and operators</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Milestone: Create a qualified vendor list for ERV manufacturers that meet high efficiency standards and will invest in business development in NYS		*				
Milestone: Create open enrollment incentives for design work on ERV retrofits		*				
Milestone: Publish design templates to enable replication of ERV retrofits				*		
Output: number of commercial buildings participating in ERV initiative		10	30	50		
Output: # of qualified vendors active in NYS selling high efficiency ERV solutions (baseline = 0).		5	10	12		
Outcome: % of commercial building square feet that can replicate successful ERV retrofit approaches by utilizing design templates and related program resources (baseline: 0%)					5%	10%
Outcome: market share of high efficiency ERV systems in NYS (baseline: TBD)						10%
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

### Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 REV Campus Challenge

Of the approximately 250 higher education institutions in New York State, some have made substantial progress in energy efficiency gains and others are struggling to begin. This initiative will drive the implementation of clean energy projects and strategies at institutions of higher education and their surrounding communities by leveraging existing national and local Clean Energy Challenges as well as peer-based sustainability scorecards. Colleges and universities embarking on their path to clean energy adoption would benefit from the lessons learned and knowledge transfer available from their peers. Increased recognition and a platform for peer exchange will stimulate knowledge and implementation of clean energy projects in this sector.

### Participants, Barriers, and Objectives

Target Market Participants	
Institutional decision-makers	State University of New York (SUNY) Administration.
Second Nature (supporting organization for the Climate Commitments).	NYPA
Association for the Advancement of Sustainability in Higher Education (AASHE).	Commission on Independent Colleges and Universities (CICU).

Target Market Barriers	
Lack of state-level recognition for clean energy projects and strategies.	Lack of coordination between campuses and communities in implementing clean energy projects.
Lack of knowledge and resources needed to develop an initial college and university specific roadmap/energy master plan for improving energy efficiency and reducing GHG emissions.	Lack of funding for clean energy projects and strategies.
Lack of knowledge sharing and lessons learned among New York State institutions.	

Initiative Objectives
Establish the value of and increase implementation of clean energy projects and strategies on campuses and within their surrounding communities in the State of New York.
Engage students, faculty, and staff through the exchange of information within and among peer institutions.
Generate an environment where campuses engage with surrounding communities to foster clean energy initiatives, and prospective students are more aware of an institution's commitment to clean energy/sustainability.
Utilize higher education's capacity to conduct research and demonstrations.

## Key Activities + Measurements

<b>Activity:</b>						
Provide targeted outreach and communication to drive REV Campus Challenge membership and ascertain needs including webinars, website updates, event invites, and one-on-one outreach.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of REV Campus Challenge members (baseline = 0).		130	135	140	145	150
Output: Number of REV Campus Challenge Members reporting new clean energy projects on campus <sup>a</sup> (baseline = 0).		83	85	90	93	95
Output: Number of REV Campus Challenge Members reporting new clean energy curricula or curriculum integration <sup>a</sup> (baseline = 0).		49	50	51	52	53
Outcome: Number of REV Campus Challenge Members with new or updated climate action plans, energy master plans, or GHG inventories (baseline = 0).		73	75	77	80	85
Outcome: Number of REV Campus Challenge Members with staff assigned to manage clean energy/sustainability goals <sup>a</sup> (baseline = 82%; 18/22).		91	91	93	95	95
Outcome: Number of REV Campus Challenge Members reporting a greater understanding of clean energy opportunities on their campus <sup>a</sup> (baseline = 0).		71	75	80	85	90
Outcome: Number of REV Campus Challenge Members reporting greater buy-in and support from management for clean energy projects and initiatives <sup>a</sup> (baseline = 0).		52	55	58	60	65
Outcome: Number of REV Campus Challenge Members reporting improved community relations as a result of clean energy strategies <sup>a</sup> (baseline = 0).		46	48	50	52	55
<b>Related Notes:</b>						
a. As reported through the annual survey.						
b. There are currently no milestones associated with the activity described here.						
c. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 Market Challenges

Large commercial buildings in New York State are being compelled by their investors, occupants, and state and local laws to take more action to limit their carbon footprint. The Market Challenges initiative seeks to address a difficult-to-decarbonize energy use that has the potential for replicability and scale. The initiative includes the Empire Building Challenge, which targets portfolios that include commercial office buildings, as well as multifamily buildings, and the Commercial and Industrial Carbon Challenge, which seeks to de-risk decarbonization solutions through project demonstrations.

### Participants, Barriers, and Objectives

Target Market Participants	
Ratepayers with high levels of energy consumption in the commercial, industrial, and multifamily sectors.	Mechanical Electrical and Plumbing (MEP) engineering firms.
Energy-focused firms such as consultants, energy service companies, developers, vendors, and financiers.	Large building and facility owners, managers, and operators.
Original equipment manufacturers (OEMs) of low-carbon technologies.	

Target Market Barriers	
Resource constraints of the customer.	Resource constraints on capital and staff time.
Limited ability to implement bundled energy solutions.	Limited examples of deep energy retrofits for big, tall buildings in NY climate zones.
Limited examples of deep energy retrofits for large energy users.	Uncertainty of project benefits and lack of confidence in value proposition.
Low market prices of natural gas.	

Initiative Objectives	
Support carbon reduction strategies for which there are limited alternative means of utility or NYSERDA support.	
Catalyze investment by providers of deep-decarbonization solutions, particularly in the industrial sector, to increase availability of products and services in the NY state market.	
By catalyzing portfolio owners to make public commitments to achieving carbon neutral buildings and publishing data on retrofit needs and market opportunity, OEMs, energy-focused firms, and engineering companies will invest in innovation and product development to address market gaps.	
By providing independent verification of low-carbon solutions, portfolio owners will have improved confidence in the benefits of low-carbon solutions and will replicate proven approaches throughout their portfolio of buildings in NYS.	

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>Conduct a global scan to identify and catalog low carbon technologies that can support low carbon retrofits for big, tall buildings.</li> <li>Convene real estate portfolio owners to develop a shared definition of “carbon neutral” for big, tall buildings.</li> <li>Compile and publish market data that provides OEMs, energy-focused firms, and engineering companies better visibility on the needs and market potential for low-carbon solutions for big, tall buildings.</li> <li>Develop a pool of real estate portfolio owners partnering with NYSERDA toward the goal of achieving carbon neutral buildings.</li> <li>Fund demonstration projects of low-carbon retrofits in tall buildings through a competitive solicitation and leverage projects to share learnings with stakeholders.</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Announce the participating real estate owners and their public commitments from solicitations.		Rnd 1	Rnd 2			
Milestone: Announce awards following the release of competitive solicitation.			*	*		
Output: Increase in number of portfolio owners in commercial sector with a public commitment to achieving carbon neutral buildings by 2035 (baseline = 0 companies).		6	6	10	12	-
Outcome: commercial replication projects within portfolios as measured by total square footage (baseline = 0).		-	-	0.5M	1.5M	2.5M
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
Fund carbon reduction project portfolios for large industrial and commercial ratepayers through a competitive solicitation and leverage projects to share learnings on low-carbon energy and manufacturing strategies.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue awards following release of competitive solicitation.		*	*	*	*	*
Output: Number of sites participating (baseline = 0).		16	25	31	-	-
Outcome: Awarded participants employ advanced decarbonization solutions in their project portfolios.		4	7	8	-	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.4 P-12 Schools

The more than 6,000 public and private schools in New York State are estimated to spend a total of approximately \$1 billion on energy costs annually, and roughly 2000 of these schools are in under-resourced communities, the average age of school buildings is over 60 years. While school districts expect to own and manage their buildings throughout their useful life, investments in clean energy upgrades are often difficult due to competition for resources and funding limits. This initiative will engage the pre-kindergarten through grade 12 (P-12) school sector in pursuing carbon savings and clean energy projects. Activities include benchmarking and operational assessments, energy master planning, electrification, and indoor air quality analysis. Other professional services will be provided to increase awareness of the value of energy efficiency and efficient operations, as well as stimulate demand and investment in clean energy across the sector. Funds will be provided for installations and demonstrations to showcase replicable paths to decarbonization. The primary emphasis will be placed on disadvantaged community’s schools with dedicated initiatives and funding to reach these traditionally under resourced buildings. NYSERDA also invests RGGI funding to bolster the P-12 initiative and support state-wide work.

### Participants, Barriers, and Objectives

Target Market Participants	
6,000 P-12 Schools, with focus on the 2,000 schools in under-resourced communities	State Education Department
NYS Office of General Services	BOCES
Superintendents of Schools	Facilities Staff
School Business Officials	The NYS School Boards Association
Energy Service Companies	Architects and Engineers
School Health Advocacy Organizations	New York Power Authority
Local Government	

Target Market Barriers	
Limited school staff time.	Limited funding.
Limited insight into the energy management performance of the schools.	Schools do not fully understand the full benefits of clean energy initiatives.

Initiative Objectives
Stimulate demand and investment in clean energy across the P-12 sector.
Increase awareness of the value of energy efficiency and efficient operations and maintenance practices, for infrastructure that is almost entirely existing buildings.
Six hundred schools will engage with NYSERDA to conduct clean energy benchmarking by 2025.
Service providers utilize the guidance documents as reference guides and have increased opportunities to facilitate clean energy investments in schools.

## Key Activities + Measurements

<b>Activity:</b> Provide funding to school districts to collect data on energy consumption and costs. Use initial benchmarking as a stepping off point to engage the schools in the use of this resource and to lead to greater understanding of their energy use, patterns, and opportunities for improvement.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of schools engaging with NYSERDA to conduct clean energy benchmarking (baseline = 0).		310	500	525	550	600
Outcome: Number of schools utilizing benchmarking data and energy master plans to make informed decisions toward future clean energy projects (baseline = 0).		75	75	75	80	100
<b>Related Notes:</b>						
a. There are currently no milestones associated with the activity described here.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Provide cost-sharing to schools, focused on under-resourced schools, for professional services related to clean energy and indoor air quality analysis as well as limited funding for installations and demonstrations.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of schools that receive NYSERDA funding (baseline = 0).		45	100	100	350	500
Output: Number of projects implemented because of P12 initiative funding (baseline = 0).		4	4	4	15	30
Output: Number of schools utilizing NYSERDA funding for student and faculty engagement (i.e. workforce development efforts) (baseline = 0)		-	25	50	75	100
<b>Related Notes:</b>						
a. There are currently no milestones or outcomes associated with the activity described here.						
b. Baseline values for the outputs presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Develop and disseminate a centralized website of state-supported strategies and funding programs, recognition programs and events, to encourage schools to participate in and leverage existing market resources.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of information downloads from the website (baseline = 0).		1000	1100	1150	1200	1350
Outcome: Number of schools reporting a greater understanding of benefits of clean energy at their school (baseline = 0).		800	800	800	900	1000
Outcome: Number of schools receiving recognition (baseline = 0).		3	3	3	4	6
<b>Related Notes:</b>						
a. There are currently no milestones associated with the activity described here.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

**Activity:**

Publish and promote guidance documents and project results along with case studies and green design documents.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of case studies developed and disseminated (baseline = 0).		20	20	22	25	30
Outcome: Number of schools utilizing clean energy case studies to make informed decisions towards future clean energy projects (baseline = 0).		150	150	150	175	200
<b>Related Notes:</b>						
a. There are currently no milestones associated with the activity described here.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.5 Pay for Performance

Traditional energy efficiency programs, whether sponsored by utilities or entities like NYSERDA, secure energy savings from small- and medium-sized commercial and residential customers primarily through measure-level rebate programs. Payments are generally set as a cost share, with estimated savings based on deemed results. Many energy efficiency businesses across the country have structured their customer offerings and built business models around such utility programs. Pay for Performance (P4P) program structures, or shared savings contracts, have been successfully deployed for larger customers and have the potential to drive scale across a wider range of market segments. This P4P strategy seeks to use common methods to calculate savings, including the CalTRACK<sup>2</sup> methodology to measure energy savings. The method defines how to calculate site-based, weather-normalized, metered energy savings by comparing an existing conditions baseline to post-retrofit data from utility meters in a transparent manner. When all parties use the same standardized set of methods for calculating energy savings, a robust energy efficiency market is possible. By calculating savings from meter data, NYSERDA would expect to achieve more accurate savings estimates and measurements as well as higher realization rates than existing program models. In testing the approach, there is also the opportunity to determine whether the contractual alignment of the performance-based requirements between the program administrator and the service provider is necessary or whether an open market design would sufficiently serve to transfer risk and align payments with performance. This market design test is expected to enable greater participation from service providers and customers and encourage wider investment. While NYSERDA has been working with utilities to co-administer P4P pilots for small-to-medium businesses since 2018, the pilot model has not developed as anticipated. NYSERDA is considering what may be the best course for the future of this pilot, including pursuing P4P approaches on its own as well as revisiting co-administration models with utilities, and anticipates filing a modification to this initiative in early 2023.

### Participants, Barriers, and Objectives

Target Market Participants	
Aggregators	Utilities
Contractors and service providers	Small to medium businesses (owners and property owners)
Financiers and insurers	

Target Market Barriers	
Low customer uptake of energy efficiency in the market.	Lack of market for procuring energy efficiency (current program model constrained by cost-effectiveness requirements).
High customer acquisition costs.	Existing energy efficiency program model puts project performance risk on utilities, and by extension, ratepayers.
Site-level energy savings are highly variable and have a lower confidence than portfolio level savings.	Installation contractors are not rewarded or responsible for energy efficiency project performance.
Lack of standard methodology for measuring normalized energy savings in a consistent and credible way.	

<sup>2</sup> CalTRACK (<https://www.caltrack.org/>) was originally developed in California through a stakeholder process with funding and leadership from the California Energy Commission, California PUC, and PG&E.

### Initiative Objectives

- Achieve customer uptake through simpler, less risky offerings.
- Deliver reliable savings to the customer and system.
- Measure the savings reliably and credibly.
- Grow the base of energy efficiency service providers and financiers.
- Begin to determine whether such an approach can work at cost-effective compensation levels for steady state post-pilot programs.
- Begin to determine key parameters and contract terms for steady state post-pilot programs.

### Key Activities + Measurements

#### Activity:

Continue working with utilities to pilot the procurement model approach to P4P, whereby a competitive selection process identifies specific portfolio managers/aggregators to secure customers and deliver savings for a set implementation period and be paid over a longer performance period.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Continue Business Energy Pro pilot with Con Edison.		*	*			
Output: Number of participating aggregators (baseline = 0).		1	2	-	-	-
Output: Total number of projects implemented in commercial sector (baseline = 0).		3	-	75	-	-
Output: Number of datasets published on OpenNY (baseline = 0).		-	1	-	-	-
Outcome: Number of additional market actors involved in P4P pilot (non-aggregator involvement such as financial institutions, subcontractors, etc) (baseline = 0).		2	4	-	-	-
Outcome: Number of utilities committed to offering P4P programs post pilot (baseline = 0).		-	1	-	-	-

#### Related Notes:

- a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

<b>Activity:</b>						
Scope and launch an open-market P4P approach, whereby a qualified vendor list determines potential aggregators that may be available to multiple sectors and could include program features such as promoting electrification.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Gather lessons learned from procurement model approach to inform new pilot design parameters.		*	*			
Milestone: Obtain stakeholder feedback to complete open-market program design.		*	*			
Output: Increased participation by aggregators in open-market approach versus procurement approach (baseline = number in procurement model).		-	-	100%	-	-
Output: Increase in Number of business types serving as aggregators (baseline = number of business types in procurement model).		-	-	200%	-	-
Outcome: Reduction in time to market for first project (from pilot launch) using open-market approach versus procurement approach (baseline = 11 months cycle time for procurement approach).		-	-	50%	-	-
Outcome: Percentage of aggregators participating in utility energy efficiency programs in New York State for the first time (baseline = number of first-time aggregators in procurement model).		-	-	25%	-	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.6 Technical Services

This initiative engages energy consultants, solution providers and building owners to provide objective, decision-quality analyses, building-level and portfolio-level capital planning services, and project pre-development support to advance efficiency, electrification and electrification-readiness solution assessment, scoping, implementation, and replication. Market feedback indicates these actors need timely and decision-quality information to leverage planned, incremental investments that reduce emissions over time cost-effectively. The initiative supports commercial, industrial, agriculture, and multifamily sectors.

For the commercial sector, NYSERDA will provide tools and technical assistance and capital planning services to help building owners incorporate low-carbon upgrades as part of planned investments to meet emission reduction targets. These tools and services will reduce the cost of project scoping and help building owners and managers integrate low-carbon improvements into building and portfolio capital plans that meet ROI criteria. Activities will include: cost-sharing technical assistance; on-site energy management support; working with market partners to develop technical/financial playbooks for select building typologies that identify implementation pathways and financial considerations for packages of measures that leverage common investment milestones; and developing tools such as sample bid documents, and guidance documents for decarbonization that streamline replication of proven solutions and reduce project development costs. Emphasis will be placed on energy efficient indoor air quality and reduction and electrification of thermal loads.

## Participants, Barriers, and Objectives

Target Market Participants	
Energy-focused firms	New York State investor-owned utilities.
Professional and industry associations as applicable to each sector.	Trade Associations
End users served by the programs and pilots including all commercial, industrial facilities, data centers, agriculture facilities, and multifamily and residential dwellings.	

Target Market Barriers	
Lack of information	Seasonality
Competing priorities	Lack of comprehensive energy efficiency resource and information.
General market uncertainty	Site specificity

Initiative Objectives
Build the clean energy and energy management capacity, capability, and interest of consultants, energy service companies, and other energy-focused firms to serve the market and provide objective and credible guidance.
Prove the efficacy of the pilots and approaches listed herein through participation rates.
Increase the rate at which clean energy technologies are identified through studies or best practices.

## Key Activities + Measurements

Activity:						
Continue providing building and portfolio-level assessments of low-carbon solutions to drive clean energy adoption through the successful FlexTech Program.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Output: Number of qualified energy-focused firms (baseline = 39). <sup>a</sup>		49	49	82	82	85
Output: Number of case studies developed (baseline = 0).		2	2	40	40	50
Output: Number of studies assessing electrification options completed (baseline = 0).		6	26	50	80	100
Outcome: Increase in the number of beneficial electrification installations (baseline = 0%).		0	TBD	-	-	-
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by participants (baseline = 65%). <sup>b</sup>		65%	65%	65%	65%	65%
Outcome: Increase the rate at which clean energy technologies are adopted by non-participants through sharing of best practices and case studies (baseline = 25%). <sup>c</sup>		30%	30%	30%	30%	30%
Related Notes:						
a. Technical Services is an initiative that spans multiple focus areas/market sectors. As such, some of the measures associated with this initiative reflect overall market measures and are not specific to one focus area or sector.						
b. There are currently no other milestones associated with this activity. The baseline metric identified here can be found in the final FlexTech Impact Evaluation completed March 2012 and posted <a href="#">here</a> .						
c. The baseline metric identified here can be found in the NYSERDA 2007 to 2010 Commercial and Industrial Existing Facilities Sector Nonparticipant Spillover and Market Effects Study Impact Evaluation Report linked <a href="#">here</a> .						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## Industrial Focus

### 2.7 Energy Management Practices

NYSERDA will aim to integrate the adoption of energy efficiency and clean energy into the core business processes of industrial companies. Programming and resources focus on:

- Identifying areas for improvement.
- Driving managerial and corporate behavioral changes with respect to energy.
- Developing mechanisms to track energy optimization efforts versus other business investment opportunities.
- Allowing companies to become accustomed to energy management with minimal risk.

This initiative will address the interest in On-site Energy Managers and the availability of Strategic Energy Management resources for the industrial sector. On-site Energy Managers will work with their industrial hosts to support project identification and implementation as well as help the owners and managers of industrial facilities incorporate Strategic Energy Management into their business practices. The education and technical guidance provided through this initiative will allow companies to better manage their energy use through operational, organizational, and behavioral changes resulting in energy efficiency gains on a continuous basis, and to also demonstrate the value proposition of process and energy efficiency projects. NYSERDA will collaborate with the utilities as customers may take advantage of utility programs to address cost barriers they encounter.

### Participants, Barriers, and Objectives

Target Market Participants	
Industrial facility and process engineers, production, and plant managers; and industrial and commercial operations and maintenance managers, energy managers, and C-suite executives.	Multiple decision-makers: facility, production, managerial, C-suite Executives.
Utility companies	Manufacturing and sector association groups.
Energy-focused Process consultants.	

Target Market Barriers	
Lack of awareness of the benefits of an On-site Energy Manager or energy management.	Limited access to internal capital and resources necessary to fund a dedicated On-site Energy Manager position.
Facilities lack manpower or technical expertise to address energy efficiency projects or the energy aspect of process improvement projects.	Limited number of service providers with expertise or capacity to provide dedicated energy management.
Risk aversion related to facility downtime.	Limited understanding of the energy embedded in the manufacturing process.
Staffing and operating cost constraints.	Difficulty in obtaining executive support due to lack of awareness of SEM benefits.

## Initiative Objectives

The value of an On-site Energy Manager role in industrial facilities will become standardized, fostering the emergence of an on-site energy manager provider market which will gain traction and become self-sustaining.

Provide energy management training to industrial and commercial businesses to help them manage their energy use and realize energy, cost, and carbon emission reductions.

## Key Activities + Measurements

### Activity:

Conduct outreach to educate industrial companies on the value of On-site Energy Manager and promote program participation.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Output: Number of energy management plans with energy reduction target developed (baseline = 0).		18	32	36	40	44
Output: Number of energy efficiency projects identified and completed during program engagement (likely starts with low/no cost and Operations and Maintenance type measures) (baseline = 0).		210	215	220	225	230
Output: Number of case studies, testimonials developed, webinars or knowledge transfer sessions conducted (baseline = 0).		15	23	27	35	37
Outcome: Number of industrial plants (beyond program participants) adopting on-site Energy Manager role (baseline = 110 or 15% of addressable market) <sup>b</sup> .		218	230	240	250	260
Outcome: Number of energy managers hired/retained within program facilities (baseline = 0).		5	7	11	15	20
Outcome: Number of projects implemented involving more complex CapEx and process improvements as a result of this strategy (baseline = 0).		44	49	54	58	60
<b>Related Notes:</b>						
a. There are currently no milestones associated with the activity described here.						
b. Baseline metrics identified here can be found in the final Continuous Energy Improvement Baseline Market Evaluation completed April 2020 and posted <a href="#">here</a> . The remainder of baseline values for outputs presented in this table are not derived from evaluation studies.						

### Activity:

- Lead facilities through Strategic Energy Management training and implementation of Strategic Energy Management activities
- Develop and disseminate templates and resources for Strategic Energy Management.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Output: Number of industrial participants (baseline = 0 participants in 2016).		66	100	135	170	205
Output: Number of commercial participants (baseline = 0 participants in 2021).		-	10	20	30	40
Outcome: Number of facilities that have adopted a system for monitoring, tracking, and making decisions based on their energy use to assist with their SEM activities as a result of this strategy (baseline = 1,886 participants in 2016) <sup>b</sup> .		-	-	-	-	1,996
Outcome: Number of industrial facilities (beyond program participants) that have adopted SEM (baseline = 0 participants in 2016).		-	-	-	-	30
<b>Related Notes:</b>						
a. There are currently no milestones associated with the activity described here.						
b. Baseline metrics identified here can be found in the final Continuous Energy Improvement Baseline Market Evaluation completed September 2017 and posted <a href="#">here</a> . The remainder of baseline values for outputs presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.8 Market Challenges

Large industrial facilities in New York State are being asked by their investors, customers, and employees to take more action to limit their carbon footprint. However, barriers such as low-market prices of natural gas, perceived risk of technological readiness or business disruption and policy uncertainty, have stifled capital investment in energy efficiency projects. The Commercial and Industrial (C&I) Carbon Challenge initiative is a component of the Market Challenges initiative and seeks to fund projects that achieve one of two criteria: provide a streamlined and cost-effective manner for large energy users to reduce greenhouse gas emissions; or address a difficult-to-decarbonize energy use through a project that has the potential for replicability and scale. Reducing emissions/energy consumption from industrial facilities in disadvantaged communities will be prioritized.

Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The enormous scale-up of buildings served and associated energy and emission reductions needed calls for a holistic, fuel-neutral approach that is employed here.

### Participants, Barriers, and Objectives

Target Market Participants	
Ratepayers with high levels of energy consumption in the commercial, industrial, and multifamily sectors.	Original equipment manufacturers of low carbon technologies.
Energy-focused firms such as consultants, energy service companies, developers, vendors, and financiers.	

  

Target Market Barriers	
Resource constraints of the customer.	Limited examples of deep energy retrofits for large energy users.
Limited ability to implement bundled energy solutions.	Uncertainty of project benefits.

  

Initiative Objectives	
Support carbon reduction strategies for which there are limited alternative means of utility or NYSERDA support.	
Catalyze investment by providers of deep-decarbonization solutions, particularly in the industrial sector, to increase availability of products and services in the NY state market.	

## Key Activities + Measurements

<b>Activity:</b> Fund carbon reduction project portfolios for large industrial and commercial, ratepayers through a competitive solicitation and leverage projects to share learnings on low-carbon energy and manufacturing strategies.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue awards following release of competitive solicitation.		*	*	*	*	*
Output: Number of sites participating (baseline = 0).		16	25	31	-	-
Outcome: Awarded participants employ advanced decarbonization solutions in their project portfolios.		4	7	8	-	-
<b>Related Notes:</b> a. Baseline value for the output presented in this table is not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.9 Technical Services

This initiative engages energy consultants, solution providers and industrial site owners to provide objective, decision-quality analyses, site-level, and portfolio-level capital planning services, and project pre-development support to advance efficiency, electrification, and electrification-readiness solution assessment, scoping, implementation, and replication. Market feedback indicates these actors need timely and decision-quality information to leverage planned, incremental investments to reduce emissions over time at lower overall cost. This initiative serves the commercial, industrial, agriculture, and multifamily sectors.

For the industrial sector, NYSERDA will provide tools and technical assistance to reduce the cost of project scoping and help industrial sites plan for emission reduction targets and integrate efficiency improvements into assessment management plans that meet ROI criteria. Activities will include cost-sharing, technical assistance, and developing tools, such as sample bid documents and guidance documents for decarbonization that streamline replication of proven solutions and reduce project development costs. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The enormous scale-up of buildings and industries served and associated energy and emission reductions needed calls for a holistic, fuel-neutral approach that is employed here.

## Participants, Barriers, and Objectives

Target Market Participants	
Energy-focused firms	New York State investor-owned utilities.
Professional and industry associations as applicable to each sector.	End users served by the programs and pilots including all commercial, industrial facilities, data centers, agriculture facilities, and multifamily and residential dwellings.
Trade Associations	

<b>Target Market Barriers</b>	
Lack of information	Seasonality
Competing priorities	Lack of comprehensive energy efficiency resource and information.
General market uncertainty	Site specificity

<b>Initiative Objectives</b>
Build the clean energy and energy management capacity, capability, and interest of consultants, energy service companies, and other energy-focused firms to serve the market and provide objective and credible guidance.
Prove the efficacy of the pilots and approaches listed herein through participation rates.
Increase the rate at which clean energy technologies are identified through studies or best practices.

## Key Activities + Measurements

<b>Activity:</b>						
Continue providing site-specific industrial technical engineering support of low-carbon solutions to drive clean energy adoption through the FlexTech Program.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Outcome: Maintain or (best case) increase the rate at which clean energy technologies are adopted by participants from baseline of 65% <sup>c</sup> .		65%	65%	65%	65%	65%
Outcome: Increase the rate at which clean energy technologies are adopted by non-participants through sharing of best practices and case studies (2020 baseline = 25%). <sup>d</sup>		30%	30%	30%	30%	30%
<b>Related Notes:</b>						
<ul style="list-style-type: none"> <li>a. Technical Services is an initiative that spans multiple focus areas/market sectors. As such, some of the measures associated with this initiative reflect overall market measures and are not specific to one focus area or sector. See the Commercial Focus section 2.6 for additional detail.</li> <li>b. There are currently no milestones or outputs associated with the activity described here.</li> <li>c. The baseline metric identified here can be found in the final FlexTech Impact Evaluation completed March 2012 and posted <a href="#">here</a>.</li> <li>d. The baseline metric identified here can be found in the NYSERDA 2007 to 2010 Commercial and Industrial Existing Facilities Sector Nonparticipant Spillover and Market Effects Study Impact Evaluation Report linked <a href="#">here</a>.</li> </ul>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

# Agriculture Focus

## 2.10 Greenhouse Lighting and Systems Engineering

The agricultural greenhouse market in New York State is expanding with the interest from consumers in locally grown food. Since 2012, continued rapid growth in greenhouse product value, acreage, year-round use, and control techniques has been observed. Newer greenhouses now produce more than twice the yields per acre of low-tech greenhouses. While the potential energy savings in efficient greenhouses is high, market players often do not understand the potential opportunity. Growers do not have the expertise to design specialized control systems, and the lighting industry generally does not understand plant physiology and the overall greenhouse systems that are needed to optimize crop production and energy usage. The Greenhouse Lighting and Systems Engineering (GLASE) initiative brings together academia and marketplace knowledge and experience, to enable new control systems, lighting products and technical services. The goal is to target energy-related improvements in greenhouse system operations by optimizing energy efficiency, crop yield, and quality, by establishing a Consortium that will become self-sufficient and work to increase the adoption of the new technologies in the greenhouse industry. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The enormous scale-up of buildings and industries served and associated energy and emission reductions needed calls for a holistic, fuel-neutral approach that is employed here.

### Participants, Barriers, and Objectives

Target Market Participants	
Botanists	Lighting designing and manufacturing companies
Engineers	Trade associations
Greenhouse growers	Supermarket produce buyers
Agriculture and lighting engineers	Agriculture and lighting engineers
New York State Department of Agriculture and Markets	Cooperative Extension agents
Small lighting sales companies	Horticulture suppliers
Energy Auditors	Academic and research organizations
Potential manufacturers of improved greenhouse control and lighting products.	

Target Market Barriers	
Packaged solutions for greenhouse production and energy-use optimization do not exist.	The industry currently lacks cross-cutting expertise in greenhouse system solutions.
The full potential of a system-wide approach to greenhouse control has not been fully demonstrated at scale.	

Initiative Objectives	
The goal of this initiative is to establish a financially self-sufficient GLASE Consortium to develop new control systems and lighting technologies for greenhouses.	
The GLASE Consortium aims to transform lighting and systems management in the rapidly growing greenhouse industry by optimizing energy efficiency, crop yield, and quality.	

## Key Activities + Measurements

<b>Activity:</b> Form and grow the GLASE Consortium by assisting with and monitoring its organizational structure, business model, member recruitment, partner support, Scientific Advisory Panel creation, and financial self-sustainability achievement.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Contract with core Consortium members.		*				
Milestone: Review and approve Scientific Advisory Panel structure.		*				
Milestone: Review and approve Consortium business plan to attain financial self-sustainability by 2023.		*				
Output: Number of paid Consortium memberships (baseline = 0).		25	-	-	-	30
Outcome: Consortium remains viable after NYSERDA milestones are completed.		-	-	-	-	Assess
<b>Related Notes:</b> a. Baseline values for the output and outcome presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Monitor the Consortium as it develops new lighting products as well as new control strategies and services for light, CO2 and humidity to increase yield or the production of chemical compounds that increase crop value. New products that benefit greenhouse growers will be tested in small and large pilot settings, and provisional patents will be filed.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Greenhouse area used for pilot testing (sq ft) (baseline = 0).		-	26,000	-	-	-
Output: Number of services developed (baseline = 0).		-	3	-	-	-
Output: Number of product variations tested in pilot systems (baseline = 0).		-	8	-	-	-
Outcome: Number of intellectual properties or technology disclosures filed (baseline = 0).		-	8	-	-	-
<b>Related Notes:</b> a. There are currently no milestones associated with the activity described here. Baseline values for the outputs and outcome presented in this table are not derived from evaluation studies.						

<b>Activity:</b> Assist the Consortium with the continual education and outreach to help Consortium members and others better understand best practices and the economics of improved control systems, through use of outreach materials, networking at trade association meetings/conferences, trainings, and coordinating with Cornell Cooperative Extension and other existing NYSERDA agriculture targeted programs.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Formal training offered to service providers.			*			
Output: Number of case studies developed (baseline = 0).		-	4	-	-	-
Outcome: Average market penetration of improved technologies in New York State greenhouse acreage in the lettuce and tomato sectors (baseline = 0).		-	-	-	25%	-
Outcome: Reduced electricity usage per participating greenhouse in NYS (depending on NYS climate zone).		-	-	-	70%	-
Outcome: Number of acres of greenhouses in New York State (beyond pilot participants) adopting the improved technologies (baseline = 0).		-	-	-	23	-
<b>Related Notes:</b> a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

### Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 2.11 Technical Services

The initiative engages energy consultants, solution providers and farm owners to provide objective, decision-quality analyses, information, and project pre-development support to advance efficiency, electrification and electrification-readiness solution assessment, scoping, implementation, and replication. Market feedback indicates these actors need timely and decision-quality information to leverage planned, incremental investments to reduce emissions over time at lower overall cost. This initiative serves the commercial, industrial, agriculture, and multifamily sectors.

For the agricultural sector, NYSERDA will provide tools and technical assistance to help farm owners plan for emission reduction upgrades and integrate efficiency improvements that meet return on investment criteria into assessment management plans. Activities will include providing energy-related, farm management best practice guides, farm energy audits and greenhouse benchmarking. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The enormous scale-up of buildings and industries served and associated energy and emission reductions needed calls for a holistic, fuel-neutral approach that is employed here.

### Participants, Barriers, and Objectives

Target Market Participants	
Energy-focused firms	New York State investor-owned utilities
Professional and industry associations such as Cornell Cooperative Extension.	Trade Associations
End users served by the programs (farms, etc.)	

Target Market Barriers	
Lack of Information	Seasonality
Competing Priorities	Lack of comprehensive energy efficiency resource and information.
General Market Uncertainty	Site specificity

Initiative Objectives
Build the clean energy and energy management capacity, capability, and interest of consultants, energy service companies, and other energy-focused firms to serve the market and provide objective and credible guidance.
Increase the rate at which clean energy technologies are identified through studies or best practices.

## Key Activities + Measurements

Activity:						
<ul style="list-style-type: none"> <li>Continue the Agriculture Energy Audit component of the FlexTech Program to provide site-specific clean energy recommendations directly to farms to improve site operations, align future investment opportunities, and prioritize those investments as well as provide greenhouse benchmarking.</li> <li>Engage in the development of information, tools, and resources to demonstrate the benefits of clean energy investments and energy management for the agriculture sector. A third-party technical resource will be utilized to develop, market, maintain and update an energy-related, farm management best practice guide and disseminate best practice materials across multiple platforms, including direct delivery to farms, the NYSERDA website, partner organizations, and through trade allies such as sector-based organizations and consortiums, and other entities with similar market participants</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Output: Number of best practice guides delivered (Baseline = 0).		0	500	2,033	-	-
Outcome: Percentage rate in which clean energy technologies are adopted by participants receiving best practice guides (baseline = 0%).		-	-	20%	20%	20%
Related Notes:						
<ol style="list-style-type: none"> <li>Technical Services is an initiative that spans multiple focus areas/market sectors. As such, some of the measures associated with this initiative reflect overall market measures and are not specific to one focus area or sector. See the Commercial Focus section 2.6 for additional detail.</li> <li>There are currently no milestones associated with the activity described here.</li> <li>Baseline values for the output and outcome presented in this table are not derived from evaluation studies.</li> </ol>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.12 Advancing Agricultural Energy Technologies

Farms operate under tight margins and continuously strive to reduce operating expenses to maintain profitability and long-term farm viability. While energy efficiency projects represent a strong cost-saving opportunity, identifying what improvements could lower utility expenses and obtaining the appropriate level of technical and financial assistance is often difficult for farm owners to navigate.

This initiative will accelerate the adoption and market penetration of underused and emerging technologies by animal- and crop-production farms. The technologies will provide cost-effective energy efficiency improvements compared to current standard technology and be replicable at farms throughout the State. Eligible technologies may include hardware, software, process alterations, and new operating strategies. Performance will be validated by a third party through data collection and analyses. Easy to understand technical and economic information will be developed for use by farms in making sound investment decisions, and awareness of the opportunity will be increased via reporting and outreach to target audiences. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The enormous scale-up of buildings and industries served and associated energy and emission reductions needed calls for a holistic, fuel-neutral approach that is employed here.

### Participants, Barriers, and Objectives

Target Market Participants	
Farm equipment vendors and suppliers	Farm owners
Agricultural industry consultants and partners	Soil and Water Districts
County Agricultural Business Centers	New York State Department of Agriculture and Markets
New York Farm Bureau	United States Department of Agriculture
Cornell Cooperative Extension	Clean Energy for Agricultural Task Force
New York State investor-owned utilities	Energy Auditors
Trade Associations	

Target Market Barriers	
Seasonality	Risk aversion
Lack of understanding of the benefits of energy and process efficiency.	Limited capital for investment

Initiative Objectives
Increase the number of farms adopting underused or emerging energy efficiency technologies.
Increase communication and market awareness of underused or emerging energy efficiency technologies.

## Key Activities + Measurements

<b>Activity:</b>						
Collect, analyze, and verify demonstration site data to support the business case for the technologies and share the information with the market. Perform targeted outreach of successful business case scenarios to farms suitable for implementing the demonstrated technology.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of farm sites hosting demonstration projects (baseline = 2).		2	3	-	-	-
Output: Number of case studies developed and disseminated (baseline = 0).		2	3	-	-	-
Output: Number of open houses hosted (baseline = 0).		4	6	-	-	-
Outcome: Number of farms knowledgeable of energy efficiency opportunities provided by underused or emerging technologies (baseline = 82) <sup>a</sup> .		87	100	-	-	-
<b>Related Notes:</b>						
a. Baseline metrics identified here can be found in the final Agriculture Market Evaluation completed December 2019 and posted <a href="#">here</a> . The remaining baseline values for the outputs presented in this table are not derived from evaluation studies.						
b. There are currently no milestones associated with the activity described here.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Commercial, Industrial & Agriculture	P-12 Schools	P-12 Schools - Impact - Assessment 1 - PY 2018-2021	Impact	PY 2018-2021	2020 Q1	2022 Q2	Complete
MD - Commercial, Industrial & Agriculture	Pay for Performance	Pay for Performance Non-Routine Event evaluation	Impact	PY2022-2023	2022 Q2	2024 Q4	In progress
MD - Commercial, Industrial & Agriculture	Energy Management Practices	Continuous Energy Improvement (SEM, OSEM) - Market Update 4 (PY 2020-2021)	Market	PY 2020-2021	2020 Q4	2022 Q3	Complete
MD - Commercial, Industrial & Agriculture	Energy Management Practices	Energy Management Practice - Impact - Assessment 1 - Years 2017-2021	Impact	PY 2017-2021	2020 Q4	2022 Q2	Complete
MD – Commercial, Industrial & Agriculture [housed within Crosscutting Activities and Analyses section]	Various- Industrial sector	Statewide Industrial Facility Stock Study	Building Stock and Potential Studies	2022-2023	Q4 2021	Q2 2023	In Progress
MD – Commercial, Industrial & Agriculture [housed within Crosscutting Activities and Analyses section]	Various- Industrial sector	Statewide Energy Efficiency and Electrification Potential Study for NYS Industrial Sector	Building Stock and Potential Studies	2021-2022	Q4 2021	Q2 2023	In Progress
MD - Commercial, Industrial & Agriculture	Energy Management Technology	Energy Management Technologies (RTEM/REM); Commercial Energy Management - Market Update 2 (PY 2020)	Market	PY 2020	2020 Q4	2021 Q4	Complete

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Commercial, Industrial & Agriculture	REV Campus Challenge	REV Campus Challenge - Market Baseline (PY 2016 - 2020)	Market	PY 2016-2020	2020 Q4	2021 Q4	Complete
MD - Commercial, Industrial & Agriculture	Real Estate Tenant (previously Commercial Real Estate Tenant)	Commercial Tenant Program - CRE Tenant - Impact - Mar 2019-2021 (Round 2)	Impact	PY 2019-2021	2021 Q1	2022 Q2	Complete
MD - Commercial, Industrial & Agriculture	n/a	Energy Efficiency Soft Cost Study - Market Update #1- years 2021-2022	Market	PY 2021-2022	2021 Q1	2022 Q3	Complete
I&R - Grid Modernization, I&R - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	Market Development & Innovation & Research	Market Dev. & I&R - Case Studies - program years 2016-2020	Impact	PY 2016-2020	2021 Q1	2022 Q4	In Progress
MD - Commercial, Industrial & Agriculture	REV Campus Challenge	REV Campus Challenge - Impact - Program years 2016-2021	Impact	PY 2016-2021	2021 Q1	2022 Q2	Complete
MD - Commercial, Industrial & Agriculture	Advancing Agricultural Energy Technologies, Greenhouse Lighting and Systems Engineering, Technical Services (GLASE previously known as 2030 GLASE)	AAET, GLASE, Ag Tech Services - Market - program years 2017-2019	Market	PY 2017-2019	2021 Q2	2022 Q2	In Progress
MD - Commercial, Industrial & Agriculture	Energy Management Technology	Energy Management Technologies (RTEM/REM); Commercial Energy Management - Impact - Round 3 PY 2016-2021	Impact	PY 2016-2021	2021 Q3	2022 Q4	In Progress
MD - Commercial, Industrial & Agriculture	Rev Campus Challenge	Rev Campus Challenge - Market Update 1 (PY 2021)	Market	PY 2021	2021 Q4	2022 Q4	In Progress

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Commercial, Industrial & Agriculture	Advancing Agricultural Energy Technologies, Greenhouse Lighting and Systems Engineering, Technical Services (GLASE previously known as 2030 GLASE)	AAET, GLASE, Ag Tech Services - Impact - program years 2017-2019	Impact	Various by initiative	2022 Q1	Various by initiative	In Progress
MD - Commercial, Industrial & Agriculture	Energy Management Practices	Energy Management Practice - Impact - Assessment 2 - Years 2017-2022	Impact	PY 2017-2022	2022 Q1	2023 Q2	Upcoming
MD - Commercial, Industrial & Agriculture	Energy Management Practices	Energy Management Practices (SEM and OSEM) - Market Update (PY 2022)	Market	PY 2022	2023 Q1	2023 Q4	Upcoming
MD - Commercial, Industrial & Agriculture	Energy Management Technology	Energy Management Technologies (RTEM/REM) Market Update (PY 2021-2023)	Market	PY 2021- 2023	2023 Q1	2023 Q4	Upcoming
MD - Commercial, Industrial & Agriculture	Energy Management Technology	Energy Management Technologies (RTEM/REM); Commercial Energy Management - Market Update	Market	TBD	2024 Q1	2024 Q4	Upcoming
MD - Commercial, Industrial & Agriculture	P-12 Schools (previously K-12 Schools)	P-12 Schools - Impact - Assessment 2	Impact	TBD	2022 Q4	2023 Q3	Upcoming
MD - Commercial, Industrial & Agriculture	P-12 Schools (previously K-12 Schools)	P-12 Schools - Market Update 1	Market	TBD	2022 Q4	2023 Q3	Upcoming
MD - Commercial, Industrial & Agriculture	Advancing Agricultural Energy Technologies, Greenhouse Lighting and Systems Engineering, Technical Services	AAET, GLASE, Ag Tech Services - Market - program years 2018-2020	Market	PY 2018-2020	2023 Q1	2023 Q3	Upcoming
MD - Commercial, Industrial & Agriculture	Market Challenges	Market Challenges	Impact	TBD	2023 Q1	2025 Q1	Upcoming
MD - Commercial, Industrial & Agriculture	Technical Services	Commercial and Industrial FlexTech – Impact – PY 2017-2019	Impact	2017-2019	2023 Q1	2023 Q4	Upcoming

# Energy Management Technology

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	998,880	-	-	6,265	9,845	16,797	10,530	94,539	265,574	363,386	174,549	52,663	4,732	-	-	-
Energy Efficiency MMBtu - Natural Gas	1,123,151	-	-	3,576	34,655	21,582	9,765	76,401	314,918	335,979	245,222	78,041	3,010	-	-	-
Energy Efficiency MMBtu - Other Fuels	97,211	-	-	-	-	238	1,019	8,180	46,625	30,576	10,573	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	1,102,249,097	-	-	8,010,115	28,118,983	69,427,428	111,989,125	78,290,472	195,773,990	361,075,975	205,452,209	42,007,200	2,103,600	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	4,150,801	-	-	-	-	-	-	140,250	387,157	458,426	854,986	694,547	526,968	371,125	372,026	345,315
Energy Efficiency MMBtu - Natural Gas	3,276,033	-	-	-	-	-	-	61,875	226,590	285,665	862,114	542,208	418,585	332,018	260,168	286,810
Energy Efficiency MMBtu - Other Fuels	283,471	-	-	-	-	-	-	-	14,535	21,335	104,891	45,066	31,547	18,026	18,026	30,044
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	93,571,612	-	159,029	1,147,199	4,047,829	7,930,737	11,770,834	7,390,000	9,606,000	12,600,000	17,955,000	11,358,249	9,068,939	537,797	-	-
Implementation	6,936,314	20,049	541,805	905,067	1,296,223	815,913	274,506	206,655	480,000	1,141,189	884,907	250,000	120,000	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	7,790,937	3,750	42,574	170,292	570,158	886,056	777,459	623,433	405,000	1,107,269	1,717,500	1,075,000	412,446	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>108,298,862</b>	<b>23,799</b>	<b>743,407</b>	<b>2,222,557</b>	<b>5,914,210</b>	<b>9,632,706</b>	<b>12,822,799</b>	<b>8,220,088</b>	<b>10,491,000</b>	<b>14,848,458</b>	<b>20,557,407</b>	<b>12,683,249</b>	<b>9,601,385</b>	<b>537,797</b>	<b>-</b>	<b>-</b>

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects the the **Commercial/Industrial/Agriculture** Focus Area. See the **Multifamily Residential** Focus Area plans for additional information.

# Greenhouse Lighting and Systems Engineering

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	3,470	-	-	-	-	-	-	-	800	2,670	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	9,460,000	-	-	-	-	-	-	-	500,000	750,000	1,250,000	1,500,000	1,750,000	1,750,000	1,500,000	460,000

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	364,000	-	-	-	-	31,000	31,000	43,200	43,200	43,200	43,200	43,200	21,500	21,500	21,500	21,500
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	4,245,000	-	118,148	244,244	309,250	429,309	697,861	537,125	467,648	775,809	560,660	104,945	-	-	-	-
Tools, Training and Replication	500,000	-	33,000	74,500	79,000	50,609	72,656	51,500	10,000	28,680	46,047	54,008	-	-	-	-
Business Support	255,000	-	82,000	19,000	28,000	42,566	44,066	20,500	5,000	7,606	3,000	3,262	-	-	-	-
<b>Total</b>	<b>5,000,000</b>	-	<b>233,148</b>	<b>337,744</b>	<b>416,250</b>	<b>522,485</b>	<b>814,583</b>	<b>609,125</b>	<b>482,648</b>	<b>812,095</b>	<b>609,707</b>	<b>162,215</b>	-	-	-	-

# REV Campus Challenge

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	188,360
Energy Efficiency MMBtu - Natural Gas	1,177,957
Energy Efficiency MMBtu - Other Fuels	32,301
Energy Efficiency MW	-
Renewable Energy MWh	736
Renewable Energy MW	-
Leveraged Funds	60,897,683

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	100,630	22,698	51,731	10,000	1,100	1,100	1,100	-	-	-	-	-
-	-	-	725,104	63,874	328,179	41,000	6,600	6,600	6,600	-	-	-	-	-
-	-	-	4,729	16,454	11,118	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	346	-	-	390	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	17,705,406	3,737,880	7,050,397	11,404,000	7,000,000	7,000,000	7,000,000	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	58,800
Energy Efficiency MMBtu - Natural Gas	365,000
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	3,870
Renewable Energy MW	3

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	5,300	5,300	5,300	5,300	5,300	5,300	5,300	21,700
-	-	-	-	-	-	-	33,000	33,000	33,000	33,000	33,000	33,000	33,000	134,000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	3,870	-	-	-	-	-
-	-	-	-	-	-	-	-	-	3	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(567)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	(386)	(181)	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	15,262,213
Implementation	1,808,423
Research and Technology Studies	-
Tools, Training and Replication	4,579,366
Business Support	-
<b>Total</b>	<b>21,650,002</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	468,339	830,316	1,541,302	3,943,369	1,650,000	1,500,000	1,500,000	1,500,000	1,500,000	828,888	-	-	-
-	249,357	326,987	543,414	(268,612)	239,728	180,000	150,000	100,000	100,000	100,000	87,551	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	39,490	14,191	2,209	894,079	180,281	85,000	500,000	750,000	675,000	675,000	764,116	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	288,847	809,517	1,375,938	2,166,768	4,363,377	1,915,000	2,150,000	2,350,000	2,275,000	2,275,000	1,680,554	-	-	-

# Energy Management Practices

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	236,106
Energy Efficiency MMBtu - Natural Gas	1,757,050
Energy Efficiency MMBtu - Other Fuels	279,260
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	150,878,636

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	16,054	25,097	76,847	34,602	14,420	9,738	13,936	16,428	21,644	4,746	1,297	1,297	-
-	-	80,289	332,669	229,905	210,460	464,874	44,275	38,725	74,645	234,525	26,100	10,292	10,291	-
-	-	-	(72,448)	237,462	3,937	79,027	12,857	4,975	5,475	4,975	1,000	1,000	1,000	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	2,525,045	5,401,060	9,245,037	46,525,397	20,300,000	13,597,400	15,761,280	15,761,280	16,896,157	4,761,280	52,350	52,350	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	180,000
Energy Efficiency MMBtu - Natural Gas	1,867,500
Energy Efficiency MMBtu - Other Fuels	382,500
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	45,000
-	-	-	-	-	155,625	155,625	155,625	155,625	155,625	155,625	155,625	155,625	155,625	466,875
-	-	-	-	-	31,875	31,875	31,875	31,875	31,875	31,875	31,875	31,875	31,875	95,625
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	16,691,268
Implementation	9,020,578
Research and Technology Studies	-
Tools, Training and Replication	3,164,933
Business Support	-
<b>Total</b>	<b>28,876,778</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	761,043	1,454,087	1,426,981	1,519,559	1,703,052	1,777,500	1,564,500	2,414,500	2,437,850	1,093,079	270,000	134,559	134,559	-
-	357,111	355,474	419,319	407,504	671,273	700,000	1,300,000	1,600,000	1,650,000	1,192,705	272,552	47,320	47,320	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	40,344	82,040	285,876	339,314	197,324	150,000	675,000	651,080	451,080	191,794	101,080	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1,158,498	1,891,601	2,132,176	2,266,377	2,571,649	2,627,500	3,539,500	4,665,580	4,538,930	2,477,577	643,632	181,879	181,879	-

# Market Challenges

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	160,120
Energy Efficiency MMBtu - Natural Gas	4,452,218
Energy Efficiency MMBtu - Other Fuels	586,601
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	515,588,208

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	7,421	13,030	23,592	55,042	11,754	13,711	19,982	15,587	-
-	-	-	-	-	-	949,398	59,980	14,997	467,091	565,267	798,501	823,576	773,408	-
-	-	-	-	-	-	-	69,963	80,667	66,564	74,225	106,256	106,256	82,672	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	19,793,100	4,318,000	82,750,230	115,319,695	100,375,000	45,455,348	85,188,417	62,388,417	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	244,214
Energy Efficiency MMBtu - Natural Gas	133,920
Energy Efficiency MMBtu - Other Fuels	327,355
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	26,863	54,540	32,562	32,562	32,562	32,562	32,562
-	-	-	-	-	-	-	-	14,731	29,909	17,856	17,856	17,856	17,856	17,856
-	-	-	-	-	-	-	-	36,010	73,105	43,648	43,648	43,648	43,648	43,648
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(54,684)
Direct Energy Usage MMBtu - Natural Gas	(14,906)
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	(2,654)	(365)	(388)	(2,532)	(12,959)	(11,585)	(12,705)	(11,495)	-
-	-	-	-	-	-	-	-	(2,056)	-	-	(12,850)	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	102,920,875
Implementation	7,108,557
Research and Technology Studies	-
Tools, Training and Replication	2,926,524
Business Support	-
<b>Total</b>	<b>112,955,956</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	2,002,833	2,884,129	3,223,996	2,735,000	7,760,000	14,346,131	21,024,970	17,045,872	11,192,261	13,990,327	6,715,358	-
-	-	60,150	98,247	425,764	670,438	152,000	567,026	800,385	1,450,963	1,482,235	680,654	400,385	320,310	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	157,639	347,258	235,000	630,000	796,827	550,000	209,800	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	60,150	2,101,080	3,467,532	4,241,691	3,122,000	8,957,026	15,943,343	23,025,933	18,737,907	11,872,915	14,390,712	7,035,667	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects the the **Commercial/Industrial/Agriculture** Focus Area. See the **Multifamily Residential** Focus Area plans for additional information.

**P-12 Schools**

Active

<b>Direct Benefits - Annual</b>	<b>Total</b>
Energy Efficiency MWh - Electric	134,315
Energy Efficiency MMBtu - Natural Gas	920,138
Energy Efficiency MMBtu - Other Fuels	230,034
Energy Efficiency MW	-
Renewable Energy MWh	4,558
Renewable Energy MW	-
Leveraged Funds	88,050,847

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	905	7,671	9,000	20,000	20,000	20,000	20,000	20,000	16,739	-
-	-	-	-	-	20,440	26,488	45,000	147,000	147,000	147,000	147,000	147,000	93,210	-
-	-	-	-	-	902	2,400	15,000	35,800	35,800	35,800	35,800	35,800	32,732	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	4,558	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	2,470,038	3,467,649	8,000,000	12,500,000	12,500,000	12,500,000	12,500,000	12,500,000	11,613,160	-

<b>Indirect Benefits - Annual</b>	<b>Total</b>
Energy Efficiency MWh - Electric	53,000
Energy Efficiency MMBtu - Natural Gas	344,000
Energy Efficiency MMBtu - Other Fuels	86,000
Renewable Energy MWh	11,200
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	2,500	2,500	8,000	8,000	8,000	8,000	6,000	10,000
-	-	-	-	-	-	-	8,000	8,000	32,000	32,000	32,000	32,000	80,000	120,000
-	-	-	-	-	-	-	2,000	2,000	8,000	8,000	8,000	8,000	20,000	30,000
-	-	-	-	-	-	-	500	500	800	800	800	800	1,000	6,000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<b>Energy Usage - Annual</b>	<b>Total</b>
Direct Energy Usage MWh	(1,699)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	(1,699)	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<b>Expenditure Budget</b>	<b>Total</b>
Incentives and Services	47,606,683
Implementation	4,500,000
Research and Technology Studies	-
Tools, Training and Replication	5,493,317
Business Support	-
<b>Total</b>	<b>57,600,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	31,074	177,167	464,116	1,700,591	790,000	2,000,000	2,000,000	5,000,000	5,000,000	9,000,000	11,000,000	10,443,736	-
-	-	116,829	281,496	563,261	324,512	290,000	300,000	500,000	500,000	500,000	500,000	323,902	300,000	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	6,881	284,663	317,350	529,935	190,000	200,000	650,000	650,000	650,000	650,000	650,000	714,488	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	154,783	743,325	1,344,727	2,555,038	1,270,000	2,500,000	3,150,000	6,150,000	6,150,000	10,150,000	11,973,902	11,458,224	-

# Pay for Performance

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	121,635
Energy Efficiency MMBtu - Natural Gas	61,512
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	65,547,619

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	218	-	-	45,759	43,580	26,148	5,930	-	-
-	-	-	-	-	-	110	-	-	23,100	22,000	13,200	3,102	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	45,000	-	-	23,400,000	21,090,000	18,000,000	3,012,619	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	5,260
Energy Efficiency MMBtu - Natural Gas	1,360
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	1,105	-	-	4,155	-	-
-	-	-	-	-	-	-	-	-	172	-	-	1,188	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	29,787,753
Implementation	2,164,280
Research and Technology Studies	-
Tools, Training and Replication	2,017,016
Business Support	-
<b>Total</b>	<b>33,969,049</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	500,000	3,255,750	5,500,000	5,460,000	5,024,000	5,000,000	5,048,003	-	-
-	-	45,500	378,159	282,925	252,546	300,000	200,000	200,000	161,500	143,396	100,000	100,255	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	120,991	149,460	198,675	300,000	236,486	211,404	200,000	200,000	200,000	200,000	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	45,500	499,150	432,385	451,220	1,100,000	3,692,236	5,911,404	5,821,500	5,367,396	5,300,000	5,348,257	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects the the **Commercial/Industrial/Agriculture** Focus Area. See the **Single Family Residential** Focus Area plans for additional information.

# Technical Services

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	375,343
Energy Efficiency MMBtu - Natural Gas	2,531,003
Energy Efficiency MMBtu - Other Fuels	542,160
Energy Efficiency MW	-
Renewable Energy MWh	3,706
Renewable Energy MW	4
Leveraged Funds	235,823,815

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	988	637	45,494	65,395	65,257	34,239	36,969	33,409	27,140	28,407	23,188	14,221	-
-	-	(60)	(662)	258,006	184,200	160,395	140,872	380,422	336,585	312,834	287,548	239,594	231,270	-
-	-	360	7,714	47,544	297,351	126,846	1,942	10,714	10,714	10,714	10,718	8,772	8,772	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	13	556	1,242	1,895	-	-	-	-	-	-	-	-	-
-	-	-	-	-	0	0	0	1	1	1	1	0	-	-
-	-	529,955	2,530,262	10,190,351	18,543,677	5,222,982	17,390,050	33,453,181	33,702,424	31,807,042	29,762,540	27,008,981	25,682,369	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	206,127
Energy Efficiency MMBtu - Natural Gas	1,457,852
Energy Efficiency MMBtu - Other Fuels	76,728
Renewable Energy MWh	5,304
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	3,084	12,334	18,501	31,321	31,321	31,321	31,321	31,321	-	15,602
-	-	-	-	-	21,809	87,235	130,853	221,522	221,522	221,522	221,522	221,522	-	110,347
-	-	-	-	-	1,148	4,591	6,887	11,659	11,659	11,659	11,659	11,659	-	5,808
-	-	-	-	-	81	322	484	806	806	806	806	806	-	387
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(1,017)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	(1,874)	996	(139)	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	64,455,689
Implementation	7,740,754
Research and Technology Studies	-
Tools, Training and Replication	4,400,742
Business Support	-
<b>Total</b>	<b>76,597,185</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	136,574	1,404,282	3,378,336	7,064,992	4,697,148	4,695,000	9,693,866	9,497,744	8,082,773	7,042,261	6,105,478	2,657,235	-
-	807	32,466	536,051	794,097	861,193	1,103,930	783,752	1,046,812	946,506	678,289	599,138	263,972	93,741	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	160,019	931,459	114,539	370,794	1,049,004	891,928	550,000	333,000	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	807	169,040	1,940,333	4,332,452	8,857,644	5,915,617	5,849,546	11,789,682	11,336,178	9,311,062	7,974,399	6,369,450	2,750,976	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects the three sectors within the **Commercial/Industrial/Agriculture** Focus Area. See the **Multifamily Residential** Focus Area plans for additional information.

# Advancing Agricultural Energy Technologies

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	810	-	-	-	-	-	162	162	162	162	162	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	86	-	-	-	-	-	-	-	-	43	43	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	6,248	-	-	-	-	-	572	572	572	2,266	2,266	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	677,076	-	-	-	-	-	52,076	187,500	250,000	125,000	62,500	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	17,500	-	-	-	-	-	-	-	-	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Energy Efficiency MMBtu - Natural Gas	18,000	-	-	-	-	-	-	-	-	-	3,000	3,000	3,000	3,000	3,000	3,000
Energy Efficiency MMBtu - Other Fuels	1,800	-	-	-	-	-	-	-	-	-	300	300	300	300	300	300
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	149,245	-	-	1,929	2,508	9,321	4,935	-	50,000	75,000	5,552	-	-	-	-	-
Research and Technology Studies	3,305,755	-	-	-	12,000	145,383	109,972	-	750,000	1,000,000	1,288,400	-	-	-	-	-
Tools, Training and Replication	305,000	-	-	-	-	-	5,000	-	75,000	150,000	75,000	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>3,760,000</b>	-	-	<b>1,929</b>	<b>14,508</b>	<b>154,704</b>	<b>119,907</b>	-	<b>875,000</b>	<b>1,225,000</b>	<b>1,368,952</b>	-	-	-	-	-

# Agriculture Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	14,407
Energy Efficiency MMBtu - Natural Gas	18,503
Energy Efficiency MMBtu - Other Fuels	15,655
Energy Efficiency MW	-
Renewable Energy MWh	1,137
Renewable Energy MW	-
Leveraged Funds	15,390,233

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1,508	8,755	3,712	433	-	-	-	-	-	-	-	-	-	-	-
38	16,734	1,545	186	-	-	-	-	-	-	-	-	-	-	-
1,290	7,808	6,029	528	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	777	150	126	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,569,423	10,133,789	3,279,379	407,642	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(106)
Direct Energy Usage MMBtu - Natural Gas	(1,683)
Direct Energy Usage MMBtu - Other Fuels	(1,635)
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
(14)	(64)	(29)	-	-	-	-	-	-	-	-	-	-	-	-
(295)	(32)	(1,356)	-	-	-	-	-	-	-	-	-	-	-	-
(297)	(589)	(707)	(43)	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	3,552,678
Implementation	46,142
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>3,598,821</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
247,175	1,019,462	794,505	92,007	1,399,529	-	-	-	-	-	-	-	-	-	-
334,946	510,868	482,925	100,943	(1,386,774)	3,235	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
582,121	1,530,330	1,277,431	192,950	12,755	3,235	-	-	-	-	-	-	-	-	-

# Commercial Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	84,969
Energy Efficiency MMBtu - Natural Gas	223,782
Energy Efficiency MMBtu - Other Fuels	194,527
Energy Efficiency MW	1
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	37,555,083

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	362	6,018	19,057	20,335	32,024	7,153	20	-	-	-	-	-	-	-
-	-	5,642	29,431	55,283	65,979	4,157	3,000	20,000	25,000	15,290	-	-	-	-
-	-	8,263	58,293	54,666	54,004	19,301	-	-	-	-	-	-	-	-
-	0	0	-	0	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	174,617	5,414,635	6,746,582	10,666,662	9,883,684	1,000,000	925,000	925,000	925,000	893,902	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	9,782,572
Implementation	2,776,576
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>12,559,148</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
179,672	932,838	1,459,314	2,132,563	2,227,581	1,086,303	639,871	300,000	300,000	300,000	224,430	-	-	-	-
22,500	593,565	656,154	467,134	575,171	152,486	17,648	30,000	50,000	150,000	61,919	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
202,172	1,526,403	2,115,468	2,599,697	2,802,752	1,238,789	657,518	330,000	350,000	450,000	286,349	-	-	-	-

# Industrial Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	337,124
Energy Efficiency MMBtu - Natural Gas	1,874,798
Energy Efficiency MMBtu - Other Fuels	9,018,122
Energy Efficiency MW	34
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	520,910,924

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1,023	9,595	65,174	49,561	92,647	53,645	27,918	6,378	20,412	10,773	-	-	-	-	-
1,151	46,045	751,902	376,175	392,959	84,787	75,484	70,977	75,318	-	-	-	-	-	-
-	-	8,855,577	90,288	25,494	8,610	17,150	12,602	8,401	-	-	-	-	-	-
-	1	8	4	11	8	3	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21,577	9,364,994	121,008,635	83,469,111	172,935,791	68,217,619	43,186,326	18,000,000	4,706,872	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(2,167)
Direct Energy Usage MMBtu - Natural Gas	(7,164,279)
Direct Energy Usage MMBtu - Other Fuels	(2,062)
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	(779)	(794)	(117)	-	(477)	-	-	-	-	-	-	-	-
-	-	(7,134,904)	(29,293)	(82)	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	(2,062)	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	41,947,702
Implementation	6,275,672
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>48,223,374</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
179,919	2,163,355	6,021,408	11,340,198	8,296,054	5,645,419	4,538,175	1,593,925	1,574,630	594,618	-	-	-	-	-
739,556	1,083,415	1,455,393	1,783,669	694,752	451,623	67,264	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
919,475	3,246,770	7,476,801	13,123,867	8,990,806	6,097,043	4,605,439	1,593,925	1,574,630	594,618	-	-	-	-	-

# Real Estate Tenant

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	99,959
Energy Efficiency MMBtu - Natural Gas	111,456
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	28,450,238

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	14,796	28,388	51,098	5,678	-	-	-	-
-	-	-	-	-	-	-	7,485	27,485	66,989	9,497	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	1,910,265	8,846,658	15,923,984	1,769,332	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	341,000
Energy Efficiency MMBtu - Natural Gas	86,600
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	32,750	61,650	61,650	61,650	61,650	30,825	30,825
-	-	-	-	-	-	-	-	8,660	12,990	12,990	12,990	12,990	12,990	12,990
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	9,323,834
Implementation	3,093,318
Research and Technology Studies	-
Tools, Training and Replication	3,381,237
Business Support	-
<b>Total</b>	<b>15,798,390</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	94,114	759,854	1,799,272	3,052,596	1,820,622	600,000	800,000	397,377	-	-	-	-	-	-
19,443	453,014	487,819	681,319	586,689	389,373	160,000	110,662	205,000	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8,703	84,862	99,950	574,687	339,216	474,305	225,000	250,000	350,000	400,000	574,513	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28,146	631,990	1,347,624	3,055,279	3,978,501	2,684,299	985,000	1,160,662	952,377	400,000	574,513	-	-	-	-

# New Construction Plan

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Commercial New Construction Transition** initiative budget revised from \$15.1 M to \$14.6M (-0.4M).
- **New Construction – Market Rate** benefits forecast updated to better reflect the results of more recent projects which are demonstrating lower costs of implementing measures to achieve the targeted level of performance (a trend providing evidence that the market is transforming as desired, consistent with initiative objectives).
- Updates made to Evaluation Studies planned start/end dates in Section 3.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Commercial New Construction Transition** revised from \$20.2M to \$15.1M (-5.1M); **Low Rise New Construction Transition - Market Rate** revised from \$4.54M to \$4.38M (-0.16M); **Multifamily New Construction Transition - Market Rate** revised from \$2.5M to \$1.6M (-0.9M)

- **New Construction – Market Rate** budget revised from \$131.0M to \$142.2M (+11.1M) supporting a revised mix of services and projects between Single-Family, Multifamily and Commercial sectors through 2025 and addressing critical support needs for the Climate Act.
- The previously filed **New Construction – Market Rate** plan included metrics for Renewable MW (capacity) that should have been listed as Renewable MWh (generation) instead. This has been corrected with this filing.

## 1. Focus Area Overview

### Focus Area Description

This Focus Area contains the general strategy for New Construction and the market rate program initiatives. All New Construction programming serving the LMI Focus Area (\$124 million of additional funds to the programming described in this Focus Area Plan) can be found within the Statewide Low- and Moderate-Income Portfolio Implementation Plan<sup>1</sup> (Joint Plan) which is jointly administered by NYSERDA and the investor-owned utilities.

Although it represents 1-2% of the existing building stock in any given year, making progress in design, performance, and cost of carbon neutral buildings in New Construction is essential for meeting our 2030 and 2050 goals under the Climate Act. The proving ground for proposed energy code and emissions standards in NYSERDA's New Construction initiatives will enable the aggressive code cycle proposed under the Climate Act for zero on-site emissions in single family in 2025 and multifamily/commercial in 2027. An example of this is that all winners in the 2020 award round of Buildings of Excellence were all-electric and the cost premiums over conventional code multifamily construction was 0-2%. This is the type of accomplishment that facilitates adoption of aggressive energy codes.

While the New Construction programs contained within the Joint Plan (referenced above) will primarily focus on serving disadvantaged communities through low-income housing, the New Construction focus area described here supplements these benefits to disadvantaged communities by advancing high performance commercial and institutional buildings within these communities, which provide services such as education, training and healthcare, with much less carbon pollution. Many of the demonstration projects under Carbon Neutral Community Economic Development are in Downtown Revitalization Districts. Building market capability in this focus area benefits all segments of new construction – from market-rate projects to affordable housing.

For the purposes of this plan, New Construction is defined as ground up new construction of buildings as well as adaptive re-use of existing buildings. To qualify as adaptive re-use, the building must be unoccupied and subject to current code requirements for its intended use. The purpose of new construction programs is to build market capacity and prove the technical and financial viability of

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<sup>1</sup> Plan jointly administered by NYSERDA and the utilities resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084  
<https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

various solution sets to the market one to three code cycles before they are adopted as the minimum building code. The new construction activities in this plan are comprehensively intended to have buildings, neighborhoods and campuses achieve building decarbonization via the aggregated result of efficiency + electrification + onsite renewables + real-time capability to respond to grid conditions (via controls, storage, onsite renewables, etc.).

### **Current State of Market**

There are many examples of our desired building decarbonization solution set being demonstrated in the new construction sector. These solutions include: electrification of space and water heating systems and appliances; high efficiency buildings, particularly with regard to high performing building envelopes; having sufficient electric capacity to support electrification and electric vehicle (EV) charging; installation of on-site solar (thermal and electric) and other renewable energy systems; and ability to respond to an intelligent grid or respond in real-time to grid signals. Although this currently represents less than 5% of the market, the growth in deployment of these solutions is accelerating due to local laws, pending state requirements, and corporate/institutional sustainability pledges.

The level of construction is highly sensitive to global economic cycles. Approximately 100 million square feet of new construction is built per year in New York State. Current market conditions are driving up costs for all construction projects, due to disruptions in supply chains, labor shortages, increased material costs and rising interest rates. The COVID health and economic disruption has drastically changed the mix of new projects in the short-term and some of those changes seem to have permanence. Going forward, NYSERDA expects continued strength in multifamily construction but contraction in commercial office and retail buildings. Single family construction is expected to contract due to increased mortgage rates. Outside of housing, life sciences, chip manufacturing and light industrial/logistics structures are expected to be growth areas. Beyond new ground up construction, NYSERDA expects a higher than typical adaptive re-use market for the next several years, with much of the activity focused on developing housing. This creates a highly leveraged intervention opportunity to influence the adoption of carbon neutral solutions that are difficult and expensive to execute in an occupied building.

Nearly 200 Net Zero Capable and Net Zero Energy buildings have been built in New York. Net Zero was NYSERDA's previous focus under New Efficiency New York before pivoting to Carbon Neutral building strategies which are necessary to achieve the goals under the state Climate Act and fully decarbonize by mid-century. For some building typologies, experienced design teams and developers are able to achieve carbon neutral performance with no or minimal incremental cost. However, much of the market is only able to achieve this level of performance, with an incremental cost of 5-10% above standard design and construction, limiting the market penetration of carbon neutral buildings. The Carbon Neutral Buildings Road Map, which released a draft in June of 2021, provides economic and market information for many building types. The incremental costs are often driven by lack of an integrated approach to building envelopes, HVAC, and domestic hot water systems sizing. Over-sizing or engineering is a common practice for handling uncertainty. Commercially available solutions in the market today are expected to yield cost parity soon, indicating a trend of decreasing costs for carbon neutral buildings. Many developers have shown a learning curve of 3-5 projects to get to a less than 1% incremental cost to achieve carbon neutral performance.

## **Intervention Strategies**

Most of NYSERDA's New Construction program services to date, have supported individual buildings. Going forward, increased efforts will be made to support the integration of carbon neutral performance goals into larger portfolio-level or community/campus scale development and redevelopment efforts. The initiatives in this plan will advance the design and construction of carbon neutral new construction and adaptive re-use projects by building the capability and market capacity of developers, design teams, and the construction industry. The goal of new construction market interventions is to achieve decarbonized buildings that provide superior health, comfort and resiliency at comparable cost to business-as-usual practices. NYSERDA will focus on solutions in the single-family, multifamily, and commercial market sectors where carbon neutrality is achievable with current technology, is financially viable with incentives and tax credits, and scale can be achieved in the market.

### **Commercial/Industrial (\$79.9M)**

Projects are supported through one of two Commercial and Industrial focused offerings. NYSERDA's Commercial New Construction program is an open enrollment program available as a standard offer to support carbon neutral new construction and rehabilitation projects through technical assistance and financial incentives. The Carbon Neutral Community Economic Development program offers incentives and technical support on a competitive basis to spur carbon neutral energy performance in projects and the campuses/communities aligned with the priorities of the Regional Economic Development Councils, as well as State climate and energy priorities.

### **Multifamily (\$34.4M)**

The New Construction–Housing program supports New Construction and adaptive re-use of multifamily buildings and mixed-use projects. These open enrollment and standard offer programs provide technical and financial support to transition multifamily buildings to achieve carbon neutral performance. Targeted incentives are available for design and innovative technical solutions. Additionally, the Buildings of Excellence Competition is aimed at driving innovative design and construction approaches in the multifamily market and creating highly replicable use cases to spur public interest and demand for carbon neutral buildings. The Buildings of Excellence Competition provides direct support to the design community to enhance the capabilities of architects, engineers, and construction managers to facilitate more advanced building designs and execution. Note: An additional \$108.2M of funding is identified in the Joint Plan for LMI housing that also serves this sector.

### **Single Family (\$25.9M)**

Builders and developers of single-family homes are encouraged to transition to carbon neutral performance through the New Construction–Housing program, an open enrollment and standard offer program which provides technical and financial support as well as targeted design and technology incentives. NYSERDA is also developing a new network of high-quality carbon neutral home builders across the State. This new program offering will help build the market capability to build healthy homes that offer better living environments. New messaging for the single-family market will focus on health

impacts and resiliency. Additionally, NYSERDA will issue a competitive Single-Family home design competition for neighborhoods and subdivisions. The competition will target mid-market developers and de-risk the development of neighborhoods without fossil-fuel line infrastructure. NYSERDA will support efforts to increase consumer demand for these high-quality carbon neutral homes. Note: An additional \$23M of funding is identified in the Joint Plan for LMI housing that also serves this sector.

### Cross-Sector (\$2.0M)

New Construction initiatives support activities that have cross-sector impacts. This includes the Carbon Neutral Buildings Roadmap which is supporting the advancement of the Climate Act, Channel Partnerships, and workshops and conferences. These activities support the advancement of policies that impact new construction and building re-use, strengthen public and private sector organizations that champion carbon neutral performance, and increase the capacity of market actors to broaden the impacts of those investments.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$180.1	-	\$163.2	- \$0.4	\$162.8	90%

Initiatives Active in The Market	Funding (\$M)	Period
New Construction – Market Rate	\$142.2	2018 -
<b>Total Active Funding</b>	<b>\$142.2</b>	

Completed/Inactive Initiatives (where applicable)	Funding (\$M)	Period
Commercial New Construction Transition	\$14.6	2016 - 2019
Low Rise New Construction Transition (Market Rate)	\$4.4	2016 - 2019
Multifamily New Construction Transition (Market Rate)	\$1.6	2016 - 2019
Total Inactive Funding	\$20.6	
<b>Total Focus Area Funding</b>	<b>\$162.8</b>	

Note: In addition to the investments detailed below, NYSERDA also commits substantial New Construction funding (\$134.6M) to support the Statewide Low- and Moderate-Income Portfolio Implementation Plan, an effort jointly administered with all utilities . This plan is updated annually under the referenced case number. This work has a strong focus on affordable housing and includes partnerships with housing agencies.

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	1.2	2.4
Cumulative Annual Electricity EE Savings (MWh)	0.1	0.3
Cumulative Annual Natural Gas EE Savings (MMBtu)	0.8	1.5
Cumulative Annual Other Fuels EE Savings (MMBtu)	0.01	0.03
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$71	\$130

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technical assistance and/or defrays the cost of installing energy efficient, electrification or clean energy technologies intended to reduce buildings’ energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings’ energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement/construction decisions considering the entirety of their energy budget rather than in an electric-only manner.

Section III of the Compiled Investment Plan is dedicated to NYSERDA’s **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA’s Evaluation Plans and Reports are posted on the New York State Department of Public Service’s Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA’s entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA’s website](#).

## **2.1. New Construction (Market Rate)**

The initiative is made up of six activities that will increase the awareness of and confidence in the performance of new carbon neutral buildings. NYSERDA will modify and simplify the current standard offer base incentives to help overcome initial design challenges, and cost and risk barriers related to building and renovating carbon neutral buildings. This initiative will identify opportunities to engage with more innovative market segments, reduce administrative burdens, and shorten project engagement times.

NYSERDA will work with and support various State entities to drive carbon neutral building performance opportunities related to economic development, affordable and healthy housing efforts, and other State investments. NYSERDA will issue the Carbon Neutral Community Economic Development program, a multi-year competitive solicitation that leverages opportunities to spur carbon neutral projects aligned with Regional Economic Development Councils' Strategic Plans and other State priorities. The competition provides a unique program model in which technical assistance and incentives for decarbonization strategies (efficiency, renewables, energy storage, electric vehicle charging, embodied carbon, low global warming potential (GWP) refrigerants) are aligned with project timelines for these important economic development projects. This program model will also support the planning of community-level projects to achieve carbon neutral performance.

NYSERDA will also host a Buildings of Excellence Competition for multifamily buildings. The competition promotes carbon neutral buildings that are cost-effective, highly replicable, resilient, achieve superior performance in terms of efficiency and incorporate renewables, energy storage, electric vehicle charging, embodied carbon, and low-GWP refrigerants. NYSERDA will conduct performance analyses to assess actual building and equipment performance to create a data library on measure performance, and case studies of successful projects. The objective is to show that carbon neutral multifamily buildings can be affordable, profitable, beautiful, and great places to live.

NYSERDA will build on the success of the Buildings of Excellence program model to target single-family homes and neighborhood developments through a competition that promotes the construction of carbon neutral homes that are cost-effective, highly replicable, resilient, and achieve high performance. The objective is to advance the adoption of carbon neutral homes and highlight the health benefits that are inherent in all-electric homes. Additionally, NYSERDA will generate awareness of the benefits of these homes through a media campaign; support for builder and developer self-marketing; showcasing carbon neutral homes for potential home buyers to experience; and continuing to support the design development and advancement of construction practices through training and resource development. NYSERDA will conduct performance analyses and develop case studies on successful projects to provide building performance validation and increase market demand for carbon neutral homes.

Additional activities conducted for this focus area include simplified design packages, tools, resources, performance validation, and support for third-party standards. These activities will promote market-based solutions by increasing the capacity of design and construction teams through training, creating model measure packages for common building types, using technology solutions to improve design development, and validating third-party organizations to provide quality assurance over performance standards.

**Participants, Barriers, and Objectives**

<b>Target Market Participants</b>	
Building Owners and Developers	Green Building Verifiers
Tenants and Residents	Manufacturers
Distributers and Suppliers	Finance Community
Economic Development and Community Planning Agencies	Channel Partners
State Agencies/Climate Action Council	Architects and Engineers
Energy Modelers	Construction Entities

<b>Target Market Barriers</b>	
Difficulty predicting energy savings	Lack of verified performance
Lack of awareness of integrated design practices	Complex program requirements and offerings
Lack of confidence in energy performance ratings and standards as well as lack of confidence in technical capabilities and reliability of some decarbonization solutions.	Lack of awareness and quantification of non-energy benefits (e.g., health, comfort, resiliency) of carbon neutral buildings.
Lack of Consumer demand for carbon neutral buildings	

<b>Initiative Objectives</b>
Reduce the overall costs of carbon neutral performance construction and renovation.
Increase the confidence in advanced clean energy building practices and technologies.
Develop tools and market capacity to make building designs more consistent and reliable and expedite the review and approval process of buildings.
Increasing Consumer demand for carbon neutral new construction.

## Key Activities + Measurements

### Commercial New Construction

<b>Activity:</b> Provide technical assistance and financial incentives to overcome initial design challenges, costs and risk barriers related to building and renovating carbon neutral commercial and industrial buildings.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of Market Participants that attend Conferences and Events <sup>b</sup> (baseline = 4,979).		5,000	9,000	13,000	17,000	21,000
Output: Published Case Studies (baseline = 0).		0	5	-	-	-
Output: Number of Carbon Neutral Commercial Buildings Completed (baseline = 0)		11	20	40	60	100
Output: Carbon Neutral Commercial Square Feet Completed (baseline = 0)		40,000	80,000	250,000	550,000	1,000,000
Output: Number of Market Participants that attend Trainings and Workshops <sup>b</sup> (baseline = 2,372).		4,400	6,400	-	-	-
Output: Published Model Measure Packages (baseline = 0).		-	-	5	10	15
Output: Number of projects that completed performance analysis (baseline = 0).		5	12	20	30	45
Outcome: Incremental Cost of Building a highly energy efficient all-electric (Carbon Neutral) project on total construction cost (baseline = 10%-20%).		10-20%	10-20%	8-15%	8-15%	5-10%
Outcome: Percent market penetration of commercial projects >20,000 square feet, utilizing integrated design and construction practices (baseline = TBD)		3%	3%	6%	8%	10%
<b>Related Notes:</b>						
a. There are currently no open milestones associated with the activity described here.						
b. Participants will be categorized based on the new construction sector that is funding the activity and participant numbers will be split according to the funding assigned for each new construction sector						
c. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

### Carbon Neutral Community Economic Development

<b>Activity:</b> Provide incentives and technical support to building owners on a competitive basis, leveraging economic development opportunities, to spur carbon neutral projects that are aligned with Regional Economic Development Councils' Strategic Plan and State Priorities.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue Awards for the Carbon Neutral Community Economic Development program.		Rnd 3	Rnd 4			
Output: Number of Carbon Neutral Community Economic Development facility projects awarded (baseline = 17).		27	37	-	-	-
Output: Number of Carbon Neutral Community Economic Development Campus/ Community projects awarded (baseline = 3).		5	7	-	-	-
<b>Related Notes:</b>						
a. There are currently no outcomes associated with the activity described here.						
b. Baseline values for outputs presented in this table are not derived from evaluation studies.						

## New Construction–Housing

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>Build market capability and capacity for new construction and adaptive reuse of multifamily and single-family homes to achieve carbon neutral performance.</li> <li>Offer project-specific targeted support for integrated and advanced design, innovative or smart technologies, as well as mentoring support.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Output: Number of Market Participants that receive mentoring Support (baseline = 16).		30	45	60	75	90
Output: Number of Market Participants that attend Conferences and Events <sup>b</sup> (baseline = 4,979).		11,000	16,000	-	-	-
Output: Published Case Studies (baseline = 56).		65	75	-	-	-
Output: Number of Market Participants that attend Trainings and Workshops <sup>b</sup> (baseline = 2,372).		4,400	6,400	8,400	10,400	12,400
Output: Number of Carbon Neutral Market Rate Multifamily Units Completed (baseline = 0)		100	250	450	900	2000
Output: Carbon Neutral Market Rate Multifamily Square Footage Completed (baseline = 0)		0.10M	0.25M	0.45M	0.90M	2.0M
Output: Number of Carbon Neutral Market Rate Single Family Homes Completed (baseline = 0)		100	150	250	400	1,000
Output: Carbon Neutral Market Rate Single Family Square Footage Completed (baseline = 0)		0.25M	0.38M	0.63M	1.0M	2.5M
Output: Published Model Measure Packages (baseline = 0).		-	-	5	10	15
Output: Number of Projects that completed performance analysis (baseline = 0).		15	30	45	60	75
Outcome: Incremental Cost of Building a highly energy efficient all-electric (Carbon Neutral) project on total construction cost (baseline = 10%-20%).		5-12%	5-12%	4-10%	3-8%	2-5%
Outcome: Percent market penetration of multifamily projects >20,000 square feet, utilizing integrated design and construction practices (baseline = TBD)		3%	3%	6%	8%	10%
<b>Related Notes:</b>						
<ol style="list-style-type: none"> <li>There are currently no open milestones associated with the activity described here.</li> <li>Participants will be categorized based on the new construction sector that is funding the activity and participant numbers will be split according to the funding assigned for each new construction sector</li> <li>Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.</li> </ol>						

## Buildings of Excellence – Multifamily Housing

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Host competition to promote and demonstrate carbon neutral buildings that are highly replicable, resilient, achieve superior performance, are cost-effective, and create great places to live or work.</li> <li>• Conduct performance analyses to assess actual building and equipment performance to create a data library on measure performance,</li> <li>• Develop case studies on successful projects to provide building performance validation and increase market demand for advanced clean energy buildings.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue Awards for the Buildings of Excellence Competition			Rnd 3	Rnd 4		
Output: Number of Buildings of Excellence projects awarded (baseline = 42 (both LMI and Market Rate)).		42	47	51	-	-
<b>Related Notes:</b>						
<ol style="list-style-type: none"> <li>There are currently no outcomes associated with the activity described here, but this activity is expected to be supportive of the outcomes listed for New Construction – Housing.</li> <li>Baseline value for the output presented in this table is not derived from evaluation studies.</li> </ol>						

## Single-Family Housing Development Competition

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Target single family homes and neighborhood developments through a competition to advance the adoption of carbon neutral homes and highlight the health benefits that are inherent in all-electric homes.</li> <li>• Support the market for carbon neutral single-family homes through activities that generate awareness of the benefits of these homes. This includes a media campaign, support for builder and developer self-marketing, showcasing carbon neutral homes for potential home buyers to experience, and continuing to support the design development and advancement of construction practices through training and resource development.</li> <li>• Conduct performance analyses and develop case studies on successful projects to provide building performance validation and increase market demand for carbon neutral homes.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue Builder/Developer Network Solicitation.		*				
Milestone: Issue Awards for each round of the Carbon Neutral Single Family Neighborhoods Competition.			Rnd 1	Rnd 2	Rnd 3	Rnd 4
Output: Number of Builders and Developers in the Carbon Neutral Network (baseline = 0).		10	30	50	65	75
Output: Number of Carbon Neutral Neighborhoods Awarded (baseline = 0).		-	3	8	13	21
<b>Related Notes:</b>						
<ol style="list-style-type: none"> <li>There are currently no outcomes associated with the activity described here.</li> <li>Baseline value for the output presented in this table is not derived from evaluation studies.</li> </ol>						

Climate Leadership and Community Protection Act Support

<b>Activity:</b> <ul style="list-style-type: none"> <li>Support the writing, research and analysis for the Carbon Neutral Buildings Roadmap and other activities as determined by the Climate Action Council.</li> <li>Support future roadmap activities and updates.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Carbon Neutral Buildings Roadmap is published.		*				
Milestone: Provide input and support to State and local governments to advance adoption of requirements for carbon neutral buildings in state/local laws and programs.		*	*	*	*	*
<b>Related Notes:</b> <ol style="list-style-type: none"> <li>There are currently no outputs or outcomes associated with the activity described here.</li> </ol>						

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - New Construction	New Construction	New Construction - Market and Impact - Assessment 1 - Years 2017-2021	Market and Impact	PY 2017-2021	2020 Q4	2022 Q4 Single Family; Q2 2023 Comm/MF	In Progress
IR - Grid Modernization, IR - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	Market Development & Innovation & Research	Market Dev. & I&R - Case Studies - program years 2016-2020	Impact	PY 2016-2020	2021 Q1	2022 Q4	In Progress
MD - New Construction	New Construction	New Construction - Market and Impact - Assessment 2 - Years TBD	Market and Impact	PY TBD	2023 Q1	2023 Q4	Upcoming

# New Construction - Market Rate

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	78,011
Energy Efficiency MMBtu - Natural Gas	410,742
Energy Efficiency MMBtu - Other Fuels	18,422
Energy Efficiency MW	0
Renewable Energy MWh	3,800
Renewable Energy MW	-
Leveraged Funds	91,040,917

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	1,374	1,247	1,290	1,490	6,940	10,190	13,390	13,490	14,000	9,600	5,000
-	-	-	-	19,372	13,668	7,000	8,000	45,663	62,663	77,163	73,213	46,000	40,000	18,000
-	-	-	-	290	-	-	50	2,688	2,868	3,338	3,188	2,750	2,250	1,000
-	-	-	-	0	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	200	200	350	450	800	750	500	350	200
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	1,745,576	1,345,341	2,200,000	2,600,000	11,000,000	14,500,000	17,250,000	14,750,000	11,500,000	9,250,000	4,900,000

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	320,520
Energy Efficiency MMBtu - Natural Gas	1,643,116
Energy Efficiency MMBtu - Other Fuels	20,960
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	29,961	31,567	32,374	32,374	32,374	32,374	32,374	32,374	32,374	32,374
-	-	-	-	-	151,778	161,818	166,190	166,190	166,190	166,190	166,190	166,190	166,190	166,190
-	-	-	-	-	1,912	1,912	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(2)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	(2)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	119,266,313
Implementation	8,038,088
Research and Technology Studies	-
Tools, Training and Replication	14,846,105
Business Support	-
<b>Total</b>	<b>142,150,505</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	3,625	2,445,502	2,242,103	3,150,000	2,600,000	10,650,000	19,750,000	23,850,000	21,709,063	15,507,651	11,660,290	5,698,079
-	6,060	330,117	891,270	994,657	315,955	455,000	420,000	950,000	875,000	987,540	810,344	657,230	269,914	75,000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	899	160,435	587,645	1,173,445	475,000	370,000	2,611,199	4,325,000	2,900,000	1,962,481	280,000	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	6,060	331,016	1,055,329	4,027,805	3,731,502	4,080,000	3,390,000	14,211,199	24,950,000	27,737,540	24,481,888	16,444,881	11,930,204	5,773,079

# Commercial New Construction Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	23,348
Energy Efficiency MMBtu - Natural Gas	122,290
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	6
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	22,134,433

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	1,097	6,617	3,012	3,016	3,606	500	500	1,500	2,500	1,000	-	-	-	-
-	1,923	675	1,910	16,899	15,884	10,000	15,000	20,000	25,000	15,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0	1	0	1	1	-	-	1	-	1	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	385,057	1,642,181	430,996	3,062,162	3,114,037	1,500,000	2,000,000	3,500,000	4,500,000	2,000,000	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(1,095)
Direct Energy Usage MMBtu - Natural Gas	(14,827)
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	(625)	(470)	-	-	-	-	-	-	-	-	-
-	(1,318)	(5,639)	(5,355)	(377)	(2,138)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	13,139,551
Implementation	1,506,432
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>14,645,983</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
83,983	597,165	1,126,139	1,482,279	2,250,055	1,373,578	425,000	650,000	1,650,000	2,000,000	1,501,353	-	-	-	-
20,019	366,028	343,118	94,879	112,610	129,335	130,000	100,000	94,174	66,270	50,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104,002	963,193	1,469,257	1,577,158	2,362,664	1,502,912	555,000	750,000	1,744,174	2,066,270	1,551,353	-	-	-	-

# Low Rise New Construction Transition - Market Rate

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	5,847	493	1,450	678	1,264	497	514	130	300	300	220	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	114,671	16,464	31,027	17,048	39,479	8,308	1,095	50	400	400	400	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	2,151	1,037	551	152	381	-	30	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	13,236,359	1,213,587	2,730,113	2,218,827	3,400,310	1,230,513	1,138,009	305,000	350,000	350,000	300,000	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	3,459,045	307,450	685,700	651,900	697,817	383,965	397,236	85,000	85,000	85,000	79,977	-	-	-	-	-
Implementation	922,240	38,582	200,420	193,495	136,519	111,345	79,970	63,182	52,359	30,000	16,369	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>4,381,285</b>	<b>346,032</b>	<b>886,120</b>	<b>845,395</b>	<b>834,336</b>	<b>495,311</b>	<b>477,205</b>	<b>148,182</b>	<b>137,359</b>	<b>115,000</b>	<b>96,346</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# Multifamily New Construction Transition - Market Rate

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	1,426
Energy Efficiency MMBtu - Natural Gas	13,000
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	3,912,761

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	626	225	225	350	-	-	-	-	-	-
-	-	-	-	-	5,800	2,100	2,100	3,000	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1,687,761	225,000	500,000	1,500,000	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	689,141
Implementation	937,733
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>1,626,873</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	13,122	153,058	228,502	3,704	100,000	90,000	100,755	-	-	-	-	-	-
42,418	268,317	200,067	86,022	83,757	107,475	75,000	34,000	40,676	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42,418	268,317	213,189	239,080	312,259	111,179	175,000	124,000	141,431	-	-	-	-	-	-

# Communities Plan

## *Market Development Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. The majority of forecast updates are minor adjustments to plan; major modifications are described in the details below, where applicable.
- **Clean Energy Communities** planned activities and associated measures updated in Section 2.1 and updates made to plan milestones.
- Updates made to Evaluation Studies planned start/end dates in Section 3.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Community Energy Engagement** initiative now inactive as of this filing.

## **1. Focus Area Overview**

### **Focus Area Description**

Local governments in New York State can be enlisted to make significant contributions to achieving the goals of the Climate Act, including providing meaningful benefits to disadvantaged communities. However, local governments and communities still lack the funding, staff capacity and information needed to prioritize and implement the highest impact clean energy actions. The Communities initiative addresses these challenges through grants, direct technical support, tools, resources and recognition to local governments that demonstrate leadership in clean energy. Clean Energy Communities will provide the resources that communities need to advance clean energy in their neighborhoods, demonstrate the benefits of such investments, and encourage replication by communities across the State. Through its community interventions, NYSERDA aims to partner with local governments and communities enabling them to make informed energy choices in their communities, government operations, homes, businesses, and community institutions.

### **Current State of Market**

Local governments in particular, have the ability to educate and influence clean energy activities in their community, making them ideal candidates to be a leader and influencer in the clean energy economy. However, communities throughout the nation and in New York often lack information, resources, capacity and technical knowledge to effectuate this change.

Many municipalities lack information regarding what clean energy opportunities exist. Still others often have too many choices, some of which appear complex and time consuming. Municipalities that are aware of clean energy opportunities or programs are often overwhelmed with too many choices and have trouble prioritizing the highest impact actions. Local governments often lack staff capacity, and often do not have the in-house technical knowledge needed to properly implement clean energy projects. Furthermore, there are few opportunities for peer-to-peer engagement, learning and motivation. And finally, many municipalities have inadequate financial resources readily available for implementing clean energy projects. Lack of implementation funding for innovative projects is a major barrier; there is no reliable (ongoing), open source of funding that municipalities know will be there if they take the time to put together plans for clean energy projects.

### **Intervention Strategies**

NYSERDA will package, promote, and deploy new clean energy initiatives that resonate with local governments and community stakeholders. The activities in this Focus Area incorporate tools and services from various State agencies and authorities, while presenting a unified approach to municipal and community leaders. These efforts are designed to institutionalize deployment of clean solutions at the local level, building on local expertise by working through trusted champions to deploy solutions.

A complementary component to Clean Energy Communities will be developed to support NYS communities advancing toward carbon neutrality. This initiative will provide funding and technical

support to municipalities to take advanced actions that drive further investment toward a decarbonized future.

Through the Clean Energy Communities initiative, NYSERDA will encourage communities and municipalities to pursue high-impact actions that include, but are not limited to, the following:

- **Unified Solar Permit:** Adopt the NYS Unified Solar Permit to streamline the approvals process for small-scale solar.
- **Energy Code Enforcement Training:** Train code compliance officers and other municipal officials in best practices in energy code enforcement.
- **Property Assessed Clean Energy (PACE) Financing:** Authorize a financing program for clean energy upgrades to commercial or non-profit property.
- **Clean Energy Upgrades:** Achieve significant reductions in the greenhouse gas emissions from municipal buildings through energy efficiency upgrades and renewable energy.
- **Clean Heating and Cooling Demo:** Convert at least one municipal facility to all-electric with ground- or air-source heat pumps.
- **One Hundred Percent Renewable Electricity:** Use renewable energy resources for all the electricity supply needs of municipal government.
- **Climate Smart Communities Certification:** Earn Climate Smart Communities Certification to reduce carbon emissions and build resilience.
- **LED Street Lights:** Convert at least half of the municipal cobra-head or decorative-style streetlights to light-emitting diode (LED) technology.
- **Benchmarking:** Adopt a policy to track and report the energy use of municipal buildings or large private buildings.
- **Clean Fleets:** Deploy light to heavy duty electric vehicles or install electric vehicle charging stations.
- **Community Choice Aggregation:** Dramatically reduce carbon emissions by transitioning to a clean, renewable electricity supply for community residents and businesses.
- **NYSStretch Energy Code:** Adopt an energy code that is more stringent than the base energy code.
- **Community Campaigns:** Undertake one or more campaigns to promote clean energy in the community.
- **Clean Transportation:** Take action in support of nonmunicipal electric vehicles, transportation demand management (TDM), congestion mitigation, and smart growth.

Program investments and activities will be informed via engagement with stakeholders and subject matter experts. The investments support Climate Act goals by stimulating communities across the State to save on energy costs, create jobs, and drive local economic growth, while protecting the environment by reducing greenhouse gas (GHG) emissions and other pollutants. The investment also supports Clean Energy Standard (CES) goals by helping retain existing renewable energy resources while stimulating demand for new clean energy resources.

NYSERDA will deliver significant benefits to disadvantaged communities through a multi-pronged communities strategy. This includes bonus incentives to communities that spend grant funding in disadvantaged community areas, targeted outreach to encourage participation by those communities, and high-impact actions specifically serving low-to-moderate income residents including, for example, Community Campaigns for Community Solar (Solar for All).

The combination of concise choices, technical assistance, outreach, engineering support, tools, resources, and dedicated funding will provide the foundation necessary to enable communities to undertake clean

energy actions and projects. One of the key aims of this support structure is to help build the capacity needed for local governments and communities to take future action on their own.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan's Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$85.7	-	\$85.7	-	\$85.7	100%

Initiatives Active in The Market	Funding (\$M)	Period
Clean Energy Communities	\$81.3	2017 -
<b>Total Active Funding</b>	<b>\$81.3</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
Community Energy Engagement	\$4.4	2017 - 2021
<b>Total Inactive Funding</b>	<b>\$4.4</b>	
<b>Total Focus Area Funding</b>	<b>\$85.7</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	2.1	2.6
Cumulative Annual Electricity EE Savings (MWh)	0.3	0.4
Cumulative Annual Natural Gas EE Savings (MMBtu)	0.7	1.0
Cumulative Annual Other Fuels EE Savings (MMBtu)	0.2	0.3
Renewable Energy (RE) Distributed Solar Capacity (MW) <sup>3</sup>	0.001	0.001
Mobilized Clean Energy Investment (Leveraged Funds)	\$138	\$138

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

<sup>3</sup> Clean Energy Communities assumes a small percentage of total renewable MW planned is distributed solar, and these MW are assumed to be overlapping with NY-Sun

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports communities with technical assistance and/or defrays the cost of installing energy efficient, electrification or clean energy technologies intended to reduce buildings' energy consumption and/or the associated GHG emissions. The same supports are provided to promote use of renewable energy and clean transportation options by communities. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of community energy usage and recognizes the interplay between the different energy systems and infrastructure. Importantly, this approach recognizes that communities prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

NYSERDA invests funding from this focus area to support the NYS Clean Heat Market Development Plan, working to advance the electrification of buildings across New York State. Reference the Clean Heating & Cooling focus area plan for more detailed information on this strategic priority.

Some CEF initiatives are strategically partnered with Regional Greenhouse Gas Initiative (RGGI) funding to maximize the reach and impact of these collective efforts. As it relates to this CEF focus area NYSERDA also invests RGGI funding that bolsters the following CEF initiatives: Clean Energy Communities.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1. Clean Energy Communities

NYSERDA’s Clean Energy Communities program is designed to help local government officials and staff who want their communities to benefit from the new clean energy economy but struggle with tight budgets, limited staff, and local decision-making. By providing grants, coordinator support, and clear guidance for implementing a range of high-impact clean energy actions, NYSERDA is helping local governments save money, grow the local economy, and improve the environment. In addition, the Communities initiatives serve as a feeder to increase participation in other clean energy activities that result in greenhouse gas emission savings. To help communities prioritize and implement the high-impact actions, expert guidance is provided by dedicated and knowledgeable Clean Energy Communities Coordinators, at no cost to the local government. In addition, Clean Energy Communities offers online toolkits for each high-impact action with tools and resources including step-by-step guides, calculators, case studies, and model language that communities can incorporate into legislation.

NYSERDA will partner with local governments and community stakeholders to build local capacity to enable them to make informed energy choices in their communities, government operations, homes, businesses, and community institutions.

### Participants, Barriers, and Objectives

Target Market Participants	
Local Governments/Municipalities including elected officials and staff	Non-governmental organizations (e.g. Chambers of Commerce)
Partnering agencies, including the New York State Department of Environmental Conservation, Department of Transportation, Department of Health, Department of State, the Public Service Commission, the New York Power Authority (NYPA), and the Governor’s Office	Private consultants engineering firms, and other clean energy service providers
Utility and industry representatives	Partner Organizations (environmental groups, schools, etc.)
Community volunteers	Community-based organizations, including those servicing disadvantaged communities

Target Market Barriers	
Lack of information, resources, capacity and technical knowledge	Too many choices, some of which appear complex and time consuming to navigate
Few opportunities for peer-to-peer engagement, learning, and motivation	Lack of implementation funding for innovative projects

Initiative Objectives
Increase the number of clean energy actions completed by local governments
Drive advanced participation in high-benefit clean energy activities
Provide services and platforms to support communities pursuing clean energy actions

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Refine and update the Clean Energy Communities program and related technical assistance, tools, and resources.</li> <li>• Increase access to aggregated community-level energy use data (via Utility Energy Registry) needed for clean energy planning and tracking.</li> <li>• Develop a statewide building energy benchmarking platform to support a benchmarking mandate.</li> <li>• Target outreach and engagement efforts to influence electrification and other clean heating and cooling activities.</li> <li>• Provide focused program efforts that target disadvantaged communities.</li> <li>• Develop and launch new pilot to support communities' pursuit of advanced clean energy actions.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Launch Clean Energy Communities Leadership Round.		*				
Milestone: Launch Clean Energy Communities program update.				*		
Milestone: Develop and launch new pilot that supports advanced clean energy actions				*		
Output: Number of designation communities (baseline = 315).		375	455	470	485	500
Output: Number of completed high impact actions (baseline = 1,785).		2,400	3,149	3,400	3,700	4,000
Output: Number of communities that have completed one or more high impact action (baseline = 592).		690	778	790	795	800
Output: Number of completed Community Campaigns (baseline = 80).		150	150	170	190	200
Output: Number of certified Climate Smart Communities (baseline = 45).		73	91	100	110	115
Outcome: Number of communities implementing CCA (baseline = 24).		45	55	65	75	85
Outcome: Number of communities implementing NYStretch (baseline = 0).		20	30	-	-	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Communities	Community Energy Engagement	Community Energy Engagement Program - Market Assessment 1 - Years 2017-2020	Market	PY 2017-2020	2020 Q2	2021 Q4	Complete
MD - Communities	Clean Energy Communities	Clean Energy Communities - Market Update 2 PY 2018-2020	Market	PY 2018-2020	2021 Q2	2022 Q4	In Progress
MD - Communities	Clean Energy Communities	Clean Energy Communities - Impact - Program Years 2018 and 2021	Impact	PY 2018-2021	TBD	TBD	Upcoming

# Clean Energy Communities

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	262,617
Energy Efficiency MMBtu - Natural Gas	365,542
Energy Efficiency MMBtu - Other Fuels	154,580
Energy Efficiency MW	-
Renewable Energy MWh	546,116
Renewable Energy MW	838
Leveraged Funds	137,020,693

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
6,257	52,360	32,335	38,463	10,420	34,458	13,325	20,000	30,000	25,000	-	-	-	-	-
17,425	35,325	25,368	102,724	19,010	85,691	20,000	20,000	20,000	20,000	-	-	-	-	-
4,751	37,775	30,499	33,110	6,232	22,213	5,000	5,000	5,000	5,000	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5,890	13,539	43,683	118,307	5,868	26,830	47,000	35,000	100,000	150,000	-	-	-	-	-
7	16	250	183	18	31	45	65	112	112	-	-	-	-	-
2,673,739	39,141,658	5,481,798	19,543,523	9,060,970	27,119,005	19,000,000	5,000,000	6,000,000	4,000,000	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	269,052
Energy Efficiency MMBtu - Natural Gas	1,197,097
Energy Efficiency MMBtu - Other Fuels	257,877
Renewable Energy MWh	1,339,140
Renewable Energy MW	608

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	21,007	-	48,045	-	-	-	-	100,000	-	-	-	-	100,000
-	-	19,179	-	177,918	-	-	-	-	500,000	-	-	-	-	500,000
-	-	13,397	-	44,480	-	-	-	-	100,000	-	-	-	-	100,000
-	-	478,683	-	60,457	-	-	-	-	400,000	-	-	-	-	400,000
-	-	58	-	50	-	-	-	-	250	-	-	-	-	250

Energy Usage - Annual	Total
Direct Energy Usage MWh	(2,615)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	(730)
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
(15)	(1,582)	(264)	(103)	(27)	(4)	(20)	(175)	(225)	(200)	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	(730)	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	69,207,266
Implementation	6,619,799
Research and Technology Studies	-
Tools, Training and Replication	5,444,897
Business Support	-
<b>Total</b>	<b>81,271,963</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	25,000	1,413,625	3,046,075	5,607,562	4,974,503	5,303,421	4,535,178	7,001,032	9,813,568	9,990,121	9,560,486	5,887,044	2,049,651	-
-	288,994	356,178	722,026	599,506	494,587	551,693	1,231,982	1,356,870	826,458	191,508	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12,941	4,653	39,117	39,249	415,957	1,004,380	828,642	760,473	1,135,473	904,014	300,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12,941	318,646	1,808,919	3,807,350	6,623,025	6,473,469	6,683,755	6,527,633	9,493,375	11,544,040	10,481,628	9,560,486	5,887,044	2,049,651	-

# Community Energy Engagement

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	994,123	-	-	-	-	-	-	994,123	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	4,247,044	-	-	-	2,123,277	1,028,295	1,006,510	88,961	-	-	-	-	-	-	-	-
Implementation	160,774	-	34,449	861,844	(735,562)	44	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>4,407,818</b>	-	<b>34,449</b>	<b>861,844</b>	<b>1,387,715</b>	<b>1,028,339</b>	<b>1,006,510</b>	<b>88,961</b>	-	-	-	-	-	-	-	-

# Transportation Plan

## *Market Development Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary.
- Updates made to Evaluation Studies status in Section 3.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- The **Electric Vehicles - Rebate** initiative is now inactive, having committed all available CEF funding.
- The **EV Charging and Engagement** initiative is introduced to launch a Level 2 EV charging station rebate program targeting workplace, multi-unit dwellings, and public disadvantaged community charging stations – locations where Level 2 EV charging stations are most likely to lead to more EV adoption and where they are in lowest supply.
- Budget details associated with this CIP revision:
  - **EV Charging and Engagement** budget established for \$7.2M.

## **1. Focus Area Overview**

### **Focus Area Description**

The Transportation Market Development focus area seeks to support further market adoption of new technologies and strategies to reduce greenhouse gas emissions from the transportation sector and to gain market traction for these products. Activities are designed to resolve market barriers holding back the adoption of clean transportation technologies and strategies and provide financial support for the adoption of these clean transportation activities.

### **Current State of Market**

In recent years clean transportation technologies have grown in prominence in the transportation sector. Electric vehicle (EV) sales have increased from less than 5,000 per year in 2016 to over 30,000 in 2021. Electric options for a wide range of medium- and heavy-duty vehicles are now available. Six of the largest public transportation operators in New York State have committed to switching all of their buses to electric by 2040. However, many more market barriers must be removed to reach New York State's Climate Act goals for clean transportation adoption. Addressing both financial and non-financial hurdles will be critical to reach widespread market penetration of clean transportation technologies.

The primary goal for the EV Rebate program was to expand market adoption of EVs by providing a point-of-sale purchase incentive to New Yorkers who purchase or lease new electric vehicles. The Drive Clean Rebate was introduced in March 2017 with a combination of CEF and non-CEF funding. The Electric Vehicle Rebate initiative successfully accelerated EV adoption in New York State. NYSERDA provided more than 24,500 CEF-funded rebates to New Yorkers from 2017 to 2021, as annual EV sales in the State increased more than 500% and EV market share increased from less than 1% to nearly 4%. The number of EV models available for sale in the State rose from about 20 in 2017 to over 50 in 2021. NYSERDA fully committed (exhausted) CEF funding for EV Rebates in 2021 and the CEF program is no longer active; the program will continue on under the Regional Greenhouse Gas Initiative (RGGI).

### **Intervention Strategies**

The primary goal of the EV Charging and Engagement program is to build on NYSERDA's experience with Level 2 charging to offer a new program that focuses on the types of Level 2 charging station installations that will be most impactful in increasing EV adoption while leveraging the relationships with charging station owners to enlist these partners as EV engagement partners who can communicate with their employees, tenants, and others about EVs. The program seeks to achieve these goals through a combination of rebates for Level 2 EV charging stations at workplaces and multi-unit dwellings (MUDs) statewide, as well as public locations in disadvantaged communities (DACs), paired with incentives for workplace and MUD charging station owners to expand their involvement by promoting EVs to their employees and tenants.

The activities pursued under the Transportation Market Development focus area are closely aligned with and mutually supportive of the activities pursued under the Clean Transportation Innovation focus area. Both focus areas target existing market barriers to adoption of clean transportation technologies

in similar but distinct ways. Whereas the Transportation Market Development focus area primarily consists of activities that target end-users, the Clean Transportation Innovation focus area primarily consists of research and activities that target broader market barriers.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$46.7	-	\$46.7	-	\$46.7	100%

Initiatives Active in The Market	Funding (\$M)	Period
EV Charging and Engagement	\$7.2	2022 -
<b>Total Active Funding</b>		

Completed/Inactive Initiatives	Funding (\$M)	Period
Electric Vehicles - Rebate	\$39.5	2017 - 2021
<b>Total Inactive Funding</b>		
<b>Total Focus Area Funding</b>	<b>\$46.7</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$884	\$886

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%; Electric Vehicle - Rebate initiative delivers energy benefits and carbon emission reductions; however, these benefits do not accrue towards NYSERDA’s Energy Efficiency savings targets and therefore are excluded here. The “Other Fuels” Savings values for the initiative are 4.4 (2025) and 8.9 (2030).

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports further market adoption of new technologies and strategies to reduce greenhouse gas emissions from the transportation sector. Activities are designed to break down market barriers to adoption of clean transportation technologies and strategies, early on providing financial incentives to dealers to offset the purchase price of EVs, and currently providing rebates and promotions for Level 2 EV charging and EV use. Transportation is one of the largest contributors to carbon emissions in the State and reduction of fossil fuel use in the transportation sector, including support for electric vehicles and zero emission transport options, is needed to meet the State Climate Act goals.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 EV Charging and Engagement

Through its activities conducted under the Electric Vehicle Innovation initiative and other non-CEF programs, NYSERDA has identified the importance of convenient Level 2 EV charging at places drivers regularly visit as a critical factor in EV adoption. An analysis of NYSERDA's past rebate programs for Level 2 EV charging found that charging stations located at workplaces are used more frequently than any other Level 2 charging stations funded through the programs and are closely associated with higher EV ownership. From an equity standpoint, access to reliable charging for people living in multi-unit dwellings and in disadvantaged communities continues to lag far behind that of people living in single-family residences and in other communities across New York State. As part of the EV Innovation initiative, NYSERDA funded EV outreach and engagement activities that took a range of approaches to engaging potential EV owners and found that many of the most effective projects at increasing EV sales met car buyers where they were and enlisted trusted local partners to convey information about EVs.

The EV Charging and Engagement initiative will build off the lessons learned from these examples to create a new Level 2 EV charging station incentive program that focuses on installing Level 2 charging stations at workplaces and MUDs, as well as public DAC locations, and enlists the organizations installing the charging stations as EV engagement partners. CEF funding for this new initiative will be available in IOU service territories other than Con Edison's. Con Edison has seen a very strong response to its EV make-ready program for Level 2 EV charging stations, while other service territories are farther behind in meeting their goals.

The new program will consist of a base Level 2 electric vehicle supply equipment (EVSE) incentive for workplace and MUD charging stations and for public charging stations in DACs. Base incentives will be lowered from previous programs, which offered \$4,000 per port, or \$4,500 per port for stations in DACs. NYSERDA will set thresholds for minimum size of employer/MUD/public parking facility, with the intention of focusing on larger opportunities. Locations will be required to install networked charging stations that are able to track usage and accept payments. All incentive recipients will be required to share EV marketing materials with their employees, tenants, or local drivers on a regular basis.

In addition to these base incentives, NYSERDA will offer workplace and MUD charging station owners bonuses if they complete additional engagement actions. Initial actions for receiving the bonus include hosting a ride-and-drive event (either alone or with other recipients), offering free charging to employees or tenants, and participating in a group purchase of EVs that offers discounts for fleet, employee, and/or tenant EV purchases. Larger employers and MUDs will be eligible for larger bonuses, as they have the opportunity to reach more people through their outreach. Public DAC station owners will not be eligible for these bonuses.

To support the program, NYSERDA will hire a contractor or multiple contractors to recruit potential participants and support their participation, track their activities, and facilitate some of the engagement activities that benefit from specialized expertise and logistics (like ride-and-drives and group purchases). Contractors will help develop high-level messaging and materials, track and verify actions taken by participants, conduct targeted outreach to employers and MUD owners, build relationships with local car dealers (for participation in group purchases and ride-and-drive events) and EVSE installers (for potential

aggregation of installations), and coordinate local events. This initiative will leverage resources available through a US Department of Energy-funded national workplace charging campaign led by Forth and CALSTART, with support from local Clean Cities Coalitions that is developing resources for workplaces to make it simpler for them to install EV charging stations and will use existing materials where available.

This CEF funding will be supplemented with additional funds from other sources, potentially including the Volkswagen diesel emissions cheating settlement (VW Settlement), Regional Greenhouse Gas Initiative (RGGI) auction proceeds, and federal funding.

**Participants, Barriers, and Objectives**

<b>Target Market Participants</b>	
New York State employers and MUD owners	NGOs and advocates
Public parking owners in DACs	Disadvantaged communities and their representatives
Charging station manufacturers, vendors, and installers	Car dealers
Utilities	Forth, CALSTART, and local Clean Cities Coalitions

<b>Target Market Barriers</b>	
Lack of Level 2 charging infrastructure deployed because of a current poor ROI and lack of driver demand	Reluctance to buy an EV for people without access to dedicated parking and/or charging at home, especially residents of MUDs
Lack of awareness and acceptance of EVs among potential car buyers	

<b>Initiative Objectives</b>
Expand installations of Level 2 charging stations at workplace and MUD locations and at public locations in DACs.
Induce charging station owners to promote EV use among their employees and tenants by providing financial and non-financial support for them to offer incentives (such as free workplace charging and discounted purchases through aggregated sales) and educational experiences (such as ride-and-drive events and facilitated communications campaigns).

## Key Activities + Measurements

### Activity:

Provide incentives for Level 2 EVSE paired with bonuses for supporting EV engagement of prospective EVSE owners, EVSE manufacturers and installers, car dealers, and utilities.

- Initiate Level 2 EVSE rebate program targeting workplace, MUD, and public DAC charging stations
- Create accompanying incentive system for rebate recipients that take additional steps to promote EVs among their employees and tenants
- Onboard and manage contractors that can support program participants' engagement activities by developing outreach templates, facilitating relationships with car dealers, EVSE installers, EVSE vendors, municipalities, and utilities, and coordinating EV outreach events

Milestone or Measure (cumulative)	Target by Year	2021	2022	2023	2024	2025
Milestone: Launch EV charging and engagement incentive program.			*			
Output: Number of Level 2 charging stations installed through program (baseline = 0).		-	-	600	1,500	3,000
Output: Number of employers and MUDs completing EV outreach actions (baseline = 0).		-	-	20	60	100
Outcome: Verified new EVs purchased by employees and tenants of participating entities (baseline = 0).		-	-	400	2,000	5,000
Outcome: Charging stations installed in NYS (2022 baseline = 9,300).		-	-	12,500	-	25,000

### Related Notes:

- a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Transportation	Electric Vehicles - Rebate	Clean Transportation - Market and Impact - Assessment 1 - Years 2017-2021	Market and Impact	PY 2017-2021	2020 Q4	2022 Q2	Complete
MD - Transportation	Electric Vehicles - Rebate	Clean Transportation - Market and Impact - Assessment 2 - Years 2021-2022	Market and Impact	PY 2021-2022	2023 Q1	2023 Q4	Upcoming

# EV Charging and Engagement

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	26,752,500

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	900,000	11,250,000	11,250,000	3,352,500	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	5,945,000
Implementation	1,255,000
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>7,200,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	1,000,000	3,000,000	1,500,000	445,000	-	-	-	-
-	-	-	-	-	-	-	250,000	400,000	400,000	150,000	55,000	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	1,250,000	3,400,000	1,900,000	595,000	55,000	-	-	-

# Electric Vehicles - Rebate

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	1,099,937
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	859,110,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	126,089	221,668	254,774	425,104	72,302	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	103,250,000	186,935,000	197,680,000	316,995,000	54,250,000	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	15,661,942
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	590,625	738,281	922,852	1,153,564	1,441,956	1,802,444	1,802,444	1,802,444	1,802,444	1,802,444	1,802,444
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(60,528)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	(911,601)
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	(6,499)	(11,778)	(14,218)	(23,858)	(4,174)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	(39,375)	(47,644)	(57,649)	(69,755)	(84,404)	(102,129)	(102,129)	(102,129)	(102,129)	(102,129)	(102,129)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	37,004,246
Implementation	2,495,754
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>39,500,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	4,191,142	7,231,931	8,949,037	14,398,824	2,233,312	-	-	-	-	-	-	-	-	-
-	205,619	355,972	627,760	582,513	405,853	200,000	118,037	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	4,396,761	7,587,903	9,576,797	14,981,337	2,639,165	200,000	118,037	-	-	-	-	-	-	-

# Clean Heating & Cooling Plan

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- Budget details associated with this CIP revision:
  - As part of regular anticipated project closeout activities **Renewable Heat NY - Clean and Efficient Biomass Heating** revised from \$13.5M to \$13.4M (-0.08M)
  - **Heat Pumps Phase 2 (2020)** initiative budget revised from \$57.0M to \$57.5M (+0.5M) with funding added to support consumer awareness efforts.
- **Heat Pumps Phase 2 (2020)** milestones updated to reflect anticipated timing of building electrification roadmap.
- Updates made to Evaluation Studies status in Section 3

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Renewable Heat NY—Clean and Efficient Biomass Heating** inactive as of August 2021.
- **Heat Pumps Phase 1 (2017)** now considered inactive as of this filing.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Solar Thermal Transition** budget revised from \$0.293M to \$0.287M (-0.006M)
  - **Heat Pumps Phase 1 (2017)** budget revised from \$65.8M to \$57.5M (-8.3M) as part of project closeout with budget and benefit plan updated accordingly

- **Heat Pumps Phase 2 (2020)** budget revised from \$56.2M to \$57.0M (+0.8M), with funding being utilized to support Consumer Awareness and Critical Tools Development; Section 2.1 updated accordingly

## 1. Focus Area Overview

### Focus Area Description

Clean heating and cooling (CH&C) technologies have the potential to contribute significantly to the decarbonization of the heating and cooling sector. Analysis by NYSERDA in support of the Climate Action Council suggests that New York will need between one to two million buildings with clean heating and cooling solutions like heat pumps by 2030 to achieve the states climate goals.

Benefits to customers who implement clean heating and cooling technologies include energy bill savings, increased comfort levels, and health benefits, compared to conventional heating and cooling technologies.

Activities within this plan (specifically Community Campaigns and Clean Thermal District Systems) seek to increase viable and scalable solutions for electrifying homes in disadvantaged communities while addressing energy affordability, institutional barriers unique to affordable housing, and consumer protections.

### Current State of Market

Building electrification is a major priority for NYSERDA as demonstrated by the cross-cutting nature of investment in both Market Development and Innovation & Research portfolios, where electrification efforts seek to transform the way New Yorkers heat their homes and businesses in this and each of the following focus areas:

Buildings Innovation	Commercial/Industrial/Agriculture	Communities
Low-to-Moderate Income <sup>1</sup>	Multifamily Residential	Single Family Residential
New Construction	Workforce Development	

Today, CH&C technologies occupy a niche position in the State’s heating and cooling market. Barriers to wide-spread adoption include cost-effectiveness challenges in certain applications, limited customer awareness of and confidence in CH&C technologies, and a nascent supply chain in New York.

### Intervention Strategies

Starting in Q2 2020, the Utilities are administering the New York State Clean Heat Statewide Heat Pump incentive program. To achieve the heat pump goals and build the market infrastructure for a low-

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<sup>1</sup> Statewide Low-to-Moderate Income Implementation Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084 <https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

carbon future, the utility incentive program is paired with market development initiatives implemented by NYSERDA. This includes a \$270 million investment in market enabling initiatives funded through the CEF. For a summary of all market enabling building electrification initiatives, see the appendix to the NYS Clean Heat: Statewide Heat Pump Program Implementation Plan, Case 18-M-0084 which was filed on September 1, 2022.

A breakdown of NYSERDA funding for the NYS Clean Heat Market Development Plan in all Focus Areas, and the critical needs and associated electrification initiatives are as follows:

<b>Blue denotes NYS Clean Heat Effort funded through the "Heat Pumps Phase 2" initiative, serving multiple Focus Areas.</b>			
<b>Critical Market Need</b>	<b>Total Funding</b>	<b>Initiative</b>	<b>Budget</b>
Train and Develop the Needed Clean Heating and Building Electrification Workforce	\$38.2	Workforce Development	\$38.2
Build Consumer Demand and Market Confidence and Reduce Customer Acquisition Costs	\$68.4	<b>Marketing</b>	<b>\$26.1</b>
		<b>Community Campaigns*</b>	<b>\$10.0</b>
		<b>Critical Tools</b>	<b>\$4.5</b>
		Technical Assistance	\$28.8
Drive Performance Improvements, Reduce Cost, and Deliver New Economic Solutions through Technology Innovation and Demonstrations	\$83.6	<b>Clean Thermal District Systems</b>	<b>\$20.0</b>
		HVAC Technology Challenges	\$40.3
		Empire Building Challenge	\$15.0
		Multifamily Building Demonstrations	\$18.3
		<b>Cost Reduction Strategies</b>	<b>\$5.0</b>
Make Electrification Solutions Available for LMI Consumers	\$30.0	<b>LMI</b>	<b>\$30.0</b>
Make Products Available When and Where Consumers Need Them by Building the Clean Heat Supply Chain	\$12.2	<b>Supply Chain**</b>	<b>\$12.2</b>
Minimize Winter Electrical Peak by Investing in Demand Reducing "Heat-Pump Ready" Solutions	\$26.5	Comfort Home	\$22.7
Develop a Long-Term Building Electrification Roadmap to Guide the Transformation of How New Yorker's Heat and Cool Their Buildings	\$1.0	<b>Building Electrification Roadmap</b>	<b>\$1.0</b>
<b><i>SUB-TOTAL (representing the Heat Pump Phase 2 elements of the overall NYS Clean Heat effort)</i></b>			<b>\$99.5</b>
<b>TOTAL (representing totality of NYSERDA's NYS Clean Heat Market Development Plan Investment)</b>			<b>\$272.0</b>
* Includes funding through initiatives Clean Energy Communities (\$3M) and Regional Clean Energy Hubs (\$6M)			
** Pre-investment strategy development supported by Market Characterization & Design initiative (\$0.2M)			

Across its component initiatives, the NYS Clean Heat Market Development Plan aims to build market capacity to deliver building electrification solutions including air-source heat pumps (ASHP), water- and ground-source heat pumps (GSHP), and heat pump water heaters (HPWH). Advancing the market for these technologies is needed to meet the following central goals by 2025:

- Help achieve and possibly exceed the State's energy efficiency goals reflected in the Climate Act and in the New Efficiency: New York 2025 site TBtu savings target.

- Help achieve and exceed the State’s current heat pump energy savings targets with the installation of approximately 130,000 new heat pump systems<sup>2</sup>
- Increase the pool of skilled labor needed to grow a quality-oriented industry, training 14,000 workers across the heat pump supply chain, including 4,200 workers to sell, design, and install systems.
- Increase stocking of heat pumps by 50% above 2019 industry shipments and increase penetration of high-performance cold climate heat pumps to 90% of all heat pumps shipped for space conditioning in New York State.

NYSERDA’s NYS Clean Heat Market Development Plan includes broader market progress metrics, for example overall heat pump market size, installations, workforce development, and market penetration of heat pumps to advance the adoption of heat pump systems that are designed and used for heating. These market progress metrics will be supported collectively by all of NYSERDA’s market development activities that extend beyond any singular initiative. NYSERDA will measure market progress broadly, rather than for each specific initiative. Progress will be reported collectively within the Statewide Heat Pump Program Annual Report, filed in April each year.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$135.8	-	\$128.3	+\$0.5	\$128.7	95%

Initiatives that serve multiple Focus Areas across NYSERDA’s CEF portfolio are listed with a sterisk (\*). As noted in the Overview, the total funding for Heat Pump Phase 2 (2020) is \$99.5M, with portions of this plan serving the *Low-to-Moderate Income* and *Single-Family Residential* Focus Areas.

Initiatives Active in the Market	Funding (\$M)	Period
Heat Pumps Phase 2 (2020)*	\$57.5	2020 -
Total Active Funding	\$57.5	

<sup>2</sup> The State’s current energy savings targets from the installation of heat pumps by 2025 total 4.6 TBtu, including 3.6 TBtu from the state’s investor-owned electric utilities and 1.0 TBtu from the Long Island Power Authority. The 130,000 installations noted above refers to target installations in the regions served by the CEF (largely aligned with the IOU territories).

Inactive/Completed Initiatives	Funding (\$M)	Period
Solar Thermal Transition	\$0.3	2016-2019
Renewable Heat NY—Clean and Efficient Biomass Heating	\$13.4	2017-2021
Heat Pumps Phase 1 (2017)	\$57.5	2017-2021
Total Inactive Funding	\$71.2	
<b>Total Focus Area Funding</b>	<b>\$128.7</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	1.1	1.1
Cumulative Annual Electricity EE Savings (MWh)	0.01	0.01
Cumulative Annual Natural Gas EE Savings (MMBtu)	0.2	0.2
Cumulative Annual Other Fuels EE Savings (MMBtu)	1.0	1.0
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$173	\$173

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technical assistance and/or defrays the cost of installing clean heating and cooling technologies intended to reduce buildings' energy consumption and associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

NYSERDA also invests funding to support building electrification under the Joint NYSERDA-Utility LMI Implementation Plan (as part of the Heat Pumps Phase 2 initiative)<sup>3</sup>. Funding from this initiative can also be found in the Single-Family Residential focus area plan. Although not formally considered a part of the NYS Clean Heat Market Development Plan as outlined above in the overview, building electrification is an important component of the work documented in the New Construction focus area plan as well.

<sup>3</sup> Joint Plan resulting from January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025; Department of Public Service case number 18-M-0084  
<https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=55825&MNO=18-M-0084>

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

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Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 Heat Pumps Phase 2 (2020)

The Heat Pump Phase 2 (2020) initiative is a core component of NYSERDA’s work to build the market infrastructure for heat pumps and building electrification in New York State. The NYS Clean Heat Market Development Plan is designed to address critical barriers and market needs through the initiatives listed in the table above. Six activities (marketing, community campaigns, critical tools, clean thermal district systems, cost reduction strategies, and a building electrification roadmap), are presented in this Heat Pumps Phase 2 (2020) initiative, while other components can be found serving other Focus Areas as noted in the overview above.

### Participants, Barriers, and Objectives

Target Market Participants	
Customers with a higher propensity to adopt clean heating and cooling technologies.	New and redevelopment sites such as campuses, downtown corridors, and the related large-scale solution providers.
Clean heating and cooling industry partners who install heat pumps and technologies related to energy-efficient electrified space and water heating for residential, multifamily, and commercial consumers.	Residential, multifamily, commercial, and institutional buildings owners, owners of large portfolios of buildings and building developers and managers.
Policy decision makers and program administrators and building decision makers.	Clean energy supply chain actors including manufacturers, distributors, and installation contractors.
Community-based organizations and local governments.	Industry experts and stakeholders

Target Market Barriers	
Shortage of qualified labor to rapidly scale the market.	Lack of solutions for many building types.
High costs of energy-efficient electrified space and water heating technologies compared to fossil fuel alternatives.	Reluctance in the HVAC and general contractor communities to transition their business and service models to emphasize clean heating technologies.
Lack of consumer awareness about clean heating and cooling options.	

Initiative Objectives
Increase consumer awareness of clean energy options for heating and cooling homes and business to build demand resulting in installations of energy-efficient electrified space and water heating technologies through NYS Clean Heat.
Reduce customer acquisition cost incurred by clean heating and cooling contractors .
Develop resources that range from market analysis to user guides to make it easier for consumers to adopt clean heat solutions.
Support Community Heat Pump District Systems scoping studies, design studies, demonstration projects to demonstrate viable business models, and identify systemic frictions in the development of clean thermal district systems.
Drive cost reductions of heat pump installations.
Characterize for each major building typology in New York State a path to develop and scale building electrification solutions that are cost-effective and attractive to building decision makers.
Identify public policies and investments that are needed to support the development of a robust 2030 market for these solutions with greater speed, efficiency, and certainty.

## Key Activities + Measurements

This plan includes broader market progress metrics, for example, overall heat pump market size and market penetration of cold climate heat pumps. These market progress metrics will be supported collectively by all of NYSERDA’s market development activities that extend beyond this singular plan and initiative. NYSERDA will measure market progress broadly, rather than for each specific initiative with progress reported collectively within the Statewide Heat Pump Program Annual Report in April each year.

<p><b>Activity:</b> Build consumer demand and market confidence and reduce customer acquisition costs related to Heat Pumps. Provide consumer education, community engagement, and timely decision-quality information to the marketplace, to build market confidence resulting in consumer demand for heat pumps and related technologies.</p> <ul style="list-style-type: none"> <li>• NYSERDA and utility co-branded marketing, awareness and education campaigns will increase New Yorkers’ awareness of heat pumps as an option for heating and cooling homes and businesses, improve consumer perceptions, and increase demand and reduce customer acquisition costs for heat pump installations and energy efficiency projects.</li> <li>• Contractor Cooperative (Co-op) Advertising offers clean heating and cooling industry partners (manufacturers and contractors) marketing funds and materials. Planned enhancements include templated ads, opt-in opportunities, and re-targeting.</li> <li>• Pursue Community HeatSmart Campaigns via Regional Clean Energy Hubs (Low-to-Moderate Income initiative) with the objective to provide support to communities and local groups to stimulate adoption of heat pump technologies along with building envelope solutions, while leveraging local labor and facilitating soft cost reduction; and increase participation of households within disadvantaged communities.</li> <li>• Develop user-friendly resources to aide in consumer decision-making and contractors in adopting good industry practices.</li> <li>• Support and publish technical studies and conduct market research and analysis to address critical market challenges. Assess potential impacts as markets shift and new challenges emerge, and support the evolution of the NYS Clean Heat framework</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Finalize and release the Heat Pump Pattern Book through a public web-based interface.		*				
Milestone: Development of revised QA/QC protocols to support the NYS Clean Heat Pump incentive program.		*				
Milestone: Support 18,900 installations of energy-efficient electrified space and water heating technologies through NYS Clean Heat.			*			
Milestone: Release new Phase 2 solicitation for future Community Campaigns.			*			
Output: Number of leads generated for contractors (baseline = 1).		140,000	250,000	430,000	680,000	1,000,000
Output: Number of energy-efficient electrified space and water heating technologies installed through NYS Clean Heat (baseline = 0).		18,200	32,500	55,900	88,400	130,000
Output: Customer acquisition costs offset, in dollars (baseline = \$0).		600,000	1,000,000	1,600,000	2,250,000	3,000,000
Output: Coop advertising campaign costs offset, in dollars (baseline = \$0).		3,150,000	5,850,000	8,250,000	9,500,000	-
Outcome: Increase in awareness of CH&C technologies (baseline = TBD).		-	15%	-	-	50%
<p><b>Related Notes:</b></p> <p>a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.</p>						

**Activity:**

Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations. Investments will de-risk building electrification solutions that can deliver better performance, cost reduction, and new economic solutions for a wider range of building types.

- The Community Heat Pump Systems initiative will test and demonstrate potentially scalable models for clean thermal district systems that leverage economy-of-scale at new and redevelopment sites (e.g., campuses, downtown corridors). The competitive program expresses a preference for projects serving DAC/LMI stakeholders.
- Provide technical assistance funding for initial scoping, pre-development, and environmental impact studies.
- Provide technical assistance to cost-share detailed design work that will develop cost estimates and a financial plan for the proposed system.
- Provide installation incentives for construction of competitively selected clean thermal district demonstration projects
- Use multibuilding aggregation to load smooth across different building demands to deliver a more cost-effective solution than a single building solution.
- Support the development and demonstration of related business models that can drive performance improvements, reduce costs and deliver new economic solutions through technology innovation and demonstrations.
- Conduct an annual statewide continuous tracking study for New Yorkers to measure trends in energy attitudes, familiarity and intent, and adoption of clean energy technologies and services.
- Leverage various research techniques to hone investment opportunities for electrification, identifying and applying actionable insights to interventions to increase their likelihood of success in the market.

In addition to collaborating with technology innovation efforts, develop a cost reduction strategy to address key drivers of cost compression including scale and supply chain innovation, heat pump system designer and contractor education, investigating regulatory roadblocks and perceived technology risks of electrification.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Award contracts to experts to support scoping, design and construction of district systems.		*				
Milestone: Develop action plan for the next phase of cost reduction work, following the publication of the Building Electrification Roadmap in 2023.				*		
Output: Number of Clean Thermal District System projects supported by NYSERDA (baseline = 0).		-	-	2	-	-
Outcome: Replication of Clean Thermal District System projects beyond NYSERDA supported projects (baseline = 0).		-	-	-	1	2
Outcome: Reduce the cost of heat pump installations in New York State (baseline = 0).		-	10%	-	-	25%

**Related Notes:**

- a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

**Activity:**

Develop a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings. The roadmap provides a policy and program framework that can be advanced in New York State to enable energy efficient and cost-effective building electrification for consumers, consistent with the state’s low-carbon future. The roadmap analysis will characterize both the current state and a 10-year vision for building electrification solutions across the small residential, multifamily, and commercial and institutional market segments. The roadmap will:

- Advance the technical and business model solutions and the policy supports necessary to transform how New York consumers heat and cool buildings and guide policy and program interventions, including the refinement of NYS Clean Heat initiatives.
- Support a comprehensive analysis of technology and market readiness for efficient electric heat pump solutions by building type and model scenarios for achievable market uptake, energy savings, and greenhouse gas emissions reductions.
- Engage industry experts and stakeholders to ensure relevant, informed, and market- and customer-oriented work

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Publish the Building Electrification Roadmap				*		

**Related Notes:**

- a. There are currently no outputs or outcomes associated with the activity described here.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Clean Heating and Cooling	Heat Pumps Phase 1 (2017), Solar Thermal Transition	Heat Pumps and Solar Thermal - Impact - Incremental - Program Years 2016 to 2020	Impact	PY 2016-2018	2020 Q4	2022 Q2	Complete
MD - Clean Heating and Cooling	Heat Pumps Phase 2	Heat Pump Electrification Insights Impact Study - PY 2018-2023	Impact	PY 2018-2023	2021 Q1	2025 Q2	In Progress
MD - Clean Heating and Cooling	Heat Pumps Phase 1 and 2	Statewide Air Source Heat Pump Technical Study	Impact	n/a	2021 Q2	Q4 2022	In Progress
Other Studies	n/a	Statewide Heat Pump Study	Market	n/a	TBD	TBD	Upcoming

# Heat Pumps Phase 2 (2020)

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	20,650
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	1,260,000
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	1,180	2,360	4,130	5,310	7,670	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	72,000	144,000	252,000	324,000	468,000	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	33,395,114
Implementation	3,481,833
Research and Technology Studies	1,998,841
Tools, Training and Replication	18,661,151
Business Support	-
<b>Total</b>	<b>57,536,939</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	585,254	12,243,949	6,750,000	6,433,727	4,200,000	3,182,184	-	-	-	-
-	-	-	-	27,627	443,257	637,837	890,974	840,615	641,522	-	-	-	-	-
-	-	-	-	220,356	364,474	222,485	691,526	500,000	-	-	-	-	-	-
-	-	-	-	142,983	6,691,187	75,165	4,701,116	3,101,000	3,199,699	750,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	390,966	8,084,173	13,179,437	13,033,617	10,875,342	8,041,221	3,932,184	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Clean Heating & Cooling** Focus Area. See the **Low-to-Moderate Income** and **Single Family Residential** Focus Area plans for additional information.

# Solar Thermal Transition

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	123	104	19	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	82,288	78,288	4,000	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	91,311	53,589	37,722	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	196,202	-	36,956	98,232	61,013	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>287,513</b>	<b>53,589</b>	<b>74,678</b>	<b>98,232</b>	<b>61,013</b>	<b>-</b>										

# Renewable Heat NY - Clean and Efficient Biomass Heating

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	70,402	-	3,836	14,019	20,397	16,366	13,626	381	1,776	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	13,978,665	-	569,620	2,483,127	4,041,920	3,361,759	3,286,776	115,008	120,455	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	23,500	-	-	-	-	-	-	-	-	-	2,000	2,000	2,000	5,000	6,000	6,500
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	11,024,317	-	689,778	1,891,420	3,081,541	2,551,088	2,207,892	428,284	174,315	-	-	-	-	-	-	-
Implementation	1,103,531	-	40,432	140,253	275,754	289,987	174,381	102,075	80,649	-	-	-	-	-	-	-
Research and Technology Studies	1,222,570	-	-	138,836	335,277	241,691	114,338	195,143	197,285	-	-	-	-	-	-	-
Tools, Training and Replication	60,158	-	-	-	27,164	30,562	2,433	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>13,410,575</b>	-	<b>730,210</b>	<b>2,170,509</b>	<b>3,719,735</b>	<b>3,113,328</b>	<b>2,499,043</b>	<b>725,502</b>	<b>452,248</b>	-	-	-	-	-	-	-

# Heat Pumps Phase 1 (2017)

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	2,562
Energy Efficiency MMBtu - Natural Gas	211,549
Energy Efficiency MMBtu - Other Fuels	321,167
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	158,916,583

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	125	941	1,087	403	5	-	-	-	-	-	-	-	-	-
-	297	11,943	33,771	31,475	134,063	-	-	-	-	-	-	-	-	-
-	28,012	90,401	173,510	28,924	320	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	7,617,147	40,358,532	75,477,947	18,598,127	16,864,829	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	18,130
Energy Efficiency MMBtu - Other Fuels	7,770
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	18,130	-	-	-	-	-	-	-	-	-	-
-	-	-	-	7,770	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	(60,806)
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	(5,716)	(16,286)	(31,914)	(3,739)	(3,152)	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	37,773,072
Implementation	12,471,609
Research and Technology Studies	-
Tools, Training and Replication	7,065,519
Business Support	181,485
<b>Total</b>	<b>57,491,685</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	1,440,677	8,035,777	14,642,034	6,026,366	3,785,612	1,088,974	1,149,632	878,974	725,026	-	-	-	-	-
-	521,919	1,994,326	2,941,778	2,702,210	1,794,039	671,608	806,876	798,604	240,249	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	60,229	634,824	1,508,471	1,771,383	887,864	315,000	850,000	461,865	575,882	-	-	-	-	-
-	20,780	3,000	25,599	92,836	39,270	-	-	-	-	-	-	-	-	-
-	2,043,606	10,667,927	19,117,883	10,592,795	6,506,785	2,075,582	2,806,508	2,139,443	1,541,157	-	-	-	-	-

# Workforce Development Plan

## Market Development Portfolio Focus Area

### Focus Area Plan Contents

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**Appendix: Workforce Development Budgets and Benefits by Initiative**

### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- **Talent Pipeline** benefits forecast updated to reflect change to cost-share requirements which impact leveraged funding estimates. Output target updated to correct error in previously stated value.
- Updates made to Evaluation Studies timing & status in Section 3.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.

## **1. Focus Area Overview**

### **Focus Area Description**

NYSERDA will build on its long history of working in partnership with education and training providers to deliver the workforce skills and employer need. To identify, address, and support building operations and maintenance workforce needs, NYSERDA uses an industry partnership approach that encourages dialogue among industry leaders on common workforce issues and opportunities. This approach helps identify skills needed by the emerging clean energy workforce, informs investments in skills and talent development, supports career pathways, and builds the training infrastructure needed to better link supply and demand in the labor market.

While many workforce training projects target incumbent workers, efforts are also taken to identify and support future workforce needs and increase economic opportunity for unemployed or underemployed persons, and for workers from priority populations and disadvantaged communities. This is done by developing and delivering skills-based trainings and placing trainees in good-paying jobs in the energy efficiency and clean energy fields.

### **Current State of Market**

Many of the State's most skilled energy efficiency, Heating Ventilation and Air Conditioning (HVAC) and building operations employees are approaching retirement age; an insufficient pipeline of new skilled workers is currently available to fill the gap. With technologies in this area evolving rapidly, New York State needs to actively develop a workforce that is readily available, skilled, and adaptable. Net employment in key sectors (electricity, fuels, buildings and transportation) will grow by at least 189,000 jobs by 2030, continuing to grow by at least 268,000 jobs in 2050. Over half of these new jobs will be in the buildings sector. NYSERDA is doing this by continuing to support Building Operation and Maintenance training, on-the-job training, clean energy internships, and development of a training infrastructure for energy efficiency and clean energy and especially to increase opportunities for residents of disadvantaged communities and underserved populations.

### **Intervention Strategies**

To date, NYSERDA workforce development and training initiatives have served training needs led by business and market demands, through projects with unions, manufacturers, colleges and universities, technical high schools, trade associations and community-based training organizations. NYSERDA will also work with businesses to offset the costs and risks associated with hiring and training interns, fellows, and new full-time employees, with a focus on job and career opportunities for targeted populations and individuals from disadvantaged communities.

Competitive funding opportunities are continuously evaluated and modified or enhanced to address equity considerations, stakeholder feedback, market demands and needs, and technological and geographical priorities. For example, 50% of individuals participating in career pathway training projects must now come from disadvantaged communities and priority populations. Large companies participating in the on-the-job training program must also serve individuals from these populations. Career pathway training now includes more initiatives that start in technical high schools with paths to more advanced training, certifications, internships, pre-apprenticeships, and jobs. A new Climate Justice Fellowship program is

designed to support individuals with barriers to employment to participate in climate justice work in the communities in which they live.

Opportunities to leverage and combine NYSEERDA funding opportunities have been streamlined, giving businesses a path to hire individuals who have been successful through the on-the-job training program, and allowing training providers to leverage the internship and on-the-job programs to support trainees after soft and technical skill training.

Technology focus areas identified in solicitations now include more support for skills development for land-based and off-shore, large-scale renewable projects, and alternative transportation needs in areas such as electric vehicle charging station installation.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$108.3	-	\$108.3	-	\$108.3	100%

Initiatives Active in The Market	Funding (\$M)	Period
Building Operations and Maintenance Partnerships	\$33.3	2016 -
Talent Pipeline	\$75.0	2018 -
<b>Total Active Funding</b>	<b>\$108.3</b>	

Inactive/Completed Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$108.3</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	5.1	9.9
Cumulative Annual Electricity EE Savings (MWh)	0.4	0.7
Cumulative Annual Natural Gas EE Savings (MMBtu)	3.7	7.4
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$48	\$63

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### **Additional Information for Initiatives**

This Focus Area and the initiatives within it help train workers and build the workforce capacity for efficient building operations and installation of energy efficient/building electrification technologies. Ultimately, these activities are intended to reduce buildings' energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems that workers must address. Likewise, customers prefer to make operational and capital improvement decisions considering the entirety of their energy budget, rather than in an electric-only manner. Workforce training from a holistic, fuel neutral perspective best meets these real-world needs, and an electric-only focus to training would be impractical given the workforce is not organized in this manner.

NYSERDA invests funding from this focus area to support the NYS Clean Heat Market Development Plan, working to advance the electrification of buildings across New York State. Reference the Clean Heating & Cooling focus area plan for more detailed information on this strategic priority.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 Building Operations and Maintenance Partnerships

NYSERDA’s Building Operations and Maintenance (O&M) Workforce Development and Training Program helps employers and building owners implement workforce development and training projects that create the talent development strategy, corporate culture, on-site training framework, and training tools needed to support building O&M workers. Funds are awarded for eligible projects for activities such as on-site training laboratories, curriculum development, career pathways training, coaching/mentorships, apprenticeships, internships, train-the-trainer programs within a company, and partnerships with manufacturers. Comprehensive O&M training initiatives are designed to help build the technical skills of O&M staff and reduce facility energy use.

The Building Operations and Maintenance Program has funded 61 projects to date, and the program overall is projected to train an estimated 9,600 workers. The pause created by COVID had a significant effect on workforce training efforts, halting all in-person training in March 2020 with some in-person training, where appropriate safety protocols can be addressed, resuming gradually starting in mid-2021. Many of the existing contracts have been extended by up to two years. Proposal submissions also fell steeply in 2020 as evidenced by the awards made (seen in outputs below).

### Participants, Barriers, and Objectives

Target Market Participants	
Facilities and property managers	Building superintendents
Mechanics and supervisors	Unions
New building O&M hires	Current building O&M employees
Operating and stationary engineers	Energy/sustainability managers
Technicians, including HVAC	Electricians and plumbers

Target Market Barriers	
Shortage of skilled workers due to attrition from retirements.	Lack of information and tools needed to address skills gaps from the demand side.
Changing technology demands requiring upgraded skills for new and existing workers.	Ongoing delays in initiating and/or resuming training throughout most of 2020 and into 2021 due to Covid-19.
Limited resources and conflicting demands on building owners post-Covid.	

Initiative Objectives
Increase energy savings by more than 5% through implementation of O&M best practices.
Achieve non-energy benefits such as reduced equipment downtimes, increased occupant comfort, reduced occupant complaints and tenant turnover, increased numbers of staff with national certifications, and greater opportunities for employee retention, promotion, and career advancement.
Develop an in-house energy training culture, infrastructure, and activities that result in continuous, organization-wide training.
Develop replicable and sustainable training tools and staff to deliver trainings throughout the building portfolio on an ongoing basis.

## Key Activities + Measurements

<b>Activity:</b>						
Work with training providers, building owners, and property management companies, to identify and fund training initiatives that will serve the needs of building operations and maintenance staff across building portfolios.						
<ul style="list-style-type: none"> <li>Solicit proposals 3-4 times annually through a competitive solicitation. The program will remain open through 2025 or until all funds are exhausted.</li> <li>Invest in curriculum development where gaps are identified and assess the need for new industry standards to address technological changes.</li> <li>Develop case studies to identify best practices and illustrate career pathways in energy efficient building operations and maintenance, and to identify interventions and combinations of interventions that can serve as a roadmap to advance skills and provide easy paths to entry-level jobs.</li> <li>Implement an outreach and marketing/education strategy to disseminate building operations and maintenance training project results and case studies and to cultivate new partnerships. Activities will be tailored to the various sectors that can benefit from the results and lessons learned.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Continue to promote and offer competitive solicitations annually.		*	*	*	*	*
Milestone: Develop and distribute 4-5 case studies annually.		*	*	*	*	
Milestone: Execute a contract to develop and implement an outreach and education strategy that will be implemented over 24-30 months.			*			
Output: Increase in number of workers trained (electrification target in parenthesis) (baseline = 20).		3,000 (0)	5,000 (100)	6,500 (250)	7,500 (400)	9,600 (1,000)
Output: Increase in % of trainees obtaining certifications (baseline = 15%). <sup>a</sup>		20%	22%	25%	28%	30%
Outcome: Increase number of staff qualified to train others (baseline = 4,322). <sup>a</sup>		4,382	4,482	4,622	4,792	4,992
Outcome: Increase number of organizations developing new curricula (baseline =370 organizations). <sup>a</sup>		380	392	408	426	446
Outcome: Improve performance and efficiency of building systems (baseline = 0%).		5%	5%	5%	7%	-
Outcome: Square footage of buildings whose owners invest in training infrastructure without NYSERDA funding (baseline =0 SF).		-	-	-	-	125M
<b>Related Notes</b>						
a. Baseline metrics identified here can be found in the final Industry Partnerships Market Evaluation completed February 2019 and posted <a href="#">here</a> . The remaining baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Talent Pipeline

NYSERDA will create a talent pipeline to ensure that businesses involved with clean energy, electrification and energy efficiency have a robust supply of new and existing workers with the required occupational skills, credentials, and experience. This will ensure workers are trained to provide the professional and technical skills necessary to design, manufacture, specify, sell, distribute, install, operate, maintain, repair, and inspect clean energy technology and systems. Areas of focus currently include off-shore wind, energy efficiency, electrification, air- and ground-source heat pumps in support of NY Clean Heat; cleantech companies (including startups), alternative transportation, large-scale and community-based renewables, and energy storage. Areas of focus will be evaluated on a continuing basis and may be modified based on market analyses, training gaps, industry and supply chain needs, and stakeholder input.

Activities will continue to focus on expanding training infrastructure and capacity and ensuring that family-sustaining clean energy jobs are available for New Yorkers especially those from disadvantaged communities and underserved populations. Training and employment opportunities will be provided for individuals from disadvantaged communities and other targeted populations that have barriers to employment in the clean energy sector, including women and minority-owned enterprises (MWBs), and service-disabled veteran-owned businesses. Projects will offset the cost of hiring and training new workers, which can decrease the time, and costs associated with getting a worker to full productivity. Wrap-around services such as meeting transportation needs, childcare, and financial literacy will also be pursued with partner organizations.

### Participants, Barriers, and Objectives

Target Market Participants	
Businesses	Manufacturers
Distributors	Contractors
Training Providers	Community-Based Organizations and residents
Project Developers	Colleges and Universities
Unions	High Schools

Target Market Barriers	
Insufficient supply of skilled workers; career awareness and training needs to start earlier (K-12).	Businesses not aware of all the training programs and providers.
Training programs are not aligned with business needs.	High costs to find, hire, and train workers.
Lack of workers with skills that businesses need.	Business risk aversion.
Workers with barriers to employment need wraparound services and case management support once on the job.	Community-based organizations need resources to identify and recruit trainees, connect with training providers (soft and technical training), and connect with employers.

<b>Initiative Objectives</b>
Increase opportunities to train, support, and place individuals from disadvantaged communities and targeted populations in clean energy jobs.
Increase the diversity of clean energy companies.
Address opportunities to leverage environmental and climate justice goals.
Reduce soft costs for energy efficiency and electrification projects so that businesses will expand building electrification, energy efficiency, and clean energy and related sales and services, leading to increased career opportunities for workers.
Reduce the time that building electrification, energy efficiency, energy storage, and other clean energy businesses spend filling open positions and bringing workers to full productivity (new and existing workers).

## Key Activities + Measurements

### On-the-Job Training (OJT)

NYSERDA’s OJT for Energy Efficiency and Clean Technology provides wage subsidies to eligible businesses to help reduce the financial risk of hiring and training new workers. This program enables New York State to meet the objectives of the Clean Energy Fund and advance the climate equity and transition goals of New York’s Climate Leadership and Community Protection Act (Climate Act), by developing a workforce equipped to perform jobs in energy efficiency and clean technology, and to support disadvantaged communities and targeted populations with barriers to employment.

Open since Q3 2018, the program has undergone many revisions to respond to COVID-19, market demand, stakeholder feedback, and shifting priorities. To date, 971 individuals have been hired, with approximately 32% of the individuals hired coming from disadvantaged communities or targeted populations, and with this proportion of individuals hired increasing each year. The program also provides additional incentives for businesses to hire from targeted populations and communities, MWBEs, and Service-Disabled Veteran Owned Businesses hiring new workers.

<b>Activity:</b>						
Continue to administer and market the On-the-Job Training Program on an open enrollment basis.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Promote and offer the open enrollment program annually through 2025.		*	*	*	*	*
Output: Number of New Hires (electrification target in parentheses) (baseline = 0).		650 (170)	900 (250)	1100 (350)	1400 (450)	1700 (600)
Outcome: Percent reduced cost to recruit and hire new workers (baseline = 0).		30%	30%	30%	30%	30%
Outcome: Percent reduced time for workers to reach full productivity (baseline= 0).		20%	20%	20%	20%	20%
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

Internships and Fellowships

The Clean Energy Internship Program has been open since Q4 2018, accepting applications from interested businesses and interns. The program provides clean energy businesses and organizations with a pool of young, skilled workers while equipping people entering the industry with relevant career experiences. The program facilitates the placement of paid interns at qualified clean energy companies or organizations by partially funding the interns’ salary. Revisions have been made to respond to COVID-19, market demand, stakeholder feedback, and shifting priorities related to disadvantaged communities, target populations and WMBEs. To date, the program has supported 1,181 interns providing businesses up to \$7.8 million for intern wages.

A new Climate Justice Fellowship program was launched in Q3 2022. The program is designed to support individuals with barriers to employment to participate in climate justice work in the communities in which they live. The program provides professional development training/mentoring for year-long, full-time fellowships for individuals to work within organizations and businesses that advance climate justice and clean energy priorities for disadvantaged communities. The program is being revised to address stakeholder feedback and will be open for applications again by Q4 2022

<b>Activity:</b> Continue to implement and market the open enrollment Internship Program. Implement and market the Fellowship program which will be offered in 2021-2023 to support 3 cohorts or a total of 150 fellows.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Release due date solicitations and associated awards for the Fellowship Program.		*	*	*		
Output: Number of Interns and Fellows (electrification target in parenthesis) (baseline = 0).		1,050 (18)	1,200 (100)	1,350 (200)	1,600 (350)	2,000 (500)
<b>Related Notes</b>						
<ul style="list-style-type: none"> <li>a. There are currently no outcomes associated with the activity described here.</li> <li>b. The baseline value for the output presented in this table is not derived from evaluation studies.</li> </ul>						

Building Training Capacity: Technical Training for Existing Workers, Upskilling

Several programs and solicitations support two funding categories that are intended to build training capacity and target: (1) training for existing workers and/or (2) training for new workers. This technical training activity focuses on those initiatives that provide training to existing workers with training on new emerging technologies such as offshore wind, heat pumps, and electric vehicle charging station installation. Training may result in professional advancement, new credentials and certifications, and new job responsibilities.

<b>Activity:</b> Continue to offer solicitations to support technical training for existing workers. Address technical training gaps such as timing, geographical needs, and lack of consistent market demand, through training providers. High-priority areas include building electrification, energy efficiency, OSW, and training for transitioning fossil fuel workers to support clean energy transition goals.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Release competitive solicitations and award contracts to train existing workers and address training gaps in the market.		*	*	*	*	*
Output: Number of existing workers upskilled (electrification target in parenthesis) (baseline= 0).		3,440 (1,200)	7,000 (2,200)	10,000 (3,500)	13,000 (6,000)	16,000 (8,000)
Output: Number of new curriculum developed, or curriculum modified. (baseline = 0)		55	60	70	75	-
Output: Number of trainers trained. (baseline = 0)		83	90	100	110	120
Outcome: Number of new business and training provider partnerships created. (Baseline = 42)		50	65	75	85	90
<b>Related Notes:</b> a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

### Building Training Capacity: Career Pathway Training

Career Pathway Training supports new workers including high school students or individuals that are underemployed or unemployed. Career pathway activities typically include soft and professional skills training, technical training, hands-on training, certifications, job preparedness, internships, apprenticeship, job placement assistance and job coaching. While the focus has been on energy efficiency and building electrification, new activities have also addressed career pathways for offshore wind (OSW). All training initiatives require that a percentage of new workers trained must come from disadvantaged communities and targeted populations such as low- income, formerly incarcerated, transitioning fossil fuel workers, and veterans. Also included are requirements that a certain percentage of these trainees be placed in jobs, internships, pre-apprenticeships or apprenticeships, or advanced training. To date, funding has supported career pathway projects focused on training new HVAC and heat pump workers, welders skills training for OSW port development, energy auditors, clean energy training for women entering the trades, building operations and maintenance, building automation systems and smart meter installation.

<b>Activity:</b> Continue to offer solicitations and other program support to fund pathway training for new workers, including career awareness and education initiatives that start in K-12 schools. High priority areas include building electrification, energy efficiency and large-scale renewables.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Release competitive solicitations & award contracts to train new workers		*	*	*	*	*
Output: number of individuals trained for new job placements (electrification target in parenthesis) (baseline= 0).		925 (120)	2,200 (600)	4,000 (1,200)	6,000 (2,000)	9,000 (3,000)
Output: Number of students placed in internships by training providers (baseline= 0).		128 (0)	300 (75)	400 (150)	500 (225)	600 (300)
Output: Number of new curriculum developed, or curriculum modified. (baseline = 0)		55	60	70	75	-
Outcome: Number of new business and training provider partnerships created. (baseline = 42)		50	65	75	85	90
<b>Related Notes:</b> a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
I&R - Grid Modernization, I&R - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	Market Development & Innovation & Research	Market Dev. & I&R - Case Studies – Program Years (PY) 2016-2020	Impact	PY 2016-2020	2021 Q3	2022 Q3 – 2023 Q2 (various)	In Progress
MD - Workforce Development	Talent Pipeline	Talent Pipeline - Impact - Program Years 2016 to 2021	Impact	PY 2016-2021	2021 Q1	2022 Q3	Complete
MD - Workforce Development	Building Operations and Maintenance Partnerships	Industry Partnerships - Impact - Program Years 2016 to 2021	Impact	PY 2016-2021	2021 Q1	2022 Q3	Complete
MD - Workforce Development	Building Operations and Maintenance Partnerships	Industry Partnerships - Market Update 1 - years 2019-2021	Market	PY 2019-2021	2021 Q2	2022 Q3	Complete
MD - Workforce Development	Talent Pipeline	Talent Pipeline - Market Baseline	Market	PY 2019-2021	2021 Q2	2022 Q3	Complete
MD - Workforce Development	Building Operations and Maintenance Partnerships	Industry Partnerships - Market Update 2 - years 2021-2023	Market	PY 2021-2023	2024 Q1	2025 Q1	Upcoming
MD - Workforce Development	Building Operations and Maintenance Partnerships	Industry Partnerships - Impact - PY 2021-2023	Impact	PY 2021-2023	2023 Q3	2024 Q3	Upcoming

# Building Operations and Maintenance Partnerships

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	389,661
Energy Efficiency MMBtu - Natural Gas	3,882,317
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	29,653,057

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	415	2,835	41,980	20,952	100,000	72,000	10,000	45,516	61,547	34,417	-	-
-	-	-	3,695	24,648	373,648	173,849	900,000	660,000	95,000	469,950	626,600	554,927	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1,157,269	193,336	2,553,870	1,500,000	2,358,575	2,250,000	6,620,000	7,415,000	3,768,605	1,836,401	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	714,087
Energy Efficiency MMBtu - Natural Gas	6,983,057
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	1,055	28,831	39,994	73,660	155,058	67,402	109,436	69,792	116,469	52,389
-	-	-	-	-	9,399	281,710	387,383	718,372	1,530,475	656,404	1,068,160	671,507	1,143,222	516,424
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	29,653,057
Implementation	2,347,057
Research and Technology Studies	452,314
Tools, Training and Replication	892,573
Business Support	-
<b>Total</b>	<b>33,345,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	189,823	1,059,601	1,313,736	1,561,962	2,051,801	1,572,075	2,240,000	3,268,750	5,443,750	5,440,350	5,102,301	408,908	-	-
-	58,112	80,748	445,476	430,333	436,257	542,547	100,000	80,000	70,000	50,000	28,584	25,000	-	-
-	-	-	-	-	-	200,126	202,188	50,000	-	-	-	-	-	-
-	-	52,351	315,173	70,362	-	82,304	175,000	137,382	60,000	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	247,935	1,192,699	2,074,385	2,062,657	2,488,058	2,397,053	2,717,188	3,536,132	5,573,750	5,490,350	5,130,885	433,908	-	-

# Talent Pipeline

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	<b>33,832,645</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1,182,871	3,923,783	7,400,740	6,817,576	3,728,005	4,755,583	3,206,734	1,723,003	1,049,349	45,000	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	<b>67,943,271</b>
Implementation	<b>4,356,730</b>
Research and Technology Studies	-
Tools, Training and Replication	<b>2,700,000</b>
Business Support	-
<b>Total</b>	<b>75,000,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	1,089	1,384,316	4,766,663	7,898,033	6,866,358	7,840,851	10,434,163	14,462,960	11,309,909	2,753,930	225,000	-	-
-	-	-	31,355	381,663	1,029,892	738,832	700,000	786,831	562,792	125,363	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	81,551	324,134	762,967	670,000	661,348	200,000	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	1,089	1,415,671	5,148,326	9,009,476	7,929,324	9,303,818	11,890,995	15,687,100	11,635,272	2,753,930	225,000	-	-

# Codes and Standards, & Other Multisector Initiatives Plan

## *Market Development Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- The models used to estimate benefit metrics for both **Product and Appliance Standards** and **Codes and Standards for Carbon Neutral Buildings** have been updated recently and the forecast adjusted accordingly.
- **Codes and Standards for Carbon Neutral Buildings** Section 2.2 milestone target updated. Outputs and outcomes targets refined.

#### August 16, 2022

- Corrected *Cumulative Annual Electricity EE Savings (MWh) 2030 Contribution* value in Focus Area Benefits Summary to 1.8M, previously entered incorrectly as 1.6M.
- Budget details associated with this CIP revision:
  - Modified Focus Area Budget revised to \$133.9M (-0.4M); this budget is being used to support the Multifamily Residential Focus Area as noted in CIP Appendix A

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area plan.
- “Code to Zero” initiative renamed **Codes and Standards for Carbon Neutral Buildings**

- **Market Characterization and Design** work supporting the Market Development portfolio relocated to this focus area plan from the previous “MCDC” Chapter.
- Budget details associated with this CIP revision:
  - **Codes and Standards for Carbon Neutral Buildings** budget revised from \$21.0M to \$57.0M (+36.0M) with funding added to extend codes and standards work to future code cycles and address additional work identified by the Climate Action Council; plan Section 2.2 adjusted accordingly.
  - **Product and Appliance Standards** budget revised from \$21.7M to \$25.7M (+4.0M) to extend work and coordination with the federal government and other states; plan Section 2.3 adjusted accordingly
  - **Information Products and Brokering** budget revised from \$8.5M to \$5.5M (-3.0M) with scale of web-based tools to support customer targeting and customer value proposition adjusted appropriately. Outputs and outcomes refined to reflect only most relevant targets and progress measures.
  - **Market Characterization and Design** budget revised from \$29.5M to \$30.5M (+1.0M) to conduct economic and technical analysis of clean energy supply chains, identifying specific opportunities for New York State firms to serve as suppliers to Original Equipment Manufacturers (OEMs), produce and assemble components, and recruit OEMs to New York State.

## 1. Focus Area Overview

### Focus Area Description

This focus area encompasses a portfolio of multisector initiatives that include both regulatory efforts and market and utility innovation efforts, all of which focus on approaches that can scale building decarbonization in New York. Pre-investment strategy work and research is also conducted under this focus area benefiting all Market Development efforts.

The regulatory initiatives include building codes, product standards, existing building performance standards, and reporting requirements. Collectively these initiatives are critical to achieve decarbonization of buildings in an environment where fossil fuel systems are readily available and inexpensive in comparison to those that use electricity. The regulatory initiatives are intended to grow the size and scale of the market for heat pumps, geothermal systems, high-performing building envelopes, and other key clean energy technologies, by constraining the business-as-usual market for inexpensive fossil fuel heating and encouraging installation of electric technologies and other efficiency actions particularly at the time of replacement.

### Current State of Market

With the exception of the NYSERDA-developed 2020 “stretch energy code” which was adopted by New York City and a number of municipalities on a voluntary basis, New York has primarily relied on national advancements in codes and standards to set the baseline energy usage for products and buildings in the state for the past decade. In practice, that has meant adopting national model energy codes, like the International Energy Conservation Code, largely as-is and allowing the U.S. Department of Energy to set appliance standards without New York involvement or action at the state level. While these actions have driven significant energy savings over time, current progress and projected actions nationally are no longer sufficient to meet New York’s goals under the Climate Act, especially related to decarbonizing

buildings and equipment, leaving the state’s buildings and appliances far short of what is needed to achieve a decarbonized economy by 2050. Now is the time for New York to step forward with other willing partners to create and implement the needed codes & standards to meet our state goals.

**Intervention Strategies**

Initiatives target mandatory statewide strategies related to codes & standards, as well as efforts to ratchet up baseline requirements that take advantage of climate leadership at the local level. NYSERDA will work with partners and stakeholders to develop and enact aggressive codes & standards focused on driving decarbonization. Those codes & standards will be paired with market engagement, education, and compliance efforts to ensure that savings are achieved. NYSERDA’s energy code strategies are coordinated with the New Construction focus area initiatives to help prime the market and capture the advances in building performance and economics for future codes.

NYSERDA’s regulatory strategies deliver benefits directly to Disadvantaged Communities and low-income households by setting the minimum energy efficiency performance of products being sold state-wide and new low-income housing being developed. Price sensitive households often are burdened with cheap and inefficient products and housing built to the minimum standard that cost more to operate over time. By setting a minimum performance level for products and buildings, codes and standards deliver outsized benefits to New Yorkers with the greatest economic needs. Research previously published by NYSERDA and the [Department of State](#) shows that appliance energy efficiency standards can provide low- and moderate-income New York families more than \$500 million per year in net economic benefits by 2030 and about \$6 billion overall through 2035.

The Market and Utility initiatives include investments to test new approaches and tools to drive scale in market uptake of efficiency and electrification. Strategies are designed to advance the development of tools, data, processes, and methods that overcome barriers to scale in the current market. Many of the strategies also focus on lowering the cost of customer acquisition, gaining access to a new base of customers, and monetizing the value of efficiency and decarbonization. These initiatives will be delivered in collaboration with the utilities and other market actors.

NYSERDA also plans for and executes pre-investment strategy work for the entire Market Development portfolio under the Market Characterization & Design initiative that is funded through this focus area.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$134.3	\$133.9	\$131.7	-	\$131.7	98%

Initiatives Active in The Market	Funding (\$M)	Period
REV Connect	\$13.0	2016 -
Codes and Standards for Carbon Neutral Buildings	\$57.0	2017 -
Product and Appliance Standards	\$25.7	2017 -
Information Products and Brokering	\$5.5	2019 -
<i>Market Characterization and Design</i>	\$30.5	2018 -
<b>Total Active Funding</b>	<b>\$131.7</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$131.7</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	3.8	12.3
Cumulative Annual Electricity EE Savings (MWh)	0.6	2.0
Cumulative Annual Natural Gas EE Savings (MMBtu)	1.6	4.9
Cumulative Annual Other Fuels EE Savings (MMBtu)	0.2	0.7
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$28	\$28

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports training, tools and resources to develop and advance building codes, product standards, existing building performance standards and reporting requirements in an effort to scale building decarbonization in New York State. The Focus area also supports market and utility initiatives to test new approaches and tools to drive adoption at scale and lower the cost of building energy efficiency and electrification. Fundamentally, these initiatives support energy efficient, electrification or clean energy technologies intended to reduce building energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems. Importantly, development of regulations such as building codes is traditionally a holistic approach, looking at the entirety of the building and the technologies used within, and an electric-only approach would be impractical. The holistic, fuel-neutral approach also aligns with how customers make capital improvement decisions, considering the entirety of their energy budget rather than in an electric-only manner.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 REV Connect

Through the REV Connect innovation platform, NYSERDA seeks to advance innovation in New York State towards the achievement of Climate Act goals by facilitating the deployment of new technologies and business models. REV Connect will help solution providers and other stakeholders connect with New York State utilities and NYSERDA to advance high-quality demonstrations, non-wire alternatives, non-pipeline alternatives, and other innovative projects.

REV Connect will offer a centrally managed program focused on strategic areas where coordinated engagement across stakeholders can have the most impact. REV Connect also will publicize opportunities, share best practices, and convene market participants and policymakers to enhance the culture of innovation and collaboration in New York State. NYSERDA will make funding available where possible to support in-field market tests of high-value projects to help accelerate innovation with utility portfolios. Utility funding will also be critical to deploying demonstrations and pilots. This will function as a streamlined approach to in-field market tests and support for innovative projects such as those focused on Low- to Moderate-Income (LMI) households, advanced efficiency solutions, and utility-oriented pilots.

### Participants, Barriers, and Objectives

Target Market Participants	
Investor-owned utilities	Startup companies
Small, medium, and large software solutions providers	Grid-technology and distributed energy resource deployment companies.
Original equipment manufacturers	New York State (NYS) Regulators
Academia	National research labs

Target Market Barriers	
The mismatch between the large volume of inbound project ideas and limited bandwidth within the utilities for assessing technical readiness.	Lack of easy access to information about the numerous opportunities within each utility and throughout the State.
Limited resources at each utility to invest in developing and implementing innovative projects.	Insufficient process for sharing of learning from current projects.
Lack of awareness of the points of contact for each utility.	Insufficient or untimely feedback to market partners on proposal concepts.
Lack of coordinated statewide approach to statewide problems	

Initiative Objectives
REV Connect will be a proactive catalyst of innovation in New York State.
REV Connect will help utilities define their needs and identify solutions to meet those needs.
REV Connect will facilitate greater utility coordination and collaboration around shared problems and opportunities, including non-pipeline alternatives and other areas that cross utility and fuel service territories.

## Key Activities + Measurements

<b>Activity:</b>						
Advance innovation at New York State utilities by engaging utility company contacts and industry experts in strategic planning workshops/sessions, working with utility company contacts to identify areas of need or interest, publicizing these needs statements to market partners to obtain proposed solutions, and facilitating ongoing engagement between utilities and promising solution providers up to and including launching new pilots.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Host innovation sprints to publicize utility needs and identify market partners in areas of interest to the state and to utilities.		*				
Milestone: Host workshops with utility company contacts and industry experts on interest areas to inform a possible future sprint.		*				
Milestone: Develop innovation plan for activity beyond 2022			*			
Output: Number of market solution providers participating in webinars (baseline = 241).		-	-	-	1,200	-
Output: Number of market solution provider submissions to utility identified areas of interest (baseline = 122).		-	-	-	600	-
Output: Number of utility/solution provider workshops/sprints (baseline = 2).		-	-	-	22	-
Outcome: Number of innovative, value-producing utility partnerships or demonstration projects in place (baseline = 8).		-	-	-	10	-
Outcome: Number of new grid modernization technologies and business models (baseline = 0).		-	-	-	3	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
Provide funding to support market tests that require additional testing before moving into the market or into utility partnership, subsequent to proposal deemed as successful via broader NYSERDA-issued solicitation.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Initial in-field market tests enter the market.		*				
Milestone: Remainder of in-field market tests enter the market.			*			
Output: Number of market solution providers applying to NYSERDA market test funding opportunities (baseline = 0).		57	60	-	-	-
Outcome: Number of NYSERDA-supported market tests (baseline = 0).		2	2	4	-	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Codes and Standards for Carbon Neutral Buildings

Through its Codes and Standards for Carbon Neutral Buildings initiative, NYSERDA implements approaches that accelerate the pathway to more efficient, flexible, decarbonized buildings by supporting the advancement of building codes, standards, and other building policies. Our efforts are consistent with and supportive of the Carbon Neutral Building roadmap and have been adapted to support the recommendations of the Efficiency and Housing Advisory Panel to the Climate Action Council. To support the direction from the Climate Action Council, NYSERDA will drive activities related to the advancement of all State building codes and standards, including the State uniform and energy codes, and through stretch energy codes to require efficient, all-electric residential new construction by 2024 and commercial new construction by 2027.<sup>1</sup> NYSERDA will also develop, implement, and promote parallel regulatory and policy programs to address building decarbonization in line with the Climate Act, including strategies such as (but not limited to) building performance standards, on-site emissions regulations, and building labeling. Program investments and activities will be informed via engagement with stakeholders and subject matter experts.

NYSERDA offers training, support, and tools to improve compliance and performance. The forward- looking work of future code requirements is used to guide the requirements utilized in the New Construction program, so it can focus its efforts on developing the capabilities of design and construction professionals and proving the performance and cost-effectiveness of future code.

### Participants, Barriers, and Objectives

Target Market Participants	
Architects	Builders/Developers
Engineers	Design Professionals
Authorities Having Jurisdiction (e.g., code officials, other municipal officials, etc.)	Construction Trades
Energy Professional firms such as energy efficiency consultants, developers, energy service companies.	Utility Representatives

Target Market Barriers	
Constraints on resources and expertise prevent timely enactment of state and local codes.	National model codes do not address all aspects of a building's energy use, and the pace of national model code advancement will not support New York State's greenhouse gas reduction goals.
Lack of energy code training.	Lack of knowledge of value in adoption of stretch codes .
Code enforcement departments are resource constrained.	Lack of energy code understanding.
Codes currently focus on energy costs rather than carbon/GHG reduction, making building decarbonization difficult under the current rules and metrics.	Codes primarily impact new construction, but most of NYS is already built, so updated policies and expanded regulations will be needed to address existing buildings.

<sup>1</sup> The benefits of these advancements are not yet included in the quantified energy and other benefits of this investment plan but will be added in future updates; current quantified savings include voluntary adoption of stretch energy codes and increased compliance from training.

<b>Initiative Objectives</b>
Develop market capacity, tools, and policy mechanism to implement a codes & standards pathway that requires all-electric, efficient residential new construction by 2024 and commercial new construction by 2027 in line with the Climate Action Council (CAC) Scoping Plan.
Increase the percentage of buildings that are code compliant.
Accelerate the advancement of codes, and other regulatory and policy options (such as, but not limited to, building performance standards, on-site emissions limits, and labeling, to achieve greater carbon reductions from new and existing buildings in line with the CAC Scoping Plan.
Work to implement the Climate Action Council scoping plan and the Carbon Neutral Buildings Roadmap.

## Key Activities + Measurements

<b>Activity:</b>						
Develop, deploy, and support training, tools and resources to increase code and policy compliance and support authorities having jurisdiction with their enforcement duties.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue awards for training solicitations.		*			*	
Output: Training attendance, number of seats filled (baseline =0).		4,000	8,000	12,000	16,000	20,000
Outcome: Increased percentage of buildings in compliance in areas of trainings/resource deployment compared to Business as Usual under current code (baseline =0).		5%	5%	5%	5%	5%
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
Develop stretch energy codes and uniform codes revisions to promote efficiency, flexibility and decarbonization. Develop and advance other policies and regulations to promote similar outcomes.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Submit updated or advanced provisions to the regulatory process.				*		
Output: Number of regulations or policies developed or updated to promote efficiency, flexibility, and decarbonization (baseline =0).		-	2	2	2	4
<b>Related Notes:</b>						
a. There are currently no outcomes associated with the activity described here. The baseline value for the output presented in this table is not derived from evaluation studies.						

<b>Activity:</b>						
Use pilots to test, refine, and scale new approaches to code and policy development, advancement, enactment, compliance and enforcement.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue awards for pilots.			*	*	*	*
Output: Number of communities adopting pilot approaches (baseline = TBD).		-	5	15	25	35
<b>Related Notes:</b>						
a. There are currently no outcomes associated with the activity described here.						

<b>Activity:</b> Support the adoption and enactment of State and local policies to promote efficiency, flexibility and decarbonization in buildings.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Policies or codes adopted at the state or local level with support from NYSERDA.		*	*	*	*	*
Output: Number of policies or codes adopted at the state or local level (baseline = 0).		20	25	26	27	28
Outcome: Codes and policies are adopted and enacted faster than they would without NYSERDA's intervention, as reported by industry experts (baseline = qualitative).		Yes	Yes	Yes	Yes	Yes
<b>Related Notes:</b> a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

### **Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 Product and Appliance Standards

Through its Product and Appliance Standards initiative, NYSERDA will accelerate adoption of clean energy products that have proven energy/GHG savings as a key tool to achieve the goals in the Climate Act and as directed in the Climate Action Council Scoping Plan. This will be accomplished by supporting product and appliance standards that set minimum performance requirements for products and building a robust market engagement and compliance regime to support those regulations, as well as other market readiness and intervention strategies to prepare for future codes and standards. Initial research funded by this initiative demonstrated that New Yorkers could save billions of dollars on their energy and water bills with State appliance standards, and the CAC Scoping Plan directs NYSERDA to take this further by exploring strategies to get to zero-carbon emissions standards by 2030<sup>2</sup>.

NYSERDA will support activities and advancement related to state and federal product and appliance standards, voluntary standards such as those set by the ENERGY STAR program or the Northeast Energy Efficiency Partnership (NEEP), and international standards for key product categories. Where New York needs to move more rapidly than those shared efforts to eliminate fossil fuel equipment from buildings, NYSERDA will explore and develop emissions standards to support our 2030 goals under the Climate Act.

### Participants, Barriers, and Objectives

Target Market Participants	
Product and appliance manufacturers	Product and appliance retailers
Product and appliance distributors	Contractors
New York Department of State	Partner organizations and state/local governments
Regulators at the state, national, and international levels	Enforcement Authorities
NYS electric utilities	

Target Market Barriers	
Address gaps in federal standards	Lack of stocking and sales for efficient appliances
Broad usage of gas and oil-fired appliances and equipment with lower operational costs.	

Initiative Objectives	
Accelerate the adoption of efficient, flexible, decarbonized products and appliances through policies, regulations, and market readiness interventions to reduce GHG emissions.	
Work to implement the Climate Action Council scoping plan and the Carbon Neutral Buildings Roadmap.	

<sup>2</sup> The benefits of these advancements are not yet included in the quantified energy and other benefits of this investment plan but will be added in future updates; current quantified savings include the adoption and enactment of energy and water efficiency standards.

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Provide technical, market, and stakeholder analysis and support for potential State and federal appliance and product standards, voluntary product standards, and international standards.</li> <li>• Work closely with other regulatory authorities and stakeholders at the state, national, and international levels to share findings, collaborate on strategies, and ensure compliance.</li> <li>• Develop and validate technical requirements and testing protocols for proposed standards.</li> <li>• Partner with market actors, trade associations, stakeholders, testing bodies, technical experts and other regulatory authorities to determine the feasibility of standards.</li> <li>• Leverage and build on research and actions from other states and stakeholders to inform these standards</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Once legislation is in effect, propose state-level appliance standards.			*	*	*	*
Output: Number of standards in effect in NYS (baseline = 0).		-	-	10	15	20
Outcome: Increased sales and stocking of covered products (baseline = TBD).		-	-	TBD	TBD	TBD
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
<b>Regulatory and Compliance.</b> Use the regulatory process to advance and promulgate standards. Develop and drive education and engagement to increase compliance. Deploy tools to increase and validate compliance. Support enforcement authorities to improve compliance.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue solicitation to support compliance with product standards.			*			
Output: Number of products covered by compliance regime (baseline = 0).		-	-	10	15	20
Outcome: Increased compliance rate (baseline = TBD).		-	-	TBD	TBD	TBD
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
<b>Market Readiness.</b> Work with market actors to prepare the market for future codes and standards. Collect information on technology advancement, market availability, and product stocking to support standards. Provide financial support to increase the stocking and sales of key items. Partner nationally and internationally to advance underutilized products and prepare the market for the market.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Launch market readiness offering in conjunction with other states/entities.				*		
Output: Sales of covered products in retail partners (baseline = TBD).		-	-	TBD	TBD	TBD
<b>Related Notes:</b>						
a. There are currently no outcomes associated with the activity described here.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.4 Information Products and Brokering

Through the Information Products and Brokering initiative, NYSERDA will develop a robust ecosystem of information tools and resources that accelerate customer adoption of building decarbonization strategies and products. This initiative will reduce soft costs of building decarbonization projects by developing tools and value proposition calculators that can be used by the market to target customers. Events that recruit talented web-based tool development and analytics firms into the building decarbonization space will be held. The initiative will acquire, aggregate, and share data resources with the market.

### Participants, Barriers, and Objectives

Target Market Participants	
Web Based Tool and Platform Developers	Homeowners
Vendors	Small to Medium Businesses
Property Management Firms	

Target Market Barriers	
Web-based tool and platform developers and solution providers are not actively engaged in energy markets.	High-customer acquisition costs for clean energy businesses.
Lack of clear energy information for customers.	

Initiative Objectives	
Reduce vendor customer acquisition costs through improved sales conversions.	
Recruit web-based tool and data analytics firms to create resources that support customer adoption of building decarbonization solutions.	
Increase customer demand for energy efficiency and clean energy technologies by supporting the development of value proposition calculators.	
Support the provision of data resources that enable new business initiatives that support vendors and customers of building decarbonization solutions.	

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Develop and deploy web-based, data-driven tools to deliver increased value for building decarbonization solutions.</li> <li>• Develop and deploy customer targeting tools for use by vendors to strengthen their ability to identify, cultivate, and acquire new customers.</li> <li>• Develop and deploy value proposition calculators that support both customers and vendors in their efforts to articulate the value of building decarbonization investments.</li> <li>• Support pilots for asset data matching and DER data platform feasibility.</li> <li>• Co-host hackathons that bring together web-based tool development firms and data analytics providers to develop web-based tools that address barriers to customer adoption of building decarbonization.</li> <li>• Develop data platforms and data assets that support customer adoption of building decarbonization solutions.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Host data hackathon that leverages building asset data to identify decarbonization strategies for a variety of building and customer types.		*	*			
Output: number of participants in data hackathons (baseline = 0).		175	300	-	-	-
Output: number of awards issued from hackathons (baseline = 0).		6	9	-	-	-
Output: number of value proposition calculators developed for customers and vendors (baseline = 0).		-	-	1	-	-
Output: number of customer targeting tools developed for vendors (baseline = 0).		2	-	-	-	-
Outcome: web-based tool and platform developers and solution providers serving NY energy markets without support from NYSERDA (baseline = 0).		-	-		12	20
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## **2.5 Market Characterization and Design (Market Development Portfolio)**

The Market Characterization & Design initiative (and its Innovation & Research counterpart found in the Climate Resilience Innovation focus area plan) is uniquely defined when compared to all other initiatives documented in the Compiled Investment Plans. Broad categories of work required to initiate and accelerate interventions under the CEF are identified under this framework and refined to support Market Development portfolio interests and strategies, operating across sectors with the goal of having broad applicability and value to other clean energy activities in New York.

The work described in this plan includes Market Development efforts that pave the way for broad scale potential, such as small market proof of concept tests, pre-investment strategy work to ensure proper positioning of investments in market, and resources including Technical Assistance and Data Sets. A yearly breakdown of funding for this initiative can be found in Section IV of these Compiled Investment Plans, Budgets and Benefits Summary Table 3.

### **Innovative Market Strategies**

NYSERDA will support in-market tests of novel ideas, including behavior and performance-based solutions, and other concepts that are promising, but require further real-world market validation prior to proceeding to a larger investment.<sup>[1]</sup> The in-market testing (through Innovative Market Strategies PON #4359) will accelerate the path to market for successful novel ideas and concepts that can be quickly proven. This PON closed for new proposals in August 2022.

The tests are anticipated to last up to two years, including implementation and evaluation and NYSERDA to fund novel quality in-market tests through 2025. These market-driven projects will be solicited through an open enrollment procurement. Examples of projects that may be supported that include, but are not limited to, the following:

- Novel approaches for decarbonizing space heating and hot water loads, with an emphasis on electrification of buildings located in disadvantaged communities.
- Market tests that demonstrate the potential for buildings to provide load flexibility services.
- Market tests that scale adoption of energy efficient products in low-income housing.

### **Analysis in Support of the NYS Clean Energy Transition**

NYSERDA will maintain a competitively selected pool of qualified contractors to conduct objective economic and technical analysis and analytical modeling, to inform the transition to a clean energy system. This work will help deliver on the goals set forth in the Climate Act and support NYSERDA's mission to advance clean energy innovation and investments to combat climate change, improve the health, resiliency, and prosperity of New Yorkers, and deliver benefits equitably to all. Central to implementation of the Climate Act are major, ongoing policy initiatives to reform regulatory policy, create new markets, and catalyze innovation, with the objective of integrating renewable energy

generation and clean distributed energy resources (DER) into the State's energy system, and phasing out polluting energy sources.<sup>3</sup>

This contractor pool will make available specialized expertise and technical assistance across multiple support areas that reflect NYSERDA's current and anticipated work to advance the transition to a clean energy system. Support areas address reform of the State's electric distribution system and markets, gas system planning in the near- and long-term, modeling of decarbonization pathways and achievable DER uptake, analysis of resilience and climate adaptation, and related environmental, policy, and regulatory analysis. Access to the contractor pool will augment NYSERDA staff capabilities when called upon to undertake distinct, time-sensitive projects. NYSERDA also may use technical assistance services from additional firms that offer specialized capabilities, in the event that pertinent needs outside of the contractor pool are identified.

NYSERDA will continue to provide research and analytic work to inform ongoing deliberations on relevant policy and regulatory proposals. This is consistent with NYSERDA's leadership role in developing the State Energy Plan, co-chairing the State's Climate Action Council, and preparing a scoping plan under the Climate Act. NYSERDA will also use technical assistance services in developing complementary CEF initiatives, which both account for anticipated regulatory reforms and help to accelerate technology and business model innovations that will make possible greater investment in and integration of clean DER.

### **Data Sets**

To aid in securing timely information, NYSERDA will continue to expand its procurement of primary and secondary data resources for intelligence gathering and analysis across NYSERDA's efforts. Data will be purchased to facilitate quicker and more qualitative findings, and to support more foundational, quantitative work. The secondary research will be used both as a precursor to a primary research, and to answer specific, targeted research questions. In some cases, studies cannot definitively answer the research question but, nonetheless, contribute to an understanding of the issue.

Data sources that NYSERDA has procured include:

- CoStar
- Data Axle (formerly Info Group)
- McGraw-Hill (including market sizing, relationship, and Dodge products)
- D&R International (HARDI)
- Navigant
- Green Tech Media
- E-Source
- Continental Automated Buildings Association (CABA)
- Business Monitor International (BMI)

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<sup>3</sup> DER is comprised of a variety of resources, principally located on customer premises, including energy efficiency, electrification of buildings and vehicles, demand response and energy management controls that increase demand elasticity, distributed storage, roof-top solar, and other on-site power generation.

- American Council for an Energy Efficient Economy (ACEEE)

In addition to the above data sets and resources, NYSERDA will also leverage and procure data from other sources, as appropriate, to support its efforts on an ongoing basis.

### **Strategic Partnerships, Paid Memberships and Sponsorships**

The CEF will take advantage of national, state, and regional entities whose mission is to advance and improve markets for clean energy, through collaborations to inform research, aggregate information from thought leaders and experts, and pool and promote resources across multiple jurisdictions. Support for such organizations through paid memberships and sponsorships facilitates the collection of best practices that provide valuable insights and guidance for program formation, innovations in program approaches, and market designs that assist with New York's REV strategy and CEF implementation. Collaborations undertaken through paid memberships and/or sponsorships provide important forums for NYSERDA to engage with experts in various topic areas, platforms that both inform policy and program directions for New York, and foster New York's approaches to clean energy market development. Such engagements also nurture enhanced interest in New York's clean energy market, providing greater opportunities to accelerate CEF investment while simultaneously animating necessary private sector financing for products and services. These collaborations further increase the level of expertise among stakeholders to stimulate greater information exchange across priority market sectors and in public proceedings. Finally, such institutions often provide focused research and/or market data (particularly in regional markets) that help to ensure that CEF strategies can be best structured to have impact in target market audiences.

As NYSERDA evolves its focus and activities under the CEF, it will continue to assess which organizations/activities provide the greatest value for engagement in furtherance of the CEF objectives. NYSERDA will engage where the organization finds value in supporting its market characterization and design activities, and in a manner which provides market intelligence, information, and pooled resources from multiple sources. Noteworthy examples of such paid memberships and sponsorships include but are not limited to: The Business Council of New York State (BCNYS), Building Energy Exchange (BEEEx), the American Council for an Energy Efficient Economy (ACEEE), Northeast Energy Efficiency Partnerships (NEEP), New Buildings Institute (NBI), New York Energy Consumers Council (NYECC), and the Business Network for Offshore Wind.

### **Initiative Budget and Benefits**

Refer to Budgets and Benefits Summary Table 3 in Section IV of these Compiled Investment Plans for a yearly breakdown of funding.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD – Codes and Standards, & Other Multisector Initiatives	Codes and Standards for Carbon Neutral Buildings (previously Code to Zero)	Code to Zero - Market Update 1 - years 2020-2021	Market	PY 2020-2021	2020 Q3	2022 Q1	Complete
MD – Codes and Standards, & Other Multisector Initiatives	Codes and Standards for Carbon Neutral Buildings (previously Code to Zero)	Code to Zero - Market Update 2 - years 2022-2023	Market	PY 2022-2023	2021 Q3	2022 Q4	In Progress
MD – Codes and Standards, & Other Multisector Initiatives	Market Characterization and Design – MD Portfolio	MCDC - Innovative Market Strategies	Impact	TBD	2022 Q4	2023 Q3	Upcoming
MD – Codes and Standards, & Other Multisector Initiatives	Information Products & Brokering	Information Products & Brokering Market Evaluation years 2022-2023	Market	TBD	2023 Q4	2024 Q3	Upcoming

# REV Connect

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	28,000,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	66,400	51,000	655,000	1,348,500	4,501,150	6,861,153	6,000,000	5,000,000	3,516,797	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	12,982,977
Implementation	17,023
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>13,000,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
59,155	1,217,655	942,791	609,093	435,775	699,430	533,500	1,332,000	3,800,000	3,353,579	-	-	-	-	-
-	-	-	6,652	9,926	445	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59,155	1,217,655	942,791	615,745	445,701	699,875	533,500	1,332,000	3,800,000	3,353,579	-	-	-	-	-

# Codes and Standards for Carbon Neutral Buildings

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	805,750	-	341	21,590	61,787	52,444	55,580	57,111	57,111	57,111	73,779	73,779	73,779	73,779	73,779	73,779
Energy Efficiency MMBtu - Natural Gas	2,028,163	-	400	25,678	69,903	77,238	82,420	103,572	103,572	103,572	243,635	243,635	243,635	243,635	243,635	243,635
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	19,000,000	-	-	-	-	-	-	200,000	1,690,000	2,810,000	5,000,000	5,300,000	2,500,000	1,500,000	-	-
Implementation	2,044,391	-	11,548	200,867	563,627	(611,930)	178,580	225,000	275,000	275,000	275,000	250,000	250,000	151,698	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	35,955,609	-	-	161,975	187,597	2,678,780	3,010,202	3,381,653	3,500,000	6,000,000	7,250,000	4,500,000	2,500,000	2,500,000	285,402	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>57,000,000</b>	-	<b>11,548</b>	<b>362,842</b>	<b>751,224</b>	<b>2,066,850</b>	<b>3,188,782</b>	<b>3,806,653</b>	<b>5,465,000</b>	<b>9,085,000</b>	<b>12,525,000</b>	<b>10,050,000</b>	<b>5,250,000</b>	<b>4,151,698</b>	<b>285,402</b>	-

# Product and Appliance Standards

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	3,092,696	-	-	-	-	-	-	16,664	63,185	301,381	316,658	290,325	421,008	554,901	560,628	567,945
Energy Efficiency MMBtu - Natural Gas	7,432,013	-	-	-	-	-	-	152,404	353,955	821,294	946,304	952,832	1,026,025	1,095,038	1,061,486	1,022,676
Energy Efficiency MMBtu - Other Fuels	623,371	-	-	-	-	-	-	24,544	48,658	69,893	90,028	87,109	83,430	78,931	73,512	67,264
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	8,800,000	-	-	-	-	-	-	-	2,000,000	2,800,000	2,000,000	2,000,000	-	-	-	-
Implementation	1,709,539	-	-	-	151,061	21,777	26,273	302	200,500	200,500	200,500	200,500	200,000	508,126	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	15,189,461	-	-	-	-	-	579,588	1,705,605	2,242,880	2,968,560	2,383,500	2,200,000	1,489,328	1,100,000	520,000	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>25,699,000</b>	-	-	-	<b>151,061</b>	<b>21,777</b>	<b>605,862</b>	<b>1,705,907</b>	<b>4,443,380</b>	<b>5,969,060</b>	<b>4,584,000</b>	<b>4,400,500</b>	<b>1,689,328</b>	<b>1,608,126</b>	<b>520,000</b>	-

# Information Products and Brokering

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	15,540	-	-	-	-	-	-	-	-	2,220	2,220	2,220	2,220	2,220	2,220	2,220
Energy Efficiency MMBtu - Natural Gas	324,352	-	-	-	-	-	-	-	-	46,336	46,336	46,336	46,336	46,336	46,336	46,336
Energy Efficiency MMBtu - Other Fuels	756,819	-	-	-	-	-	-	-	-	108,117	108,117	108,117	108,117	108,117	108,117	108,117
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	250,000	-	-	-	50,000	-	10,000	-	-	100,000	50,000	40,000	-	-	-	-
Implementation	556,211	-	-	-	2,429	52,337	158,186	70,000	40,000	83,260	150,000	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	4,693,789	-	-	-	280,484	252,591	489,344	400,000	400,000	1,000,000	1,271,370	600,000	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>5,500,000</b>	-	-	-	<b>332,912</b>	<b>304,928</b>	<b>657,530</b>	<b>470,000</b>	<b>440,000</b>	<b>1,183,260</b>	<b>1,471,370</b>	<b>640,000</b>	-	-	-	-

# Renewables / Distributed Energy Resources (DER) Plan

## *Market Development Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Combined Heat & Power** initiative budget revised from \$59.5 M to \$58.1M (-1.4M); **Solar Plus Energy Storage** initiative budget revised from \$40.0 M to \$36.8M (-3.2M); **Small Wind Transition** initiative budget revised from \$3.6M to \$3.6M (-0.01M); **Offshore Wind Pre-development Activities** initiative budget revised from \$9.9 M to \$9.8M (0.1M); **Fuel Cells** initiative budget revised from \$8.3 M to \$7.2M (-1.1M).
  - Modified Focus Area Budget revised to \$176.2M (-12.7M); this budget is being used to support the Commercial / Industrial / Agriculture and Low-to-Moderate Income Focus Areas as noted in CIP Appendix A
- **Clean Energy Siting and Soft Cost Reduction** activities and associated measures updated to reflect a strategic shift away from direct incentives/grants to reward communities for adopting certain local laws to focus on providing more up-front enhanced technical assistance and financial support for communities experiencing a large volume of renewables and struggling to prepare. Milestone target updated to correct anticipated launch date of grant opportunity.

#### September 9, 2022

- Budget details associated with this CIP revision:

- **Clean Energy Siting and Soft Cost Reduction** budget remains \$8.8M, however funding allocations between budget categories as noted in this Focus Area plan appendix have been updated, and all years of the plan revised to reflect the latest history and forward-looking projections. No other changes have been made to the plan.

#### May 20, 2022

- Initial filing of NYSERDA's Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Solar Plus Energy Storage, Offshore Wind Master Plan, and Offshore Wind Pre-Development Activities** initiatives now considered inactive as of this filing.
- Budget details associated with this CIP revision:
  - As part of regular anticipated Resource Acquisition Transition closeout activities **Fuel Cells** initiative budget revised from \$11.3M to \$8.3M (-3.0M).
  - **Offshore Wind Master Plan** budget revised from \$5.0M to \$5.0M (-0.03M) as part of project closeout.
  - **Offshore Wind Pre-Development Activities** budget revised from \$10.0M to \$9.9M (-0.1M) as part of project closeout.
  - **Reducing Barriers to Distributed Deployment** budget revised from \$24.5M to \$15.5M (-9.0M) with scope adjusted to free up funding for other strategic energy storage priority work currently under development. Initiative will continue funding cost-shared studies and Section 2.1 plan has been adjusted accordingly.
- Added outcome indicators to **Clean Energy Siting and Soft Cost Reduction** to ensure additional historical perspective was being properly captured in reporting.

## **1. Focus Area Overview**

### **Focus Area Description**

On August 1, 2016, the Public Service Commission issued an order adopting a Clean Energy Standard (CES), which mandates that clean energy sources generate 50% of New York State's electricity by 2030. In July 2019, the Climate Leadership and Community Protection Act (Climate Act) was enacted, which increases the CES goal to 70% by 2030, and converts that goal into a mandate. Meeting this goal requires accelerated market growth in numerous sectors, including clean energy generation, energy efficiency, and energy storage, as well as an accelerated siting process for large-scale renewables. Accordingly, in April 2020, the State enacted the Accelerated Renewable Energy Growth and Community Benefit Act (the Act), the goal of which is to help foster and encourage expedient siting and development of community and environmentally compatible renewable energy facilities in furtherance of the Climate Act.

The significant increase in renewable deployment necessary to achieve the CES goals, requires a focused effort to reduce all system cost components. As capital costs continue to decline for many clean energy technologies, further cost efficiencies must be achieved by reducing non-equipment costs, referred to as soft costs or balance-of-system (BOS) costs. These include inefficient and inconsistent local regulations; one-time costs such as land siting, interconnection, and environmental studies; and ongoing costs such as customer acquisition and management.

### **Current State of Market**

Many local governments that are encountering large-scale clean energy development in their communities for the first time, are not equipped to manage such development efficiently and appropriately. They struggle with issues such as payment-in-lieu-of-tax (PILOT) agreements, environmental impact studies, decommissioning, and zoning. Reducing soft costs associated with local governments, as well as other soft costs, such as customer acquisition costs or community acceptance issues, will accelerate clean energy deployment while making it easier and more affordable. NYSERDA will reduce market barriers inhibiting the deployment of clean energy technologies by providing tools, resources, education, and one-on-one technical support to local governments and stakeholders across the State. For energy storage specifically, the market has seen rapid growth and maturity through the State's deployment programs, with strong interest and pipelines for projects in most areas of the State. A few barriers remain, which can be addressed through these programs, namely permitting barriers in New York City, and project-specific feasibility analyses for complex or customer-sited projects.

### **Intervention Strategies**

The Office of Renewable Energy Siting (ORES) was created to streamline the permitting process for large-scale renewables in New York State, resulting in faster turnaround times, reduced costs, and increased clarity with respect to technical and legal project requirements. To address immediate ORES startup support needs, NYSERDA procured and continues to fund consultants to ensure that ORES was able to quickly ramp up and maintain an effective and efficient permitting process.

For energy storage, the market intervention strategy has shifted in recent years to focus on deployment programs, particularly under the separately funded Market Acceleration Bridge Incentive Program. However, certain aspects of market development still require attention to reduce remaining barriers that are not targeted through deployment programs. These include continuing to fund cost-shared studies of project feasibility to enable projects to be evaluated before moving to deployment, and continuing to support permitting process development and improvement, particularly in New York City, where deployment remains a challenge.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan's Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$188.9	\$176.2	\$173.1	- \$5.8	\$167.3	95%

Initiatives Active in The Market	Funding (\$M)	Period
Reducing Barriers to Distributed Deployment	\$15.5	2017 -
Clean Energy Siting and Soft Cost Reduction	\$8.8	2018 -
ORES Support	\$9.0	2020 -
<b>Total Active Funding</b>	<b>\$33.2</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
Anaerobic Digesters Transition	\$13.6	2016 - 2019
Combined Heat & Power Transition	\$58.1	2016 - 2019
Fuel Cells	\$7.2	2016 - 2019
Offshore Wind Master Plan	\$5.0	2016 - 2019
Small Wind Transition	\$3.6	2016 - 2019
Offshore Wind Pre-Development Activities	\$9.8	2017 - 2021
Solar Plus Energy Storage	\$36.8	2019 - 2021
<b>Total Inactive Funding</b>	<b>\$134.1</b>	
<b>Total Focus Area Funding</b>	<b>\$167.3</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$333	\$333

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%; Fuel Cells and Combined Heat & Power initiatives deliver carbon emission reductions for the CEF portfolio; however, these benefits do not accrue toward NYSERDA's Energy Efficiency savings targets and therefore are excluded here.

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 Reducing Barriers to Distributed Deployment

The Reducing Barriers to Distributed Deployment initiative has accomplished several of the deployment goals established when the initiative was first launched and was the primary method of addressing soft costs for storage in New York State. Since 2019, the primary method has been through the over \$400 million in deployment programs across the State<sup>1</sup>; this transition has resulted in the need to modify NYSERDA’s approach for this initiative. While some challenges in terms of soft cost reduction and cycle time remain, this initiative will focus all remaining efforts on providing support for both front-of-the-meter and behind-the-meter energy storage feasibility studies and maintain a strong presence in the push for indoor permitting guidelines in New York City.

NYSERDA will also continue to measure and report performance metrics annually in the State of Storage Report required by the PSC Energy Storage Order. These include the following:

- Average total installed cost of energy storage systems.
- Total megawatts (MW) and megawatt-hours (MWh) deployed, including those funded by NYSERDA.
- Major progress during the year in reducing soft costs.
- New impediments to deployment that have been identified and proposed solutions.
- Adjustments to market acceleration incentive funds.

### Participants, Barriers, and Objectives

Target Market Participants	
Building owners and operators, professional associations and trade associations.	Storage vendors, renewable energy vendors, and service providers.
Permitting agencies (authorities having jurisdiction (AHJ) such as building and fire departments).	Architects and engineers
Distribution and municipal utilities, load serving entities, curtailment service providers (aggregators), NYISO.	Professional associations and trade associations such as Building Owners and Managers Association (BOMA) and the New York Battery and Energy Storage Technology consortium (NY-BEST).

Target Market Barriers	
Permitting and siting is exacerbated by safety uncertainty which causes significant delays or prevents projects from consideration.	Storage siting and economics are complicated and site-specific. Customers need information regarding feasibility of various use cases.
Permitting storage inside of buildings in NYC is currently not feasible and a process for safe construction and permitting of storage in buildings must be finalized.	

<sup>1</sup> Funding references 2018 Storage Order (<https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={FDE2C318-277F-4701-B7D6-C70FCE0C6266}>) and 2019 RGGI Operating Plan (<https://www.nyserda.ny.gov/-/media/Files/EE/RGGI/2019-rggi-operating-plan.pdf>).

### Initiative Objectives

Support technical and economic feasibility studies that analyze energy storage sites and use cases through using funds authorized by this plan.

Safely deploy and site energy storage technologies by providing permitting agencies and local communities with technical support and access to subject matter experts to assist with developing responsible, clear, and streamlined permitting and processes that enable informed decision making.

### Key Activities + Measurements

#### Activity:

Provide cost-share support to building owners and operators for both behind-the-meter and front-of-the-meter feasibility studies with scopes of work tailored to investigate the customer's needs. Such items may include economic viability, resiliency (long duration), carbon reduction commitments, and challenges associated with aggregating generation technologies.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Output: Number of cost-share studies supported (baseline = 0).		12	14	18	22	25
Outcome: Number of projects deployed following studies (baseline = 0).		1	1	2	2	3

#### Related Notes:

- a. There are currently no open milestones associated with the activity described here.
- b. Baseline values for the output and outcome presented in this table are not derived from evaluation studies

#### Activity:

Provide support to teams and consultants engaging with and augmenting staff at NYC government and FDNY in the development of the permitting processes for energy storage, particularly indoor applications.

Milestone or Measure (cumulative)	Target By Year:	2021	2022	2023	2024	2025
Milestone: Complete permitting process for indoor storage systems.				*		
Outcome: Permitted indoor storage systems in NYC (baseline = 0).		-	-	5	10	20

#### Related Notes:

- a. There are currently no outputs associated with the activity described here.
- b. Baseline value for the outcome presented in this table is not derived from evaluation studies.

### Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Clean Energy Siting and Soft Cost Reduction

Authorities Having Jurisdiction (AHJs<sup>2</sup>) often encounter an asymmetry of information between developers and communities regarding the planning, zoning, taxation, and health and environmental impacts of clean energy projects. Local officials and community leaders with a decision-making role in planning and zoning, frequently lack the resources to assess the costs and benefits of clean energy development. As a result, they often take a conservative approach in working with project developers, leading to project delays, erosion of public support, moratoriums on further development, and project failure.

NYSERDA’s Clean Energy Siting and Soft Cost Reduction initiative coordinates a portfolio of activities that target the most urgent soft cost barriers to clean energy market growth, by creating a central forum for representatives from industry, AHJs, and utility companies to address these barriers and collaboratively identify solutions. NYSERDA will further research and develop soft cost solutions to support the many stakeholders involved in clean energy deployment and provide comprehensive direct technical assistance to AHJ officials across the State. This initiative will leverage NYSERDA’s Clean Energy Communities program to provide financial assistance and technical support to AHJs to encourage soft cost solution leadership and recognize communities that have taken steps to significantly reduce soft costs.

The Clean Energy Siting and Soft Cost Reduction initiative focuses on distributed solar, large-scale renewables, and battery energy storage, but will utilize the same framework to pursue soft cost reduction strategies for other clean energy technologies as the need arises.

### Participants, Barriers, and Objectives

Target Market Participants	
NYS AHJs	NYS agencies
NYS utilities	Clean energy companies, developers, and trade associations
National labs /U.S. Department of Energy (DOE)	Schools, fire districts, and other public organizations
Non-profit organizations (e.g., environmental, conservation, community-focused)	Local, county, and regional economic development organizations and community residents

Target Market Barriers
AHJs lack resources to manage clean energy development.
Local concerns about clean energy development impede deployment.
Soft costs especially the costs associated with permitting and siting clean energy remain high.
Lack of reliable, objective, third-party information and resources.

<sup>2</sup> AHJs are defined as local and State entities and officials that have a decision-making role in clean energy project development.

<b>Initiative Objectives</b>
Optimize the project permitting and approval process within each clean energy technology project development cycle related to solar, wind, and battery energy storage.
Increase the number of clean energy projects successfully completing the project permitting and approval process.
Contribute to reducing distributed energy soft costs in New York State.

## Key Activities + Measurements

<b>Activity:</b>						
Support local governments and other stakeholders in their efforts to prepare for clean energy development.						
<ul style="list-style-type: none"> <li>• Create and update guidebooks, factsheets, technical reports, and other resources that provide information on best practices to overcome soft cost barriers.</li> <li>• Leverage the reach of NYSERDA Clean Energy Communities program to continue implementation of outreach and education campaigns for AHJ officials using online resources, webinars, workshops, and events to disseminate soft cost solutions and products. Provide assistance to local governments and other stakeholders on clean energy development issues. Technical assistance offerings will include remote and in-person consultations.</li> <li>• Coordinate with the Clean Energy Communities (CEC) program and other initiatives to recognize and reward communities that actively reduce clean energy soft costs, including adopting and implementing local laws to responsibly regulate solar and energy storage. Provide enhanced technical or financial assistance to communities struggling to adequately prepare for and respond to clean energy development.</li> <li>• Support other funding and technical support opportunities for communities and stakeholders to reduce soft costs and accelerate project deployment timelines.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Release solicitation for consultant support.		*				
Milestone: Launch updated educational campaign through CEC program.			*			
Milestone: Launch new grant opportunity for soft cost reduction.				*		
Output: Soft cost solutions created or updated (baseline = 10).		11	12	13	14	15
Output: Number of communities that attended workshops (baseline = 0).		-	100	150	200	250
Output: Number of AHJs receiving direct technical assistance (baseline = 355).		376	391	406	421	436
Output: Number of communities engaged in completing steps to reduce soft costs (i.e. non-restrictive clean energy laws) (baseline = 0).		-	25	100	175	200
Outcome: Cycle time (in months) of projects from customer proposal to commissioning (baseline = 22) <sup>a</sup>		22	-	-	-	-
Outcome: Soft costs \$ per KWh of battery storage based on CEF strategies (baseline = 109) <sup>a</sup>		109	-	-	-	-
<b>Related Notes:</b>						
a. Baseline metrics identified here can be found in the final PY 2020 Energy Storage Market Evaluation completed September 2021 and posted <a href="#">here</a> . The remaining baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 ORES Support

New York State enacted the Accelerated Renewable Energy Growth and Community Benefit Act (the Act) to accelerate the large-scale renewable siting process and to help New York State meet its aggressive clean energy goals. The Act creates a first in the nation Office of Renewable Energy Siting (ORES) to improve and streamline the process for environmentally responsible and cost-effective siting of large-scale renewable energy projects across the State. ORES will coordinate and undertake environmental reviews and permitting of major renewable energy facilities and has the authority to issue a single permit for the construction of major renewable energy facilities from both a State and local law perspective (except for any approvals necessary under federal law, including federally delegated permits). ORES must issue a final decision on the siting permit within one year of the date on which the application is deemed complete, or within six months if the project is located on a brownfield, commercial, landfill, former power plant, or other “abandoned or under-utilized” site.

Given the magnitude of the State’s goals, the potential contributions of ORES are both prudent and necessary. ORES is expecting many application submittals and permit requests during the first three years of its operation. Due to sensitive timing and the potential for application schedules to overlap, the ORES staff workload will be heavy. ORES has recognized a need for third-party assistance in application review and other professional services to help meet its statutory deadlines.

NYSERDA, through its Clean Energy Resources Development and Incentives (Build Ready) Program, is expected to submit project permit applications to ORES. While NYSERDA will oversee and manage the initial procurement of ORES consultants, the resulting contracts will be designed to avoid the conflict of interest that would arise if NYSERDA, as a future applicant of Build Ready projects to ORES, managed consultants that review ORES permits.

Accordingly, the resulting contracts will delineate that ORES will have responsibility to manage the selected consultants, including assigning work, approving invoices, and managing contractor performance and adherence to the Quality Control Plan, under the oversight of the Department of Public Service (DPS). ORES will also provide quarterly reports to DPS, summarizing the technical, legal, or scientific consultant support provided by each contractor, including a list of application submittals and permit requests worked on by the contractor, with associated hours worked, invoiced rates, and associated fees. As part of its oversight function, DPS may also review invoices and related documentation as well as audit contractor performance and ORES management of the consultants. NYSERDA’s sole responsibility will be to pay invoices approved by ORES.

## Participants, Barriers, and Objectives

Target Market Participants	
Local Governments	Private renewable energy developers
Landowners	Interested advocacy organizations
State agencies and authorities	

Target Market Barriers
Establishing a new office and hiring staff to the levels necessary to process the volume of work anticipated will take some time yet permit applications will need to be processed immediately.

Initiative Objectives
Meet or exceed statutory deadlines, permit high quality projects, and increase the number of clean energy projects developed/constructed by obtaining technical, legal, and scientific consultant support.

## Key Activities + Measurements

<b>Activity:</b> Procure consultant support through one or more competitive solicitations to assist ORES staff with carrying out the functions necessary to issue permits for major renewable energy facilities.						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Finalize regulations and uniform standards and conditions (complete)		*				
Milestone: Implement permitting process.		10%	60%	90%	100%	-
<b>Related Notes:</b>						
a. There are currently no outputs or outcomes associated with the activity described here.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
MD - Renewables / DER	Reducing Barriers to Distributed Deployment, Solar Plus Energy Storage, Clean Energy Siting and Soft Cost Reduction	Solar PV and Energy Storage Evaluation	Market and Impact	PY 2018-2024	2022 Q1	2025 Q2	In progress

# Reducing Barriers to Distributed Deployment

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	3,954,101	-	-	-	-	-	-	3,772,680	50,000	50,000	50,000	31,421	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	4,927,041	-	-	2,000	74,729	2,359,995	-	50,000	280,000	250,000	315,000	550,000	550,000	495,317	-	-
Implementation	3,282,986	-	105,885	1,193,873	752,981	174,930	35,622	150,000	500,000	369,696	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	7,239,972	-	120,868	1,504,608	2,061,908	376,619	351,860	35,000	550,000	750,000	949,141	539,967	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>15,450,000</b>	-	<b>226,753</b>	<b>2,700,481</b>	<b>2,889,619</b>	<b>2,911,544</b>	<b>387,482</b>	<b>235,000</b>	<b>1,330,000</b>	<b>1,369,696</b>	<b>1,264,141</b>	<b>1,089,967</b>	<b>550,000</b>	<b>495,317</b>	-	-

# Clean Energy Siting and Soft Cost Reduction

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	902,435	-	-	-	-	-	-	34,000	40,762	333,333	215,271	250,000	29,070	-	-	-
Implementation	893,392	-	-	50,459	69,451	75,235	545	103,808	223,494	223,494	146,905	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	6,999,172	-	-	63,960	217,607	540,045	287,841	200,000	1,049,521	760,000	1,610,000	1,133,333	1,136,865	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>8,795,000</b>	-	-	<b>114,419</b>	<b>287,058</b>	<b>615,279</b>	<b>288,386</b>	<b>337,808</b>	<b>1,313,777</b>	<b>1,316,828</b>	<b>1,972,176</b>	<b>1,383,333</b>	<b>1,165,935</b>	-	-	-

# ORES Support

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	8,000,000	-	-	-	-	667,646	1,229,407	500,000	2,000,000	2,000,000	1,000,000	602,947	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	1,000,000	-	-	-	-	-	-	-	250,000	500,000	250,000	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>9,000,000</b>	-	-	-	-	<b>667,646</b>	<b>1,229,407</b>	<b>500,000</b>	<b>2,250,000</b>	<b>2,500,000</b>	<b>1,250,000</b>	<b>602,947</b>	-	-	-	-

# Anaerobic Digesters Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	51,956
Renewable Energy MW	-
Leveraged Funds	9,476,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	10,584	29,062	12,310	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1,895,200	5,211,800	2,369,000	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	13,013,424
Implementation	620,608
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>13,634,032</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	65,000	313,826	564,993	2,226,178	702,449	903,201	4,000,000	2,224,468	400,000	400,000	313,309	300,000	300,000	300,000
-	26,160	46,929	121,053	84,711	41,754	-	50,000	50,000	50,000	50,000	50,000	50,000	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	91,160	360,755	686,047	2,310,889	744,204	903,201	4,050,000	2,274,468	450,000	450,000	363,309	350,000	300,000	300,000

# Combined Heat & Power Transition

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	204,508	-	1,490	8,180	10,813	21,897	33,328	22,400	106,400	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	37	-	0	2	2	4	6	4	19	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	205,679,966	-	13,932,598	9,865,744	20,865,000	60,171,151	34,987,396	15,967,249	49,890,829	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	(1,238,411)	-	(9,023)	(49,534)	(65,476)	(132,597)	(201,821)	(135,643)	(644,316)	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	56,644,549	265,275	2,874,549	5,335,116	7,537,299	7,346,619	6,659,931	4,057,869	12,041,508	10,526,384	-	-	-	-	-	-
Implementation	1,447,360	-	283,039	156,345	415,018	194,763	148,374	83,273	83,273	83,273	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>58,091,908</b>	<b>265,275</b>	<b>3,157,588</b>	<b>5,491,461</b>	<b>7,952,317</b>	<b>7,541,382</b>	<b>6,808,305</b>	<b>4,141,142</b>	<b>12,124,782</b>	<b>10,609,657</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# Fuel Cells

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	162,393
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	20
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	91,230,680

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	56,486	-	39,628	66,279	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	7	-	5	8	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	31,737,189	-	24,500,000	34,993,491	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	(1,108,831)
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	(440,023)	-	(281,363)	(387,445)	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	7,103,756
Implementation	95,388
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>7,199,144</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	845,625	1,845,625	500,000	2,156,250	1,756,256	-	-	-	-	-	-
-	-	35,733	49,297	7,194	3,164	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	35,733	49,297	852,819	1,848,789	500,000	2,156,250	1,756,256	-	-	-	-	-	-

# Offshore Wind Master Plan

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	51	-	-	-	30	20	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	4,965,831	450,000	786,410	3,507,474	174,501	-	37,219	5,228	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>4,965,882</b>	<b>450,000</b>	<b>786,410</b>	<b>3,507,474</b>	<b>174,531</b>	<b>20</b>	<b>37,219</b>	<b>5,228</b>	<b>-</b>							

# Small Wind Transition

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	2,254
Renewable Energy MW	2
Leveraged Funds	4,043,802

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
487	409	202	597	140	405	15	-	-	-	-	-	-	-	-
0	0	0	0	0	0	1	-	-	-	-	-	-	-	-
700,193	1,148,267	256,900	1,133,806	207,250	359,386	238,000	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	3,512,721
Implementation	45,047
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>3,557,768</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
500,807	1,163,611	222,552	770,233	132,500	262,614	460,404	-	-	-	-	-	-	-	-
-	11,192	9,672	11,774	5,767	2,546	4,095	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
500,807	1,174,803	232,224	782,007	138,267	265,160	464,499	-	-	-	-	-	-	-	-

# Offshore Wind Pre-Development Activities

Inactive

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	1,027,654	7,666	89,937	198,024	587,950	74,178	-	69,899	-	-	-	-	-	-	-	-
Research and Technology Studies	8,761,808	-	4,124,013	(1,045,434)	2,601,095	998,814	1,067,282	673,230	342,809	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>9,789,462</b>	<b>7,666</b>	<b>4,213,949</b>	<b>(847,410)</b>	<b>3,189,046</b>	<b>1,072,991</b>	<b>1,067,282</b>	<b>743,129</b>	<b>342,809</b>	<b>-</b>						

# Solar Plus Energy Storage

Inactive

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	18,795,509

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	225,500	4,463,698	14,106,311	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	36,820,772
Implementation	-
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>36,820,772</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	1,424,500	8,246,500	27,149,772	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1,424,500	8,246,500	27,149,772	-	-	-	-	-	-	-

# Clean Energy Fund

## Compiled Investment Plans

# Section II

## Innovation & Research Portfolio

### Focus Areas

- Technology to Market
- Buildings Innovation
- Clean Transportation Innovation
- Energy Focused Environmental Research
- Grid Modernization
- Renewables Optimization
- Negative Emissions Technologies
- Gas Innovation
- Climate Resilience Innovation

### Funding

\$572M

91% of authorized CEF  
Innovation & Research  
funding programmed  
as of this filing.

# Technology to Market Plan

## CEF Innovation and Research Portfolio Focus Area

### Focus Area Plan Contents

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### Appendix: Technology to Market Budgets and Benefits by Initiative

#### Plan Record of Revisions

##### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable
- Budget details associated with this CIP revision:
  - **Novel Business Models and Offerings** budget revised from \$13.4M to \$13.4M (-0.06M) freeing up remaining uncommitted funds for use elsewhere in the Focus Area.
  - **Manufacturing Corps** budget revised from \$17.0M to \$17.1M (+0.06M), utilizing uncommitted funds from elsewhere in the Focus Area.
  - **Climatetech Commercialization Support** initiative budget revised from \$55.1M to \$54.9M (-0.2M) to reflect funding needed to support 76 West awards.
- Benefits forecasts updated for both **Climatetech Commercialization Support** and **Manufacturing Corps** to reflect substantial increase to leveraged funding from projects, greater than originally anticipated.

##### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- The initiative previously filed as **CleanTech Startup Growth** has been split into the following four smaller initiatives to improve clarity for stakeholders: **Climatetech Commercialization Support**, **Catalytic Capital for Climatetech**, **Climatetech Expertise and Talent**, and **Carbontech**

**Development.** The nature of the work being executed within these four newly named initiatives is consistent with the plans approved in the previous CEF Chapter, except for the changes noted below.

- With the introduction of Focus Areas for NYSERDA’s CEF portfolios, some of the work being undertaken under the initiative formerly known as “CleanTech Startup Growth” was deemed to support other Focus Areas beyond Technology to Market. **Climatetech Commercialization Support** supports the *Buildings Innovation* Focus Area (\$10M) while **Carbontech Development** supports the *Negative Emissions Technology* Focus Areas (\$4.5M) with the appropriate funding, activities, and expected impacts distributed to each of those plans in the CIP.
- Budget details associated with this CIP revision:
  - **Climatetech Commercialization Support** budget revised from \$41.1M to \$55.1M (+14.0M) to expand the scope of Incubator efforts and Corporate Challenges funding for the growth-stage accelerator solicitation referred to as “The Climate Fight”. Section 2.1 of the plan updated accordingly.
  - **Novel Business Models & Offerings** budget revised from \$16.1M to \$13.4M (-2.7M), changes made in concert with Climatetech Commercialization Support noting that no impacts to targeted outputs and outcomes are expected.
  - **Catalytic Capital for Climatetech** budget revised from \$19.6M to \$19.4M (-0.2M), changes also made in concert with Climatetech Commercialization Support noting that no impacts to targeted outputs and outcomes are expected.
  - **Climatetech Expertise and Talent** budget revised from \$7.5M to \$12.0M (+4.5M) to support continued Entrepreneur-in-Residence efforts.
  - **Manufacturing Corps** budget revised from \$12.0M to \$17.0M (+5.0M) to extend the impact of this initiative.

## 1. Focus Area Overview

### Focus Area Description

NYSERDA seeks to support a vibrant climate technology innovation ecosystem that will enable the maturation and scale of new startup ventures and innovative solutions designed for decarbonization outcomes that can directly benefit New York State. NYSERDA also seeks to inform regulation and policy with the latest breakthrough and achievements in climate innovations. The activities in this NYSERDA focus area will benefit many ecosystem actors with emphasis on early-to-mid stage companies, investors, manufacturers, entrepreneurs, solution adopters, and policy makers and regulators. We seek to impact these groups through our activities that advance the maturity of climate technologies in alignment with NYSERDA’s ambitious climate goals.

### Current State of Market

Many barriers exist for clean energy and climate technology solution providers on their path from lab to market. The barriers these solutions face are diverse and center around three key areas: technology risk, execution risk, and market risk. NYSERDA’s Technology to Market programs have, over the last decade, provided the services needed to mitigate some of these risks. We observe the impact of these programs primarily through our program and company investments catalyzing the participation of the private sector faster, and more efficiently than if our investments were not present. The demand for this catalytic capital and these catalytic programs continues as our State’s climate ambition increases. The Initiatives in this plan provide an end-to-end pathway to scale for climatetech companies in New York

State. These efforts, in concert, provide a market intervention that can both rapidly increase the speed of solution commercialization and rapidly increase realization of program benefits.

Growth stage ventures (see definitions below) are bringing forward the innovations that early investors and funding agencies have been funding over the past decade. They are closer to market, readier for partnerships, and their impact on New York State's climate goals can occur sooner than early-stage companies. Growth-stage ventures may not require the hand-holding mentorship that some early-stage ventures led by first-time entrepreneurs may need. Rather they benefit from deeper business advice and expert services that can complement their experienced executive teams. This makes the innovation programming and resources for such companies quite different. Growth-stage innovation programming, such as a growth-stage accelerator, focuses on scaling for impact. This means taking a company with product-market fit for its innovation and helping it scale its business development, while filling in operational gaps. A growth-stage accelerator is a unique entity in the State's innovation ecosystem, where much of the effort is instead aimed at creating new ventures and fostering them to early funding rounds that establish their viability. These programs are a key feature of this focus area plan.

To date, NYSERDA's incubator strategy has helped accelerate the growth of energy-related startups across New York State. Recent evaluation findings show a considerable decrease in commercialization time for companies participating in incubator programs. NYSERDA's Manufacturing Corps (M-Corps) Initiative supports client companies to overcome obstacles in manufacturing clean energy products. Participating startups manufactured 41 products between 2018 and 2020 and one-third of them (14 of 41) were manufactured in New York State. Before the existence of the Cleantech Startup Growth Initiative in 2016, our programs had enabled the commercialization of 293 products. Since 2016, Tech to Market supported contractors have raised over \$590M, reported \$395M in revenue, and commercialized 160 products.

### **Intervention Strategies**

Key interventions within this plan focus on providing catalytic funding, market insight and access to customers, and training and mentorship to solution providers. Activities are designed to result in the successful: (1) spin out of innovations from academic labs to the private sector, (2) assessment and optimization of greenhouse gas emission reduction potential of solutions, (3) mitigation of commercial and execution risks for early-stage companies, (4) leveraging of private sector capital by innovators, and (5) the achievement of in-market events (such as sales, revenue, and paid customer projects). When companies get assistance to eliminate barriers, and resources can be secured and disseminated efficiently, solution providers will be more likely to raise funds, confirm product market fit, grow their teams, complete key technical milestones, scale their products to manufacture, and reach key in-market events. In such an environment, investors, customers, third-party support organization, manufacturers, and other actors in the market will be capable of supporting, investing into, and benefiting from the maturation and scale of these solutions.

Since this sector is flush with terminology whose definitions may not always be consistent from one source to another, the following definitions help to clearly communicate with all market participants how NYSERDA is structuring its new programs and market interventions.

- **Climate Technology (climatetech):** Innovation that supports decarbonization of the economy through hardware, software, technology-enabled services, data analytics, or processes that broadly reduce energy consumption, increase resource efficiency, reduce greenhouse gas emissions and/or enable the transition to a sustainable and decarbonized economy.
- **Early-Stage Companies:** Pre-Series B companies and/or companies that have yet to establish a clear value proposition with paying customers. These companies have yet to achieve in-market events.
- **Growth-Stage Ventures:** Innovation firms achieving in-market events; revenue, or paid customer projects.
- **Near-term:** Within a five-year period.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$141.0	-	\$131.3	- \$0.2	\$131.1	93%

Initiatives that serve multiple focus areas across NYSERDA’s CEF portfolio are listed with asterisk (\*).

Initiatives Active in The Market	Funding (\$M)	Period
Climatetech Commercialization Support*	\$54.9	2017 -
Catalytic Capital for Climatetech	\$19.4	2017 -
Climatetech Expertise & Talent	\$12.0	2017 -
Manufacturing Corps	\$17.1	2018 -
Novel Business Models & Offerings	\$13.4	2019 -
Carbontech Development*	\$14.4	2021 -
<b>Total Active Funding</b>	<b>\$131.1</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$131.1</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$2,746	\$2,790

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports a range of investments helping researchers and early- to growth-stage companies commercialize innovations from lab to market, including access to capital and investors, access to talent and mentorship, and wraparound services to bring new products to market. Investments also support implementation of new business models and offerings. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as the opportunity to develop new businesses and technologies will span across fuels and energy systems. Allowing the full slate of opportunities to be pursued will drive a more robust clean energy economy in the State, and will support the scale up of more options to address climate change.

Section III of the Compiled Investment Plan is dedicated to NYSERDA’s **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA’s Evaluation Plans and Reports are posted on the New York State Department of Public Service’s Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA’s entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA’s website](#).

## 2.1. Climatetech Commercialization Support

The Climatetech Commercialization Support Initiative offers targeted support to early-stage and growth-stage climate technology firms with near-term potential to reach in-market events in New York State. Through this Initiative, NYSERDA will launch a coordinated suite of interventions targeted at accelerating the time to market for climatetech companies. This initiative focuses on providing training, access to financial resources, and business support to innovators developing new solutions relevant to our Climate Act goals. These resources are being applied to mitigate the barriers of the following: establishing product/market fit with customers, attracting best fit capital, achieving in-market events, navigating regulatory and market challenges specific to New York State, and identifying pathways to locate business activities in the State. Sub-initiatives within this initiative include the 76West accelerator program and business competition, the NYSERDA Incubator program, Corporate Challenges, and the Geographic Coverage program. NYSERDA collaborates with ESD on the 76West program and has no utility partnerships on this initiative to date.

**76West** is an accelerator program and business competition focused on supporting growth-stage climatetech entrepreneurs and attracting their businesses to New York State's Southern Tier region. This program measures success by how many companies cement tangible plans to expand business operations in the Southern Tier and how directly those plans can result in in-market events in the State that can drive greenhouse gas emissions reduction. NYSERDA collaborates with ESD on the 76West program and has no utility partnerships on this initiative to date.

**Geographic Coverage** is a program that provides business incubation and acceleration services to companies in the Southern Tier. The core goal of this program is to increase the number of early-stage and growth-stage companies reaching in-market events in New York State by connecting them with investors, early adopters, and experts in New York's Southern Tier.

NYSERDA's **Incubator program** fosters the viability and growth of the most promising growth-stage climatetech companies by providing hands-on support in achieving in-market events. This support is focused on giving global companies entering the State, and New York-based companies scaling in New York, the policy, regulatory, financial, market, and ecosystem resources and insights they need to collaborate with the private sector and the State to scale their businesses and solutions for maximum greenhouse gas emission reduction impact and for the highest number of near-term, in-market events possible.

**Corporate Challenges** are cohort based, sector specific challenge programs that engage corporate actors in the program design, solution recruitment, cohort selection, cohort training and support, and direct partnership creation with select solution providers. These programs are designed to help NYSERDA drive business formation and commercialization outcomes in key sectors in partnership with the private sector. This model increases private sector leverage and delivers focused commercialization support to early and growth-stage companies.

## Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and Early-Mid Stage Companies	Corporate and Strategic Partners
Venture Development Organization Partners	Customers and Solution Adopters
Mentors and Experts	Academic Institutions
Investors	Scientists and Researchers
Minority and Women Owned Businesses	

Target Market Barriers
Early-stage and growth-stage climatetech companies often lack the commercialization and business development expertise necessary to successfully bring their technologies to market as fast as possible.
Many early-stage, climatetech companies do not have active relationships or effective relationships with the investment community, potential corporate and strategic partners, or customers.
Many early-stage and growth-stage companies struggle to secure demonstrations for their solutions and then fail to turn pilots and demonstrations into repeat in-market events.

Initiative Objectives
Increase the number of new climatetech businesses formed, across all regions of New York State, and the number of international companies attracted to New York from outside the State.
Accelerate the time to market for climatetech companies with products or services that can benefit New York State.
Increase the ability of early-stage and growth-stage climatetech companies to raise seed and follow-on capital from investors, secure commercialization assistance from development partners, enter into strategic partnerships, and engage customers in the State.
Engage strategic and corporate partners to co-define market problems and co-create technology and business solutions with NYSERDA and our partners.
Deploy demonstration projects for key solutions in the New York State market to advance progress against Climate Act goals.
Commercialize climatetech products in the State.
Provide services that enable growth-stage climatetech companies to achieve in-market events in New York State.

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>76 West: NYSERDA will solicit for a third-party contractor to run a climatetech competition for early and growth stage climatetech ventures focused on driving climate impact and economic growth in the Southern Tier.</li> <li>Geographic Coverage: NYSERDA manages a variety of early-stage startup support programs run by for-profit and non-profit organizations in the Southern Tier, both incubation and acceleration programs.</li> <li>Incubators: NYSERDA will fund specific incubator organization(s) to deliver support to growth- stage companies capable of reaching near-term in-market events in New York.</li> <li>Corporate Challenges: NYSERDA will work with third party venture development organizations to run corporate challenges and accelerator programs that can support early and growth-stage climatetech companies within specific sectors</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Extend existing Incubator contracts through 2022		*				
Milestone: Startups accepted into the first Corporate Challenge cohort		*				
Output: Companies engaged		143	175	225	260	285
Output: Companies graduated from Incubators		12	23	28	33	38
Output: Teams engaged through Corporate Challenges		2	57	82	92	122
Output: Businesses formed as result of Corporate Challenges		10	40	-	-	-
Output: Corporate parties engaged through Corporate Challenges		-	5	5	15	20
Outcome: Products Commercialized		25	50	75	105	135
Outcome: Investor Agreements Executed		20	67	100	132	160
Outcome: Corporate and Strategic Partnerships Formed		10	20	42	65	69
Outcome: Customer Agreements Executed		5	30	51	77	103
Outcome: Demonstration Projects Completed		4	15	24	38	50
<b>Related Notes:</b>						
<p>a. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders. NYSERDA will assess the collective progress of this and other related initiatives (Carbontech Development, Catalytic Capital for Climatetech, Climatetech Expertise &amp; Talent) in the context of those initial baselines in the CEF Annual Report.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2. Catalytic Capital for Climatetech

Through the Catalytic Capital for Climatetech Initiative, NYSERDA is providing the access to capital and access to investors that companies need to scale and grow. This program centers around injecting targeted capital resources into climatetech companies with a track record of success and building the ecosystem needed to attract world class customers and investors into New York State to transact with them. By offering these services and capital, NYSERDA is leveraging public funds to stimulate private sector investment into companies that can support New York State’s nation-leading climate goals.

A collaboration with the NY Green Bank, Ignition, New York Climate Progress has invested in otherwise strong and successful climatetech companies have demonstrated the potential to scale and repeat existing in-market events in the wake of the COVID-19 crisis. The goal of this program is to enable the survival of growth-stage companies so they can successfully bring their climatetech products to market while creating economic value in New York State and supporting the State’s nation-leading climate and energy goals.

The Investor, Corporate, and Customer Engagement (ICC Engage) program develops interventions to support companies as they connect with and advance commercial agreements with complex counterparties such as investors and customers. This program offers direct grants to companies to catalyze the syndication of investments into them. An activity of this program includes the Co-Investment program which places grants into companies with demonstrated potential to attract capital to their business. This program is applicable to both early and growth-stage companies.

### Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and Early-Growth Stage Ventures	Corporate and Strategic Partners
Investors	Customers and Solution Adopters

Target Market Barriers
Many early-stage, climatetech companies do not have active relationships or deep connections with the investment community, potential corporate and strategic partners, or customers.
Many climatetech companies need targeted, flexible capital for specific phases of their development that can then catalyze private sector engagement for the next phase(s).

Initiative Objectives
Increase the ability of early-stage and growth-stage climatetech companies to raise seed and follow-on capital from investors, secure commercialization assistance from development partners, enter into strategic partnerships, and engage customers in New York State.
Provide greater visibility for NYSERDA-supported entrepreneurs and companies to potential investors, corporate and strategic partners, and customers.
Engage strategic and corporate partners to co-define investment programs with NYSERDA and our partners.

## Key Activities + Measurements

<b>Activity:</b>						
<ul style="list-style-type: none"> <li>• Ignition: NYSERDA will run a competitive selection process to award growth-stage climatetech companies up to \$500,000 in convertible note agreements.</li> <li>• ICC Engage: NYSERDA’s Co-Invest program directly supports growth stage ventures to raise money alongside private investors on their path to complete subsequent commercial milestones.</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue awards from Ignition solicitation		*				
Output: Companies engaged		141	508	-	-	-
Outcome: Investor Agreements Executed		-	6	8	22	24
Outcome: Customer Agreements Executed		-	-	36	40	44
<b>Related Notes:</b>						
<p>a. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders. NYSERDA will assess the collective progress of this and other related initiatives (Climatetech Commercialization Support, Carbontech Development, Climatetech Expertise &amp; Talent) in the context of those initial baselines in the CEF Annual Report.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 2.3. Climatetech Expertise & Talent

The Climatetech Expertise & Talent Initiative provides workforce development training, access to talent, and access to mentorship to early and growth-stage climatetech companies. Through this initiative, NYSERDA is delivering experts to climatetech companies and solution providers in need of high-quality mentorship and talent. The programs within this initiative focus on providing companies and solution providers with both short-term and long-term access to experts so they can make notable progress on projects that lead to increased greenhouse gas emissions reduction and in-market events. This initiative also provides the access to talent companies need to grow and refine elements of their businesses.

The **Entrepreneur-in-Residence (EIR)** program connects experts and talent with early- and growth-stage ventures around specific projects and issues, such as raising capital, executing complex agreements, staffing for growth, resource planning, strategic partnering, and board management. This program also connects entrepreneurs with each other to discuss best practices as they secure needed expertise and talent for their companies.

The Innovation Advisors program provides an opportunity for top tier management and technical talent to actively contribute toward the success of NYSERDA’s climatetech startup support initiatives, and to the overall growth of the clean energy market within the State. This program funds consultants who work for the innovation team to increase the success of the other programs in this chapter.

#### Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and Early-Growth Stage Ventures	Academic Institutions
Venture Development Organization Partners	Scientists and Researchers
Mentors and Experts	Professionals and Experts

Target Market Barriers
Entrepreneurs and early-stage companies often lack the commercialization and business development expertise necessary to successfully bring clean energy technologies to market.
Many climatetech companies have a difficult time attracting talent to their organizations.
Without a track record of sector experience, some companies can’t find talent, professionals, and experts and therefore struggle to enter the field and find roles.

Initiative Objectives
Accelerate the time to market for climatetech companies in New York State, which can range the full spectrum of hardware and software technologies in various stages of development.
Enhance the pool of human capital available to early-stage companies and increase the number of successful climatetech entrepreneurs.
Increase the ability of early-stage and growth-stage climatetech companies to raise seed and follow-on capital from investors, secure commercialization assistance from development partners, enter into strategic partnerships, and engage customers in New York State.
Increase the number of successful hires companies can make as they grow their businesses.

## Key Activities + Measurements

Activity:						
<ul style="list-style-type: none"> <li>EIR: NYSERDA will pay a third-party to match experts with early and growth-stage climatetech ventures on select projects, connect companies and experts to discuss how they can attract the right talent and resources to their companies, offer targeted trainings, and directly connect companies with the talent they need to make an impact.</li> <li>Innovation Advisors: NYSERDA will hire innovation experts to serve as internal consultants for NYSERDA team members.</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue Awards for Innovation Advisors		*	*			
Output: Innovation Advisors deployed (Baseline = 3)		7	19	-	-	-
Output: Companies engaged		52	130	150	175	225
Outcome: Customer Agreements Executed		10	20	30	40	50
Outcome: Investor Agreements Executed		10	20	30	40	50
Outcome: Corporate and Strategic Partnerships Formed		5	10	15	20	25
Outcome: Demonstration Projects Completed		5	10	15	20	25
Outcome: Products Commercialized		2	4	6	8	10
<b>Related Notes:</b>						
<p>a. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders. NYSERDA will assess the collective progress of this and other related initiatives (Climatetech Commercialization Support, Carbontech Development, Catalytic Capital for Climatetech) in the context of those initial baselines in the CEF Annual Report.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.4 Manufacturing Corps

Hardware startups with a product to manufacture face significant risks as they move from prototype to production stage. These risks include a lack of technical and manufacturing expertise, operational execution gaps, rapid talent and organizational growth, and cash flow challenges. Without adequate support during this phase of company growth, costly and time-consuming errors can be made resulting in slower time-to-market or at worst, company failure.

The Manufacturing Corps initiative provides wraparound support to climatetech startup companies so they can manage the unique risks of bringing a new hardware product to market. Based on significant market discovery and nearly three years of program learnings, the suite of interventions herein has successfully delivered outcomes and impacts exceeding expectations.

The investment plan seeks authorization to issue a competitive solicitation to recompetete this successful program through 2025 and aims to contract with one to two entities for program administration with statewide coverage. The proposed solicitation will include but is not limited to activities that help startups build knowledge of product manufacturability, support for technical and operational scale up, matching between climate tech startup companies with relevant manufacturers, strategic supply chain management, improving access to scaleup resources, support for production costs, production scaleup road mapping, and mentorship/expertise to manage execution risk.

Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. New clean tech business opportunities and accelerated commercial introduction of new clean tech products will not only support the scale up of options to address climate change but will also drive a more robust clean energy economy in the State.

### Participants, Barriers, and Objectives

Target Market Participants	
Manufacturers	Financiers
Solution Providers	Growth-Stage Companies

Target Market Barriers
Lack of support for companies at the manufacturing scale-up phase in the form of financial resources, training and education, access to network resources and product development tools.
Lack of support for manufacturers in the form of deal flow of smaller, climate technology innovators, lack of access to education, and lack of awareness of their resources, facilities, and production capabilities.

**Initiative Objectives**

Accelerate the time-to-market for climatetech startup companies by removing barriers for climatetech startup companies to work with New York State (NYS) manufacturers.

Develop curriculum and scaleup road mapping tools to help startup companies navigate the tactical manufacturing priorities and decisions as they move from prototype to production.

Develop partnerships with market actors like mentors, serial hardware entrepreneurs, manufacturers, rapid prototyping spaces, pilot manufacturing facilities and others that will support sourcing and fulfillment, scalable manufacturing space needed by growing startup companies, and critical decisions that impact the company’s profitability.

Better prepare startup companies for working with manufacturers by addressing both product DFM and the ability of startups to pay for manufacturing costs. This technical and financial de-risking is key to the desirability of startup companies as customers for manufacturers. Evidence of success may include signed contracts between startups and manufacturers to produce climatetech hardware products. These same activities also address a startup company’s investor readiness.

Improve the profitability of NYS climatetech companies through reduction in Cost of Goods Sold (COGS) by reducing supply chain and manufacturing costs.

Increase seed and follow-on capital investments in climatetech startup companies who have strong manufacturing strategies for their product(s).

Improve manufacturers’ ability to unlock new customer opportunities by working with startups and thereby increasing revenue.

**Key Activities + Measurements**

**Activity:**  
 NYSERDA will fund a manufacturing training and support program that will support growth stage ventures through manufacturing training, access to experts, and grants as they advance their manufacturing readiness and commercialize their products.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: NYSERDA determines level of continued investment based on pilot program performance.				*		
Output: Manufacturing agreements signed between startups and manufacturers.		24	24	66	75	80
Output: Manufacturing strategies developed for cleantech products.		24	24	66	-	-
Outcome: Climatetech products manufactured total (Baseline = 221) <sup>a</sup>		24	24	66	68	70
Outcome: Agreements to invest in climatetech startup companies signed (Baseline = 70) <sup>a</sup>		-	-	14	20	25

**Related Notes**  
 a. Baseline metrics identified here can be found in the final Cleantech Startup / M-Corps Market Evaluation completed July 2018 and posted [here](#).

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.5 Novel Business Models and Offerings

The Novel Business Models and Offerings (NBMO) Initiative catalyzes new business models that can support the decarbonization of New York State’s economy. This initiative will support promising companies in making business model investments to accelerate the deployment of these models. Through competitive solicitations, NYSERDA will provide the financial resources to assist with the validation and implementation of new business models and offerings. These funds may be used for the development and refinement of legal documents, development of tools for marketing and customer engagement, business development personnel, raising project capital, and other activities that enable the company to scale the deployment of the business model more rapidly. The funding is not for product or technology development and the initiative will take no technology risk. NYSERDA and the Department of Financial Services have an MOU for collaboration that is relevant to this Initiative. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. New clean tech business opportunities and accelerated commercial introduction of new clean tech products will not only support the scale up of options to address climate change but will also drive a more robust clean energy economy in the State.

### Participants, Barriers, and Objectives

Target Market Participants	
End use Customers	New integrated solutions providers and aggregators.
Entrepreneurs seeking to enter the clean energy space.	Firms offering new services to clean energy companies.
Existing clean energy service providers	Business incubators
Non-clean-energy firms offering related services to end use customers.	Utilities and their solution provider partners
Insurers, Managing General Agents and Managing General Underwriters	Data management firms

Target Market Barriers
High customer acquisition costs exist for many technology and solution providers.
High upfront capital costs for investors and technology developers.
Incorrectly priced risks for both market interventions and new technologies.
Companies advancing new business models often face a lack of capital to fully develop and scale those models.
Unproven returns for new business models can keep the cost of project capital high to test those models.

Initiative Objectives
Support and scale up business models and risk pricing interventions that facilitate greater customer uptake of solutions that lead to decarbonization.

## Key Activities + Measurements

### Activity:

NYSERDA will support early- and growth-stage climatetech ventures, insurance companies, MGAs, MGUs, and other stakeholders in the finance ecosystem. NYSERDA will issue a competitive solicitation to award funding to scale and validate novel business models and offerings. The level of funding provided will differ for companies with a well-defined and validated business model, and for companies with a well-articulated business model that is plausible but has not yet been tested against the needs of market participants and real-world costs and barriers.

- NYSERDA will solicit proposals from companies with novel business models (NBM) and offerings. These will be evaluated competitively with multiple opportunities per year.
- Following awards, NYSERDA will employ project management practices to further limit the risks of market acceptance and mitigate execution risk as much as possible. Companies that cannot demonstrate transactions will not be eligible for the highest funding level, and NYSERDA will use Innovation Advisors, experienced entrepreneurs, and investors under contract to NYSERDA, in support of project selection and management. Progress will be monitored with a focus on ensuring achievement of well-defined and commercialization-critical milestones.
- NYSERDA will coordinate with utilities in cases where the company's business model intersects with evolving utility business models to ensure there is no duplication and to share lessons learned.

Milestone/Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025	2030
Milestone: Issue PON for second NBM program solicitation.		*					
Output: Number of companies supported (baseline = 0)		16	33	35	-	-	-
Output: Number of validation and scaling projects completed (baseline = 0)		14	46	49	-	-	-
Output: Number of validation and scaling projects initiated		-	46	-	-	-	-
Outcome: Number of supported companies raising additional capital (baseline = 0)		-	11	14	-	-	-
Outcome: Number of new business models successfully scaled by supported companies (baseline = 0)		4	8	11	-	-	-
Outcome: Number of new business relationships formed with utilities by supported companies (baseline = 0)		2	6	-	-	-	-

### Related Notes:

- Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.6 Carbontech Development

The Carbontech Advancement Initiative provides the investment and support researchers and entrepreneurs require to commercialize innovations from lab to market. This initiative is centered around providing the ecosystem of resources New York State-based carbontech researchers and entrepreneurs need to turn technology innovations into viable and financeable companies that can provide direct climate benefits to the State. This initiative will fund research, technology transfer, and commercialization of carbontech solutions as well as carbontech entrepreneurial fellowships for academics transitioning carbontech out of academic spaces. Ratepayer-funded programs such as this CEF initiative play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. New clean tech business opportunities and accelerated commercial introduction of new clean tech products will not only support the scale up of options to address climate change but will also drive a more robust clean energy economy in the State. Carbontech is defined by NYSERDA as an emerging sector described by products that capture, transport, and convert different forms of carbon into a diverse array of valued products and services in a climate-beneficial way. NYSERDA’s definition of carbontech excludes any products or services that increase the emission of greenhouse gases, emit substantial greenhouse gases, or other environmental pollutants through operation.

### Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and Early-Mid Stage Companies	Corporate and Strategic Partners
Venture Development Organization Partners	Customers and Solution Adopters
Mentors and Experts	Academic Institutions
Investors	Scientists and Researchers
Minority and Women Owned Businesses	

Target Market Barriers
Entrepreneurs and early-stage companies often lack the commercialization and business development expertise necessary to successfully bring carbontech innovations to market.
Many researchers and scientists developing carbontech innovations don’t have the training, capital, or connections they need to turn them into viable businesses.
Many early-stage and growth-stage carbontech companies struggle to secure demonstrations for their solutions.
The commercialization of carbontech solutions requires a pipeline of candidate technologies that have demonstrated proof-of-concept, funding for technology transfer, commercialization support, and activities that engage market actors to further attract funding and resources to carbontech innovators.

<b>Initiative Objectives</b>
Enhance the pool of human capital developing carbontech innovations and deliver to them the trainings and resources they need to build companies based on their innovations.
Ensure the testing, research, capital, and development resources needed by entrepreneurial scientists developing carbontech are available to them as they build their innovations.
Build a robust ecosystem composed of academic, private sector, and public actors committed to accelerating the scale of carbontech products and financing them.
Commercialize carbontech products in New York State.

## Key Activities + Measurements

<b>Activity:</b>						
NYSERDA will launch a grant funding and carbontech ecosystem building program as well as an entrepreneurial fellowship program within this program. These activities will serve researchers, scientists, and early-stage companies.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue awards from competitive solicitation for program administrator.		*				
Milestone: At least \$2.5M in cost share due from the program administrator.		*				
Milestone: Issue awards from Fellowship partner solicitation that is released in 2021.			*			
Milestone: At least \$2.2M in external funding opportunities awarded by the program administrator.			*			
Milestone: At least 10 corporate partners secured as partners of the Carbontech Development Initiative.			*			
Milestone: At least \$6.5M in cumulative External Funding Opportunities awarded by the program administrator.				*		
Milestone: At least \$5.5M in cumulative cost share due from program administrator.				*		
Milestone: Programs achieve full-financial sustainability					*	
Output: New Awards Issued		-	9	18	27	36
Output: New Products Created		-	3	7	11	15
<b>Related Notes:</b>						
<ul style="list-style-type: none"> <li>a. There are currently no outcome measures associated with the activity described above.</li> <li>b. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders.. NYSERDA will assess the collective progress of this and other related initiatives (Climatetech Commercialization Support, Catalytic Capital for Climatetech, Climatetech Expertise &amp; Talent) in the context of those initial baselines in the CEF Annual Report.</li> </ul>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
IR - Technology to Market	CleanTech StartUp Growth and Manufacturing Corps	CleanTech StartUp and M-Corps - Market Update 1 - years 2020-2021	Market	PY 2020-2021	2020 Q4	2021 Q4	Complete
IR – Negative Emissions Technologies, IR – Technology to Market	TBD: Study will include one or more initiatives from this Focus Area	TBD	Market	TBD	TBD	TBD	Upcoming

# ClimateTech Commercialization Support

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	<b>2,027,117,671</b>	-	32,759,930	104,455,368	327,419,444	275,190,196	663,985,419	230,467,314	292,840,000	50,000,000	50,000,000	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	<b>1,220,891</b>	-	55,175	111,958	69,606	88,932	295,272	259,474	233,264	53,605	53,605	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	<b>53,640,700</b>	-	-	2,741,232	3,268,963	5,125,450	10,758,163	6,076,787	5,636,007	10,816,819	8,861,582	355,698	-	-	-	-
<b>Total</b>	<b>54,861,591</b>	-	<b>55,175</b>	<b>2,853,190</b>	<b>3,338,569</b>	<b>5,214,382</b>	<b>11,053,435</b>	<b>6,336,261</b>	<b>5,869,271</b>	<b>10,870,424</b>	<b>8,915,187</b>	<b>355,698</b>	-	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Technology to Market** Focus Area. See the **Buildings Innovation** Focus Area plan for additional information.

# Catalytic Capital for Climatetech

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	66,921,892	-	-	-	-	42,350	597,529	782,013	500,000	20,000,000	22,000,000	15,000,000	8,000,000	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	2,140,627	-	-	-	79,719	33,101	209,193	331,749	243,015	684,635	458,807	100,408	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	17,219,601	-	-	-	662,162	1,922,005	3,915,275	5,734,536	3,173,000	979,544	833,078	-	-	-	-	-	-
<b>Total</b>	<b>19,360,228</b>	-	-	-	<b>741,882</b>	<b>1,955,107</b>	<b>4,124,468</b>	<b>6,066,285</b>	<b>3,416,015</b>	<b>1,664,179</b>	<b>1,291,885</b>	<b>100,408</b>	-	-	-	-	-

# Climatetech Expertise & Talent

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	80,397,925

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1,425	25,179,000	25,217,500	30,000,000	-	-	-	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	-
Implementation	129,337
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	11,919,940
<b>Total</b>	<b>12,049,277</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	32,469	9,070	34,941	21,049	5,013	15,000	11,795	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	667,200	1,806,017	1,970,881	2,503,001	1,754,054	1,825,044	1,393,743	-	-	-	-	-
-	-	32,469	676,270	1,840,958	1,991,930	2,508,014	1,769,054	1,836,839	1,393,743	-	-	-	-	-

# Manufacturing Corps

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	<b>383,178,546</b>	-	-	292,000	26,005,316	52,285,283	204,595,947	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	<b>200,535</b>	-	31,596	48,328	7,178	38,691	12,628	5,936	18,726	18,726	18,726	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	<b>16,858,425</b>	-	8,000	397,000	2,207,000	2,673,500	4,679,404	2,118,033	500,000	2,137,744	2,137,744	-	-	-	-	-
<b>Total</b>	<b>17,058,959</b>	-	<b>39,596</b>	<b>445,328</b>	<b>2,214,178</b>	<b>2,712,191</b>	<b>4,692,031</b>	<b>2,123,969</b>	<b>518,726</b>	<b>2,156,470</b>	<b>2,156,470</b>	-	-	-	-	-

# Novel Business Models and Offerings

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	153,570,728	-	-	-	1,027,939	2,734,806	678,886	51,327,892	48,525,826	49,275,379	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	1,364,680	-	-	33,918	13,072	40,044	163,477	146,563	371,390	371,390	224,827	-	-	-	-	-
Research and Technology Studies	5,426,714	-	-	-	762,432	2,295,068	1,042,861	524,700	413,327	388,327	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	6,592,000	-	-	-	-	-	-	92,000	500,000	4,000,000	2,000,000	-	-	-	-	-
<b>Total</b>	<b>13,383,394</b>	-	-	<b>33,918</b>	<b>775,504</b>	<b>2,335,111</b>	<b>1,206,337</b>	<b>763,263</b>	<b>1,284,717</b>	<b>4,759,717</b>	<b>2,224,827</b>	-	-	-	-	-

# Carbontech Development

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	78,463,500	-	-	-	-	-	-	3,000,300	13,612,800	22,987,800	23,400,000	13,162,500	2,300,100	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	216,020	-	-	-	-	-	-	54,005	54,005	54,005	54,005	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	14,146,000	-	-	-	-	-	175,000	2,862,500	3,767,500	4,405,000	2,825,000	46,000	65,000	-	-	-
<b>Total</b>	<b>14,362,020</b>	-	-	-	-	-	175,000	2,916,505	3,821,505	4,459,005	2,879,005	46,000	65,000	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Technology to Market** Focus Area. See the **Negative Emissions Technologies** Focus Area plan for additional information.

# Buildings Innovation Plan

## *Innovation and Research Portfolio Focus Area*

### Focus Area Plan Contents

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<b>Appendix: Buildings Innovation Budgets and Benefits by Initiative</b>	

### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable:
- Budget details associated with this CIP revision:
  - **NextGen Buildings** budget revised from \$50.0M to \$65M (+15.0M); section 2.1 plan updated with expanded scope to include Intelligent Buildings focus which is designed to enable buildings to pursue decarbonization, better manage load and the utilization of energy generation assets, and to serve as a reliable distributed energy resource (DER).

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **NextGen HVAC** initiative name updated, now **NextGen Buildings**.
- Budget details associated with this CIP revision:
  - **NextGen Buildings** budget revised from \$30.0M to \$50.0M (+20.0M); Section 2.1 plan updated with expanded scope to include Building Envelope and Thermal Storage focus.
- **Climatetech Commercialization Support** was previously filed as a component of the **CleanTech Startup Growth** initiative and has been broken out into a separate initiative to improve clarity for all stakeholders. With the introduction of Focus Areas, a component of this work has been deemed to support (and be funded through) Buildings Innovation, therefore it has been added as an initiative serving the Focus Area.

## 1. Focus Area Overview

### Focus Area Description

NYSERDA's Buildings Innovation work is focused on accelerating the development and commercialization of innovative solutions that enable carbon neutral buildings in New York State – that is buildings that are highly energy efficient, use low-to-no-carbon fuels, and are capable of interacting with the current and future electric and thermal energy grids. The focus area addresses both existing and new buildings.

### Current State of Market

New York State has 6.2 million buildings and 70% of these buildings were constructed before the energy codes and will need substantial improvements to decarbonize. Buildings represent a large opportunity for energy efficiency improvements and GHG emission reductions. The buildings sector was New York's largest source of GHG emissions in 2019, responsible for 32% of emissions statewide, which includes direct emissions from the combustion of fossil fuels in residential and commercial buildings, associated “upstream” emissions from imported fuels, and HFCs released from building equipment and foam insulation; additional (indirect) emissions are associated with the electricity used in buildings.

Air leakage and insufficient insulation in existing buildings often requires the use of HVAC systems that are larger, more expensive, and less efficient than what would be required if those factors were addressed. New solutions need to address the value proposition to the building owner with consideration of the general condition, vintage, and type of building. Failing to address the envelope performance of existing buildings will necessitate a much larger installed base of renewable generation and storage to meet the energy demand, and will reduce resilience and the potential for buildings to act as a flexible load for the electric and gas systems. Additionally, solutions must provide value propositions that, aligned with policy, enable or drive retrofits to occur at a pace substantially faster than the current rate of major retrofits in New York State.

A shift to electric-powered heat pumps for space conditioning is expected to increase winter electric demand on average, produce a demand delta between night and day, and generate peaks in electric demand associated with extreme cold weather events. Coupling thermal energy storage with heat pumps will reduce demand, alleviating system reliability concerns, while reducing the needed investments in transmission and distribution upgrades. The role of clean fuels must also be assessed as part of a comprehensive strategy.

With the increasing deployment of intermittent renewable generation and electric vehicles, buildings will need to serve as a grid resource to balance supply and demand. Building – grid interactions can develop revenue streams for building owners that might offset decarbonization investment requirements. Alongside appropriate policies, enabling demand management and response capabilities for buildings provides an opportunity to develop a transactive energy market for buildings.

**Intervention Strategies**

The Buildings Innovation focus area will (1) target innovation investments that support building decarbonization, including clean heating and cooling, thermal storage, building envelope improvements, and intelligent grid-interactive buildings and (2) identify, support, and bring to the NYS market innovative, commercially available building solutions that are currently available elsewhere in the world to address New York State’s needs. These interventions include: adapting the solution for the NY/United States market, regulatory and safety testing and certification, assistance to navigate the NY/U.S. market, identification of strategic NY partners, and demonstrations of the solution in NY buildings.

NYSERDA will continue to actively engage with internal and external stakeholders to identify the factors that limit the development and scaled deployment of existing products and business solutions. Upon development of specific hypotheses in each technology and market segment, specific solicitations are developed, vetted, and demonstrated in partnership with the innovation community to commercialize solutions that address these limitations and gaps.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$75.0	-	\$60.0	+ \$15	\$75.0	100%

Initiatives that serve multiple focus areas across NYSERDA’s CEF portfolio are listed with asterisk (\*).

Initiatives Active in the Market	Funding (\$M)	Period
NextGen Buildings	\$65.0	2016 -
Climatetech Commercialization Support*	\$10.0	2022 -
<b>Total Active Funding</b>	<b>\$75.0</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$75.0</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$347	\$454

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%.

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage.

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports technology demonstration, validation, technology-to-market activities, and commercialization support for energy efficient, electrification or clean energy technologies intended to reduce buildings' energy consumption and/or the associated GHG emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers the entirety of the buildings' energy usage and recognizes the interplay between the different energy systems. Importantly, this approach recognizes that customers prefer to make capital improvement decisions considering the entirety of their energy budget rather than in an electric-only manner.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

NYSERDA invests buildings innovation funding to support the NYS Clean Heat initiative, working to advance the electrification of buildings across New York State. Reference the Clean Heating and Cooling focus area plan for more information on this strategic priority.

Archives of previous CEF plan filings (chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 NextGen Buildings

The NextGen Buildings Initiative seeks to enable the decarbonization of buildings through development and commercialization of clean forms of heat and cooling, thermal storage technologies, building envelope retrofit products and intelligent grid interactive building solutions. NYSERDA will work with commercial and residential property owners to define technical needs and performance specifications, engage the industry and innovation community to deliver and tailor products to meet New York State’s building needs, and support cost-shared demonstrations of innovative solutions in the State. This effort is expected to leverage opportunities to grow the green economy through industry and university partnerships, investor community engagements, and international alliances. Activities will foster the commercialization of advanced building technologies, technology validation to drive market impact, and strategic partnerships between market participants, manufacturers, and the innovation community. Where possible, NYSERDA will leverage its investments in building innovation and new technology alongside of its investment in market development to accelerate decarbonization.

### Participants, Barriers, and Objectives

Target Market Participants	
Innovators and U.S. manufacturers of HVAC, building envelope, and thermal storage solutions.	Entrepreneurs.
Foreign companies with commercially available clean heating and cooling, envelope retrofit, and thermal storage products.	Scientists and researchers.
Residential, multifamily, and commercial building owners and large real estate management organizations.	LMI and disadvantaged communities.
Utilities and NYISO.	Technology Developers

Target Market Barriers	
Lack of a portfolio of building decarbonization solutions to address market needs (availability & cost).	Coupled management of latent and sensible cooling energy inherently insufficient.
Innovative HVAC, envelope retrofit, and thermal storage products commercially available outside of the U.S. but not widely available in NY.	Packaged HVAC and domestic hot water systems are needed to enable deep energy retrofits.
Compressor technology responsible for substantial energy use and cost for AC and Heat Pump Systems.	Need for solutions to enable low-GWP refrigerant use, monitoring and leak detection.
Need market signal to drive manufacturer development of products/solutions enabling integration of renewable generation, thermal storage, and advanced controls.	Scaling of envelope retrofits limited by the high cost, long payback and associated disruptions of currently available building envelope retrofit solutions.
Performance improvements and cost compression solutions for cold climate heat pumps (CCHPs) needed to have broader application/adoption.	Thermal storage technologies and their application for space heating is just coming into existence and beginning to display signs of future potential..
Electrifying space heating for existing buildings is difficult due to lack of drop-in replacements compatible with the existing thermal distribution system and building envelopes deficiencies.	Many building systems are replaced upon failure – often in an emergency mode – constraining the willingness of the asset owner to try a new and innovative product.
Availability and reliability of buildings to serve as a Distributed Energy Resource (DER).	Increasingly complex building systems associated with distributed heating and cooling, storage, on-site renewable generation.
Electrical service capacity limitations in existing buildings	

## Initiative Objectives

Increase availability and affordability of clean heating and cooling, envelope retrofit, thermal storage and intelligent building solutions through created and established innovations that address technology gaps, improve performance, and/or lower cost (value proposition).

Provide building owners/operators with innovations that improve the controllability and grid interactivity of buildings systems, allowing them to capture unrealized economic value through energy savings, GHG reductions, and demand management or participation in demand response programs.

Increase the number of clean heating and cooling, envelope retrofit, thermal energy storage, and intelligent building businesses formed across all regions of New York State, and the number of international companies attracted to New York State.

## Key Activities + Measurements

### Heating, Ventilation, Air Conditioning

As the majority of GHG emissions from HVAC are associated with fossil fuel use for heating buildings, activities will primarily focus on clean and efficient space heating and the integration of HVAC systems with thermal storage and advanced controls.

#### Activity:

- **Determine Technology Performance and Cost Needs.** NYSERDA will seek market intelligence on the specific performance and cost thresholds for various technologies that are likely to drive adoption. Once these targets are well understood, focused competitive “innovation challenges” solicitations will be released targeting these thresholds. The solicitations will look to support technology development, technology validation, and tech-to-market activities.
- **HVAC Technology Development.** Solicitations will target the innovation community to develop solutions that will provide the desired performance. Multiple innovators may be sought to address a specific technology barrier, increasing the likelihood of a viable/investable solution. Where appropriate, utility involvement will be included.
- **Technology Validation Effort.** Demonstration/validation efforts will be conducted to test the developed, and other available, innovations in the intended relevant operational environment. For this tactic, NYSERDA will directly engage large real estate management organizations and other key stakeholders to serve as test beds.
- **Tech-to-Market Support.** Tech-to-market support will be provided to technology developers to help drive the commercialization of new innovations. This support will be tailored specifically to help early-stage companies navigate the typical channels to market for buildings technologies; for instance, introductions through planned and structured events with key decision makers (HVAC contractors, architecture and engineering firms, energy service companies, consultants, and building owners/operators). Outputs and outcomes include activities with international companies attracted to offered product and to doing business in NYS.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue annual awards from each round of Innovation Challenge.			Rnd 6	Rnd 7,8	Rnd 9	
Output: number of product development projects started (baseline = 17).		21	24	26	28	-
Output: number of demonstration projects started (baseline = 22).		32	35	39	41	-
Output: number of projects (product development and demonstration) completed (baseline = 5).		7	15	22	40	52
Output: number of companies supported or other partnership (baseline = 39).		53	59	65	69	-
Outcome: number of products commercialized (baseline = 4).		5	7	9	12	15
Outcome: revenue (\$M) to companies commercializing products (baseline— \$1.6M).		\$2.5	\$7	\$22	\$67	\$202
Outcome: number of replications from demonstration projects (baseline = 147).		180	225	300	375	450

#### Related Notes:

- Baseline values of outputs and outcomes presented in this table are not derived from evaluation studies.

## Building Envelope and Thermal Storage

NYSERDA will focus primarily on innovations that advance building envelope retrofits of existing buildings and the use of thermal storage for heating applications.

### Activity:

- **Assessment of Envelope Retrofit and Thermal Storage Solutions.** NYSERDA will perform an assessment of emerging and innovative envelope retrofit and thermal storage solutions for the common building types in NYS. Information from this assessment will be used to define the economic and technical potential for energy efficiency and GHG reductions, and to inform the innovation challenges to be issued.
- **Envelope Retrofit and Thermal Storage Technology Development.** Innovation Challenges will target the innovation community to develop solutions that will provide the desired performance or targets. Multiple innovators may be sought to address a specific technology barrier, increasing the likelihood of a viable/investable solution. Where appropriate, utility involvement will be included.
- **Technology Validation Effort.** Demonstration/validation efforts will be conducted to test the developed, and other available, innovations in the intended relevant operational environment. For this effort, NYSERDA will directly engage large real estate management organizations and other key stakeholders to serve as test beds. Priority will be given to demonstrations with applicability to disadvantaged communities.
- **Tech-to-Market Support.** Tech-to-market support will be provided to technology developers to help drive the commercialization of new innovations.

Outputs and outcomes include activities with international companies attracted to offered product and to doing business in NYS.

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue annual awards from each round of Innovation Challenge.			Rnd 1	Rnd 2,3	Rnd 4	
Output: Envelope Retrofit Technical and Economic Potential Assessment Study (value proposition, scalability, market size, energy benefits, GHG reduction) has been completed.		-	1	-	-	-
Output: Thermal Storage Technical and Economic Potential Assessment Study (value proposition, scalability, market size, energy benefits, GHG reduction) has been completed.		-	1	-	-	-
Output: number of product development projects contracted (baseline = 0).		-	4	12	16	-
Output: number of demonstration projects contracted (baseline = 0).		-	3	9	12	-
Output: number of projects (product development and demonstration) completed (baseline = 0).		-	-	2	7	16
Output: number of companies supported or other partnership (baseline = 0).		-	7	21	28	-
Outcome: number of products commercialized (baseline = 0).		-	-	2	4	8
Outcome: revenue (\$M) to companies commercializing products (baseline - \$0M).		-	-	\$10	\$40	\$120
Outcome: number of replications from demonstration projects (baseline = 0).		-	-	10	40	120

### Related Notes:

- Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

## Intelligent Buildings

NYSERDA will focus primarily on innovations that enable buildings to pursue decarbonization, better manage load and the utilization of renewable energy generation assets, and to serve as a reliable distributed energy resource (DER).

### Activity:

- **Intelligent Building Technology Development and Demonstrations.** Innovation Challenges will target the innovation community to develop solutions that will provide the desired performance or targets. Multiple innovators may be sought to address a specific technology barrier, increasing the likelihood of a viable/investable solution. Where appropriate, utility involvement will be included.
- **Technology Validation Effort.** Demonstration/validation efforts will be conducted to test the developed, and other available, innovations in the intended relevant operational environment. For this effort, NYSERDA will directly engage large real estate management organizations and other key stakeholders to serve as test beds. Priority will be given to demonstrations with applicability to disadvantaged communities.
- **Tech-to-Market Support.** Tech-to-market support will be provided to technology developers to help drive the commercialization of new innovations.

Milestone or Measure (cumulative)	Target by Year:	2023	2024	2025	2026	2027
Milestone: Issue annual awards from each round of Innovation Challenge.	Rnd 1,2	Rnd 3				
Output: number of product development projects contracted (baseline = 0).	5	7	-	-	-	-
Output: number of demonstration projects contracted (baseline = 0).	4	8	-	-	-	-
Output: number of projects (product development and demonstration) completed (baseline = 0).	0	3	8	-	-	-
Output: number of companies supported or other partnerships (baseline = 0).	10	18	19	-	-	-
Outcome: number of products commercialized (baseline = 0).	-	1	2	5	-	-
Outcome: revenue (\$M) to companies commercializing products (baseline - \$0M).	-	\$1	\$5	\$15	\$64	
Outcome: number of replications from demonstration projects (baseline = 0).		1	6	21	71	

### Related Notes:

- Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

## **Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Climatetech Commercialization Support

The Climatetech Commercialization Support Initiative offers targeted support to early and growth stage climate innovation providers focused on serving the buildings sector. NYSERDA will launch a coordinated suite of interventions to accelerate the time to market for climatetech solutions. The key activity is the execution of the Empire Technology Prize, a \$10m initiative launched as a part of NYSERDA’s Empire Building Challenge. Corporate Challenges are cohort based, sector specific challenge programs that engage corporate actors in the program design, solution recruitment, cohort selection, cohort training and support, and direct partnership creation with select solution providers. These programs are designed to help NYSERDA drive business formation and commercialization outcomes in key sectors in partnership with the private sector. This model increases private sector leverage and delivers focused commercialization support to early and growth stage companies. This specific corporate challenge will seek solution providers with retrofit solutions (business models or technology) that can solve for critical market gaps in building decarbonization. The NYSERDA Innovation team will work in close collaboration with building owners, operators, and the NYSERDA Market Development team to scope the program and its eligibility rules. This initiative serves both Buildings Innovation and Technology to Market Focus Areas. The Technology to Market focus area plan contains further detail and relevant definitions.

### Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and early- to mid-stage companies	Corporate and strategic partners
Venture development organization partners	Customers and solution adopters
Minority and women owned businesses	Investors

Target Market Barriers
Early-stage and growth-stage climatetech companies often lack the commercialization and business development expertise necessary to successfully bring their technologies to market as fast as possible.
Many early-stage climatetech companies do not have active relationships or effective relationships with the investment community, potential corporate and strategic partners, or customers.
Many early-stage and growth-stage companies struggle to secure demonstrations for their solutions, and then fail to turn pilots and demonstrations into repeat in-market events.

Initiative Objectives
Accelerate the time to market for climatetech companies with products or services that can benefit New York State.
Increase the ability of early-stage and growth-stage climatetech companies to raise seed and follow-on capital from investors, secure commercialization assistance from development partners, enter into strategic partnerships, and engage customers in New York State.
Engage strategic and corporate partners to co-define market problems and co-create technology and business solutions with NYSERDA and our partners.

## Key Activities + Measurements

<b>Activity:</b> NYSERDA will work with third-party venture development organization to design and run the “Empire Technology Prize” focused on decarbonizing buildings in New York State.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue award to an Empire Technology Prize program administrator.			*			
Output: Number of teams engaged.		-	10	-	-	-
Output: Corporate parties engaged through Corporate Challenges.		-	20	-	-	-
Outcome: Corporate and strategic partnerships formed.		-	10	-	-	-
<b>Related Notes:</b>						
<p>a. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders. NYSERDA will assess the collective progress of this and other related initiatives (Carbontech Development, Catalytic Capital for Climatetech, Climatetech Expertise &amp; Talent) in the context of those initial baselines in the CEF Annual Report.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
IR - Grid Modernization, IR - Transportation, IR - Renewables Optimization, IR - Building Innovations	NextGen Buildings	Product Development Impact - PY 2016 - 2020	Impact and Market	PY 2016-2020	2021 Q3	2022 Q4	In Progress

# NextGen Buildings

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	343,852,316	-	-	-	61,578	660,570	881,391	906,678	38,131,250	103,631,250	51,131,250	41,106,250	53,246,307	54,095,792	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	9,494,514	-	-	21,573	228,765	190,599	301,884	267,481	530,000	1,300,000	1,930,000	1,696,737	1,330,001	1,137,475	560,000	-	-
Research and Technology Studies	54,905,486	-	-	46,359	171,456	1,382,580	1,413,464	2,087,139	3,571,894	6,550,000	10,483,593	11,108,263	8,600,000	6,100,000	3,390,738	-	-
Tools, Training and Replication	600,000	-	-	-	-	-	-	-	-	200,000	100,000	200,000	100,000	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>65,000,000</b>	-	-	<b>67,932</b>	<b>400,220</b>	<b>1,573,179</b>	<b>1,715,348</b>	<b>2,354,620</b>	<b>4,101,894</b>	<b>8,050,000</b>	<b>12,513,593</b>	<b>13,005,000</b>	<b>10,030,001</b>	<b>7,237,475</b>	<b>3,950,738</b>	-	-

# Climatetech Commercialization Support

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	110,412,272	-	-	-	-	-	-	-	11,252,272	25,160,000	37,000,000	37,000,000	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	500,000	-	-	-	-	-	-	-	166,666	166,667	166,667	-	-	-	-	-	
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Business Support	9,500,000	-	-	-	-	-	-	-	-	2,000,000	7,500,000	-	-	-	-	-	
<b>Total</b>	<b>10,000,000</b>	-	-	-	-	-	-	-	<b>166,666</b>	<b>2,166,667</b>	<b>7,666,667</b>	-	-	-	-	-	

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Buildings Innovation** Focus Area. See the **Technology to Market** Focus Area plan for additional information.

# Clean Transportation Innovation Plan

## *Innovation & Research Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable:
- **Public Transportation and Electrified Rail** benefits forecast updated to reflect a substantial investment made on one of the companies supported through the program.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Electric Vehicles – Innovation** initiative name updated, now **Electric Vehicle Innovation**.
- Budget details associated with this CIP revision:
  - **Electric Vehicle Innovation** budget revised from \$19.9M to \$31.9M (+12.0M) to fund new activities regarding medium- and heavy-duty vehicle electrification, managed charging, and EV policy development. Section 2.1 plan updated accordingly.
- Milestones added to both initiatives serving the Focus Area (Section 2.1, 2.2) to reflect current/future efforts.

## **1. Focus Area Overview**

### **Focus Area Description**

The Clean Transportation Innovation focus area seeks to support the development and demonstration of new technologies, policies, and strategies to reduce greenhouse gas emissions from the transportation sector and to gain market traction for these products. Activities are designed to harness stakeholders' creative solutions to New York State's transportation energy use challenges, facilitate the development of these solutions into products or services that are commercially viable, demonstrate their benefits to critical stakeholders, and research, identify solutions for and resolve any barriers to adoption that might prevent these solutions from being adopted.

### **Current State of Market**

In recent years clean transportation technologies have grown in prominence in the transportation sector. Electric vehicle (EV) sales have increased from less than 5,000 per year in 2016 to over 30,000 in 2021. Electric options for a wide range of medium- and heavy-duty vehicles are now available. Six of the largest public transportation operators in New York State have committed to switching all their buses to electric by 2040. However, many more technical and economic hurdles must be removed to reach New York State's Climate Act goals for clean transportation adoption. Further research is needed on how to bring down the cost of deploying EVs and EV charging stations while minimizing their impact to the electric grid. More work must be done to identify opportunities to increase the efficiency of transit operations and attract more riders through innovative services, especially post-COVID.

### **Intervention Strategies**

The primary goal for Electric Vehicle Innovation is expanding market adoption of EVs by making EV charging more widely available, engaging critical stakeholders, and overcoming technical and cost hurdles. Key activities include funding research, development, and demonstration activities focused on EV charging and EV-enabling technologies, funding an innovative project proposed through the Electric Truck & Bus Challenge of the New York Clean Transportation Prizes, supporting consumer engagement activities to increase awareness of EVs, developing and implementing policies that remove market barriers to EV adoption, and investing in programs to reduce the cost of EV charging stations.

The Public Transportation and Electrified Rail program invests in the development and demonstration of new energy-efficient products and operating strategies for New York State's public transportation system. The program's goal is to advance products and strategies that can reduce energy use from subway and commuter rail traction power, enable electric transit bus service, and improve transit agency operations and ridership statewide. The program seeks to achieve these goals by bringing new products to market, conducting in-service testing, and removing key financial, logistical, and bureaucratic barriers to adoption. Coordination with transit agencies and NYS Department of Transportation will help NYSERDA focus on priority system needs and realistic solutions.

The activities pursued under the Clean Transportation Innovation focus area are closely aligned with and mutually supportive of the activities pursued under the Transportation Market Development focus area. Both focus areas target existing market barriers to adoption of clean transportation technologies, in similar but distinct ways. Whereas the Transportation Market Development focus area primarily

consists of activities that target end-users, the Clean Transportation Innovation focus area primarily consists of research and activities that target broader market barriers.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$54.0	-	\$50.4	-	\$50.4	93%

Initiatives Active in the Market	Funding (\$M)	Period
Electric Vehicle Innovation	\$31.9	2017 -
Public Transportation and Electrified Rail	\$18.5	2017 -
<b>Total Active Funding</b>	<b>\$50.4</b>	

Inactive Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$50.4</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$173	\$238

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This Focus Area supports development and demonstration of new technologies, policies, and strategies to reduce greenhouse gas emissions from the transportation sector and to gain market traction for these products. Transportation is one of the largest contributors to carbon emissions in the State and reduction of fossil fuel use in the transportation sector, including support for electric and zero emission transport options, is needed to meet the State Climate Act goals.

Some CEF initiatives are strategically partnered with Regional Greenhouse Gas Initiative (RGGI) funding to maximize the reach and impact of these collective efforts. As it relates to this CEF focus area NYSERDA also invests RGGI funding that bolsters the following CEF initiatives: Electric Vehicles Innovation.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 Electric Vehicle Innovation

Through the Electric Vehicle Innovation initiative, NYSERDA has invested in technical, business model, and policy solutions that address market barriers holding back the broader adoption of electric vehicles in New York State (both passenger and medium- and heavy-duty vehicles). For the purposes of this initiative, electric vehicles include both battery-electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell electric vehicles (FCEVs).

Activities moving forward include demonstrating medium- and heavy-duty EV and charging technologies in new settings and vocations, providing market insights and technical support to medium- and heavy-duty fleets considering adopting EV technologies, and continuing to research policy and technological approaches that improve the business case for EV charging stations and increase participation in managed charging programs.

NYSERDA will further promote advances in the medium- and heavy-duty EV market by supporting a project selected through the Electric Truck and Bus Challenge, one of three prizes established by the Public Service Commission's July 2020 Make-Ready Order. The New York Clean Transportation Prizes offer a highly visible platform for attracting strong proposals from global leaders in transportation electrification and its goals are closely aligned with the goals of this CEF investment plan. The Electric Truck and Bus Challenge (formally known as the Clean Medium- and Heavy-Duty Vehicle Innovation Prize) "aims to identify and demonstrate ways to reduce the cost, system and operational challenges of further deployment of MD/HD EVs, including minimizing the costs of charging and grid-integration infrastructure for MD/HD EVs; improve health, the quality of life and the quality of opportunity in affected communities, as a co-benefit, with a preference for improvements in disadvantaged communities; and demonstrate clear potential for replication and scale."

To date, the initiative has supported the development and demonstration of multiple technologies and business models that show promise in expanding EVs in new market segments (especially in medium- and heavy-duty vehicles) and reducing the cost of EV infrastructure. The initiative has demonstrated successful models for EV consumer engagement and has enhanced the state of research on policies targeting EV adoption for low- and moderate-income car buyers and on EV-grid interactions.

Key elements of the strategy moving forward include:

- Demonstrating emerging medium- and heavy-duty electric vehicle technologies in both on-road and non-road contexts and in new settings and vocations
- Compiling findings from demonstrations and other available research to develop guides for medium- and heavy-duty fleet operators on how to integrate EVs into their operations and to offer direct technical assistance where needed
- Working with stakeholders to assess policy and technology options that can help proliferate EV charging station deployment and integrate EVs more seamlessly into the electric grid and inform utility plans for appropriate EV market interventions for both passenger and medium- and heavy-duty vehicles.

## Participants, Barriers, and Objectives

Target Market Participants	
Charging station manufacturers, operators, and installers	Utilities
Other State agencies, federal agencies, and other states	Technology developers and academic researchers
Municipalities	Potential charging station site owners
NGOs and advocates	Fleet vehicle operators
Disadvantaged communities and their representatives	

Target Market Barriers	
Lack of understanding of and access to data on the performance of EVs and EV charging among medium- and heavy-duty fleet operators.	Local and State policies and regulations are often not supportive of EVs (building codes, planning, and zoning, fleet purchases, utility rates designs).
Lack of charging infrastructure (both Level 2 and DCFC) deployed because of a current poor ROI and lack of driver demand.	Few vehicle electrification projects of a large scale have been conducted in New York, which would provide greater understanding of the grid and operational impacts of large-scale electrification.
Potential for adverse grid impacts and costly hardware upgrades due to high penetrations of EVs charging at peak times, or even at off-peak times on specific feeder circuits.	

Initiative Objectives	
Expand market adoption of medium- and heavy-duty EVs and gather data and intelligence on the operational performance of new EV technologies through demonstrations of emerging technologies and business models.	
Educate and advise medium- and heavy-duty fleet operators on the benefits of EVs and how to integrate them into their fleet operations.	
Remove technical and policy barriers to greater EV charging station deployment and more widespread participation in managed charging programs	

## Key Activities + Measurements

### Activity:

Solicit and Support New Technology and Business Model Demonstration Projects:

- Fund one project selected through the Electric Truck and Bus Challenge, which targets projects that will address the operational barriers to medium- and heavy-duty EV deployment, especially regarding the costs associated with charging.
- Fund demonstrations of emerging medium- and heavy-duty EV technologies in new market segments, including for non-road vehicles (such as trailer refrigeration units and construction equipment) and FCEVs. Demonstrations will focus on both the vehicle and charging technologies and innovative approaches to charging (such as managed charging and vehicle-to-grid charging).
- Rigorously collect data from demonstrations and use it to help design future programs and facilitate replication of successful demonstrations.

Participants engaged include auto manufacturers, charging station manufacturers, fleet operators, technology developers, academic researchers, utilities, disadvantaged communities and their representatives, and the financial sector.

Milestone or Measure (cumulative)	Target by Year	2021	2022	2023	2024	2025
Milestone: Issue award for Electric Truck and Bus Challenge.			*			
Milestone: Identify successful strategies for managing charging profiles and reducing the cost of grid upgrades associated with electric trucks and buses.					*	
Output: Product development and demonstration projects initiated (baseline = 0).		25	30	35	-	-
Output: Product development and demonstration companies supported (baseline = 0).		20	23	26	-	-
Outcome: Replications from demonstration projects (baseline = 0).		2	6	6	8	15

### Related Notes:

- Baseline values of outputs and outcomes presented in this table are not derived from evaluation studies.

### Activity:

Educate and Support Fleet Operators' Transportation Electrification Efforts:

- Gather information from industry on innovative business models for charging, purchasing, and financing medium- and heavy-duty EVs. Work with experts to evaluate responses.
- Based on information gathered from industry and data collected through demonstration projects, develop best practice guides, case studies, and "how to" materials for fleet operators that introduce the options and offer guidance on how to start electrifying fleets.
- Offer technical assistance to medium- and heavy-duty fleets based on the findings described in the best practice guides, with a focus on school bus operators.

Participants include auto manufacturers, charging station manufacturers, operators, and installers, financial institutions, fleet operators, consultants, and other state agencies

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Publish best practice guides for fleet operators				*		
Output: Case studies and guides published (baseline = 0).		-	1	4	6	8
Outcome: NYS school bus operators purchasing electric buses (baseline = 5)		5	15	50	150	300

### Related Notes:

- Baseline values of outputs and outcomes presented in this table are not derived from evaluation studies.

**Activity:**

Support State and Local EV Policy Development and Implementation:

- Develop an EV market development plan for New York State that describes EV policies and programs needed to meet the State’s aggressive EV adoption goals.
- Develop a plan for school bus electrification that identifies how to remove barriers to school bus electrification
- Collaborate with DPS and utilities to design and demonstrate technologies and policies that encourage off-peak charging and/or managed charging.
- Collaborate with DPS to identify and implement options for rate design and programs that address business model challenges associated with EV charging, specifically related to demand charges for higher speed charging and the integration of EVs and DERs.
- Work with utilities and DPS to quantify the benefits utilities and ratepayers may derive from medium- and heavy-duty EV adoption.
- Work with municipalities and other stakeholders to encourage the adoption of EV-friendly permitting, zoning, and building codes.

Participants include utilities, other State and federal agencies and other states, municipalities, consultants, and NGOs and advocates.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Complete EV market development plan				*		
Milestone: Complete school bus electrification roadmap			*			
Output: Policy studies completed (baseline = 0).		5	8	11	-	-

**Related Notes:**

- a. There are currently no Outcomes associated with the activity described here.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 Public Transportation and Electrified Rail

In the Public Transportation and Electrified Rail initiative, NYSERDA will work with transit agencies and technology providers to develop and demonstrate new public transportation and electrified rail technologies that reduce energy use and peak load, helping transit agencies make tangible improvements to their operations while achieving real energy savings. The program is focused on developing and demonstrating new solutions. NYSERDA’s strategy will include three main elements:

- Supporting new technology and product development that solves specific problems transit agencies have identified.
- Testing and validating the benefits, identifying the value streams, and exploring new delivery business models of new or new-to-New York products.
- Supporting transit agencies with finding alternative products that meet their needs and produce energy savings, helping transit agencies develop specifications for buying new products, and coaching potential vendors on how to adapt their products to specific NYS transit operators’ needs.

There is currently little pilot-scale research and testing being conducted on ways to improve smaller public transportation networks to reduce greenhouse gas (GHG) emissions. NYSERDA will support research into options for increased energy efficiency and lower-cost approaches to increasing ridership and achieving cost savings, such as aggregate purchasing of energy-saving technologies, technologies supporting bus rapid transit, behavioral science-informed marketing, and making data available to private application developers. Initial focus has been identified with input from NYS transit agencies. To date the initiative has funded product development and demonstration projects that are investigating high-potential opportunities, such as energy storage to capture regenerative subway braking, vehicle light weighting, electric bus efficiency improvements, and opportunities to expand and enhance transit service in underserved areas.

### Participants, Barriers, and Objectives

Target Market Participants	
Rail car and bus manufacturers, component manufacturers, and third-party solution providers.	Researchers and inventors
Energy storage companies	Software developers
Financial sector organizations and energy service companies.	Public transportation riders
NYS public transit agencies	Federal, State, local, and regional transportation agencies.
Utilities	

<b>Target Market Barriers</b>	
Lack of dedicated budget and process for transit operators to support product development and demonstration, and difficulty in conducting demonstrations on systems that operate 24/7.	Innovative partnerships and business models are difficult to incorporate into practice because of administrative and operational challenges.
Continued large incremental costs of electric buses, high charging costs, and logistical and infrastructure hurdles to the introduction of electric buses into transit fleets.	Outdated procurement practices at transit operators that do not consider energy use.
Uniqueness of transit operations to each operator.	

<b>Initiative Objectives</b>
Develop and demonstrate innovative technologies and operational approaches that reduce traction power overall and peak energy use.
Develop and demonstrate innovative technologies and operational approaches that improve the performance and business case for electric transit buses.
Develop and demonstrate new hardware and software technologies that enable operational improvements to make transit access more widespread and economically viable, especially in underserved areas.

## Key Activities + Measurements

<b>Activity:</b>						
Solicit and Support New Product Development and Demonstration Opportunities:						
<ul style="list-style-type: none"> <li>• Fund product development projects that advance and commercialize new technologies that help NYS transit agencies become more energy efficient and adapt their services to attract more customers.</li> <li>• Fund demonstration projects to test new and underutilized energy-saving and service-improving transit products in operation.</li> <li>• Fund product “adaptation” projects to customize energy-saving products for NYS transit operators’ special operational requirements.</li> </ul>						
Participants engaged with this activity include rail car and bus manufacturers, component manufacturers, and third-party solution providers, energy storage companies, financial sector organizations and energy service companies, researchers and inventors, software developers, NYS public transit agencies, federal, State, local, and regional transportation agencies, and utilities.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue awards from solicitation.			*			
Output: Projects initiated (baseline = 0).		25	34	40	-	-
Output: Companies supported (baseline = 0).		18	24	28	-	-
Output: Demonstration projects completed (baseline = 0).		3	8	14	18	-
Outcome: Products commercialized (baseline = 0).		1	3	5	-	-
<b>Related Notes:</b>						
a. Baseline values of outputs and outcomes presented in this table are not derived from evaluation studies.						

**Activity:**

Support Transit Operators in Integrating New Technologies into Their Operations:

- Work with transit agencies to develop procurement specifications for new products that encourage competition and open-source standards wherever possible.
- Advise transit agencies directly or contract with experts to help the agencies find solutions to logistical and operational barriers to new technology adoption.
- Investigate opportunities to provide aggregate purchasing opportunities for transit agencies that can use similar energy-saving technologies.
- Support the implementation of operating technologies, such as data collection and communication systems, and system performance improvements, such as reconfiguring bus routes to improve travel times, that improve rider experiences and increase utilization of existing assets.
- Work with transit agencies to pilot behavioral approaches that make taking transit easier, faster, and more cost-effective.
- Share information with transit operators and funders about successfully demonstrated products and inform them in their development of financing packages and project implementation support for transit agencies to broadly deploy products.
- Develop case studies and “how to” materials to facilitate replication of successful demonstrations.

Participants engaged with this activity include NYS public transit agencies, federal, State, local, and regional transportation agencies, and financial sector organizations and energy service companies.

<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Complete advisory project with transit operator.			*			
Output: Transit advisory projects completed (baseline = 0).		0	2	4	-	-
Output: New operational approaches piloted (baseline = 0).		2	3	6	-	-
Outcome: Replications of successful demonstrations (baseline = 0).		2	4	8	10	-

**Related Notes:**

- a. Baseline values of outputs and outcomes presented in this table are not derived from evaluation studies.

**Initiative Budget and Benefits**

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
I&R - Grid Modernization, I&R - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	Electric Vehicle Innovation	Market Dev. & I&R - Case Studies - program years 2016-2020	Impact	PY 2016-2020	2021 Q1	2023 Q2	In Progress
I&R - Grid Modernization, I&R - Transportation, I&R - Renewables Optimization, I&R - Building Innovations	Electric Vehicle Innovation	Product Development Impact - PY 2016 - 2020	Impact and Market	PY 2016-2020	2021 Q2	2022 Q4	In Progress
IR - Transportation	Electric Vehicles – Innovation, Public Transportation and Electrified Rail	Clean Transportation - Market and Impact - Assessment 1 - Years 2017-2021	Market and Impact	PY 2017-2021	2020 Q4	2022 Q2	Complete
IR - Transportation	Electric Vehicles – Innovation, Public Transportation and Electrified Rail	Clean Transportation - Market and Impact - Assessment 2 Years 2021-2022	Market and Impact	PY 2021-2022	2023 Q1	2023 Q4	Upcoming

# Electric Vehicle Innovation

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	93,712,555

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	722,288	842,437	772,014	1,375,816	5,000,000	10,000,000	15,000,000	18,000,000	18,000,000	10,000,000	6,000,000	4,000,000	4,000,000

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	9,000,000
Implementation	2,719,586
Research and Technology Studies	19,274,252
Tools, Training and Replication	856,163
Business Support	-
<b>Total</b>	<b>31,850,001</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	100,000	2,000,000	4,400,000	2,000,000	500,000	-	-	-	-
-	120,541	171,661	336,719	233,087	267,583	300,000	400,000	400,000	350,000	139,995	-	-	-	-
-	1,000	475,158	929,401	863,136	1,602,055	1,250,000	1,500,000	4,000,000	4,000,000	3,000,000	1,653,502	-	-	-
-	31,692	20,000	90,590	37,549	29,856	30,000	150,000	200,000	200,000	66,475	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	153,233	666,820	1,356,710	1,133,772	1,899,493	1,680,000	4,050,000	9,000,000	6,550,000	3,706,470	1,653,502	-	-	-

# Public Transportation and Electrified Rail

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	143,965,350	-	-	100,000	891,757	1,267,323	101,206,270	3,000,000	4,500,000	4,500,000	6,000,000	6,000,000	6,000,000	6,000,000	3,000,000	1,500,000

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	814,240	-	-	14,220	75,234	99,929	89,075	80,000	90,000	150,000	100,000	66,000	49,782	-	-	-
Research and Technology Studies	17,685,759	-	-	163,582	533,528	1,139,384	1,243,519	1,000,000	1,750,000	3,000,000	3,500,000	3,000,000	1,500,000	855,746	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>18,500,000</b>	-	-	<b>177,803</b>	<b>608,762</b>	<b>1,239,314</b>	<b>1,332,594</b>	<b>1,080,000</b>	<b>1,840,000</b>	<b>3,150,000</b>	<b>3,600,000</b>	<b>3,066,000</b>	<b>1,549,782</b>	<b>855,746</b>	-	-

# Energy Focused Environmental Research Plan

## *Innovation and Research Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- Budget details associated with this CIP revision:
  - **Energy-Related Environmental Research** budget revised from \$37.8M to \$47.8M (+10.0M) to support ongoing research with Section 2.1 plan contents updated accordingly.
  - Modified Focus Area Budget revised to \$47.8M (+0.8M); Ordered Focus Area Budget of \$47.0M exceeded by \$0.8M and addressed with funding from the Innovation & Research Reserve as noted in CIP Appendix A.
- **Energy-Related Environmental Research** will no longer maintain a leveraged funding forecast or report benefits related to this metric as it is not a primary measure of progress for the work executed under this initiative.
- Links to quarterly published updates added to keep stakeholders better informed of the ongoing work/ results of the research in this Focus Area.

# 1. Focus Area Overview

## Focus Area Description

Since its inception in 1998, NYSERDA's Energy Focused Environmental Research work has provided sound, current, scientific research to inform decision-making relevant to energy-related environmental policies and goals. Research, analysis, and coordination will continue to be needed to meet current and emerging energy and environmental goals. For example, ozone research is important from public health, environmental, and agricultural perspectives, but the agencies responsible for these areas do not have the capacity or mission to address ozone issues in a comprehensive manner. New York State will need to continuously assess progress toward policy goals related to environmental, energy, and economic benefits. As progress is made and challenges are addressed it will be critical that policies and initiatives have the scientific foundation to measure success and guide new strategies.

NYSERDA relies upon its Program and Science Advisors, a network of professional contacts and topically developed working groups of science, policy, and in some cases, industry experts, to identify critical gaps and research needs in New York State. These individuals and entities provide guidance on the major issues and challenges associated with achieving energy proposed or adopted energy policies and provide cutting-edge scientific understanding of how research can be designed to inform the policies.

## Current State of Market

The work completed within this CEF focus area provides a foundation of scientific research, data, and analysis to inform effective, equitable energy-related policies and practices. The examples that follow are indicative of the types of activities engaged in under the Energy Focused Environmental Research focus area to advance sound decision making based on scientific research and analysis:

- In addition to briefings, workshops, conferences and working groups, the Energy-Related Environmental Research initiative continues to emphasize publication of scientific works in academic journals, assuring validity of the research for policy decision makings. Over 1,000 papers have been published papers in more than 100 journals since the program's inception in 1998. Additionally, more than 90% of these publications have been cited more than once resulting in 6,000+ citations of program sponsored research.
- NYSERDA is leading the State's Offshore Wind Pre-Development activities here, including collecting and analyzing field data and other site assessment work that will reduce environmental and developer risks, and lower procurement costs for offshore wind, specifically costs to New York State ratepayers. Several activities are taking place that cumulatively exceed \$15M in pre-development investment that is expected to be recouped many times over via reduced risk to developers and by extension lower OREC prices for ratepayers. These include geophysical and geotechnical surveys, digital aerial wildlife surveys and the deployment of Metocean buoys and passive acoustic monitoring networks to measure wind speeds, marine mammal activities, and oceanographic conditions.

- The Agricultural Technical Working Group (A-TWG) was developed and is led through the efforts of this focus area. The A-TWG is an independent forum designed to inform efforts in advancing renewable (primarily solar) energy development across scales in a responsible way that supports New York State’s agricultural operations, lands, farmers, and communities. It is comprised of agricultural land and farmer advocates, solar developers, and operators, non-governmental organizations that focus on clean energy, climate, and environmental protection, local government officials, academic experts, and State agencies.
- The Energy-Related Environmental Research initiative has supported long-term air quality monitoring, trends analysis, and intensive atmospheric chemistry studies for more than 20 years. New York State air quality regulators continue to rely upon these efforts for State Implementation Plan development and tracking progress for fine particles (PM 2.5) and ozone. Additionally, this information is used in litigation against the US Environmental Protection Agency, such as a recent win regarding out-of-state transport of ozone into New York State.
- This team is leading a comprehensive assessment of observed and projected impacts of climate change on New York State: the New York State Climate Impacts Assessment: Understanding and Preparing for Our Changing Climate. This ambitious effort will assess how climate change will affect New York State's communities, ecosystems, and economy, and may inform climate choices at all levels of decision-making in the State.
- NYSERDA is working with State agencies to adapt and leverage the State’s long-term monitoring networks that were designed to provide accountability for the Clean Air Act Amendments of 1990, to provide monitoring of carbon sequestration and flux in New York State’s forests and wetlands.

### **Intervention Strategies**

The efforts outlined in this focus area are designed to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options by providing a strong scientific, technical foundation for formulating effective, equitable energy-related policies and practices, and will do the following:

- Inform State and federal energy and environmental policies.
- Guide cost-effective greenhouse gas mitigation and climate adaptation strategies.
- Ensure that the chemical, biological and public health impacts of air pollution from power generators and other fossil fuel combustion are documented in a scientifically rigorous and legally defensible manner.
- Provide data and research to defend state energy initiatives against legal challenges.
- Examine the health and ecological co-benefits of energy-efficiency and alternative energy solutions and identify and mitigate environmental and social barriers.
- Guide emerging energy technologies and systems.
- Assess progress over time toward policy goals and provide environmental accountability.

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan's Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget
\$47.0	\$47.8	\$47.8	-	\$47.8	100%

Initiatives Active in The Market	Funding (\$M)	Period
Energy-Related Environmental Research	\$47.8	2017 -
<b>Total Active Funding</b>	<b>\$47.8</b>	

Completed/Inactive Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$47.8</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	n/a	n/a

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#)

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

### 2.1. Energy-Related Environmental Research

The Energy-Related Environmental Research initiative is designed to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options by providing a strong scientific, technical foundation for formulating effective, equitable energy-related policies and practices. The program:

- supports independent and transparent policy relevant scientific research, analysis and monitoring.
- informs State and federal energy and environmental policies and practices.
- examines the health, ecological and economic co-benefits of energy-efficiency and renewable energy solutions, and opportunities to avoid, minimize, or mitigate concerns and minimize impacts.
- invests in research that reduces renewable energy developer risk, reducing timelines and renewable energy costs for ratepayers.
- provides environmental accountability for State and federal policy goals.
- provides regular updates to a diverse set of stakeholders from the scientific and policy communities to inform new research, maximize impact, and build stakeholder support.
- supports efforts that evaluate the effectiveness of energy-related air-quality management strategies for acid deposition, mercury, ozone and co-pollutants, particulate matter, climate-forcing agents, and their interactions with each other.
- supports coordination of regional, national, and international technical working groups and other stakeholder groups to leverage out-of-state funding and improve knowledge transfer.

A quarterly newsletter is published on [NYSERDA's website](#) and is designed to keep all stakeholders apprised of the latest progress and critical insights from these efforts.

## Participants, Barriers, and Objectives

Target Market Participants	
High-level policymakers and elected officials.	State and federal regulatory departments/agencies.
Technically oriented academic, not-for-profit, government, and private sector scientists, researchers, and analysts.	Public and private utilities and generators.
Environmental and renewable energy advocacy groups and the public.	Renewable energy developers and other energy industry representatives.

Target Market Barriers	
Targeted research will continue to be needed to meet current and emerging energy and environmental goals and policies.	Lack of coordinated activities between and within State agencies and organizations.
Limited resources and/or foresight for proactive research to inform policy options in the future.	Conflicts between regulatory authorities and potential applicants in advancing clean energy projects and the clean energy industry.

Initiative Objectives
Provide the impartial knowledge necessary to better understand and reduce the adverse energy-related impacts that damage New York State's ecosystems, the health of its citizens, and the State's economy.
Support environmental accountability for existing and future energy and environmental policies.
Guide cleaner, more environmentally thoughtful alternatives in ways that responsibility and efficiently advance New York State's energy policies.

## Key Activities + Measurements

<b>Activity:</b>						
Air Quality and Health, Ecosystem Response and Climate Adaptation, and Resilience Research.						
<ul style="list-style-type: none"> <li>These topical areas primarily support original scientific research and monitoring and publish largely in peer-reviewed journals, but in some cases in reports or guidance documents. Outputs from these activities are channeled to policy makers, regulators, and other scientists via briefings, workshops, conferences, project advisory committees and the published literature.</li> </ul>						
Alternative/Renewable Energy Development.						
<ul style="list-style-type: none"> <li>These topical areas support the responsible and cost-effective development of offshore wind energy and terrestrial renewables through research, analysis, and stakeholder engagement designed to empower and inform decision makers with timely and impartial information. Outputs from these activities are channeled to State and federal policy makers and regulators, regional states, local governments, renewable energy developers, and related stakeholders in the form of procurement requirements/scoring criteria, reports, guidelines, tools, briefings, and presentations.</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Publish quarterly progress updates on <a href="#">NYSERDA's website</a> .		*	*	*	*	*
Output: Number of sponsored workshops, conferences, seminars or facilitated meetings to inform decision making.		25	50	75	100	125
Output: Number of publications/products.		30	60	90	120	150
<b>Related Notes:</b>						
a. There are currently no Outcomes associated with the activity described here.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
IR - Energy-Focus Environmental Research	Energy-Related Environmental Research	Energy and Environmental Research – Citation Analysis – Years 1998-2021	Market	PY 1998-2021	2022 Q3	2023 Q1	In Progress

# Energy-Related Environmental Research

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	2,610,219	-	70,591	353,448	282,080	139,212	147,283	277,000	276,000	277,000	277,000	277,000	233,606	-	-	-
Research and Technology Studies	45,189,780	-	27,010	835,885	1,616,990	9,126,855	5,358,521	4,944,394	6,000,000	5,700,000	3,900,000	3,500,000	2,400,000	1,400,000	380,125	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>47,800,000</b>	-	<b>97,601</b>	<b>1,189,333</b>	<b>1,899,070</b>	<b>9,266,067</b>	<b>5,505,804</b>	<b>5,221,394</b>	<b>6,276,000</b>	<b>5,977,000</b>	<b>4,177,000</b>	<b>3,777,000</b>	<b>2,633,606</b>	<b>1,400,000</b>	<b>380,125</b>	-

# Grid Modernization Plan

CEF Innovation & Research Portfolio Focus Area

## Focus Area Plan Contents

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## Plan Record of Revisions

### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- **Power Electronics Manufacturing Consortium (inactive)** benefits forecast updated to include outside investment associated with the completion of Marcy FAB, the original investment supported by NYSERDA.
- **High Performing Electric Grid** activities and associated measures updated to expand targets to future years.

### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- The initiative previously filed as **High Performing Electric Grid** has been broken out to improve clarity for all stakeholders; **Future Grid Performance Challenge** and **Grid ClimateTech Ready Capital** were previously filed as a component of the “High Performing Grid” initiative and now have separate plans.

## 1. Focus Area Overview

### Focus Area Description

NYSERDA's Grid Modernization focus area invests in technologies, tools, and processes that accelerate realization of a reliable, resilient, and equitable electric grid that is necessary to achieve New York State's Climate Act goals. Initiatives in this program support needed innovations for a future grid including cost reduction technologies, grid visualization, analytics, management solutions, and technology and business model solutions to drive the interconnection and dynamic management of buildings, vehicles, and distributed energy generation resources. NYSERDA also invests in solutions to drive customer engagement, grid and microgrid resilience, alternative ownership models, and other investments required to support the goals of the Climate Act.

Achieving New York State's decarbonization goals will require widespread research, development, and demonstrations of technologies at an accelerated pace and increased scale as well as the adoption of new processes and methods to drive the adoption of innovations at the scale and speed required to meet the goals of the Climate Act. The State's investment in innovation is needed to optimize, validate, standardize, and replicate these solutions for widespread deployment in the market.

### Current State of Market

Since 2016, NYSERDA's High Performing Electric Grid initiative has supported solution providers working to develop, de-risk, and accelerate technologies and applications that improve the grid in alignment with the State's climate and energy goals. With the Future Grid Challenge, NYSERDA collaborates directly with New York State utilities to identify challenges they face in evolving the electric grid to enable the State's clean energy and climate goals. This approach has fostered collaborative multi-functional teams and partnerships with the New York State utilities, while directly advancing electric grid evolution.

Prior and ongoing NYSERDA investments in grid modernization apply innovative technologies that seek to improve grid reliability and efficiency through improved system management, reduction of losses, and outage avoidance. Ongoing investments seek to deliver innovative technologies that improve grid flexibility, grid interaction with end-use resources such as buildings and vehicles, and which enable the integration of new renewable resources consistent with the State's climate goals.

### Intervention Strategies

This program has targeted investments in a broad range of grid-modernization topics including innovation in the following

- Sensing, communications, diagnostics and controls that optimize the coordination of system elements in performing essential system management functions.
- Development and improvement of products and materials that address physical asset protection and improved functionality.
- Dynamic management of the grid and its interconnected elements, including integration of distributed energy resources (DER) into electric grid operation.

- Grid visualization, communication, and control systems associated with the interoperability of DER and other grid-enhancing or grid-edge technologies in a manner that can be commonly applied across the utilities and promote consumer-based third-party engagement in the energy system.

As we continue to assess new opportunities to best leverage NYSERDA funding to support the needs of the Climate Act, this program is expected to adjust strategies and focus. New focus areas may include may also explore:

- New processes to drive adoption of innovations onto the grid that catalyze greater private sector investment alongside NYSERDA funding
- Demand response solutions and innovative market design to drive affordability

### Focus Area Funding and Benefits Summary

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$134.0M	-	\$133.5M	-	\$133.5M	100%

Initiatives Active in The Market	Funding (\$M)	Period
High Performing Electric Grid	\$64.8	2016 -
Future Grid Performance Challenges	\$43.0	2021 -
Grid ClimateTech Ready Capital	\$9.0	2021 -
<b>Total Active Funding</b>	<b>\$116.8</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
Power Electronics Manufacturing Consortium	\$16.7	2017 - 2020
<b>Total Inactive Funding</b>	<b>\$16.7</b>	
<b>Total Focus Area Funding</b>	<b>\$133.5</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$1,380	\$1,673

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Initiative Information

Section III of the Compiled Investment Plan is dedicated to NYSERDA’s **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA’s Evaluation Plans and Reports are posted on the New York State Department of Public Service’s Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA’s entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA’s website](#).

## 2.1. High-Performing Electric Grid

The High-Performing Electric Grid initiative focuses on enhanced grid visualization (advanced sensing, communications, diagnostics, and controls), planning processes and advanced materials that accelerate realization of an advanced, digitally enhanced and dynamically managed “high-performing” electric grid. Initiatives will aim to build the capacity to integrate and dynamically manage loads, clean distributed energy resources (DER), and electric vehicles, thereby, lowering the carbon intensity of energy usage and increasing customer engagement in energy markets, including enabling the development of community-based energy systems such as microgrids. Such a grid will enable more efficient asset utilization (e.g., reduced operating margins, reduced power demands, reduced energy losses), reduced energy costs, improved reliability, and resiliency to climate change induced weather events. The program will invest in developing and testing innovations, demonstrating their value to the utility system and supporting the development of standards for their application. This will enable accelerated adoption and use by utility and non-utility market actors.

Many important milestones have been completed since the inception of this initiative in 2016, including the development of a technology roadmap and contracts with research and consulting organizations to inform the direction of the work. The remaining milestones in this initiative are to issue competitive solicitations and engage participants according to that plan. Another key early milestone was to implement a model for continued collaboration between NYSERDA, the New York Power Authority (NYPA), the Department of Public Service (DPS), New York State utilities and grid-tech companies to ensure that work under this initiative was aligned with the development of Distributed System Implementation Plans consistent with Public Service Commission rules.

This initiative is targeted to commit all funds and complete milestones in 2022. Some activities scheduled for 2022 and beyond that were included in this initiative in prior filings are now included in other initiatives in the focus area, which are now defined separately to improve overall clarity.

### Participants, Barriers, Objectives

Target Market Participants	
Electric utilities (investor-owned [IOU], municipals, cooperatives and authorities).	Universities and contract research organizations (e.g., Electric Power Research Institute [EPRI]).
Medium-to-large original equipment manufacturers.	DOE/National Laboratories
Grid-technology companies	Large-scale renewable resource project developers.
New York Independent System Operator (NYISO)/New York Reliability Council.	Startup companies introducing innovative products and services.
DER project developers	Standards setting committees
Disadvantaged community groups affected by grid resilience, reliability issues, and energy costs.	Public and private investors in grid technology.

<b>Target Market Barriers</b>	
Lack of real-time intelligence on system conditions.	Power quality and voltage stability concerns.
Limited availability of integrated system controls.	Limitations in physical properties of existing system equipment.
Lack of validation and standardization for advanced grid technologies.	Capacity limitations for the existing power transmission and distribution network.
Limited understanding of shifts in load profiles with increasing renewables, vehicle, and building electrification.	

<b>Initiative Objectives</b>
Invest in research that accelerates realization of an advanced electric grid.
De-risk technologies by sharing in the costs of developing and testing technologies and new products.
Catalyze additional public and private investment necessary to replicate demonstrated technology and grow the market.

## Key Activities + Measurements

<p><b>Activity:</b>            Launch program solicitations targeting technology solution providers to support product development and demonstration of technologies that accelerate realization of an advanced, digitally enhanced, and dynamically managed “high-performing” electric grid. Program solicitations will be targeted to:</p> <ul style="list-style-type: none"> <li>Invest across the full continuum of the innovation chain including research, proof of concept, product engineering, prototyping, modeling/simulation, and field testing.</li> <li>Develop tools that can be used by multiple market participants to accelerate the build out of a modern and dynamically operated electric grid.</li> <li>Leverage expertise residing across all innovation programs and apply rigor to all decisions on project funding at all stages in the continuum emphasizing acceleration of technological readiness and commercialization.</li> <li>Involve stakeholders to the fullest extent practical in the planning and execution of the investment plan. This includes executing efficient mechanisms to sharing learnings with utilities and other critical stakeholders for the purpose of driving adoption.</li> <li>Coordinate with Department of Public Service to prioritize grid needs and support research &amp; development and initial deployments of new grid technologies, business models, and functionalities</li> </ul>						
Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Issue awards following release of broad competitive solicitation.		*				
Output: Number of studies, demonstrations, and product development projects initiated. (baseline = 0)		100	109	114	119	-
Output: Number of studies, demonstrations, and product development projects completed. (baseline = 0)		48	67	69	73	77
Output: Number of companies supported, utility touchpoints/partnerships, other partnerships with established manufacturers or grid technology companies. (baseline = 0)		51	64	76	92	99
Outcome: Application of advanced grid-management tools to predict failures, prevent disruptions, and support self-healing. (baseline = 0)		1	2	8	16	27
Outcome: Tests and pilots of technologies/systems that enable system condition prediction and restoration. (baseline = 0)		1	2	3	4	5
Outcome: Application of power flow optimization systems (combination of computer systems and hardware to dynamically manage power flow). (baseline = 0)		1	-	2	3	-
Outcome: Advanced control/integration of DER in electric grid (ability to monitor and control DER in system, ability to take action on DER resources in system). (baseline = 0)		1	-	2	-	-
<p><b>Related Notes:</b>            a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2. Future Grid Performance Challenges

The Future Grid Performance Challenges initiative seeks to identify, define, and ultimately bridge gaps between the performance of today’s grid and the performance needed to achieve New York State’s Climate Act goals for a 70% renewable grid in 2030, followed by a greenhouse gas free electric grid in 2040. NYSERDA will collaborate with market actors to identify and provide solutions to functionality gaps of the grid to enable New York State’s clean energy and climate goals. This approach fosters collaborative, multifunctional teams and partnerships with the New York State utilities while directly advancing electric-grid evolution.

Program activity will focus investment in key technologies required to achieve a future grid capable of supporting a fully decarbonized economy in New York State. Program solicitations will follow a rigorous process to focus efforts and resources on the most critical and actionable problems, and to fully identify both technical and market barriers to help ensure that the solutions delivered are adopted at scale. In previous filings the activities of this initiative were included in the High-Performing Grid initiative. This initiative is now defined separately to improve clarity.

### Participants, Barriers, and Objectives

Target Market Participants	
Electric utilities (investor-owned [IOU], municipals, cooperatives, and authorities).	Universities and contract research organizations (e.g., Electric Power Research Institute [EPRI]).
Medium-to-large original equipment manufacturers.	DOE/National Laboratories
Grid and Grid-edge-technology companies	Large-scale renewable resource project developers.
New York Independent System Operator (NYISO)/New York Reliability Council.	Startup companies introducing innovative products and services.
DER project developers	Standards setting committees
Disadvantaged community groups affected by grid reliability issues, and energy costs.	Public and private investors in grid technology.

Target Market Barriers	
Lack of real-time intelligence on system conditions.	Power quality and voltage stability concerns.
Limited availability of integrated system controls.	Limitations in physical properties of existing system equipment.
Lack of validation and standardization for advanced-grid technologies.	Capacity limitations for the existing power transmission and distribution network.
Limited understanding of shifts in load profiles with increasing renewables, vehicle, and building electrification.	

Initiative Objectives
Identify the most critical and actionable problems that must be solved to deliver a future power grid that achieves the State’s climate goals.
Demonstrate and validate technology solutions with high-potential for widespread adoption.
Catalyze additional public and private investment necessary to replicate demonstrated technology and grow the market.

## Key Activities + Measurements

### Activity:

Launch program solicitations targeting solution providers, in partnership with NYS utilities, to deliver key gap-bridging technologies. Program solicitations will be targeted to:

- Identify performance gaps and barriers between the present state of the electric power grid and that which is required to support New York State’s climate goals.
- Develop Performance Challenge solicitations that specifically target identified performance gaps.
- Competitively select product development, pilot, and demonstration projects that validate innovative technologies to bridge performance gaps.
- Coordinate with New York State utilities, NYISO, the Department of Public Service and other key stakeholders to standardize technology solutions for widespread application in the State

Milestone or Measure (cumulative)	Target by Year:	2021	2022	2023	2024	2025
Milestone: Complete initial Performance Gap identification studies.		*				
Milestone: Issue targeted Performance Gap solicitation.			*	*	*	*
Output: Critical and actionable performance gaps identified (baseline = 0)		2	8	12	-	-
Output: Participants engaged including companies supported and partnerships with utilities, manufacturers, and grid-technology companies. (baseline = 0)		2	16	34	52	77
Outcome: Pilots and demonstrations of technology solutions to bridge performance gaps for the future electric grid. (baseline = 0)		-	2	4	6	8

### Related Notes:

- Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.3 Grid ClimateTech Ready Capital

The Grid ClimateTech Ready Capital initiative focuses on pilots and demonstrations of technologies that must achieve widespread adoption to enable a high-performing, renewable future grid. This initiative will provide needed cost matching for qualified New York State pilots and demonstrations seeking federal infrastructure funding and funding from other public and private sources.

### Participants, Barriers, and Goals

Target Market Participants	
Electric utilities (investor-owned [IOU]), municipals, cooperatives, and authorities).	Universities and contract research organizations (e.g., Electric Power Research Institute [EPRI]).
Medium-to-large original equipment manufacturers.	DOE/National Laboratories
Grid edge and Grid Flexibility technology companies	Large-scale renewable resource project developers.
New York Independent System Operator (NYISO)/New York Reliability Council.	Startup companies introducing innovative products and services.
DER project developers	Standards setting committees
Disadvantaged community groups affected by grid resilience, reliability issues, and energy costs.	Public and private investors in grid technology.

Target Market Barriers	
Lack of real-time intelligence on system conditions.	Power quality and voltage stability concerns.
Limited availability of integrated system controls.	Limitations in physical properties of existing system equipment.
Lack of validation and standardization for advanced grid technologies.	Capacity limitations for the existing power transmission and distribution network.
Limited understanding of shifts in load profiles with increasing renewables, vehicle, and building electrification.	

Initiative Goals
Support New York State companies seeking federal and other public and private funding to solve problems related to power-grid infrastructure technology.
Demonstrate and validate technology solutions with high-potential for widespread adoption.
Catalyze additional public and private investment necessary to replicate demonstrated technology and grow the market.

## Key Activities + Measurements

<b>Activity:</b> Launch program solicitation targeting solution providers, such as grid-technology companies, start-ups, and universities in partnership with utilities and demonstration host sites.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Launch competitive solicitation			*			
Output: Companies supported (baseline = 0)		-	-	4	4	-
Outcome: Pilots and demonstrations of power grid infrastructure technology in progress. (baseline = 0)		-	-	-	2	4
<b>Related Notes:</b> a. Baseline values for the output and outcome presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
I&R - Grid Modernization, I&R - Clean Transportation Innovation, MD - Workforce Development, MD - New Construction, MD - Commercial, MD - Single Family Residential	<i>various initiatives</i>	Market Dev. & I&R - Case Studies - program years 2016-2020	Impact	PY 2016-2020	2021 Q1	2022 Q3 – 2023 Q2 (various)	In Progress
I&R - Grid Modernization, I&R - Transportation, I&R - Renewables Optimization, I&R - Building Innovations	High Performing Electric Grid	Product Development Impact and Market - PY 2016 – 2020	Impact and Market	PY 2016-2020	2021 Q3	2022 Q4	In Progress
I&R - Grid Modernization	High Performing Electric Grid	High Performing Grid	Market	TBD	TBD	TBD	Upcoming

# High Performing Electric Grid

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	222,347,801	-	-	772,563	1,650,903	4,317,686	3,933,944	6,778,874	15,400,000	20,600,000	30,600,000	30,600,000	35,500,000	35,500,000	35,951,916	468,467	273,448

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	4,469,343	-	-	105,453	281,779	410,491	1,007,042	1,767,667	442,121	300,000	150,000	4,789	-	-	-	-	-
Research and Technology Studies	47,783,614	-	-	824,197	1,900,646	4,578,759	5,907,261	10,543,857	4,838,833	6,045,960	6,177,778	4,000,000	2,424,200	542,121	-	-	-
Tools, Training and Replication	12,547,044	-	400,620	480,183	909,611	533,883	120,000	202,747	-	1,000,000	2,250,000	2,750,000	2,000,000	1,900,000	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>64,800,000</b>	-	<b>400,620</b>	<b>1,409,833</b>	<b>3,092,036</b>	<b>5,523,134</b>	<b>7,034,304</b>	<b>12,514,270</b>	<b>5,280,954</b>	<b>7,345,960</b>	<b>8,577,778</b>	<b>6,754,789</b>	<b>4,424,200</b>	<b>2,442,121</b>	-	-	-

# Future Grid Performance Challenge

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	200,296,215	-	-	-	-	-	-	296,215	4,000,000	14,000,000	14,000,000	24,000,000	24,000,000	36,000,000	36,000,000	28,000,000	20,000,000

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	3,000,000	-	-	-	-	-	-	-	550,000	400,000	400,000	450,000	400,000	400,000	400,000	-	-
Research and Technology Studies	39,100,000	-	-	-	-	-	-	-	800,000	5,000,000	8,500,000	10,000,000	7,700,000	4,700,000	2,400,000	-	-
Tools, Training and Replication	900,000	-	-	-	-	-	-	-	-	-	-	300,000	300,000	300,000	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>43,000,000</b>	-	-	-	-	-	-	-	<b>1,350,000</b>	<b>5,400,000</b>	<b>8,900,000</b>	<b>10,750,000</b>	<b>8,400,000</b>	<b>5,400,000</b>	<b>2,800,000</b>	-	-

# Grid ClimateTech Ready Capital

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	50,760,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	900,000	3,000,000	5,400,000	9,800,000	17,400,000	12,100,000	2,160,000	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	-
Implementation	3,200,000
Research and Technology Studies	5,800,000
Tools, Training and Replication	-
Business Support	-
<b>Total</b>	<b>9,000,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	100,000	600,000	1,000,000	800,000	700,000	-	-	-
-	-	-	-	-	-	-	630,000	1,000,000	1,900,000	1,270,000	1,000,000	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	730,000	1,600,000	2,900,000	2,070,000	1,700,000	-	-	-

# Power Electronics Manufacturing Consortium

Inactive

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	1,200,000,000	-	-	-	135,000,000	-	-	-	1,065,000,000	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Research and Technology Studies	16,694,490	-	-	3,322,578	11,304,802	2,072,620	(5,510)	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>16,694,490</b>	-	-	<b>3,322,578</b>	<b>11,304,802</b>	<b>2,072,620</b>	<b>(5,510)</b>	-	-	-	-	-	-	-	-	-	-

# Renewables Optimization Plan

## *Innovation and Research Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary.

#### September 9, 2022

- The **Energy Storage Technology and Product Development** budget and benefit plan has been updated; this initiative was expanded to serve other Innovation and Research Focus Areas and the plans related to this Focus Area were updated concurrently to reflect the latest history and forward-looking projections. Neither budget nor benefit totals have changed and only minor details of the plan contents have been updated.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- Budget details associated with this CIP revision:
  - **Energy Storage Technology and Product Development** budget revised from \$33.0M to \$39.5M (+6.5MM) to expand efforts focused on long duration storage solutions.

## 1. Focus Area Overview

### Focus Area Description

Increased utilization and renewables hosting capacity, lower cost, and improved performance of renewable energy assets and energy storage has many grid and consumer benefits. Optimizing the energy output and uptime of renewable resources will provide both near-term economic benefits and decrease the total cost of deploying renewable technologies in the future.

NYSERDA aims to achieve accelerated market adoption and realization of these benefits through strategies that improve performance, reduce cost, improve renewable hosting capacity, and improve integration with a grid that is distributed energy resources (DER) friendly. The initiatives in this focus area will improve the economics for renewable and distributed energy resources by addressing technical barriers, as well as advancing renewable technologies that have potential to drive large-scale greenhouse gas reductions, improve grid resiliency, and contribute to New York State's renewable generation and decarbonization objectives.

Energy storage innovation can mitigate the intermittency of solar and wind energy, helping ensure needed flexibility for the grid of the future. Energy storage can also avoid the need for additional electric system infrastructure with non-wire solutions, increase system efficiency and resiliency, and reduce the need for fossil fuel plants to meet periods of peak electric demand. NYSERDA's energy storage innovation strategy targets barriers limiting energy storage adoption in three sectors: customer-sited (behind-the-meter systems), the transmission and distribution system, and transportation.

The National Offshore Wind Research & Development Consortium focuses on establishing and operating a nationwide research and development consortium for the offshore wind industry to address United States-specific technology issues and accelerate cost reductions in the U.S. offshore wind sector.

### Current State of Market

NYSERDA's energy storage innovation and market development activities have successfully accelerated short duration energy storage solution (one to four hours) adoption in New York State and the industry has seen significant cost reduction over the last four years. The Energy Storage Technology and Product Development initiative has awarded over \$10M to 32 projects driving cost reduction, safety improvements, energy density and overall energy storage solution performance. This initiative has also provided nearly \$22M in funding to 6 long duration energy storage projects.

With the 100% zero-emissions electricity by 2040 mandate of the Climate Act, and the projection of New York State having a winter peaking grid by 2035, it is imperative that grid-flexibility solutions that can provide firm dispatchable energy for not only intra-day (Short Duration Energy Storage) balancing, but daily, multi-day, weekly and seasonal energy balancing required (Long Duration Energy Storage) to maintain grid reliability.

The National Offshore Wind Research and Development Consortium has been successfully incorporated, staffed, and has become fully operational in facilitation of solicitations and investment

in national research and development projects that target leveled cost of electricity (LCOE) reduction as a central focus. The Consortium Board of Directors and membership include most major offshore wind developers, major offshore wind OEMs, six states, utilities, and significant offshore wind industry participants.

Since 2018, the Consortium has awarded 40 projects totaling over \$28M in NYSERDA CEF, Department of Energy (DOE) and State partner funding. Project participants include United States private companies, national labs, universities, and coalitions. Project focus areas include, but are not limited to, offshore wind turbine foundation innovations including stationary and floating platforms, wind resource modeling innovations, control and monitoring innovations, and installation and O&M cost reduction research, to name a few, all anchored in a clear focus on LCOE reduction.

**Intervention Strategies**

Moving forward, the Energy Storage Technology and Product Development initiative will focus on Long Duration Energy Storage (LDES) solutions, including hydrogen solutions to help provide the flexibility and firm capacity required to provide economic, reliable, 100% zero-emissions electricity by 2040. LDES solutions require further product development, pilots, and demonstrations to reach commercialization stage. Current and future solicitations will focus on providing support to drive commercialization of the most promising LDES technologies and solutions with investment in product development from the Energy Storage Technology and Product Development funding and Pilots/Demonstrations from the Energy Storage ClimateTech Ready Capital funding. The advancements supported will reduce costs, improve performance, and stimulate growth in the critical Long Duration Energy Storage industry in New York.

The National Offshore Wind Research and Development Consortium initiative activities and investment will continue to drive the Consortium to become a self-sufficient entity, enabling investment in U.S.-specific technology issues that accelerate cost reductions in the United States offshore wind sector well beyond New York State’s and DOE’s funding.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$62.0	-	\$62.0	-	\$62.0	100%

Initiatives Active in The Market	Funding (\$M)	Period
Energy Storage Technology and Product Development	\$39.5	2017 -
National Offshore Wind Research & Development Consortium	\$22.5	2018 -
<b>Total Active Funding</b>	<b>\$62.0</b>	

Completed/Inactive Initiatives	Funding (\$M)	Period
n/a	-	
Total Inactive Funding	-	
<b>Total Focus Area Funding</b>	<b>\$62.0</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$63	\$331

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1. Energy Storage Technology and Product Development

The Energy Storage Technology and Product Development initiative makes investments primarily through competitive solicitations that focus on technology advancement, supply chain innovations, product development, pilots, and demonstration activities. Investments target technology advancements and product development that reduce costs, improve performance (efficiency, safety, energy density), and stimulate growth of the energy storage industry in New York State. The pilots and demonstrations provide verification of the viability of solutions and identify any barriers to significant adoption. Investment to date have been across three sectors/applications: customer sited (behind-the-meter), transmission and distribution system applications, and transportation system applications. Investments leverage NYS's unique innovation/testing assets; adapt innovation from other regions and include testing and optimization under typical NYS duty cycles/use cases, and relevant environmental/weather conditions. These investments also encourage commercialization-oriented partnerships.

Innovation investments to date, and NYSERDA's market development activities have successfully accelerated short-duration energy storage solution, primarily lithium-ion adoption in New York State. The lithium-ion battery industry, and short-duration energy storage solutions have seen significant cost reduction over the last four years. This initiative has awarded \$10M to 32 projects driving cost reduction, safety improvements, energy density and overall energy storage solution performance.

New York State's pathway to 100% zero-emissions electricity by 2040 drives a need for significant grid-flexibility assets with longer duration capacity capability. Moving forward, the focus of the Energy Storage Technology and Product Development initiative will be on Long Duration Energy Storage solutions, including hydrogen solutions to help provide the flexibility and firm capacity required to provide economic, reliable, zero-emissions electricity. LDES solutions require further technology innovations and product development to reach commercialization readiness. Technoeconomic analysis and innovation that drive cost reduction will be critical for LDES solution adoption. Current and future solicitations will focus on providing support to drive commercialization of the most promising LDES technologies and solutions. The advancements supported will reduce costs, improve performance, and stimulate growth in the critical Long Duration Energy Storage industry in New York State.

The Long Duration Energy Storage solicitation activity provides competitively solicited investment support in innovative and underutilized long duration energy storage solutions, devices, software, controls, and other complimentary technologies that decrease energy storage total hardware and installation costs, improve performance, and demonstrate integration with the grid. To date, this initiative has provided nearly \$22M in funding to 6 LDES projects. The areas of focus include:

1. Electrochemical
  - Electrochemical Energy Storage including Flow Batteries and innovative advanced battery solutions (greater than 6 hours duration).
  - Hydrogen Energy Storage and Flexibility Solutions

2. Mechanical

- Innovative Pumped Hydro and Compressed Air/Gas Solutions
- Mechanical/Gravity Energy Storage
- Geomechanical Energy Storage

3. Thermal

- Pumped Heat Electrical Energy Storage
- Thermophotovoltaic (TPV) Storage
- Innovative liquid or solid storage medium (e.g., water, sand, molten salts, rocks)

The Energy Storage ClimateTech Ready Capital category of the LDES Solicitation focuses on product development, pilots, and demonstrations of LDES technologies and solutions to provide needed cost matching for qualified New York State pilots and demonstrations seeking federal infrastructure funding and funding from other public and private sources.

**Participants, Barriers, and Objectives**

<b>Target Market Participants</b>	
Energy storage startup/emerging companies	Energy storage technology developers
Energy storage and renewable developers	Energy storage solution providers
Energy storage original equipment manufacturers, component manufacturers, system integrators, supply chain partners.	Universities, research organizations, government agencies
Brookhaven National Lab (BNL), New York Battery and Energy Storage Technology (NY-BEST) Consortium, Rochester Institute of Technology (RIT) Prototyping Center, Eastman Business Park.	Metropolitan Transportation Authority (MTA), State University of New York (SUNY), Public Service Commission (PSC) and New York Independent System Operator (NYISO)
Utilities and Energy Service Companies (ESCOs)	Commercial and residential consumers (load side)

<b>Target Market Barriers</b>	
Total hardware costs and installation costs of energy storage systems are high especially Long Duration Energy Storage Solutions.	Performance (efficiency, charge rates, energy capacity and density) of energy storage systems still need improvement to meet the cost, reliability, and life requirements to support a zero-emissions electric system by 2040.
Technology risks in integrating energy storage devices with the grid at transmission and distribution level, are neither well understood nor fully optimized.	Long Duration Energy Storage Solutions require pilots and demonstrations to verify their operation, their benefits and economic potential.
LDES OEM’s and suppliers need real world grid connected reliability, economic, and performance data to harden their product and solution designs.	LDES testing, pilots, and demonstrations are expensive, and investments are required for timely validation of these solutions.

<b>Initiative Objectives</b>
Help achieve New York State’s long-term renewable and greenhouse gas reduction goals.
Increase the value proposition of energy storage for New York State applications by reducing cost and improving performance.
Grow a vibrant energy storage cluster in New York State.
Demonstrate the value proposition of LDES solutions in providing economic grid flexibility and daily, multi-day, weekly, and seasonal firm capacity/energy balancing services.

## Key Activities + Measurements

<b>Activity:</b>						
Long Duration Energy Storage Solicitation targeting LDES developers, OEMs, suppliers, technology innovators, and product developers to invest in the best technology and product development, pilot, and demonstration projects.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Make awards from LDES Solicitation		*	*			
Output: Number of studies, demonstrations, and product development projects initiated (baseline 32).		42	50	52	53	-
Output: Number of studies, demonstrations, and product development projects completed (baseline =0).		-	-	1	2	5
Output: Number of companies supported (baseline =50)		53	55	-	-	-
Outcome: Number of products commercialized (baseline =0).		-	-	-	-	2
Outcome: Number of test sites for new technologies (baseline =3).		-	4	5	-	-
Outcome: Revenue (\$M) to companies commercializing products (baseline =\$0).		-	-	-	-	\$10
Outcome: Number of replications from demonstration projects (baseline =0).		-	-	-	-	2
Outcome: Percent reduction in hardware balance-of-system cost including power electronics for energy storage systems and installation cost. (baseline... Lead acid system: \$1000/kWh for 4 hr. duration; Lithium-ion system: \$667-\$670/kW) <sup>a</sup>		-	>20%	-	-	-
Outcome: Percent reduction in hardware cost for energy storage devices. (baseline... Lead acid system: \$600-\$650/kWh for 4 hr. duration; Lithium-ion system hardware (excluding battery): \$369-\$380/kW, battery only: \$350-\$500/kWh).		-	>20%	-	-	-
<b>Related Notes:</b>						
a. Baseline metrics identified here can be found in the final Baseline Market Evaluation Metrics for Energy Storage Evaluation completed November 2017 and posted <a href="#">here</a> . The remaining baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2 National Offshore Wind Research & Development Consortium

The National Offshore Wind Research & Development Consortium is a nationwide research and development consortium for the offshore wind industry to address United States-specific technology issues and accelerate cost reductions in the U.S. offshore wind sector. The Consortium Board of Directors and membership include most major offshore wind developers, major offshore wind OEMs, six states, utilities, and significant offshore wind industry participants. The Consortium has been successfully incorporated, staffed, and has become fully operational in facilitation of solicitations and investment in national research and development projects that target levelized cost of electricity (LCOE) reduction as a central focus.

This initiative is providing \$20.5M in funding for Consortium operations and research & development (R&D) investments which is matched by \$20.5M from DOE. The Consortium has also raised >\$7M from membership dues and state R&D Project cost share.

The Consortium Research and Development Roadmap (Roadmap) provides a current guide to the Consortium's research priorities. The Roadmap supports targeted solicitations for offshore wind research and development in the following three areas, called research "pillars":

Pillar 1: Advancing Offshore Wind Plant Technology.

Pillar 2: Develop Innovative Methods for Wind Resource and Site Characterization.

Pillar 3: Develop advanced technology solutions for installation, operations & maintenance (O&M), and supply chain.

The Roadmap includes Consortium, Industry, Innovation ecosystem, DOE and NYSERDA input and to date three annual revisions have been publicly released.

Multi-round competitive solicitations targeting Consortium R&D Committee prioritized challenge areas from the Roadmap have been released annually since 2019. Projects selection and competitive solicitations management has successfully transitioned to the Consortium with support from NYSERDA and DOE. The Consortium's competitive solicitations process aligns with NYSERDA's and DOE's competitive processes and the NYSERDA-Consortium Funding Agreement. NYSERDA and the U.S. DOE assist Consortium staff, and projects are approved by the Consortium Board of Directors and NYSERDA internal approval process. Funding to project recipients is managed and delivered by the Consortium. Project deliverables and payments are milestone-based.

Since 2018, the Consortium has awarded 40 projects totaling over \$28M in NYSERDA CEF, DOE and State partner funding. Project participants include United States private companies, national labs, universities, and coalitions. Project focus areas include, but are not limited to, offshore wind turbine foundation innovations including stationary and floating platforms, wind resource modeling innovations, control and monitoring innovations, and installation and O&M cost reduction research, to name a few, all anchored in a clear focus on LCOE reduction.

The Consortium has successfully and continues to grow membership by attracting key U.S. national and global industry stakeholders as members of the Consortium, including offshore wind developers, turbine OEM's, suppliers, service providers, investors, utilities, and State and public entities.

Consortium initiative activities and investment will continue to drive the Consortium to become a self-sufficient entity, enabling investment in U.S.-specific technology issues that accelerate cost reductions in the United States offshore wind sector well beyond New York State's and DOE's funding. It is expected that all initiative funding, and DOE match funding, will be committed by September 30, 2022, as planned.

### Participants, Barriers, and Objectives

Target Market Participants	
Offshore wind technology innovators and solution providers.	Offshore wind project developers
Large original equipment manufacturers (OEMs) with a focus on offshore wind.	New York Independent Systems Operator (NYISO) and utilities.
Universities and research organizations with known research activities in offshore wind.	US DOE
National Laboratories including National Renewable Energy Laboratory (NREL), SANDIA, and Brookhaven National Labs.	Trade associations including Alliance for Clean Energy New York (ACE NY), New York Offshore Wind Alliance (NYOWA), and the Northeast Clean Energy Council (NECEC).

Target Market Barriers	
Lack of an organized innovation ecosystem for offshore wind power in New York State in 2018. NY State has committed to installing 9,000 MW of offshore wind power by 2035. However, NY did not have an organized pool of companies and innovators with offshore wind technology expertise in 2018. Opportunities existed to develop the innovation talent pool and infrastructure to support offshore wind technology advancement and LCOE reduction.	Incremental Research and Development Investment in Offshore Wind to target United States and New York State specific LCOE challenges is required to realize the full benefits and opportunities that offshore wind enables to meet New York State's Climate Act goals.

Initiative Objectives
New York State is a nation leading offshore wind research and development center and innovation hub.
National Offshore Wind Research & Development Consortium is self-sustaining.
Reduction in the Levelized Cost of Electricity (LCOE) for offshore wind.

## Key Activities + Measurements

<b>Activity:</b>						
2021 Consortium Offshore Wind R&D Solicitation targeting OSW developers, OEMs, suppliers, technology innovators, National Labs, universities, and product developers to invest in the best technology and product development, pilot, and demonstration projects aligned with current prioritized challenges.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Make Awards from third Consortium Solicitation			*			
Output: Number of pilots, demonstrations, and product development projects initiated (baseline =22).		42	45	46	-	-
Output: Number of LDES studies, demonstrations, and product development projects completed (baseline =0).		-	3	6	9	31
Output: Number of companies/entities supported (baseline =18).		20	22	-	-	-
Outcome: Number of products commercialized (baseline =0).		-	-	-	-	3
Outcome: Revenue (\$M) to companies commercializing products (baseline =\$0).		-	-	-	-	\$10
Outcome: Number of replications from demonstration projects (baseline =0).		-	-	-	-	4
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
IR - Renewables Optimization	Energy Storage Technology & Product Development	Solar PV and Energy Storage Evaluation	Impact and Market	PY 2021-2025	2022 Q1	2025 Q2	In Progress
IR - Grid Modernization, IR - Transportation, IR - Renewables Optimization, IR - Building Innovations	Energy Storage Technology & Product Development	Product Development Impact and Market - PY 2016 – 2020	Impact and Market	PY 2016-2020	2021 Q3	2022 Q4	In Progress

# Energy Storage Technology and Product Development

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	217,250,000	-	-	476,798	2,670,042	4,204,872	2,530,856	1,200,000	7,500,000	8,000,000	11,000,000	22,000,000	27,000,000	30,000,000	42,191,144	58,476,288

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	5,645,574	-	19,605	218,693	117,039	198,676	191,561	700,000	1,700,000	1,700,000	800,000	-	-	-	-	-
Research and Technology Studies	33,854,426	-	-	523,156	1,068,257	2,662,901	1,899,454	1,750,000	6,000,000	9,500,000	5,500,000	3,900,000	1,050,658	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>39,500,000</b>	-	<b>19,605</b>	<b>741,849</b>	<b>1,185,296</b>	<b>2,861,577</b>	<b>2,091,015</b>	<b>2,450,000</b>	<b>7,700,000</b>	<b>11,200,000</b>	<b>6,300,000</b>	<b>3,900,000</b>	<b>1,050,658</b>	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Renewables Optimization** Focus Area. See the **Gas Innovation** Focus Area plan for additional information.

# National Offshore Wind Research & Development Consortium

Active

Direct Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	113,586,718	-	-	33,674	218,816	2,455,327	3,178,901	6,000,000	6,000,000	7,000,000	700,000	8,000,000	9,000,000	11,000,000	20,000,000	40,000,000

Indirect Benefits - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	1,808,633	-	-	2,581	242,137	351,542	282,429	535,000	200,000	160,000	34,944	-	-	-	-	-
Research and Technology Studies	8,212,861	-	-	-	498,822	290,036	2,413,971	1,500,000	1,300,000	1,000,000	1,210,033	-	-	-	-	-
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Business Support	12,478,506	-	-	-	1,000,000	429,165	949,669	3,000,000	2,750,000	2,750,000	1,599,672	-	-	-	-	-
<b>Total</b>	<b>22,500,000</b>	-	-	<b>2,581</b>	<b>1,740,959</b>	<b>1,070,743</b>	<b>3,646,068</b>	<b>5,035,000</b>	<b>4,250,000</b>	<b>3,910,000</b>	<b>2,844,649</b>	-	-	-	-	-

# Negative Emissions Technologies Plan

## *Innovation and Research Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary.
- **Carbontech Development** milestone updated to correct pace and timing of awards anticipated.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **CarbonTech Development** was previously filed as a component of the **CleanTech Startup Growth** initiative and has been broken out into a separate initiative to improve clarity for all stakeholders. With the introduction of Focus Areas, a component of this work has been deemed to support (and be funded through) Negative Emissions Technologies, therefore it has been added as an initiative serving the Focus Area.
- **Natural Carbon Solutions** initiative is introduced to explore and amplify innovative solutions for removing carbon emissions from the atmosphere.
- Budget details associated with this CIP revision:
  - **Natural Carbon Solutions** budget established for \$12.5M.

# 1. Focus Area Overview

## Focus Area Description

Negative Emission Technology (NET) describes approaches that remove carbon dioxide emissions from the atmosphere, and includes engineered and nature-based solutions. Examples include carbon storing products, such as for buildings that increase energy efficiency, and potentially achieve net negative emissions with natural or engineered sequestration. Initiatives in this focus area will support investments in a broad range of NET-related topics, including innovation in:

- Energy-efficient building products that sequester carbon, such as bio-based insulation and wood.
- Carbon negative fuel sources for building heating and distributed power generation.
- Rigorous life-cycle assessments to inform policy toward more viable decarbonization pathways.
- Improving health, economics, and resilience for rate-payers, particularly those who live in disadvantaged communities and environmental justice areas.

## Current State of Market

The 2050 Climate Act goal of a net zero economy calls for 85% reduction in gross emissions, enabling negative emissions to offset the remaining 15%. Decarbonizing the energy system cost-effectively while ensuring resilience and environmental health is a significant challenge. A decarbonized energy system for New York State requires a combination of increased electrification as well as efficiency and low-carbon fuels that can be enabled by a combination of negative emissions/carbon sequestration and avoided emissions over the fuel's life cycle.

Certain cases of heating and high-temperature industrial processes will be challenging to fully electrify, therefore, low-carbon, or carbon negative fuels as drop-in replacements for fossil fuel are desirable. This reduces stress on the power grid for heating, can add resilience benefits for distributed power, microgrids, and backup. Near-term solutions that could meet these needs include renewable liquid and gaseous fuels, yet policy support remains uncertain regarding preferred feedstocks, use cases, processing, and monitoring criteria that should be further encouraged.<sup>1</sup> Increasing supply can lower costs, benefit local feedstock suppliers, and provide transitional fuels for future deep decarbonization and other emerging technologies.

Buildings represent a significant source of statewide emissions and energy consumption.<sup>2</sup> Efficiency improvements reduce utility bills, avoid fines,<sup>3</sup> and reduce stress on the power grid. A greater supply of materials to retrofit the existing building stock with low embodied carbon is also needed and desired

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<sup>1</sup> Analysis supplied to the Climate Action Council (Oct 1, 2021 [briefing](#), slide 56) suggests > 230 TBtu by 2030 could play a substantial role in decarbonization, other estimates suggest a greater supply is feasible, sufficient to heat millions of homes

<sup>2</sup> Currently estimated over 40% of state emissions in current inventory estimate (<https://climate.ny.gov/-/media/Project/Climate/Files/2021-11-18-Integration-Analysis-Initial-Results-Presentation.ashx>), in New York City, estimated over 70% of emissions (<https://www1.nyc.gov/site/sustainability/codes/energy-benchmarking.page>)

<sup>3</sup> Local Law 97

by the market. This initiative positions New York State well as the global demand for low carbon products continues to grow.

**Intervention Strategies**

This focus area will target innovation investments that lower barriers to deployment of technologies, attract new technologies to New York State, and de-risk certain technologies that have a lower maturity by leveraging other funding sources to commercialize them in the State.

NYSERDA will continue to actively engage with internal and external stakeholders to identify the factors that limit the development and scaled deployment of existing products and business solutions. Upon development of specific hypotheses in each technology and market segment, specific solicitations are developed, vetted, and issued to the innovation community to catalyze solutions that address these limitations and gaps.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$32.0	-	\$17.6	-	\$17.6	55%

Initiatives that serve multiple focus areas across NYSERDA’s CEF portfolio are listed with asterisk (\*).

Initiatives Active in The Market	Funding (\$M)	Period
Carbontech Development*	\$5.1	2021 -
Natural Carbon Solutions	\$12.5	2022 -
<b>Total Active Funding</b>	<b>\$17.6</b>	

Completed/Inactive Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$17.6</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$47	\$102

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%.

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage.

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

This focus area provides investment and support to researchers and entrepreneurs, lowering barriers to deployment of technologies, attracting new technologies to New York State, and de-risking certain lower-maturity technologies. These investments will support commercialization and demonstration of technologies in New York State. A decarbonized energy system for New York State requires increased electrification, energy efficiency and low-carbon fuels that can be enabled by negative emissions/carbon sequestration and avoided emissions. Conducting these activities on a fuel neutral basis, rather than targeting activities that only reduce electricity, provides greater economic benefit as it considers all opportunities associated with energy use and recognizes the interplay between the different energy systems, and contribution of various energy sources/uses to overall emissions.

Some CEF initiatives are strategically partnered with Regional Greenhouse Gas Initiative (RGGI) funding to maximize the reach and impact of these collective efforts. As it relates to this CEF focus area, NYSERDA also invests RGGI funding that bolsters the following CEF initiative: Natural Carbon Solutions.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1 Carbontech Development

The Carbontech Development Initiative provides the investment and support for researchers and entrepreneurs to commercialize innovations from the lab to the market. This initiative is structured to provide the resources that New York State-based Carbontech researchers and entrepreneurs need to turn technology innovations into viable and financeable companies that have the potential to provide direct climate benefits to the State. This initiative will fund research, technology transfer, and commercialization of Carbontech and NET solutions. This initiative serves both Negative Emission Technology and Technology to Market focus areas.

### Participants, Barriers, and Objectives

Target Market Participants	
Entrepreneurs and early-mid stage companies	Corporate and strategic partners
Venture development organization partners	Customers and solution adopters
Mentors and experts	Academic institutions
Investors	Scientists and researchers
Minority and women owned businesses	

Target Market Barriers
Entrepreneurs and early-stage companies often lack the commercialization and business development expertise necessary to successfully bring carbontech innovations to market.
Many early-stage and growth-stage carbontech companies struggle to secure demonstrations for their solutions.
The commercialization of carbontech solutions requires a pipeline of candidate technologies that have demonstrated proof-of-concept, funding for technology transfer, commercialization support, and activities that engage market actors to further attract funding and resources to carbontech innovators.

Initiative Objectives
Enhance the pool of human capital developing carbontech and negative emission innovations.
Build a robust ecosystem composed of academic, private sector, and public actors committed to accelerating the scale of carbontech products and financing them.
Commercialize carbontech products in New York State.

## Key Activities + Measurements

<b>Activity:</b>						
NYSERDA will launch a grant funding and ecosystem building program focused on carbontech and negative emission technology. These activities will serve researchers and early-stage companies.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: Issue awards from competitive solicitation for program administrator.		*				
Milestone: At least \$2.5M in cost share due from the program administrator.		*				
Milestone: At least \$2.2M in external funding opportunities awarded by the program administrator.			*			
Milestone: At least 10 corporate partners secured as partners of the Carbontech Development initiative.			*			
Milestone: At least \$6.5M in cumulative External Funding Opportunities awarded by the program administrator.					*	
Milestone: At least \$5.5M in cumulative cost share due from program administrator.				*		
Milestone: Entrepreneurial fellowship and grant making programs achieve full financial sustainability.					*	
Output: New awards issued.		-	2	4	6	8
Output: New products created.		-	-	1	2	3
<b>Related Notes:</b>						
<ul style="list-style-type: none"> <li>a. There are currently no Outcomes associated with the activity described here.</li> <li>b. This initiative has evolved from the original market offering called CleanTech Startup Growth into the initiative and plan articulated here. Any baselines originally established for CleanTech Start Up Growth were collective in nature and cannot be disaggregated into the separate initiative(s) described within this Focus Area plan and broken out to improve overall clarity for stakeholders. NYSERDA will assess the collective progress of this and other related initiatives (Catalytic Capital for Climatetech, Climatetech Commercialization Support, Climatetech Expertise &amp; Talent) in the context of those initial baselines in the CEF Annual Report.</li> </ul>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2. Natural Carbon Solutions

The Natural Carbon Solutions Initiative supports demonstrations that have the potential to lead to larger scale-up and follow-on investment in New York State, while de-risking novel approaches and leveraging federal and other funding sources in the process. This initiative leverages solutions from agriculture, forestry, and waste sectors for low-carbon building products, low carbon fuels for heating and distributed power generation.<sup>4</sup> The large retrofit needs for New York State’s building stock represent a significant opportunity to improve energy efficiency while using locally sourced, low-carbon products. The development of a more local, circular, and robust bioeconomy can provide greater resilience, energy security and affordability. Several value streams fall outside CEF scope, such as carbon sequestration not related to buildings and other low-carbon products. These activities will seek support from RGGI funds in a separate but coordinated manner.

### Participants, Barriers and Objectives

Target Market Participants	
Companies creating low carbon fuels and bio-based products.	Federal funding agencies
Startup technology and service companies.	Private investors
Companies interested in lowering supply chain emissions and seeking new sourcing.	Policy makers, regulators, state procurement
Landowners, farmers, waste management companies and municipalities interested in participating in low carbon fuels and building material markets in NYS.	Disadvantaged community groups
Building products companies, architects, building owners, construction companies.	Universities and research organizations

Target Market Barriers	
Lack of widely accepted standards for low-carbon products and fuels in New York State to drive procurement and investment.	Limited scale of technologies and business models in NYS that leverage local feedstocks to supply low-carbon building products to meet State goals for energy efficiency and decarbonization.
Limited scale of technologies and business models in NYS that leverage local feedstocks to supply local needs for low-carbon fuel.	Lack of quantified demonstrations of low-carbon product benefits needed to drive market and policy, such as verified GHG reductions and co-benefits such as health and resilience.

Initiative Objectives
De-risk technologies and business models by sharing in the costs of developing and testing technologies and new products.
Catalyze additional public and private investment necessary to replicate demonstrated technology and grow the market.
Inform policy and standards with demonstrations to identify approaches that warrant incentives and larger follow-on investment.

<sup>4</sup> That can support 2040 grid requirements for a dispatchable emission-free resource, see <https://www.nyiso.com/2040grid> and greater depth here: <https://www.nyiso.com/-/new-climate-change-study-examines-resilience-and-reliability-of-new-york-energy-grid>

## Key Activities + Measurements

<b>Activity:</b>						
NYSERDA will release a rolling solicitation to provide smaller and shorter-term seed level funding to enable NY based teams and demonstrations to pursue federal or venture funds, which can include support for cost-share requirements and planning. This funding is tailored for high-risk and high-reward pursuits in State.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: NYSERDA completes initial stakeholder engagement process to finalize scope of solicitations. <sup>a</sup>			*			
Milestone: NYSERDA releases evergreen solicitation (\$1.65M).			*			
Output: Number of stakeholders engaged (baseline = 0). <sup>a</sup>		-	50	75	100	200
Output: Number of new projects supported (baseline = 0).		-	5	7	10	15
Outcome: Number of projects receiving follow-on funding with at least 5x leverage ratio of NYSERDA funding (baseline = 0).		-	-	2	4	8
<b>Related Notes:</b>						
a. Part of the same stakeholder engagement process used to inform both solicitations.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

<b>Activity:</b>						
NYSERDA will release a multi-round solicitation for an Innovation Challenge targeting demonstrations of technologies and business models that have compelling evidence for impact in New York State, with substantial follow-on investment potential, but have not yet been sufficiently demonstrated. Round 2 may be used to support scale up of existing projects or find and evaluate new projects.						
<b>Milestone or Measure (cumulative)</b>	<b>Target By Year:</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Milestone: NYSERDA completes initial stakeholder engagement process to finalize scope of solicitations. <sup>a</sup>			*			
Milestone: NYSERDA Round 1 Innovation challenge awards (\$4.5M).			*			
Milestone: NYERDA completes midpoint stakeholder engagement process reviewing project portfolio, integrating input for project down-selection and next round of funding.				*		
Milestone: NYSERDA Round 2 awards (\$4.5M).					*	
Output: Number of stakeholders engaged (baseline = 0) <sup>a</sup>		-	50	75	100	200
Output: Number of new projects supported (baseline = 0)		-	15	15	20	-
Outcome: Number of project replications (baseline = 0)		-	-	-	5	10
Outcome: Number of new industrial partners, or co-investors contributing leverage funds to scale up in NYS (baseline = 0).		-	2	5	10	20
Outcome: Number of new technologies or businesses/business models entering the NYS market (baseline = 0).		-	-	1	2	5
<b>Related Notes:</b>						
a. Part of the same stakeholder engagement process used to inform both solicitations.						
b. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 3. Evaluation Studies Related to Focus Area

All schedules are subject to further refinement based on priority and other strategic needs with future updates being provided as appropriate. Interim or phased studies may be used to provide early information ahead of finalized studies. Study start dates reflect a mix of work that is already contracted (e.g., update studies) and work necessitating a mini-bid procurement to competitively select consultant(s) to undertake the work.

Focus Area(s)	Initiative(s)	Study/Activity Name	Type of Study	Study Period	Planned Start Date	Planned End Date	Status
IR – Negative Emissions Technologies, IR – Technology to Market	TBD: Study will include one or more initiatives from this Focus Area	TBD	Market	TBD	TBD	TBD	Upcoming

# Carbontech Development

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	26,154,500

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1,000,100	4,537,600	7,662,600	7,800,000	4,387,500	766,700	-	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	-
Implementation	113,979
Research and Technology Studies	-
Tools, Training and Replication	-
Business Support	5,000,000
<b>Total</b>	<b>5,113,979</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	28,495	28,495	28,494	28,495	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	125,000	1,612,500	1,567,500	1,580,000	-	-	115,000	-	-	-
-	-	-	-	-	125,000	1,640,995	1,595,995	1,608,494	28,495	-	115,000	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Negative Emissions Technologies** Focus Area. See the **Technology to Market** Focus Area plan for additional information.

# Natural Carbon Solutions

Active

Direct Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Energy Efficiency MW	-
Renewable Energy MWh	-
Renewable Energy MW	-
Leveraged Funds	76,120,000

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	6,500,000	9,620,000	10,000,000	10,000,000	15,000,000	25,000,000	-	-

Indirect Benefits - Annual	Total
Energy Efficiency MWh - Electric	-
Energy Efficiency MMBtu - Natural Gas	-
Energy Efficiency MMBtu - Other Fuels	-
Renewable Energy MWh	-
Renewable Energy MW	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Energy Usage - Annual	Total
Direct Energy Usage MWh	-
Direct Energy Usage MMBtu - Natural Gas	-
Direct Energy Usage MMBtu - Other Fuels	-
Indirect Energy Usage MWh	-
Indirect Energy Usage MMBtu - Natural Gas	-
Indirect Energy Usage MMBtu - Other Fuels	-

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Expenditure Budget	Total
Incentives and Services	-
Implementation	1,250,000
Research and Technology Studies	11,150,000
Tools, Training and Replication	100,000
Business Support	-
<b>Total</b>	<b>12,500,000</b>

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	250,000	200,000	200,000	200,000	200,000	200,000	-	-
-	-	-	-	-	-	-	300,000	1,500,000	3,475,000	3,000,000	2,000,000	875,000	-	-
-	-	-	-	-	-	-	12,500	25,000	25,000	25,000	12,500	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	562,500	1,725,000	3,700,000	3,225,000	2,212,500	1,075,000	-	-

# Gas Innovation Plan

## *Innovation and Research Portfolio Focus Area*

### **Focus Area Plan Contents**

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### **Plan Record of Revisions**

#### **November 1, 2022**

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- “Energy Storage Technology and Product Development” initiative was renamed **Long Duration Energy Storage**
- The **Hydrogen Innovation** initiative has been introduced to decarbonize a variety of sectors that are broadly considered as hard to electrify, where electrification may either be more challenging or more expensive. The activities funded under this Focus Area will advance the commercial readiness for applications that support the transition away from natural gas and natural gas infrastructure. These include electrolysis and fuel cell building blocks, hydrogen solution product development and pilots/demonstrations.
- Budget details associated with this CIP revision:
  - **Hydrogen Innovation** budget established for \$20.0M.

#### **September 9, 2022**

- The **Energy Storage Technology and Product Development** initiative has been added to the Gas Innovation Focus Area, providing grid reliability and resilience through inclusion of the Long Duration Energy Storage solicitation that focuses on solutions providing 10 to 100+ hours of storage for multiday grid balancing requirements, seasonal energy shifting, and firm capacity provision for seasonal renewable generation shortfalls to enable the transition away from natural gas infrastructure.

- The **Utility Thermal Network Technical Support** initiative has been introduced to provide utility thermal network technical support services (ongoing technical support) to NYSERDA and the Department of Public Service Staff in carrying out the provisions required by the July 5, 2022 Utility Thermal Energy Network and Jobs Act.
- Budget details associated with this CIP revision:
  - **Energy Storage Technology and Product Development** budget established for \$17.0M.
  - **Utility Thermal Network Technical Support** budget established for \$3.0M

**May 20, 2022**

- Initial filing of NYSERDA's Compiled Investment Plan (CIP) and this Focus Area Plan.

## 1. Focus Area Overview

### Focus Area Description

While the future of gas infrastructure continues to be assessed, NYSERDA is exploring how best to support an optimized future system. As New York assesses the costs and implications of retaining gas infrastructure for use, a variety of technologies may be required to ensure a safe, decarbonized future system and reduce the need for fossil fuel plants to meet periods of peak electric demand. Areas of exploration NYSERDA has considered include leak prone pipes in-situ remediation solutions, demand response in heating and cooling across multiple sectors, carbon capture, long duration storage, decarbonized fuels including hydrogen, and others. At this time, NYSERDA is focusing on long duration storage and hydrogen solutions as detailed below.

### Current State of Market

New York State has one of the oldest gas distribution systems in the United States. Issues include safety, cost, as well as methane emissions. Costs of maintaining the current gas system fall primarily to rate payers as well as communities that are impacted by related pollution.

NYSERDA sees energy storage as one potential solution to mitigate these challenges and improve future operability. Innovation investments to date, and NYSERDA's market development activities have successfully accelerated short-duration energy storage solutions, primarily lithium-ion adoption in New York State. The lithium-ion battery industry, and short-duration energy storage solutions have seen significant cost reduction over the last four years. This initiative has awarded over \$32.2M to 51 projects driving cost reduction, safety improvements, energy density and overall energy storage solution performance.

The first Long Duration Energy Storage solicitation which was administered under the Renewables Optimization Focus Area awarded five projects with over \$49M in project scope. Two of the three demonstrations awarded are 6–10-hour solutions. Moving forward the focus of new competitive solicitations will be on 10+ to 100+ hour LDES solutions prioritizing pilots and demonstrations of technologies not represented in the first LDES solicitation awards. Studies and feasibility projects will not be solicited, and only very late-stage product development will be considered.

Although electrification will help decarbonize many sectors, to achieve the Climate Act goals, hydrogen will be an instrumental solution to decarbonize a variety of sectors that are broadly considered hard to electrify where electrification may either be more challenging or more expensive. These sectors may include medium or heavy-duty vehicles, high temperature industrial manufacturing processes, large buildings currently using steam for district heating, and peaking power generation.

On Jan. 5th, 2022, the Governor announced in the State of the State a commitment to position New York as a clean hydrogen hub. Since then, NYSERDA, together with Empire State Development and the New York Power Authority, has led a multi-state coalition with more than 90 clean hydrogen ecosystem partners to lay groundwork for a proposal for the United States Department of Energy funding opportunity announced in September 2022 with up to \$8 billion in total funding available. The State of

the State also mentioned to release \$27M to support product development, pilots, and demonstrations through competitive solicitations that will assure commercial readiness, safety, cost reduction, and reliability improvements.

In the Climate Action Council Draft Scoping Plan scenario, green hydrogen accounts for 5-11% of final energy demand by 2050 as part of the pathways to decarbonize various sectors. NYSERDA is in the process of commissioning a series of market analyses and studies to assess green hydrogen as a solution in New York, considering technology needs and risks, supply and demand potential, infrastructure, resiliency, costs, environmental justice, and jobs impact. NYSERDA has also convened a series of meetings, listening sessions, and direct discussions with individuals and groups across the stakeholder landscape to better understand diverse perspectives on hydrogen in New York and prioritize investment focus areas.

### **Intervention Strategies**

In New York, NYSERDA continues to assess the best research and development opportunities to support a broad array of outcomes. Initial assessments suggest long duration storage solutions, clean fuels including hydrogen, and carbon capture warrant emphasis to reach the potential needs of the state and support a transition from natural gas.

Long duration storage interventions will make investments primarily through competitive solicitations that focus on technology advancement, supply chain innovations, product development, pilots, and demonstration activities. Investments target technology advancements and product development that reduce costs, improve performance (efficiency, safety, energy density), and stimulate growth of the energy storage industry in New York State. The pilots and demonstrations provide verification of the viability of solutions and identify any barriers to significant adoption. Investment to date have been across three sectors/applications: customer sited (behind-the-meter), transmission and distribution system applications, and transportation system applications. Investment's leverage NYS's unique innovation/testing assets; adapt innovation from other regions and include testing and optimization under typical NYS duty cycles/use cases, and relevant environmental/weather conditions. These investments also encourage commercialization-oriented partnerships.

NYSERDA will focus the next competitive solicitation on late-stage Long Duration Energy Storage (LDES) product development, pilots, and demonstrations by targeting LDES solutions of 10 to 100+ hours. These solutions will target multiday grid balancing requirements, seasonal energy shifting, and will provide firm capacity for extended duration renewable generation shortfalls that can be expected during times of winter and summer peaks. This initiative will reduce the reliance on natural gas and gas infrastructure currently used to provide these services where short duration energy storage alone cannot sufficiently provide these capabilities.

NYSERDA will also establish the Utility Thermal Network Technical Support initiative designed to provide ongoing technical expertise to NYSERDA and the Department of Public Service Staff in carrying out the provisions required by the July 5, 2022, Utility Thermal Energy Network and Jobs Act. The Act

requires the Commission to commence a proceeding within three months of enactment to consider “the appropriate ownership, market and rate structures for thermal energy networks and whether the provision of thermal energy by gas and/or electric utilities is in the public interest”.

Clean hydrogen production and utilization solutions, like long duration energy storage solutions, can provide firm capacity for extended duration renewable generation shortfalls that can be expected during times of winter and summer peaks, reducing the reliance on natural gas and gas infrastructure currently used to provide these services. The Hydrogen Innovation activities funded under this Focus Area will target electrolysis and fuel cell building blocks and hydrogen solution product development and pilots/demonstrations that drive forward commercial readiness for applications that support the transition away from natural gas and natural gas infrastructure.

**Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan’s Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$40.0	-	\$20.0	+ \$20.0	\$40.0	100%

Initiatives Active in The Market	Funding (\$M)	Period
Long Duration Energy Storage	\$17.0	2022 -
Utility Thermal Network Technical Support	\$3.0	2022 -
Hydrogen Innovation	\$20.0	2023 -
<b>Total Active Funding</b>	<b>\$40.0</b>	

Inactive Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$40.0</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$11	\$222

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

Ratepayer-funded programs play an integral role in meeting the deep decarbonization goals set forth in the Climate Act. The fuel-neutral approach employed by these CEF initiatives supports the variety of technologies that may be required to ensure a safe, decarbonized future energy system. Long Duration Energy Storage, Hydrogen Innovation and Utility Thermal Network Technical Support initiatives support the transition away from natural gas and natural gas infrastructure, providing development and demonstration of solutions that can increase reliability and resilience, enabling the transition to a 70% renewable electricity grid in 2030 and a zero emissions grid in 2050.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and their Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1. Long Duration Energy Storage

New York State's pathway to 100% zero-emissions electricity by 2040 drives a need for significant grid-flexibility assets with longer duration capacity capability. The focus of Long Duration Energy Storage (LDES) are solutions of 10 to 100+ hours, including hydrogen solutions to help provide the flexibility and firm capacity required to provide economic, reliable, zero-emissions electricity. LDES solutions require further technology innovations and product development to reach commercialization readiness. Techno-economic analysis and innovation that drive cost reduction will be critical for LDES solution adoption. Current and future solicitations will focus on providing support to drive commercialization of the most promising LDES technologies and solutions. The advancements supported will reduce costs, improve performance, and stimulate growth in the critical LDES industry in New York State.

The Long Duration Energy Storage solicitation activities will provide competitively solicited investment support in innovative and underutilized long duration energy storage solutions, devices, software, controls, and other complimentary technologies that decrease energy storage total hardware and installation costs, improve performance, and demonstrate integration with the grid. LDES solution focus areas include:

1. Electrochemical
  - Electrochemical Energy Storage including Flow Batteries and innovative advanced battery solutions (greater than 6 hours duration).
  - Hydrogen Energy Storage and Flexibility Solutions
2. Mechanical
  - Innovative Pumped Hydro and Compressed Air/Gas Solutions
  - Mechanical/Gravity Energy Storage
  - Geomechanical Energy Storage
3. Thermal
  - Pumped Heat Electrical Energy Storage
  - Thermophotovoltaic (TPV) Storage
  - Innovative liquid or solid storage medium (e.g., water, sand, molten salts, rocks)

The Energy Storage ClimateTech Ready Capital category of the LDES Solicitation focuses on product development, pilots, and demonstrations of LDES technologies and solutions to provide needed cost matching for qualified New York State pilots and demonstrations seeking federal infrastructure funding and funding from other public and private sources.

## Participants, Barriers, and Objectives

Target Market Participants	
Energy storage startup/emerging companies	Energy storage technology developers
Energy storage and renewable developers	Energy storage solution providers
Energy storage original equipment manufacturers, component manufacturers, system integrators, supply chain partners.	Universities, research organizations, government agencies
Brookhaven National Lab (BNL), New York Battery and Energy Storage Technology (NY-BEST) Consortium, Rochester Institute of Technology (RIT) Prototyping Center, Eastman Business Park.	Metropolitan Transportation Authority (MTA), State University of New York (SUNY), Public Service Commission (PSC) and New York Independent System Operator (NYISO)
Utilities and Energy Service Companies (ESCOs)	Commercial and residential consumers (load side)

Target Market Barriers	
Total hardware costs and installation costs of energy storage systems are high, especially LDES solutions.	Performance (efficiency, charge rates, energy capacity and density) of energy storage systems still need improvement to meet the cost, reliability, and life requirements to support a zero-emissions electric system by 2040.
Technology risks in integrating energy storage devices with the grid at transmission and distribution level, are neither well understood nor fully optimized.	LDES solutions require pilots and demonstrations to verify their operation, their benefits and economic potential.
LDES OEM's and suppliers need real world grid connected reliability, economic, and performance data to harden their product and solution designs.	LDES testing, pilots, and demonstrations are expensive, and investments are required for timely validation of these solutions.

Initiative Objectives
Help achieve New York State's long-term renewable and greenhouse gas reduction goals.
Increase the value proposition of energy storage for New York State applications by reducing cost and improving performance.
Grow a vibrant energy storage cluster in New York State.
Demonstrate the value proposition of LDES solutions in providing economic grid flexibility and daily, multi-day, weekly, and seasonal firm capacity/energy balancing services.

## Key Activities + Measurements

<b>Activity:</b>						
Long Duration Energy Storage Solicitation targeting LDES developers, OEMs, suppliers, technology innovators, and product developers to invest in the best product development, pilot, and demonstration projects for LDES solutions of 10 to 100+ hours.						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
Milestone: Issue awards from LDES Solicitation		*	*			
Milestone: Issue demonstration and product development case studies including assessments of solution feasibility						*
Output: Number of studies, demonstrations, and product development projects initiated (baseline =0).		1	2	-	-	-
Output: Number of studies, demonstrations, and product development projects completed (baseline =0).		-	-	-	2	-
Output: Number of companies supported (baseline =0)		1	2	-	-	-
Outcome: Number of products commercialized (baseline =0).		-	-	-	1	-
Outcome: Number of test sites for new technologies (baseline =0).		-	-	3	-	-
Outcome: Revenue (\$M) to companies commercializing products (baseline =\$0).		-	-	-	\$15	-
Outcome: Number of replications from demonstration projects (baseline =0).		-	-	-	2	3
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## 2.2. Utility Thermal Network Technical Support (UTNTS)

The Utility Thermal Network Technical Support initiative is designed to provide ongoing technical support to NYSERDA and the Department of Public Service Staff in carrying out the provisions required by the July 5, 2022 Utility Thermal Energy Network and Jobs Act (Act).<sup>1</sup> The Act requires the Commission to commence a proceeding within three months of enactment to consider “the appropriate ownership, market and rate structures for thermal energy networks and whether the provision of thermal energy by gas and/or electric utilities is in the public interest”. The Act requires “each of the seven largest gas, electric, or combination gas and electric corporations to submit to the Commission for review and approval at least one and as many as five proposed pilot thermal energy network projects, ”with at least one pilot project in each utility territory . . . proposed in a disadvantaged community” as defined by the Climate Leadership and Community Protection Act.<sup>2</sup> The Act requires these pilot projects to be filed for Commission review within three months of the Act’s effective date; it further requires the Commission within six months of the effective date to determine whether such projects should be approved or modified consistent with the public interest.<sup>3</sup> Each utility subject to the pilot project provision is required to “coordinate” its filing with other utility participants, NYSERDA, and consultants with relevant expertise “to ensure that the pilot projects are diverse and designed to inform the commission’s [rulemaking] decisions.” Further, the Commission is required, per PSL §66-t to adopt regulations to promote the construction of thermal energy networks as a means of both affording gas utilities an alternative business model to providing traditional gas service and providing jobs to transitioning utility workers who are at risk of losing their employment.

### Participants, Barriers, and Objectives

Target Market Participants	
Utilities	Ratepayer Advocacy Groups
Consulting Firms with experience in other jurisdictions	Disadvantaged Communities Advocacy Groups
Geothermal Industry Advocacy Groups	Thermal Network Designers, Engineers, and Installers
Labor Unions or organizations with knowledge of training/apprenticeship programs and prevailing wages in the areas subject to the Act	

Target Market Barriers
In field experience with utility scale thermal energy networks and associated regulatory requirements is lacking in New York State.

Initiative Objectives
Provide technical expertise, research, and analytical support in utility-scale thermal energy networks during the immediate pilot planning and implementation phase of the Utility Thermal Energy Network Act.

<sup>1</sup> See Laws of 2022, Chapter 375 (enacted July 5, 2022).

<sup>2</sup> PSL §66-t(2).

<sup>3</sup> Id.

## Key Activities + Measurements

<b>Activity:</b> Procure the services of one or more consulting firms to support the Utility Thermal Network Act, including, but not limited to: <ul style="list-style-type: none"> <li>• Review and analysis of Utility Thermal Network Pilot Projects;</li> <li>• Provide expertise and input on related to the implementation of the Act, including participation in any relevant working groups, as necessary</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
Milestone: Execute contract(s) with consulting firms.		*				
Milestone: Support technical review of Utility Thermal Network Pilot Projects and identify any areas of concerns or further development needed			*			
Milestone: Provide expertise and input on any Working Groups associated with the Utility Thermal Networks Pilot Projects initiated		*	*	*	*	
Output: Utility-Scale Thermal Network Pilots commenced in New York (baseline = 0).		7 - 14	-	-	-	-
<b>Related Notes:</b> a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### 2.3. Hydrogen Innovation

The Hydrogen Innovation initiative was designed to address needed investments in hydrogen that will:

- Complement federal hydrogen innovation funding focusing on New York challenges, industry, and commercialization
- Stimulate growth of the New York hydrogen industry positioning it to compete effectively for, and leverage federal funding
- Assure hydrogen solutions are ready to support realization of 100% zero-emissions electricity by 2040 and a Carbon Neutral economy by 2050
- Provide building blocks supporting solutions to many key hard-to-electrify sectors to meet the Climate Act requirements, The pilots and demonstrations provide verification of the viability of solutions and identify any barriers to significant adoption.

The investments made under the Hydrogen Innovation initiative will be primarily through competitive solicitations to support specific studies, product development, pilots, and demonstrations assuring commercial readiness, safety, cost reduction and reliability of hydrogen solutions and building blocks. The Hydrogen Innovation investment will support innovation in devices, software, controls, and other complimentary technologies that decrease hydrogen solution total hardware and installation costs, improve performance, and demonstrate integration with the renewable energy source.

The solicitation will address areas of the highest strategic importance to New York and with the greatest potential for leveraged investment. The hydrogen innovation focus areas include:

- Research, development and demonstration enabling hydrogen application for high-temperature industrial manufacturing process.
- Clean hydrogen production and integration with renewable energy (such as solar and offshore wind).
- Technologies related control, test or monitor of co pollutant, such as nitrogen oxide (NOx).

### Participants, Barriers, and Objectives

Target Market Participants	
Renewable energy developers.	Electrolysis OEMs & fuel cell OEMs.
High temperature manufacturers.	

Target Market Barriers	
Clean hydrogen is expensive.	Lack of method to utilize renewable energy that would otherwise be curtailed when supply exceeds demand.
Lack of clean fuel solutions to decarbonize hard to electrify sectors such as high temperature industrial manufacturing process	

Initiative Objectives	
Provide funding and support for hydrogen research, development and demonstration for hard-to-electrify sectors (such as high-temperature manufacturing applications) to meet Climate Act requirements.	
Reduce clean hydrogen cost.	
Complement federal hydrogen innovation funding focusing on New York challenges, industry, and commercialization .	

## Key Activities + Measurements

<b>Activity:</b>						
Issue competitive solicitation for research, development and demonstration projects enabling initial clean hydrogen production and solutions for hard to electrify and natural gas replacement solutions, including but not limited to:						
<ul style="list-style-type: none"> <li>• Research, development and demonstration enabling hydrogen application for high-temperature industrial manufacturing process               <ul style="list-style-type: none"> <li>• Clean hydrogen production and integration with renewable energy (such as solar and offshore wind)</li> <li>• Technologies related control, test or monitor of co pollutant, such as nitrogen oxide (NOx).</li> </ul> </li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Milestone: Issue awards from hydrogen solicitation		*	*			
Milestone: Develop system evaluation tools for hydrogen lifecycle cost and impact			*			
Output: counts of projects funded (projects funded by DOE with NYSERDA cost share in parenthesis)		4 (1)	8 (2)	-	-	-
Output: number of companies supported (baseline = 0).		4	8	-	-	-
Output: counts of demonstration projects initiated and completed (baseline = 0).		-	-	-	-	2
Outcome: clean hydrogen cost reduction (%) associated with demonstration and replication projects (baseline = 0%)		-	-	2%	-	5%
Outcome: increase in # of replication of demonstrations ... (baseline = 0)		-	-	1	2	4
Outcome: increase in # of patents filed (counts of patents from projects funded by DOE with NYSERDA cost share) (baseline = 0).		-	1	3 (1)	5 (2)	-
Outcome: Increase in federal funds leveraged (baseline = 0).		\$3M	\$6M	-	-	-
<b>Related Notes:</b>						
a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

### **3. Evaluation Studies Related to Focus Area**

There are currently no studies in progress or planned yet for this Focus Area. This section will be updated as studies are developed.

# Long Duration Energy Storage

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	102,000,000	-	-	-	-	-	-	-	-	850,000	1,950,000	2,450,000	2,000,000	1,060,000	10,000,000	35,000,000	48,690,000

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	300,000	-	-	-	-	-	-	-	-	100,000	100,000	100,000	-	-	-	-	
Research and Technology Studies	16,620,000	-	-	-	-	-	-	-	-	1,700,000	3,900,000	4,900,000	4,000,000	2,120,000	-	-	
Tools, Training and Replication	80,000	-	-	-	-	-	-	-	-	-	-	80,000	-	-	-	-	
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Total</b>	<b>17,000,000</b>	-	-	-	-	-	-	-	-	<b>1,800,000</b>	<b>4,000,000</b>	<b>5,080,000</b>	<b>4,000,000</b>	<b>2,120,000</b>	-	-	

# Utility Thermal Network Technical Support

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	150,000	-	-	-	-	-	-	-	-	50,000	50,000	50,000	-	-	-	-	
Research and Technology Studies	2,850,000	-	-	-	-	-	-	-	-	450,000	1,950,000	450,000	-	-	-	-	
Tools, Training and Replication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Total</b>	<b>3,000,000</b>	-	-	-	-	-	-	-	-	<b>500,000</b>	<b>2,000,000</b>	<b>500,000</b>	-	-	-	-	

# Hydrogen Innovation

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	120,000,000	-	-	-	-	-	-	-	-	1,140,000	1,900,000	3,040,000	3,040,000	19,000,000	22,800,000	26,600,000	42,480,000

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	2,260,000	-	-	-	-	-	-	-	-	732,000	864,000	664,000	-	-	-	-	
Research and Technology Studies	17,630,000	-	-	-	-	-	-	-	-	914,000	2,748,000	5,460,000	3,848,000	4,660,000	-	-	
Tools, Training and Replication	110,000	-	-	-	-	-	-	-	-	-	-	110,000	-	-	-	-	
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Total</b>	<b>20,000,000</b>	-	-	-	-	-	-	-	-	1,646,000	3,612,000	6,234,000	3,848,000	4,660,000	-	-	

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Gas Innovation** Focus Area. See the **Climate Resilience Innovation** Focus Area plan for additional information.

# Climate Resilience Innovation Plan

## *Innovation and Research Portfolio Focus Area*

### Focus Area Plan Contents

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### Plan Record of Revisions

#### November 1, 2022

- As part of the Performance Management & Improvement Process established by DPS, NYSERDA revises the forecast of all CEF initiatives in the November 1 filing annually (the reforecast). Each initiative’s budget and benefit values have been updated to reflect NYSERDA’s best understanding at this time, including actual progress reported for past years alongside adjustments to future year projections where necessary. Significant modifications to initiative plans are described in the details below, where applicable.
- The **Hydrogen Innovation** initiative has been introduced to enable increased penetration of variable renewable generation and to provide resilience solution for grid stability and emergency response. The activities funded under this Focus Area will support specific studies, product development, pilots, and demonstrations for hydrogen storage and microgrid solution, assuring that hydrogen can provide resilience for grid stability or emergency response.
- Budget details associated with this CIP revision:
  - **Hydrogen Innovation** budget established for \$7.0M.

#### May 20, 2022

- Initial filing of NYSERDA’s Compiled Investment Plan (CIP) and this Focus Area Plan.
- **Market Characterization & Design** work supporting the Innovation & Research portfolio relocated to this Focus Area plan from the previously filed “MCDC” Chapter.

## 1. Focus Area Overview

### Focus Area Description

Through the Climate Act, New York State is committed to the most aggressive clean energy and climate agenda in the country. The Climate Act also seeks to transform the State's economy, create new jobs, stimulate industry and innovation, while building more resilient communities to benefit and protect all New Yorkers. In recognition that climate change is already affecting communities—and will continue to do so even as we work to decarbonize—NYSERDA has recently initiated an Authority-wide resilience initiative. This effort focuses on understanding the impacts of climate change on NYSERDA programs and clean energy assets and devising approaches that systematically consider both risk and resilience in program designs, operations, governance, and investments. The growing focus on resilience is reflected also in NYSERDA's recently refreshed mission and vision statements.

In addition to climate impacts, as New York State transitions to meet its clean energy and electrification targets, it is critical that this transition happens in a manner that fosters resilience. The State must hold fast to its decarbonization goals while also considering how to ensure flexible power supplies and redundancies—in the form of backup power and storage—to avoid critical failures, particularly in long-duration power outages. In this focus area, NYSERDA initially explores the utilization of hydrogen for resilience applications.

Other areas of focus that NYSERDA is currently assessing with respect to resilience include:

- Resilient community planning approaches that take into account advanced mobility, access to essential services, and lower-carbon footprint community development
- Microgrids capable of providing resiliency to communities as well as supporting a more resilient electric grid
- Communications and engagement strategies to educate and coordinate on the benefits of clean and resilient communities
- Interventions in the finance and insurance sectors to support investment in clean resilient investments

### Current State of Market

Energy systems, infrastructure, and associated services have not adequately factored in the consequences of climate change. Climate events including extreme weather are increasing in frequency and severity, resulting in financial and non-financial costs and harm, which includes damaged assets and infrastructure, lost business and operations, broader economic costs, as well as risks to health and safety. There is strong evidence that investing early in measures to anticipate and prepare for extreme events saves money over paying full recovery costs. However, it is not standard practice to proactively strengthen resilience in current construction projects, and market dynamics and pricing signals do not typically drive resilience best practice adoption. More work is needed to measure and value the benefits that upfront investment can provide to the State's success in providing a safe affordable resilient energy system.

Although electrification will help decarbonize many sectors, to achieve the Climate Act goal, NYSERDA considers hydrogen to be an instrumental solution to provide resiliency solutions in an increasingly electrified energy system.

In the Climate Action Council Draft Scoping Plan scenario, green hydrogen accounts for 5-11% of final energy demand by 2050 as part of the pathways to decarbonize various sectors. NYSERDA is in the process of commissioning a series of market analyses and studies to assess green hydrogen as a solution in New York, considering technology needs and risks, supply and demand potential, infrastructure, resiliency, costs, environmental justice, and jobs impact. NYSERDA has also convened a series of meetings, listening sessions, and direct discussions with individuals and groups across the stakeholder landscape to better understand diverse perspectives on hydrogen in New York and prioritize investment focus areas.

### **Intervention Strategies**

Under the Climate Act, New York is committed to 100% zero-emission electricity by 2040. Hydrogen will be instrumental to provide a resiliency solution in a highly electrified energy system.

Mass electrification will increase the need for a multi-fuel resilience mitigation option during extended renewable generation shortfalls or grid outages. Green hydrogen - hydrogen produced with renewable energy – can be transported, stored, and then used for other sectors such as industrial manufacturing process, peaking power, microgrid, fuel cell electric vehicles, etc. As such, hydrogen can enable increased penetration of variable renewable generation and be a valuable option to provide resilience solution for grid stability and emergency response. The Hydrogen Innovation activities funded under this focus area will focus on feasibility study, product development and demonstration for hydrogen storage and microgrid solution, assuring that hydrogen can provide resilience for grid stability or emergency response.

On Jan. 5th, 2022, the Governor announced in the State of the State a commitment to position New York as a clean hydrogen hub. Since then, NYSERDA, together with Empire State Development and the New York Power Authority, has led a multi-state coalition with more than 90 clean hydrogen ecosystem partners to lay groundwork for a proposal for the United States Department of Energy funding opportunity announced in September 2022 with up to \$8 billion in total funding available. The State of the State also mentioned to release \$27M to support product development, pilots, and demonstrations through competitive solicitations that will assure commercial readiness, safety, cost reduction, and reliability improvements.

This Focus Area will also continue to support the planning and execution of pre-investment strategy work for the entire Innovation & Research portfolio as reflected in the Market Characterization & Design initiative funded within.

### **Focus Area Funding and Benefits Summary**

Additional detail including a yearly breakdown of plans can be found in this plan's Appendix.

Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Funding Previously Planned (\$M)	Change in Funding Associated with this CIP (\$M)	Total Planned Funding (\$M)	Percentage of Total Focus Area Budget Planned
\$20.0	-	\$1.8	+ \$7.0	\$8.8	44%

Initiatives that serve multiple Focus Areas across NYSERDA's CEF portfolio are listed with a sterisk (\*).

Initiatives Active in The Market	Funding (\$M)	Period
Hydrogen Innovation*	\$7.0	2023 -
<i>Market Characterization &amp; Design</i>	<i>\$1.8</i>	<i>2018 -</i>
<b>Total Active Funding</b>	<b>\$8.8</b>	

Inactive Initiatives (where applicable)	Funding (\$M)	Period
n/a	-	
<b>Total Inactive Funding</b>	<b>-</b>	
<b>Total Focus Area Funding</b>	<b>\$8.8</b>	

Benefit Metric <sup>1</sup>	Contribution to 2025 Target (M)	Contribution to 2030 Target (M)
Cumulative Annual Site Energy Efficiency (EE) Acquired <sup>2</sup> (MMBtu)	n/a	n/a
Cumulative Annual Electricity EE Savings (MWh)	n/a	n/a
Cumulative Annual Natural Gas EE Savings (MMBtu)	n/a	n/a
Cumulative Annual Other Fuels EE Savings (MMBtu)	n/a	n/a
Renewable Energy (RE) Distributed Solar Capacity (MW)	n/a	n/a
Mobilized Clean Energy Investment (Leveraged Funds)	\$2	\$43

<sup>1</sup> Benefits are the sum of direct plans and indirect plans that are discounted 50%

<sup>2</sup> Equivalent Annual MMBtu, net of all savings and usage

## 2. Initiatives Serving the Focus Area

### Additional Information for Initiatives

Through this focus area, NYSERDA will invest in studies, product development, pilots and demonstrations supporting use of hydrogen for grid stability/resilience and in meeting climate-related emergency energy demands. Hydrogen will be instrumental to attaining a resilient energy system as New York works to meet the 100% zero-emission electricity goal codified in the Climate Act. Conducting these activities on a fuel neutral basis, rather than solely targeting activities that reduce electricity use or add traditional renewable electricity generation, lowers the risk of a highly electrified energy system and provides greater economic benefit to New Yorkers.

Section III of the Compiled Investment Plan is dedicated to NYSERDA's **Performance Management, Analyses & Evaluation Plans**. Information includes cross-cutting activities & analyses as well as verified gross savings specifications. All of NYSERDA's Evaluation Plans and Reports are posted on the New York State Department of Public Service's Document Matter Master under [Matter Number 16-02180](#).

Section IV of these Compiled Investment Plans contains additional detail regarding **Budgets and Benefits** metrics associated with NYSERDA's entire portfolio of initiatives.

Archives of previous CEF plan filings (Chapters and Compiled Investment Plans), including those of completed or inactive initiatives, can be found on [NYSERDA's website](#).

## 2.1. Hydrogen Innovation

The Hydrogen Innovation initiative makes investments primarily through competitive solicitations to support specific studies, product development, pilots, and demonstrations assuring that hydrogen can provide resilience solution to support grid stability and provide emergency solutions under various climate conditions. Investments will address areas with highest strategic importance to New York and with the greatest potential for leveraged investment.

The Hydrogen Innovation activities funded under this focus area will include:

- Hydrogen storage technology such as salt caverns, underwater, limited footprint at urban locations.
- Demonstrations of hydrogen-based systems to provide black start provision, electricity and heat supply to microgrids and grid firming.

### Participants, Barriers, and Objectives

Target Market Participants	
Renewable energy developers.	Electrolysis OEMs & Fuel cell OEMs.
Utilities/NYISO.	Power Generation OEMs.

Target Market Barriers	
Batteries alone have difficulty providing multi-day carbon-free dispatchable energy for grid stability	Lack of resilience in highly electrified energy system
Solutions to use curtailed renewable energy	

Initiative Objectives	
Provide funding and support for resiliency related hydrogen storage.	
Support grid stability with carbon-free dispatchable energy through hydrogen technology.	

## Key Activities + Measurements

<p><b>Activity:</b> Issue competitive solicitation for R&amp;D projects using hydrogen technologies to provide resilience solutions for grid stability and emergency responses, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Hydrogen storage technology such as salt caverns, underwater, limited footprint at urban locations.</li> <li>• Demonstrations of hydrogen-based systems to provide black start provision, electricity and heat supply to microgrids and grid firming.</li> <li>•</li> </ul>						
<b>Milestone or Measure (cumulative)</b>	<b>Target by Year:</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Milestone: Issue awards from hydrogen solicitation for R&D projects on hydrogen resiliency solutions		*				
Output: counts of all resiliency related projects funded (baseline = 0)		-	3	-	-	-
Output: number of companies supported (baseline = 0)		-	2	3	-	-
Output: counts of resiliency related demonstration projects initiated and completed (baseline = 0)		-	-	-	-	1
Outcome: increase in # of replication of resiliency related demonstrations (baseline = 0).		-	-	-	1	2
Outcome: increase in # of resiliency related patents filed (baseline = 0).		-	-	-	1	-
<p><b>Related Notes:</b></p> <p>a. Baseline values for outputs and outcomes presented in this table are not derived from evaluation studies.</p>						

## Initiative Budget and Benefits

The Appendix of this Focus Area plan contains a detailed breakdown of all Budgets and Benefits.

## **2.2. Market Characterization and Design (Innovation and Research Portfolio)**

The Market Characterization & Design initiative (and its Market Development counterpart found in the Codes and Standards focus area plan) is uniquely defined when compared to all other initiatives documented in the Compiled Investment Plans. Broad categories of work required to initiate and accelerate interventions under the CEF are identified under this framework and refined to support Innovation & Research portfolio interests and strategies, operating across sectors with the goal of having broad applicability and value to other clean energy activities in New York. The work completed under this initiative is intended to fund the pre-investment activities that form the basis for new Innovation initiatives in the CEF.

### **Innovation Portfolio Strategy Development**

NYSERDA is tasked with developing the needed funding mechanisms, support programs and policy recommendations to achieve the legislative mandates of New York's Climate Act, including the decarbonization of the State's economy by 2050.

In order to develop and invest in initiatives that address these mandates, the Innovation team needs a comprehensive understanding of the state of our present portfolio, an analysis of the technology and commercialization gaps that must be closed in order to achieve the state's decarbonization goals, and ultimately a detailed characterization of the kinds of initiatives that will be required to close those gaps and related in-state economic development and jobs opportunities.

### **Innovation Roadmap**

In addition to other research activities, Innovation will seek proposals from contractors to develop a Climate Innovation Strategy that answers key strategic questions. This strategy development study will be executed through 2023.

This effort focuses on understanding the impacts of climate change on NYSERDA programs and assets and devising approaches that systematically consider both risk and resilience in program designs, operations, governance, and investments. The growing focus on resilience is reflected also in NYSERDA's recently refreshed mission and vision statements.

### **Potential Intervention Strategies**

Prospective future initiatives in Climate Resilience include the following:

- Green Hydrogen - hydrogen produced with renewable energy—is an important potential pathway to a resilient and decarbonized future. Hydrogen can serve as a transportable, long-duration energy storage medium for hard-to-electrify sectors of the economy. It can also provide baseload, onsite fuel for back-up power, microgrids, emergency energy needs, and other applications. Further research and analysis will help to understand its applicability, how it can be integrated in an equitable and cost-effective manner.

- **Environmental Health** - As changes in the climate continue to affect the health of the environment for people and flora and fauna, the health of the overall environment is a key aspect of ensuring resilience in the face of climate change. One area where this concern is most urgent may be poor air quality in disadvantaged communities. Investments to understand and mitigate the influence of climate change on fine particulate matter and other air pollutants will be evaluated. Many investments in the Innovation and Research portfolio are expected to have co-benefits in reducing air pollution and improving health outcomes for disadvantaged communities.
- **Electric Grid Health** - In addition to climate impacts, as New York State transitions to meet its clean energy and electrification targets, it is critical that this transition happens in a manner that fosters resilience. The State must hold fast to its decarbonization goals while also considering how to ensure flexible power supplies and redundancies—in the form of backup power and storage—to avoid critical failures, particularly in long-duration power outages.

### **Initiative Budget and Benefits**

Refer to Budgets and Benefits Summary Table 3 in Section IV of these Compiled Investment Plans for a yearly breakdown of funding.

### **3. Evaluation Studies Related to Focus Area**

There are currently no studies in progress or planned yet for this Focus Area. This section will be updated as studies are developed.

# Hydrogen Innovation

Active

Direct Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leveraged Funds	43,000,000	-	-	-	-	-	-	-	-	390,000	650,000	1,040,000	1,040,000	6,500,000	7,800,000	9,100,000	16,480,000

  

Indirect Benefits - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh - Electric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Energy Usage - Annual		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu - Other Fuels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

  

Expenditure Budget		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implementation	769,600	-	-	-	-	-	-	-	-	390,000	234,000	145,600	-	-	-	-	-
Research and Technology Studies	6,170,400	-	-	-	-	-	-	-	-	100,000	1,405,000	1,963,000	1,930,000	772,400	-	-	-
Tools, Training and Replication	60,000	-	-	-	-	-	-	-	-	-	-	60,000	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>7,000,000</b>	-	-	-	-	-	-	-	-	<b>490,000</b>	<b>1,639,000</b>	<b>2,168,600</b>	<b>1,930,000</b>	<b>772,400</b>	-	-	-

Note: This initiative serves multiple Focus Areas. The funding and benefits shown in these tables reflects only the **Climate Resilience Innovation** Focus Area. See the **Gas Innovation** Focus Area plan for additional information.

# Clean Energy Fund

## Compiled Investment Plans

### Section III

#### Performance Management, Analyses & Evaluation Plan

##### Contents

Crosscutting Activities and Analyses  
Verified Gross Savings Specifications

##### Funding

\$112M

90% of authorized CEF  
Evaluation funding  
programmed  
as of this filing.

## Plan Record of Revisions

### November 1, 2022

- Revisions to Section 1.0 *Crosscutting Activities and Analyses* include:
  - Updated timeline for various studies:
    - Statewide building and industrial sector potential studies (from June 1, 2022 to December 30, 2022 and June 1, 2023, respectively)
    - Innovation and Research macroeconomic analysis (from mid-2022 to late 2022)
  - Updated Crosscutting Analyses and Activities Studies section and associated Table 1 to align with focus area descriptions, table headings and status of studies
- Revisions to Section 2.0 *Verified Gross Savings Specifications* include:
  - Updated filing date to November 1, 2022
  - Updated VGS specification forms in alignment with VGS Guidance and focus area(s); updated forms to reflect recently-completed studies
  - Added VGS specification forms for Electric Vehicles – Charging and Engagement and Innovative Market Strategies. Re-entered VGS specs recently omitted for predecessor Transition initiatives (Agriculture, Combined Heat and Power, Commercial, Multifamily New Construction, Small Wind and Solar Thermal) into the Section for consistency across the Market Development portfolio.
- Budget details associated with this CIP revision:
  - For the entirety of the CEF Evaluation budget (i.e., studies described in Section 4 and studies undertaken in support of individual CEF initiatives) the total was revised from \$85.4M to \$112.2M (+26.8M)
    - Funding for evaluation was adjusted positively (+32.7M) and negatively (-6.0M) on a case-by-case basis in response to data to-date (refinements based on estimated versus actual costs to conduct evaluation). This assessment took into account numerous considerations, including evaluation experience and cost to-date, COVID-related impacts on data collection and study approaches, and reassessing individual study budgets for studies underway and planned.
    - The most significant changes made to budgets were related to funding supporting out-year building stock study budgets (+10.2M); ad hoc, unanticipated study/support requests (+\$3.5M); and added funding for new, anticipated evaluation studies (+13.2M)

## 1.0 Crosscutting Activities and Analyses

Crosscutting activities and analyses are studies, research and other analysis activities that span multiple focus areas or initiatives. These efforts provide the New York State Energy Research and Development Authority (NYSERDA) with the analytical information necessary to understand target markets; identify barriers and opportunities; assess cost data; measure the prevalence of equipment and its potential; and evaluate other key metrics to support the adoption of clean energy equipment and services.

This work is designed to be available and useful to all those advancing the objectives of the Clean Energy Fund (CEF), including but not limited to utilities, customers, service providers, and project developers seeking to develop new business opportunities in emerging markets. This work will provide ongoing information to market participants as the regulatory environment and markets for clean energy services evolve. Importantly, this work will support goals relating to the Climate Leadership and Community

Protection Act (Climate Act) by (1) addressing and mitigating the effects of climate change, particularly in disadvantaged communities, (2) transitioning the State’s energy reliance to clean energy resources, and (3) supporting a clean energy economy. Wherever possible, any efforts undertaken will seek to address and align with Climate Act needs.

Similar to how the majority of NYSERDA’s evaluation activities are undertaken, NYSERDA will leverage its competitively-selected pools of qualified consultants to procure and perform the assessments and research outlined in this section. Work will be assigned for these activities using industry-standard approaches and tools (including, but not limited to, longitudinal surveys, analysis of secondary data and technology assessments) to conduct analyses cost-effectively and in a timely manner.

Crosscutting activities and analyses undertaken and described in this section include the following<sup>1</sup>:

- Section 1.1: Market fundamentals and associated efforts, including sector building and facility stock studies, energy efficiency and electrification potential studies, and macro-level analyses
- Section 1.2: Supporting resources, including utility data and information dissemination

A high-level listing of studies supported through these efforts is presented in Section 1.3.

## **1.1 Market Fundamentals and Associated Efforts**

To facilitate its work, NYSERDA relies on energy use data from various areas of the market to accelerate the deployment of effective clean energy solutions. This data is imperative to understanding current market activity and future changes related to clean energy interventions.

To compliment initiative-specific evaluation needs in alignment with Focus Areas, higher-level market characterization research efforts are necessary to optimize NYSERDA’s strategy in the market on an ongoing basis and to measure overall market progress across strategies. This layered approach including investment-specific and high-level market data is an important foundational element to measure market change and validate program effectiveness.

This section provides a high-level description of those higher-level market research activities.

Note that to the extent possible, NYSERDA will optimize its data gathering efforts (e.g., using the same data sets and primary data collection tools, etc., as appropriate) to meet needs across the areas described below; the results of this work will allow NYSERDA to improve its impact and innovation in deploying clean energy projects and strategies.

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<sup>1</sup> For NYSERDA’s budget planning purposes, some activities described in this section relate to crosscutting activities and analyses that support the technical analysis of equipment and systems. While otherwise falling under the umbrellas of “Market Fundamentals” or “Supporting Resources” and described within this section, NYSERDA has categorized these efforts in the Budget and Benefits table as Impact Evaluation. In addition, funding from this Focus Area plan also supports Analysis in Support of the NYS Clean Energy Transition and Data Sets as described within the Market Development – Market Characterization and Design Focus Area Plan.

### **1.1.1 Sector Building and Facility Stock Studies**

Statewide sector building and facility stock studies will be undertaken on existing and new construction buildings and industrial facilities across a broad range of customer segments and energy measures. The overall objective of these efforts is to understand the current condition of the building and facility stock (residential, multifamily, commercial, and industrial) and associated energy use, including the saturations of energy-consuming equipment (electric, natural gas, and other fuels). In addition, penetration of energy efficient and building electrification equipment, building characteristics and energy management practices will also be collected. The studies will also collect demographic and firmographic information along with behavioral and operational information, which will be correlated with the energy usage features.

The information gathered from building and facility stock studies is necessary to support initiative design and evaluation, including a critical outcome in understanding market transformation. Based on the data collected through these building and facility stock studies, NYSERDA will be better equipped to design interventions that strategically target high-opportunity segments, measures, or behaviors within different NYS building and facility markets. Further, these studies will provide valuable data to compare to other sources in order to assess estimates of the indirect, market transformative effects of NYSERDA and other interventions in the market in terms of key indicators (e.g., market penetration of high efficiency HVAC or other measures). Lastly, in addition to measuring market transformation effects, the publicized results from these building and facility stock studies will also inform the private market to better understand clean energy investment opportunities (see Information Dissemination section for more details).

A number of variables will be collected through these studies and will vary by sector. For example, data collection may address lighting, HVAC, plug load, and building shell; to assess operations and behavior, data may be collected on equipment hours or use, replacement and maintenance practices, and awareness of energy efficiency and electrification technologies and practices. Other variables collected through these studies include key characteristics on buildings and equipment including, fuel type, vintage, equipment type, nameplate data, and measure counts. Primary data collection to assess these variables will include telephone and web-based surveys coupled with onsite visits. Secondary data of public or purchased data sets (such as sales data from Heating, Air conditioning and Refrigeration Distributors International – HARDI) will also be leveraged to assess penetration of energy-using equipment.

From a longitudinal perspective, the comprehensive picture of the construction markets at different points in time can be used to understand trends within a construction market. These studies will be conducted on a regular basis. Baseline studies have been completed for the commercial and residential sectors, with a subsequent residential update completed in 2019; baseline assessments in the multifamily and industrial sectors are underway now and a second update for residential is in development. See section 1.3 for details on these efforts.

### **1.1.2. Energy Efficiency and Electrification Potential Studies**

Sector building and facility stock studies will directly support NYSERDA’s statewide energy efficiency and electrification potential studies, which will be developed for each of the construction markets to

estimate technical, economic, and achievable energy efficiency and electrification opportunities in NYS over the next three, five, and 10 years. Tools and approaches used to estimate potential will be developed using both bottom-up (measure-level) data from building stock studies and top-down (end-use or sector-level) data from secondary or other sources (e.g., technology cost forecasts). The potential studies will (1) include consideration of the influence of code changes, (2) assist with the identification of energy-related opportunities, and (3) inform intervention targets and the development of strategic initiatives that best align with New York State's clean energy agenda.

In its January 16, 2020 Order, the New York State Public Service Commission (PSC) directed NYSERDA, in consultation with NYS Department of Public Service (DPS) staff, the utilities, and the Long Island Power Authority, to conduct a Statewide Energy Efficiency and Electrification Potential Study<sup>2</sup>. This analysis is being pursued as two studies to engage distinct subject matter expertise: a Potential Study for the NYS Buildings Sector to be published in December 2022 and a Potential Study for the NYS Industrial Sector to be published in June 2023. These studies will address the fuel types of electricity, natural gas, oil and propane, and multiple building sectors including small residential, multifamily, and commercial and industrial. As noted previously, data gathered as part of sector building and facility stock studies will be incorporated into this statewide potential study as available.

Following publication of the Statewide Energy Efficiency and Electrification Potential Studies, NYSERDA will employ a strategy for keeping the comprehensive statewide energy efficiency and electrification potential study analysis up to date in the interim years between major primary data collection efforts.

### **1.1.3 Macro-Level Analyses**

NYSERDA continues to explore the viability and utility of conducting top-down analysis, including potentially basic approaches to more sophisticated econometric, macro-consumption studies, to provide a more complete understanding of overall end-use and energy-reduction outcomes, including those associated with all clean energy strategies in the State. Macro-level analysis is useful to corroborate, and correlate observed building and equipment changes with actual changes in energy use, controlling for factors such as energy prices, overall economic health, weather, and business cycles.

NYSERDA is also exploring the potential use and development of energy intensity indicators. Energy intensity is measured by the quantity of energy required per unit output or activity and may include energy use per unit of Gross State Product or energy use per square foot of building space in the residential sector, for example. Energy intensity indicators can be used to consistently track changes in energy intensity over time for the State as a whole as well as for specific end-use sectors. Energy intensity indicators have been gathered for the residential and commercial sectors through the statewide building

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<sup>2</sup> Case 18-M-0084. Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025. Issued and Effective January 16, 2020. On May 27, 2022, DPS granted an extension for the completion of these studies. The Statewide Energy Efficiency and Electrification Potential study for the NYS Buildings sector will be complete by December 30, 2022, and the Energy Efficiency and Electrification Potential Study for the NYS Industrial Sector will be complete by June 1, 2023.

stock studies. Energy intensity for the multifamily and selected industrial subsectors will be gathered in 2022 and 2023 as part of the statewide building and facility stock studies.

In addition, NYSERDA is undertaking a macroeconomic analysis to quantify impacts related to its Innovation and Research (I&R) portfolio using a multi-variable modeling tool. An outcome will be to better understand the economic impacts of I&R investments. This analysis is currently underway with an assessment of progress anticipated in late 2022 with periodic updates anticipated in future years, as appropriate.

## **1.2. Supporting Resources**

### **1.2.1 Utility Data**

Many of the crosscutting activities and analyses described in this section will require access to utility customer and system data. In its January 17, 2019 Order, the PSC defined a process in which requests for utility customer data to support NYSERDA's evaluation, measurement, and analysis of clean energy programs would be undertaken.<sup>3</sup> To establish this process, the Commission directed NYSERDA and the Joint Utilities (JUs) to develop and execute a Memorandum of Understanding (MOU) that governs the transfer and maintenance of both participant and non-participant data to NYSERDA and its contractors. This MOU was finalized and executed in October 2019. Data that can be obtained through the terms of the MOU to support these studies includes anonymized, customer-level energy usage data as well as customer-specific usage data with customer consent.

### **1.2.2 Information Dissemination**

As studies are completed, NYSERDA will share the data and information gained through this work with the public on its website, in the Department of Public Service's Document and Matter Management (DMM) system,<sup>4</sup> on Open NY and within its upcoming filings, as appropriate. NYSERDA will also take a proactive role in disseminating information from these activities by engaging in a more robust feedback loop within NYSERDA, while also publicizing findings through press releases, social media posts, and presentations to the public, such as industry conferences. NYSERDA will also continue to seek out other ways to ensure the JU and other key stakeholders have access to, and can benefit from, this information through venues including, but not limited to the upcoming Performance Management and Improvement Process led by DPS.

## **1.3. Crosscutting Analyses and Activities Studies**

This section provides a listing of the studies completed and underway emanating from the efforts described in this plan. Where applicable, links to completed studies are provided. As studies are completed, this listing will be updated with links to final reports. Note some studies included in the

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<sup>3</sup> Cases 14-M-0094, 10-M-0457 and 05-M-0090. Order Regarding New York State Energy Research and Development Authority Data Access and Legacy Reporting. Issued and Effective January 17, 2019.

<sup>4</sup> Final CEF evaluation plans and studies will be posted to DMM under Matter #16-02180.

listing are also featured in Focus Area plans to provide a wholesale presentation of activities in that Focus Area (e.g., sector building and facility stock studies)

**Table 1. Crosscutting Evaluation Studies and Status**

Focus Area(s)	Study/Activity Name	Status
MD - Clean Heating and Cooling	Cold Climate Air Source Heat Pump Study	Complete (2022). Final study posted <a href="#">here</a> with NYSERDA-specific results posted <a href="#">here</a> .
MD - Commercial/Industrial/Agriculture	[Commercial] Market Assessments for Commercial: HVAC; EMS/BMS; Energy Service Market; Customer Decisions	Complete (2016). Final market assessments posted <a href="#">here</a> .
	[Commercial] Commercial Building Stock Study	Complete (2016). Final study posted <a href="#">here</a> .
	[Industrial] Statewide Industrial Facility Stock Study	Study underway; phase 1 anticipated to be completed Q4 2022; phase 2 anticipated to be complete Q2 2023.
	[Industrial] Statewide Energy Efficiency and Electrification Potential Study for the NYS Industrial Sector	In progress; study is anticipated to be complete Q2 2023
MD - LMI	Inventory of LMI homes previously served and assessment of unmet needs of market	Complete (2017). Final study posted <a href="#">here</a> . <sup>1</sup>
	LMI Key Housing/Energy Assessments	Complete (2017). Final study posted <a href="#">here</a> . <sup>1</sup>
	Disadvantaged Community Benefits Framework	Study underway; anticipated completion Q4 2022.
	Low-Income Bill and Usage Study	Study scope in contracting; work to begin Q4 2022.
MD - Multifamily Residential	Statewide Multifamily Building Stock Study	Study underway; study anticipated to be complete Q1 2023.
MD - Codes and Standards & Other Multisector Initiatives	[Product & Appliance Standards] Home Energy Management Systems Market Assessment	Complete (2016). Final study posted <a href="#">here</a> .
	Air Source Ductless Mini-Split Market Assessment	Complete (2016). Final study posted <a href="#">here</a> . <sup>2</sup>
MD - Single Family Residential	Statewide Residential Building Stock Baseline Study.	Complete (2015). Final study posted <a href="#">here</a> .
	Net Zero Energy Homes Market Assessment	Complete (2017). Final study posted <a href="#">here</a> .
	HVAC Market Assessment	Complete (2019). Final study posted <a href="#">here</a> .
	Statewide Residential Building Stock Study	Complete (2019). Final study posted <a href="#">here</a> .
	Statewide Residential Potential Study	Complete (2019). Final study posted <a href="#">here</a> .
MD & IR - Renewables DER/Renewables Optimization/NY-SUN	Statewide Residential Building Stock Update Study	Study scope in development.
	PV Balance of System Cost Study	Complete (2017). Final study posted <a href="#">here</a> .
MD - Transportation	Solar and Storage market and impact assessment, including balance of system cost update	In progress; study anticipated to be complete 2024.
	Transportation Market Assessment	Complete (2017). Final study posted <a href="#">here</a> . <sup>3</sup>
	Energy Efficiency Soft Cost Study	Complete (2020). Final study posted <a href="#">here</a> .

Focus Area(s)	Study/Activity Name	Status
Overarching Market Development	Energy Efficiency and Building Electrification Soft Cost Study Update	Complete (2022). Final study link forthcoming.
	Statewide Energy Efficiency and Electrification Potential Study for the NYS Buildings Sector	In progress; study is anticipated to be complete Q4 2022.
Overarching Innovation and Research	Impact Study on NYSERDA Technology Demonstration Projects	Complete (2017). Final study posted <a href="#">here</a> .
	Impact Study on NYSERDA Technology Demonstration Projects – Update Study	Complete (2020). Final study posted <a href="#">here</a> .
	Impact Study on NYSERDA Product Development Projects	In progress; study anticipated to be complete Q4 2022.
<p>Related Notes</p> <ol style="list-style-type: none"> <li>1. Additional volumes of this study, including the Executive Summary, Special Topic Reports, Methodology Reports, Acronyms and Glossary can be found <a href="#">here</a> under the Low- To Moderate-Income Market Characterization Study heading</li> <li>2. Additional volumes of this study, including the appendices related to HARDI data can be found <a href="#">here</a> under the Ductless Mini-Split Heat Pump (DMSHP) Market Characterization Study heading.</li> <li>3. Additional volumes of this study, including the Executive Summary, Electric Vehicles and Transportation Demand Management Market Characterization and Baseline Assessments and report appendices can be found <a href="#">here</a> under the Clean Transportation Market Characterization Study heading.</li> </ol>		

Note that as part of the CEF, and as described generally in this section and other Focus Areas, NYSERDA supports the NY-SUN and NY Green Bank (NYGB) portfolios as well. NYSERDA is undertaking studies to support these portfolios, including a broad solar and storage market/impact study, which encompasses NY-SUN and a market evaluation supporting NYGB. The solar and storage study is anticipated to be complete Q4 2024 and the NYGB study Q1 2023.

## 2.0 Verified Gross Savings Specifications

### 2.1 Overview

As described in its Gross Savings Verification Guidance, the New York State (NYS) Department of Public Service (DPS) issued its expectations to “New York electric and gas utilities and NYSERDA on the verification of gross savings for reporting performance on energy efficiency programs” to reconcile variation in how impact evaluation results were reported across NYS program administrators.<sup>1</sup> Specifically, the guidance calls for the utilities and NYSERDA to develop Verified Gross Savings (VGS) specifications for each initiative which includes a brief description of the initiative, a description of the initiative’s planned gross savings methodology, most recent realization rate(s) with timeframes and source details to apply the realization rate(s), planned verified gross savings approach, including the timeframe covered by the evaluation, and the anticipated timeline for final analyses.

As required by this guidance, this section outlines NYSERDA’s VGS plans as of November 1, 2022, for CEF Market Development programs; future reports will update these specifications as applicable. Note VGS specifications for LMI programs are developed and presented as part of the overarching LMI Implementation Plan.

*See next page for a directory of specifications with links.*

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<sup>1</sup> NYS DPS, CE-08: Gross Savings Verification Guidance, issued August 23, 2019.

<b>Verified Gross Savings Specifications Directory</b>	
<a href="#"><u>Advancing Agricultural Energy Technologies</u></a>	<a href="#"><u>Market Challenges</u></a>
<a href="#"><u>Agriculture Transition</u></a>	<a href="#"><u>Market Characterization &amp; Design</u></a>
<a href="#"><u>Anaerobic Digesters Transition</u></a>	<a href="#"><u>Multifamily Low Carbon Pathways</u></a>
<a href="#"><u>Building Operations and Maintenance Partnerships</u></a>	<a href="#"><u>Multifamily New Construction Transition</u></a>
<a href="#"><u>Clean Energy Communities</u></a>	<a href="#"><u>New Construction</u></a>
<a href="#"><u>Clean Energy Siting and Soft Cost Reduction</u></a>	<a href="#"><u>Offshore Wind Master Plan</u></a>
<a href="#"><u>Codes and Standards for Carbon Neutral Buildings</u></a>	<a href="#"><u>Offshore Wind Pre-Development Activities</u></a>
<a href="#"><u>Combined Heat and Power (CHP) Transition</u></a>	<a href="#"><u>ORES Support</u></a>
<a href="#"><u>Commercial New Construction Transition</u></a>	<a href="#"><u>P-12 Schools</u></a>
<a href="#"><u>Commercial Transition</u></a>	<a href="#"><u>Pay for Performance</u></a>
<a href="#"><u>Community Energy Engagement</u></a>	<a href="#"><u>Product and Appliance Standards</u></a>
<a href="#"><u>Consumer Awareness</u></a>	<a href="#"><u>Real Estate Tenant</u></a>
<a href="#"><u>Electric Vehicles – Charging &amp; Engagement</u></a>	<a href="#"><u>Reducing Barriers to Distributed Deployment</u></a>
<a href="#"><u>Electric Vehicles – Rebate</u></a>	<a href="#"><u>Renewable Heat NY - Clean and Efficient Biomass Heating</u></a>
<a href="#"><u>Energy Management Practices</u></a>	<a href="#"><u>Residential</u></a>
<a href="#"><u>Energy Management Technology</u></a>	<a href="#"><u>REV Campus Challenge</u></a>
<a href="#"><u>Fuel Cells</u></a>	<a href="#"><u>REV Connect</u></a>
<a href="#"><u>Greenhouse Lighting and Systems Engineering</u></a>	<a href="#"><u>Single Family Market Rate Transition</u></a>
<a href="#"><u>Heat Pumps Phase 1 (2017)</u></a>	<a href="#"><u>Small Wind Transition</u></a>
<a href="#"><u>Heat Pumps Phase 2 (2020)</u></a>	<a href="#"><u>Solar Plus Energy Storage</u></a>
<a href="#"><u>Industrial Transition</u></a>	<a href="#"><u>Solar Thermal Transition</u></a>
<a href="#"><u>Information Products and Brokering</u></a>	<a href="#"><u>Talent Pipeline</u></a>
<a href="#"><u>Low Rise New Construction Transition</u></a>	<a href="#"><u>Technical Services</u></a>

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Advancing Agricultural Energy Technologies
<b>Initiative Period</b>	2019 (new) – present; active initiative
<b>Initiative Description</b>	
Through the Advancing Agriculture Energy Technologies initiative, NYSERDA facilitates the adoption of energy efficiency and clean energy technologies among farmers by identifying and demonstrating advanced, underused, or emerging technologies. Additionally, NYSERDA develops processes to determine those technologies that provide cost-effective energy and process efficiency. Underused or emerging technologies are defined as commercially available technologies that are not currently standard practices at farms in NYS.	
<b>Gross Savings Methodology</b>	
The data from NYSERDA-supported projects will be aggregated and analyzed by a third-party contractor using a pre-post regression analysis to verify realized energy savings per unit of production (e.g., per head of lettuce). Energy efficient measure savings are calculated using deemed values.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
The Advancing Agriculture Energy Technologies initiative will undergo Gross Savings Analysis for program period 2017 – 2023 and details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan filed in Q4 2022. The impact assessment is expected to commence Q1 2024 and the estimated completion of the Gross Savings Analysis report is Q4 2024. Independent evaluator Michaels Energy will perform the Gross Savings Analysis. In addition to the Advancing Agricultural Energy Technologies initiative, this Gross Savings Analysis will also evaluate the Agriculture Energy Audit (sub-initiative under the Technical Services initiative) and Greenhouse Lighting and Systems Engineering (GLASE).	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Agriculture Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
This initiative was initially offered in 2016 and was a modification of the predecessor Agriculture Energy Efficiency initiative. The Agriculture Transition Program (specifically known as the Agriculture Energy Audit Program) provided 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 included information on implementation incentives available for recommended measures through utility or federal programs.	
<b>Gross Savings Methodology</b>	
NYSERDA regularly reviewed program participation to determine whether changes were needed to improve efficacy of program implementation. Metrics associated with recommended energy savings, energy bill savings, emission reductions and private investment/funds initially estimated and estimated impacts were reported based on a historical NYSERDA FlexTech and Agriculture Energy Efficiency initiative adoption rates.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Anaerobic Digesters Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
This initiative was initially offered in 2016 and was a modified version of a prior Renewable Portfolio Standard offering. The program intended 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.	
<b>Gross Savings Methodology</b>	
The gross savings methodology included a NYSERDA site inspection for each project, hourly-interval data collection on system performance, and site-level measurement and verification.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	

<b>Focus Area:</b> Workforce Development	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Building Operations and Maintenance Partnerships
<b>Initiative Period</b>	2016 (new) – present; active initiative
<b>Initiative Description</b>	
The Building Operations and Maintenance (BOM) Partnerships initiative is designed to achieve energy savings by training O&M staff to operate their buildings better, thereby reducing energy usage. The BOM effort targets employers, managers, and O&M service providers involved in building operations and maintenance across commercial, institutional, multifamily, and other sectors, especially larger organizations responsible for a portfolio of buildings for replication. The program is designed to increase O&M staff competencies through training in a manner that leads to improved building operations and measurable savings.	
<b>Gross Savings Methodology</b>	
The program estimates savings by assessing projects proposed by participants and applying an average savings factor of 7%.	
<b>Realization Rate (RR)</b>	
The initial VGS RRs of 1.20 for electric and 1.25 for natural gas were calculated for the Building Operations and Maintenance Partnerships initiative for program period 2016-2021 and finalized in Q3 2022 (study will be filed imminently in alignment with the Q3 2022 CEF report). This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
The Building Operations and Maintenance initiative underwent Gross Savings Analysis for program period 2016-2021. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q4 2021. The Gross Savings Analysis Report was completed in Q3 2022 and will be filed imminently in alignment with the Q3 2022 CEF report. Independent evaluator DNV performed the Gross Savings Analysis. Along with this Gross Savings Analysis, this report will also present findings from a companion BOM market evaluation and Talent Pipeline market evaluation	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Communities	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Clean Energy Communities
<b>Initiative Period</b>	2017 – present; active initiative
<b>Initiative Description</b>	
The Clean Energy Communities initiative was initially offered in 2017 and was a modified version of a long-standing NYSERDA Communities program. The Clean Energy Communities initiative provides grants, direct technical support, tools and resources, and recognition to local governments that demonstrate leadership in clean energy. The initiative offers 10 different high impact actions (HIA) that communities can take; when a community completes four actions, the community is considered a Clean Energy Community.	
<b>Gross Savings Methodology</b>	
Energy benefits are calculated specific to each HIA when they are reported as completed to NYSERDA by communities (after 8/1/2016). The amount of energy benefits associated with each HIA is based on prior NYSERDA experience (e.g., solar PV, and other documented sources). All energy savings estimates have been conservatively discounted by 25% to account for possible overlap of HIAs with other initiatives and activities. Internal QA/QC protocols verify compliance with program requirements.	
<b>Realization Rate (RR)</b>	
The initial VGS RR of 0.58 MMBtu was calculated for the Clean Energy Communities initiative for the period 2016-2018 and as reported in the Clean Energy Communities Impact Evaluation 2016-2018 filed Q4 2021. This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
The Clean Energy Communities initiative underwent Gross Savings Analysis for program period 2016-2018. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q4 2021. The Gross Savings Analysis Report was filed in Q4 2021. Independent evaluator DNV performed the Gross Savings Analysis.	
An update to this assessment is planned for 2023 and anticipated to be filed mid-2024.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewable DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Combined Heat and Power (CHP) Transition
<b>Initiative Period</b>	2016 – 2019 (inactive)
<b>Initiative Description</b>	
This initiative was initially offered in 2016 and was a modified version of two long-standing NYSERDA Programs: CHP Acceleration and Aggregation and CHP Performance. The intervention planned to advance a modular CHP market to reduce soft costs and development time and increase penetration of CHP. A major activity focused on continuing to provide cost-shared incentives to support the installation of CHP equipment at eligible host site locations. Additionally, the program planned to continue to provide cost-shared incentives and procure a variety of technical outreach services to raise awareness of the opportunity for and value of CHP among good-prospect candidate sites.	
<b>Gross Savings Methodology</b>	
Program review plans included 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 was used to monitor performance of installed systems.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Commercial Transition (Commercial Implementation Assistance)
<b>Initiative Period</b>	2016 – 2017; inactive initiative
<b>Initiative Description</b>	
This initiative was initially offered in 2016 and was intended to be a transition from NYSERDA’s prior Existing Facilities program. The initiative intended to support measures local utility initiatives could not.	
<b>Gross Savings Methodology</b>	
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.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Communities	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Community Energy Engagement
<b>Initiative Period</b>	2017 (new) – 2021; inactive
<b>Initiative Description</b>	
The Community Energy Engagement initiative was NYSERDA’s statewide community-based outreach and engagement initiative. NYSERDA worked with locally based and constituency-based organizations across the state to deploy Community Energy Advisors (CEAs) to conduct engagement activities to New York State residents, small businesses, and multifamily building owners, with an emphasis on low-to-moderate income (LMI) households and communities. The goal was to help build clean energy awareness and connect underserved communities with cost-saving opportunities and help customers access audits, grants, and financing for clean energy projects. This Program also awarded funding for regionally specific initiatives to compliment the efforts of base activities to increase adoption of energy efficiency and/or clean energy solutions and to expand the reach of the Community Energy Engagement initiative.	
<b>Gross Savings Methodology</b>	
Energy savings were not calculated for the Community Energy Engagement Program.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Clean Energy Siting and Soft Cost Reduction ; distributed solar component
<b>Initiative Period</b>	2018 (new) – present; active initiative
<b>Initiative Description</b>	
New York State has a goal of obtaining 70% of its electricity from renewable sources by the year 2030. This initiative seeks to reduce market barriers inhibiting the deployment of clean energy technologies. NYSERDA provides technical and financial assistance to reduce the soft costs associated with implementing these renewable energy projects across the state. The primary focus of the initiative is on helping local governments understand and prepare for distributed solar and large -scale renewable projects, including energy storage.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the Clean Energy Siting and Soft Cost Reduction initiative.	
<b>Realization Rate (RR)</b>	
An initial VGS RR for distributed solar will be conducted through a separate evaluation of NY-SUN and Energy Storage. Gross Savings Analysis will not be undertaken for large-scale renewable wind technology.	
<b>Planned Verified Gross Savings Approach</b>	
Gross savings analysis for distributed solar projects undertaken through the Clean Energy Siting and Soft Cost Reduction initiative will be conducted for the NY-SUN and Energy Storage portfolios as a whole for the program period 2019-2023 and it anticipated to be complete Q4 2023. NYSERDA will develop an approach to identify projects undertaken through this initiative and represent them in the evaluation. Details related to the Gross Savings Analysis methodology were detailed in an EM&V Plan finalized in Q4 2021 (note this EM&V Plan was unintentionally omitted from recent DMM filings. This plan will be filed imminently). An update to the Gross Savings Analysis Report is anticipated for Q4 2024, in conjunction with a long term solar PV persistence study. . Independent evaluator DNV is performing the Gross Savings Analysis. Gross savings analysis will not be undertaken for large scale renewable wind technology.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Codes, Standards & Multisector Initiatives	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Codes and Standards for Carbon Neutral Buildings ; previously known as Code to Zero prior to May 2022
<b>Initiative Period</b>	2017 – present (active)
<b>Initiative Description</b>	
Codes and Standards for Carbon Neutral Buildings was initially offered in 2017 (under its prior name, Code to Zero) and was a continuation of a long-standing Technology and Market Development (SBC4) codes initiative. To maximize the effectiveness of energy codes, the Codes and Standards for Carbon Neutral Buildings initiative seeks to work with stakeholders, participants in building design and construction, and communities to strengthen compliance and enforcement, test approaches to advance the development of codes with higher performance goals and assist in the enactment of energy codes.	
<b>Gross Savings Methodology</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate, initiative-specific market evaluation. Note this market evaluation uses the prior program name of Code to Zero.	
<b>Realization Rate (RR)</b>	
N/A	
<b>Planned Verified Gross Savings Approach</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate, initiative-specific market evaluation. Note this market evaluation uses the prior program name of Code to Zero.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> New Construction	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Commercial New Construction Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Commercial New Construction Transition initiative was initially offered in 2016 and was a modified version of NYSERDA’s long-standing New Construction program. The initiative provided an offering for new buildings, and substantial renovations to existing buildings, to increase 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.	
<b>Gross Savings Methodology</b>	
Quality assurance of equipment and systems installation were provided to assess energy impacts. In addition, NYSERDA provided guidance and technical review of energy models.	
<b>Realization Rate (RR)</b>	
A prior VGS RR of 0.99 for kWh and 0.71 for MMBtu of Commercial New Construction Transition was calculated for program period 2016-Q2 2018 and as reported in the EEPS Commercial and Multifamily Close-Out Impact Evaluation, filed Q3 2020. These findings are for informational purposes only; given the vintage of these findings, they are not applied to reported savings.	
<b>Planned Verified Gross Savings Approach</b>	
New Construction will undergo Gross Savings Analysis for program period 2018 -2019 and details related to the Gross Savings Analysis methodology were submitted in an EM&V plan filed in Q3 2021. The estimated completion of the Gross Savings Analysis Report is Q2 2023. Independent evaluator DNV will perform the Gross Savings Analysis. In addition to the Commercial New Construction Transition initiative, the study will also evaluate the Low-Rise New Construction Transition initiative and the Commercial and Multifamily components of the New Construction Market Rate initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Single Family Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Consumer Awareness
<b>Initiative Period</b>	2019 (new)- present; active initiative
<b>Initiative Description</b>	
The Consumer Awareness initiative will support activities related to the critical market need to build consumer demand and market confidence and reduce customer acquisition costs related to heat pump technologies.	
<b>Gross Savings Methodology</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate market evaluation.	
<b>Realization Rate (RR)</b>	
N/A	
<b>Planned Verified Gross Savings Approach</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate market evaluation.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Transportation	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Electric Vehicles – Charging & Engagement
<b>Initiative Period</b>	2022 (new) – Present; active initiative
<b>Initiative Description</b>	
The Electric Vehicles – Charging & Environment initiative will provide incentives to build Level 2 EV charging stations in workplaces, multi-unit dwellings, and disadvantaged communities. In addition to initial incentives, charging station owners can receive bonuses for conducting outreach to employees and tenants advertising charging stations, offering free charging, or participating in a group purchase of EVs. To reach larger communities, larger workplaces and multi-unit dwellings will be eligible for larger bonuses. Increased access to EV charging stations will promote consumer EV adoption.	
<b>Gross Savings Methodology</b>	
N/A: No savings are anticipated for this initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Transportation	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Electric Vehicles – Rebate
<b>Initiative Period</b>	2017 (new)– 2021; inactive initiative
<b>Initiative Description</b>	
NYSERDA implemented a point-of-sale Electric Vehicle (EV) rebate program for new EV buyers that helped reduce the price differential between EVs and conventional vehicles. The program, modeled after successful programs in states like Connecticut and Massachusetts that also offer tiered rebates for new EV buyers, helped accelerate EV sales, raise consumer awareness of EVs, and encouraged auto manufacturers and car dealers to invest more time and effort in selling EVs in New York State.	
<b>Gross Savings Methodology</b>	
The Electric Vehicles - Rebate initiative uses three indicators to calculate gross energy savings: average MPG by class (e.g., personal vehicle) for internal combustion engine (ICE) vehicles in New York state, average vehicle miles traveled (VMT) in New York state (see US Dept. of Transportation, Indicator Data: New York), and miles per gallon equivalency (MPGe), estimated by the initiative for each rebate eligible vehicle. Gross energy savings are estimated by multiplying state average VMT by the difference between the rebated vehicle’s estimated MPGe and the corresponding ICE vehicle class average MPG. Initiative-wide savings are determined by summing the savings for vehicles rebated through the initiative. Gross energy savings accrue from the date the rebate is issued.	
<b>Realization Rate (RR)</b>	
The initial VGS RR of 0.72 for fuel savings and electricity usage was calculated for the Electric Vehicles – Rebate initiative as part of the Clean Transportation impact evaluation for program period 2017-2020 and finalized in Q2 2022. This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis for this initiative was completed in Q2 2022 and will be filed imminently. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed Q2 2021. Independent evaluator Industrial Economics and DNV performed the Gross Savings Analysis. Note that the EV – Rebate initiative was funded with CEF and non-CEF funds. The GSA treated all funding equally and produced a VGS RR for the EV-Rebate initiative as a whole, as deviations in impacts between funding sources were not uncovered. The VGS RR will be applied to the gross savings estimated for each portfolio.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Energy Management Practices
<b>Initiative Period</b>	2017(new) – present; active initiative
<b>Sub-Initiative</b>	On-Site Energy Manager (2017 – present) Strategic Energy Management (2017-present)
<b>Initiative Description</b>	
Energy Management Practices, encompassing sub-initiatives On-Site Energy Manager and Strategic Energy Manager, aims to integrate the adoption of energy efficiency and clean energy into companies' core business processes. Programming and provided resources will focus on identifying areas for improvement, driving managerial and corporate behavioral changes with respect to energy, developing the mechanisms to track energy optimization efforts versus other business investment opportunities, and allowing companies to become accustomed to energy management with minimal risk.	
<b>Gross Savings Methodology</b>	
<b>On-Site Energy Manager (OSEM)</b> – Acquired savings are reported as measures are installed. There is no additional program M&V to determine energy savings RR. <b>Strategic Energy Management (SEM)</b> – Acquired savings are reported as systems are installed and verified. Testing is done by the program to determine system accuracy. There is no additional program M&V to determine energy savings RR.	
<b>Realization Rate (RR)</b>	
<b>OSEM:</b> The initial VGS RR of 1.51 for electric savings and 1.04 for fossil fuel savings were calculated for the OSEM component of the Energy Management Practices initiative for program years 2017-2020 filed Q3 2022. This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis. <b>SEM:</b> The initial VGS RR of 1.03 for electric savings and 1.01 for fossil fuel savings were calculated for the SEM component of the Energy Management Practices initiative for program years 2017-2020 filed Q3 2022. This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis for the OSEM and SEM components of Energy Management Practices was filed in Q3 2022 and details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan finalized in February 2021 (Note this EM&V Plan was unintentionally omitted from recent DMM filings. This plan will be filed imminently). Independent evaluator Michaels Energy is performing the Gross Savings Analysis. An update to this study is expected to be completed Q2 2023.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Areas:</b> Comm/Ind/Ag and Multifamily Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Energy Management Technology
<b>Initiative Period</b>	<u>Initiative Period by Focus Area:</u> Comm/Ind/Ag: 2016 – present; active initiative Multifamily Residential: 2019 – present; active
<b>Sub-Initiatives</b>	Real Time Energy Management Remote Energy Management
<b>Initiative Description</b>	
<p>Energy Management (EM) is the common name for the management of building energy consumption from a combination of building data collection systems (e.g. meters, sensors, equipment feeds), analytics, and building data information services. There is a full spectrum of EM sophistication ranging from the basic, Remote Energy Management (REM), to the more advanced Real Time Energy Management (RTEM). The market includes vendors of systems and information services, with many vendors providing both and targets sectors including Commercial Office, Retail, University/College, and Healthcare and Commercial tenant spaces. Multifamily and Industrial buildings are also eligible to participate in this initiative. RTEM can show building management the actual state of building performance at any point in time. RTEM is utilized to capture the discreet data such as set points, power loads, flow rates, temperature and humidity, and feed the information back to building operators with key insights about operations and systems that they then use to fine-tune the building energy system operations and identify capital projects.</p>	
<b>Gross Savings Methodology</b>	
In-program Measurement and Verification of the savings is done using Option C methods (e.g., billing analysis) set in the International Performance Measurement & Verification Protocol (IPMVP) by an independent RTEM advisor.	
<b>Realization Rate (RR)</b>	
The initial VGS RR of 0.2 for electric savings, 0.42 for natural gas and 0.42 for heating oil were calculated for the Real Time Energy Management and Remote Energy Management components of the Energy Management Technology initiative for program years 2017-Q1 2020 which was filed Q4 2021. The initial VGS RRs are applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis was undertaken for the Real Time Energy Management and Remote Energy Management components of Energy Management Technology initiative for program years 2017-Q1 2020 which was filed Q4 2021. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q1 2022 (and entitled Commercial Impact Evaluation Plan). Independent evaluator DNV conducted the Gross Savings Analysis. An update to this study is anticipated Q1 2023.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Fuel Cells
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Fuel Cells initiative was initially offered in 2016 and was a modified version of a prior NYSERDA program. NYSERDA’s offering provided financial support to assist facilities with projects to install on-site, stationary power, continuous-duty fuel cells to help reduce their energy expenses and greenhouse gas emissions, to relieve strain on the electric utility grid, and where applicable to enhance the resiliency of the host site. Additionally, the program supported eligible fuel cells operating under a Community Distributed Generation (CDG) business model.	
<b>Gross Savings Methodology</b>	
Energy impacts were assessed by the program using the following formulas and calculations: Energy Generated (kWh) = Capacity Rating (kW) * 95% [Industry Standard Capacity Factor] * 8760 hrs/year. Natural Gas used (MMBtu) = Energy Generated (kWh) * (-7.79 factor). This initiative did not claim any natural gas savings.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken on this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Greenhouse Lighting and Systems Engineering; previously known as 2030 GLASE prior to May 2022.
<b>Initiative Period</b>	2016 – present; active initiative
<b>Initiative Description</b>	
To facilitate realization of the energy savings potential and address market barriers, the Greenhouse Lighting and Systems Engineering (GLASE) Consortium will synergistically target energy-related improvements to greenhouse system operations (e.g. integrated control of ventilation, lighting, humidity and CO <sub>2</sub> supplementation).	
<b>Gross Savings Methodology</b>	
As part of the implementation of the GLASE initiative, all pilot sites will undergo intense measurement and verification of electricity savings per unit of production, which will be used to calculate CO <sub>2</sub> savings. The M&V analysis will be done by Rensselaer Polytechnic Institute and Cornell University. Data will be analyzed to increase the understanding of product performance and iteratively improve greenhouse control systems.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame	
<b>Planned Verified Gross Savings Approach</b>	
GLASE will undergo Gross Savings Analysis for program period 2019-2023. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan that will be filed in Q4 2022. The anticipated completion date for this study is Q2 2023. In addition to GLASE, this Gross Savings Analysis will also evaluate the Advancing Agricultural Energy Technologies initiative and Agriculture Technical Services initiatives. Independent evaluator Michaels Energy will perform the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Clean Heating and Cooling	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Heat Pumps Phase 1 (2017)
<b>Initiative Period</b>	2017(new) – 2021; inactive initiative
<b>Initiative Description</b>	
<p>The Heat Pumps Phase 1 initiative addressed CH&amp;C project economics, lack of awareness of CH&amp;C technologies, uncertainty regarding savings and technical performance, and lack of technical expertise to evaluate feasibility and execute projects. The Heat Pumps Phase 1 initiative included activities to reduce soft costs for Ground Source Heat Pumps (GSHP) and Air Source Heat Pumps (ASHP) by improving access to reliable information, supporting the development of a customer targeting tool, and supporting clustering/aggregation of installations developing standardized contracts, data protocols and requirements and quality assurance processes; provided targeted cost-shared technical assistance for GSHP and ASHP; and provided incentives to off-set the cost of GSHP and ASHP systems.</p>	
<b>Gross Savings Methodology</b>	
Heat Pumps Phase 1 savings for ASHPs were based on deemed savings and savings for GSHP were based on contractor building heating load estimates and site-specific information on preexisting heating fuel.	
<b>Realization Rate (RR)</b>	
<p><b>ASHPs:</b> The initial VGS RR of 0.20 for electric savings and 0.05 for heating oil savings were calculated for the ASHP component of Heat Pumps Phase 1 initiative for program years 2016-2018 filed Q3 2022 (and named 2022 Heat Pump Impact Evaluation Report). This initial VGS RR is applied retrospectively and prospectively.</p> <p><b>GSHPs:</b> The initial VGS RR of 0.79 for electric savings, 1.52 for natural gas savings, 0.20 for heating oil and 2.63 for propane were calculated for the GSHP component of the Heat Pumps Phase 1 initiative for program years 2016 -2018 and filed in Q3 2022 (named 2022 Heat Pump Impact Evaluation Report). The initial VGS RR is applied retrospectively and prospectively.</p>	
<b>Planned Verified Gross Savings Approach</b>	
<p>Gross Savings Analysis was undertaken for the ASHP and GSHP component of the Heat Pump Phase 1 initiative for program years 2016-2018. Details related to the Gross Savings Analysis methodology were submitted in an EM&amp;V Plan filed in Q4 2020. Independent evaluator DNV conducted the Gross Savings Analysis.</p> <p>Note a separate study assessing cold climate ASHPs was undertaken in 2021 and filed in Q3 2022. This study did not include a Gross Savings Analysis but is included herein for awareness. Independent evaluator Cadmus conducted the study.</p>	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Clean Heating & Cooling, LMI, Single Family Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Heat Pumps Phase 2 (2020)
<b>Initiative Period</b>	2020 (new) – present; active initiative
<b>Initiative Description</b>	
<p>Heat Pumps Phase 2 (as part of the NYS Clean Heat Program 1) supports the installation of heat pump technologies that are best suited to heat efficiently in cold climates; 2) requires Participating Contractors to follow best practices related to building load calculations, equipment sizing and selection, and the installation of cold climate heat pump technologies in NYS climates; and 3) promotes contractor and other heat pump solution providers training and consumer education, including guidance provided by Participating Contractors to customers who have heat pumps installed on how to operate and maintain their system. As part of program delivery, the Joint Efficiency Providers monitor the extent to which the NYS Clean Heat Program-incentivized heat pump systems displace or replace other heating fuels.</p> <p>More specifically, the NYS Clean Heat: Statewide Heat Pump Program Implementation Plan and Program Manual describes the steps the Electric Utilities will take, in conjunction with NYSERDA’s portfolio of market development initiatives, to expand existing heat pump programs and, in other instances, establish new heat pump programs as part of the new statewide framework. The framework is designed to provide contractors and other heat pump solution providers a consistent experience and business environment throughout NYS.</p>	
<b>Gross Savings Methodology</b>	
Per the Commission’s January 16, 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025, NYSERDA will work with the Electric Utilities to jointly file a Statewide Heat Pump Program Annual Report by April 1, 2021 and annually thereafter. Energy savings estimates reference the Technical Resource Manual.	
<b>Realization Rate (RR)</b>	
No realization rates have been determined for this initiative within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
A statewide technical study for heat pumps is underway for cold climate ASHP (ccASHP), GSHP, Heat Pump Water Heater (HPWHs) and Domestic Hot Water. Independent evaluator DNV is conducting the Gross Savings Analysis and the study is anticipated to be complete Q4 2022.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Industrial Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Industrial Transition initiative was initially offered in 2016 and was a modified version of the long-standing NYSERDA program Industrial and Process Efficiency. This initiative offered performance-based incentives to manufacturers and data centers implementing cost effective process efficiency improvements. The initiative’s goal was to help manufacturers and data centers increase product output and improve data processing as efficiently as possible.	
<b>Gross Savings Methodology</b>	
Pre-installation inspections were conducted to understand each project and document the base case scenario. Energy savings calculations were estimated based on data provided by each customer. In addition, a technical reviewer was assigned to each project to assist the customer in estimating energy savings and in developing an M&V plan.	
<b>Realization Rate (RR)</b>	
A prior VGS RR of 0.86 for kWh and 0.91 for MMBtu were calculated for the predecessor Industrial and Process Efficiency initiative for program period 2014-2017 finalized in Q3 2018 and filed in Q1 2020. This VGS RR has been applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
The Industrial Transition initiative will undergo Gross Savings Analysis for program period 2018-2021 and details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan in Q4 2022. The estimated completion of the Gross Savings Analysis Report is Q2 2023. NYSERDA will competitively procure an independent evaluator to perform the Gross Savings Analysis in Q4 2022.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Codes, Standards & Other Multisector Initiatives	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Information Products & Brokering
<b>Initiative Period</b>	2019 (new) – present; active initiative
<b>Initiative Description</b>	
Through its Information Products and Brokering initiative, NYSERDA is working to develop a robust ecosystem of information tools and resources that accelerate customer adoption of building decarbonization. This initiative will reduce soft costs of building decarbonization projects through customer targeting tools and value proposition calculators. This initiative will run events that recruit talented web-based tool development and analytics firms into the building decarbonization space. Finally, this initiative will acquire, aggregate, and share data resources with the market.	
<b>Gross Savings Methodology</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate, initiative-specific market evaluation.	
<b>Realization Rate (RR)</b>	
N/A	
<b>Planned Verified Gross Savings Approach</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate, initiative-specific market evaluation.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Focus Area: Codes, Standards and Other Multisector Initiatives	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Innovative Market Strategies (IMS) (Market Characterization and Design – Market Development portfolio)
<b>Initiative Period</b>	2020 (new) – present; active initiative
<b>Initiative Description</b>	
The Innovative Market Strategies (IMS) component of the Market Development Market Characterization and Design Initiative (Market Development portfolio) is a structure to facilitate the deployment of new technologies and business models in the New York market. The IMS initiative funds projects that test market strategies that have the potential to accelerate uptake or increase the value proposition of building decarbonization (energy efficiency, electrification, demand flexibility) solutions. The goal of these initiatives is to identify and fund projects that have potential to significantly help New York State make progress towards its ambitious building decarbonization goals and demonstrate a promising pathway to scale after NYSERDA support.	
<b>Gross Savings Methodology</b>	
Energy savings for IMS will be determined as the initiatives are selected and funded under PON 4359. For the initiatives, where NYSERDA is encouraging market adoption of energy efficient technologies or practices, energy savings will be calculated using the formulas and factors found in the Technical Resource Manual (TRM) and other available data sources. As applicable, initiatives will undergo program M&V, including but not limited to desk reviews and billing analysis.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will be undertaken for IMS for program period 2020-2023 and is anticipated to be complete Q4 2025. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V plan anticipated Q4 2022. NYSERDA will competitively procure an independent evaluator to conduct the Gross Savings Analysis in Q4 2022.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> New Construction	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Low-Rise New Construction Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Low-Rise New Construction Transition initiative was initially offered in 2016 and was a modified version of a long-standing NYSERDA program. The initiative strove to increase awareness 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 the market-rate sector.	
<b>Gross Savings Methodology</b>	
NYSERDA monitored a sample of projects to analyze energy impacts. In addition, quality assurance was performed by RESNET-accredited Providers based on Residential Energy Services Network (RESNET) technical standards.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
The Low-Rise New Construction Transition will undergo Gross Savings Analysis for program period 2016-2019 and details related to the Gross Savings Analysis methodology were submitted in an EM&V plan filed in Q3 2021. The estimated completion of the Gross Savings Analysis Report is Q2 2023. Independent Evaluator DNV will perform the Gross Savings Analysis. In addition to the Low-Rise New Construction Transition initiative, this study will also evaluate the Commercial New Construction Transition and the Commercial and Multifamily components of the New Construction Market Rate initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag, Multifamily Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Market Challenges
<b>Initiative Period</b>	<u>Initiative Period by Focus Area</u> Comm/Ind/Ag: 2018 (new) – present; active initiative Multifamily Residential: 2020 (new) – present; active initiative
<b>Sub-initiatives</b>	Commercial and Industrial (C&I) Carbon Challenge: 2018-present (active) Empire Building Challenge: 2020-present (active)
<b>Initiative Description</b>	
The Market Challenges initiative seeks to fund pilot projects that achieve one of two criteria: provide a streamlined and cost-effective manner for large energy consumers to reduce greenhouse gas emissions; or address a difficult-to-decarbonize energy use through a project that has the potential for replicability and scale. While large energy users in New York State are being asked by their investors, customers and employees to take more action to limit their carbon footprint, barriers such as low market prices of natural gas, perceived technology risk and policy uncertainty have stifled capital investment in energy efficiency projects. This initiative seeks to mitigate these barriers.	
<b>Gross Savings Methodology</b>	
For the C&I Carbon Challenge and Empire Building Challenge sub-initiatives, where NYSERDA is encouraging market adoption of energy efficient technologies or practices, energy savings will be calculated using the formulas and factors found in the Technical Resource Manual (TRM). <u>Both sub-initiatives will undergo program M&amp;V at the site level. Additional specifics are provided below.</u>	
<b>C&amp;I Carbon Challenge:</b> the energy savings of this sub-initiative are based on the TRM and deemed values. NYSERDA employs independent third-party technical review for all projects implemented through this sub-initiative.	
<b>Empire Building Challenge:</b> the energy savings of this sub-initiative are based on the TRM and deemed values. NYSERDA employs independent third-party technical review for all projects implemented through this sub-initiative.	
<b>Realization Rate (RR)</b>	
No realization rates have been determined for these sub-initiatives within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will be undertaken for both the C&I Carbon Challenge and Empire Building Challenge sub-initiatives of the Market Challenges initiative and details related to the Gross Savings Analysis methodology will be submitted in an evaluation plan Q1 2023. The estimated completion for the Gross Savings Analysis report is Q1 2025. NYSERDA will competitively procure an independent evaluator to conduct the Gross Savings Analysis in Q1 2023.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Multifamily Residential@	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Multifamily Low Carbon Pathways
<b>Initiative Period</b>	2021(new) – present; active initiative
<b>Sub-Initiatives</b>	Low Carbon Solutions Demo Building Influencers Capital Planning Support Non-Energy Benefits Pilot
<b>Initiative Description</b>	
The Multifamily Low Carbon Pathways initiative is focused on increasing the adoption of low carbon technologies in the Multifamily building sector, with a focus on market rate buildings. The objectives of this initiative are to provide resources to help building owners and managers better understand how to implement low carbon projects, provide support for capital planning and for low carbon implementation to show that these technologies are feasible in variety of building types, and quantify the non-energy benefits of low carbon technologies to build confidence in the ability of low carbon projects to drive property value beyond reduced utility bills.	
<b>Gross Savings Methodology</b>	
Only two of the Multifamily Low Carbon Pathways sub-initiatives, Low Carbon Demonstrations and Building Influencers, have direct energy benefits associated with them. The Gross Savings Methodology for each is described below.	
<b>Low Carbon Demonstration:</b> Baseline usage was derived by a contractor using previous NYSERDA program data. The percentage savings for each low carbon solutions demonstration is derived from a contractor using a building modeling tool with an assumed list of measures. Each year there is an assumed increase in the projects that will be completed.	
<b>Building Influencers:</b> The baseline usage and savings were derived from contractors through industry insight.	
<b>Capital Planning Support:</b> N/A - Direct savings are not associated with this sub-initiative.	
<b>Non-Energy Benefits Pilot:</b> N/A - Direct savings are not associated with this sub-initiative.	
<b>Realization Rate (RR)</b>	
No realization rates have been determined for these sub-initiatives within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will be undertaken for both the Low Carbon Demonstration and Building Influencers sub-initiatives of the Multifamily Low Carbon Pathways initiative for program period 2020-2021. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V plan in Q4 2022. NYSERDA will competitively procure an independent evaluator to conduct the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> New Construction	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Multifamily New Construction Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
This initiative was initially offered in 2016 and was a continuation from prior Multifamily New Construction programming. The initiative sought to increase awareness of, information about, and demand for deep energy savings and zero net energy performance in the multifamily new construction and gut rehabilitation markets.	
<b>Gross Savings Methodology</b>	
Program plans included a NYSERDA site inspection for each project, hourly -interval data collection on system performance, and site-level measurement and verification. This data was used to monitor performance of installed systems (and to support performance-based incentive payments if such feature gets specified in the solicitation).	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> New Construction	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	New Construction Market Rate
<b>Initiative Period</b>	2018 – present; active initiative
<b>Sub-initiatives</b>	Buildings of Excellence Competition Net Zero Energy/Carbon Competition
<b>Initiative Description</b>	
This New Construction Market Rate initiative (encompassing single family, multifamily and commercial) was initially offered in 2018. This was a modified version of NYSERDA’s long-standing New Construction programming. Approximately 100 million square feet of new construction is built in New York State annually. These buildings are typically in operation for 50-100 years and often do not meet current NYS Energy Conservation Construction Code (NYS ECCC). This initiative provides incentives to spur net zero energy/carbon performance in construction projects. It also provides support to the design community including developing design and construction protocols. These efforts will increase the energy efficiency of construction projects around the state for which benefits will be experienced for decades over the lifetime of the buildings.	
<b>Gross Savings Methodology</b>	
Direct energy savings are estimated by third-party contractors who utilize site-specific energy models to estimate savings above code.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
The New Construction Initiative is undergoing Gross Savings Analysis for program period 2017-2020 for the single family, multifamily and commercial sectors. Independent evaluator DNV is performing the Gross Savings Analysis and details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q3 2021. Gross Savings Analysis will be complete for the single-family sector in Q4 2022. Commercial and multi-family sector Gross Savings Analysis is anticipated to be complete by Q2 2023.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Offshore Wind Master Plan
<b>Initiative Period</b>	2016 (new) – 2019; inactive initiative
<b>Initiative Description</b>	
Through this Offshore Wind Master Plan initiative, NYSERDA, in conjunction with the NYS Department of State and other state agencies, engaged community members, environmental advocates, the maritime community, industry, tribes and government partnered at all levels to develop a New York Offshore Wind Master Plan (Plan) to provide a comprehensive state roadmap to advance Atlantic offshore wind in a manner that is sensitive to environmental, maritime and social issues in a cost effective manner that maximizes environmental and economic benefits. The Master Plan provides a comprehensive State roadmap for advancing development of offshore wind in a cost effective and responsible manner, providing New York with a new renewable generation resource that can make a significant contribution to the state’s clean energy goals and the CES mandate and provide related economic development opportunities for New York.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the Offshore Wind Master Plan initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Offshore Wind Pre-Development Activities
<b>Initiative Period</b>	2017 (new) – 2021; inactive initiative
<b>Initiative Description</b>	
The Offshore Wind Pre-Development Activities initiative executed the pre-development activities called for in the New York Offshore Wind Master Plan. These pre-development activities included collecting and analyzing field data and other site assessment work that will reduce Offshore Wind (OSW) project risks and costs in New York. The primary focus of this initiative was to reduce overall project and ratepayer costs by undertaking pre-development work for NYS OSW sites that reduce the amount of expensive development capital required by private developers, reduce developer risk by providing site data, reduce required development timelines and ultimately enhance competition between developers for New York.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the Offshore Wind Pre-Development Activities initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Office of Renewable Energy Siting (ORES) Support
<b>Initiative Period</b>	2020 (new) – present; active initiative
<b>Initiative Description</b>	
The Office of Renewable Energy Siting (ORES) Support initiative will coordinate and undertake environmental reviews and permitting of major renewable energy facilities and has the authority to issue a single permit for the construction of major renewable energy facilities from both a state and local law perspective, except for any approvals necessary under federal law, including federally delegated permits.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the ORES Support initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	P-12 Schools; previously known as K-12 Schools prior to April 2019
<b>Initiative Period</b>	2018 (new)– present; active initiative
<b>Initiative Description</b>	
There are over 6,000 public and private schools in New York State that spend approximately \$1 billion on energy costs annually. Through the P-12 Schools initiative, NYSERDA will engage with these schools to leverage and promote market resources for clean energy actions. NYSERDA will offer free Benchmarking Services to schools and will also provide direct financial incentives to schools to accelerate clean energy planning, analysis, and installations.	
<b>Gross Savings Methodology</b>	
Energy savings are calculated using the formulas and factors found in the Technical Resource Manual or through other sound engineering practices. These engineering practices are industry standard methodologies which are implemented by independent contractors and reviewed and verified by NYSERDA. The FlexTech RR finalized in 2012 and determined to be 0.86 for electric and 0.77 for fuel has been used as a guide for projects that are cost-shared through this initiative.	
<b>Realization Rate (RR)</b>	
The initial VGS RR of 0.68 for electric savings was calculated for P-12 Schools for program years 2019- Q2 2021 in the P-12 Schools Benchmarking Impact Evaluation filed Q4 2022. This initial VGS RR is applied retrospectively and prospectively.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis was undertaken for P-12 Schools for program years 2019- Q2 2021. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q1 2022 (entitled Commercial Impact Evaluation Plan). Independent evaluator DNV conducted the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Areas:</b> Comm/Ind/Ag and Single Family Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Pay for Performance
<b>Initiative Period</b>	<u>Initiative Period by Focus Area:</u> Comm/Ind/Ag: 2018 (new) – present; active initiative Single Family Residential: 2018 (new) – present; active initiative
<b>Initiative Description</b>	
Pay for Performance is designed to promote a performance-based structure, where the risk of underperformance is borne by an energy service provider, and the end use customer receives guaranteed, lower cost of energy with little or no money down.	
<b>Gross Savings Methodology</b>	
The gross savings methodology centers around non-routine adjustments (NRAs) and associated non-routine events (NREs).NRAs are adjustments for changes in savings that cannot be predicted, such as weather or occupancy, typically referred to as NREs. NREs occurring on program pilot projects are flagged by the initiative’s Advanced Measurement and Verification (AMV) Solution Provider (ReCurve). These flagged NREs and potential NRAs resulting from these events are forwarded to an independent impact contractor (DNV) competitively procured by NYSERDA. DNV receives NRE records from Recurve, reviews the basis of each of them with a combination of automated and manual procedures, and reports monthly on accepted and rejected NREs. DNV also checks for longer-term trends in NRE claims to support refinement of the pilot over time.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Pay for Performance will continue to undergo review of NREs and adjustments , as needed, for program pilot period 2022-2023. Details related to the review of program pilot non-routine events and adjustments were submitted in an EM&V Plan filed Q1 2021. Independent evaluator DNV is performing this review. Discussions are underway for more comprehensive VGS efforts and future reports will detail the plans for these activities.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Codes, Standards and Other Multisector Initiatives	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Product and Appliance Standards
<b>Initiative Period</b>	2017 – present; active initiative
<b>Initiative Description</b>	
The Product and Appliance Standards initiative was originally offered in 2017 and was a modified version of NYSERDA’s long standing Product Support program. NYSERDA will support activities related to the development, promulgation, compliance, and enforcement of product and appliance standards for categories not currently covered by the federal government.	
<b>Gross Savings Methodology</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate market evaluation.	
<b>Realization Rate (RR)</b>	
N/A	
<b>Verified Gross Savings Approach</b>	
N/A: all savings for the initiative are indirect and will be evaluated through a separate market evaluation.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Real Estate Tenant; previously known as Commercial Real Estate Tenant
<b>Initiative Period</b>	2016 (new) – 2021 ; inactive initiative
<b>Initiative Description</b>	
New York State has the highest percentage of non-building owner (tenant) occupied space. This type of real estate has split incentives for energy efficiency between tenants and owners as tenants typically account for 40 to 60% of energy consumption and are not under the control of owners and managers. The Real Estate Tenant initiative provided cost-sharing of energy analysis and modeling for tenant office spaces, as well as the development of new tools and resources to allow tenants greater visibility and manageability over their energy consumption. This drove energy efficiency efforts during the commercial tenant lease and build out process by demonstrating to tenants a cost-effective approach to achieving energy efficient high-performance office spaces. It also demonstrated to owners, managers, brokers, and architecture and engineering firms a cost-effective and replicable approach to delivering those spaces.	
<b>Gross Savings Methodology</b>	
Energy savings were determined by applying a Measure Adoption Rate (MAR) of 41% to the recommended savings obtained by program implementor's energy audits.	
<b>Realization Rate (RR)</b>	
The initial VGS RR of 0.96 for electric savings was calculated for Real Estate Tenant for program years 2017- 2021 in the Commercial Tenant Impact Evaluation filed Q4 2022. This initial VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis. The evaluated cumulative program MAR after three years is 41%	
<b>Planned Verified Gross Savings Approach</b>	
Real Estate Tenant underwent Gross Savings Analysis for program period 2016-2021 in the Commercial Tenant Impact Evaluation filed Q4 2022. Details on the Gross Savings Analysis methodology can be found in the Clean Energy Fund Commercial Chapter Impact Evaluation Plan filed Q1 2022. Independent evaluator, DNV, performed the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewable/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Reducing Barriers to Deploying Distributed Energy Storage
<b>Initiative Period</b>	2017 (new)– present; active initiative
<b>Initiative Description</b>	
The Reducing Barriers to Deploying Distributed Energy Storage Initiative targets key barriers limiting energy storage adoption in three sectors: customer-sited (behind-the-meter systems), distribution system, and bulk system, and grid impacts from electrifying the transportation system.	
<b>Gross Savings Methodology</b>	
As per the New York State Energy Storage Roadmap, the resulting public benefits of the deployment of 3,000 MW of energy storage are expected to include over \$3 billion in gross lifetime benefits to New York’s utility customers, approximately 30,000 new jobs, the elimination of approximately 2 million metric tons of greenhouse gas (GHG) emissions, and the avoidance of criteria air pollutant emissions such as nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter deployed in New York over the life of the storage assets. The carbon benefits from adding energy storage grow substantially as the state approaches higher levels of renewable generation that would otherwise be curtailed, especially at night. Charging the storage with off-peak renewable energy to discharge and displace fossil generation during peak periods of demand will provide a substantial benefit to the state’s carbon footprint and air quality.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Reducing Barriers to Deploying Distributed Energy Storage will undergo Gross Savings Analysis for program period 2019-2022. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan in Q4 2022. The estimated completion of the Gross Savings Analysis Report is Q4 2023 as part of the comprehensive Solar PV + Energy Storage evaluation. Independent evaluator DNV is performing the Gross Savings Analysis	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Clean Heating and Cooling	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Renewable Heat NY – Clean and Efficient Biomass Heating
<b>Initiative Period</b>	2017 (new) – 2021; inactive initiative
<b>Initiative Description</b>	
Through Renewable Heat NY – Clean and Efficient Biomass Heating, New York pursued a multi-pronged market support strategy to promote development in a manner that enabled individuals to heat their building with biomass and support best available, high efficiency, low emissions biomass installations.	
<b>Gross Savings Methodology</b>	
Performance data were be collected, and programmatic measurement and verification activities included post installation inspection on each biomass boiler project and a percentage of pellet stove projects and verification of compliance with Renewable Heat New York program rules.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Single Family Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Residential (Market Rate)
<b>Initiative Period</b>	2018 – present; active initiative
<b>Sub-initiatives</b>	Home Energy Ratings Pilot (2019-present) Consumer Awareness (2019-present) Comfort Home (formerly Heat Pump Ready): 2019-present (active) Residential Energy Audits (successor to Green Jobs Green New York Audits): 2005-present (active)
<b>Initiative Description</b>	
<p>This initiative was initially offered in 2018. This was a new initiative but carried forward some long-standing NYSERDA programs (e.g., sub-initiative GJGNY Audits).</p> <p>The Residential initiative includes the following sub-initiatives: Home Energy Ratings Pilot, Consumer Awareness, Comfort Home, and Residential Energy Audits (prior program Green Jobs Green New York Audit).</p> <p>NYSERDA seeks to scale the market for providers of energy efficient and clean energy services and accelerate the rate at which homeowners adopt energy efficiency and clean energy technologies. The sub initiatives will use pilots for proof of concept, make adjustments to improve impact as needed, engage utilities in collaborative approaches, and at the conclusion of the pilots, deploy tools and other means to expand successful activities statewide via utilities or the market itself.</p>	
<b>Gross Savings Methodology</b>	
For the following sub-initiatives, where NYSERDA is encouraging market adoption of energy efficient technologies or practices, energy savings will be calculated using the formulas and factors found in the Technical Resource Manual (TRM).	
<p><b>Home Energy Ratings Pilot:</b> The savings of this sub-initiative are based on the TRM and deemed values. These deemed values are informed by historic savings, per measure, in NYSERDA residential program offerings as well as secondary research conducted by an independent evaluation contractor.</p> <p><b>Consumer Awareness:</b> N/A - direct savings are not associated with this sub-initiative.</p> <p><b>Comfort Home:</b> This sub-initiative will utilize Energy Plus modeling to estimate energy savings. The Energy Plus model inputs are based on the TRM and comply with custom measure option for whole building simulation. This sub-initiative includes Measurement &amp; Verification of installations according to IPMVP standards and include preliminary estimates of energy consumption and logging of data at site.</p> <p><b>Residential Energy Audits:</b> The savings of this sub-initiative are based on the TRM and deemed values. These deemed values are informed by historic savings, per measure, in NYSERDA residential program offerings as well as secondary research conducted by an independent evaluation contractor.</p>	
<b>Realization Rate (RR)</b>	
No realization rates have been determined for these sub-initiatives within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
Residential sub-initiatives are planned to undergo Gross Savings Analysis as described below. Independent evaluation contractor(s) will be procured by NYSERDA to perform these analyses.	
<p><b>Home Energy Ratings Pilot :</b> This sub-initiative will undergo Gross Savings Analysis for program period 2019-2021. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan in Q4 2022. The estimated completion of the Gross Savings Analysis Report is Q3 2023. This Gross Savings Analysis study will also encompass the Residential Energy Audits sub-initiative discussed below.</p> <p><b>Consumer Awareness:</b> N/A - direct savings are not associated with this sub-initiative.</p> <p><b>Comfort Home:</b> This sub-initiative will undergo Gross Savings Analysis for program period 2019-2021. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan in Q1 2023. The estimated completion of the Gross Savings Analysis Report is Q3 2023.</p> <p><b>Residential Energy Audits:</b> This sub-initiative will undergo Gross Savings Analysis for program period 2019-2021. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan in Q4 2022. The estimated completion of the Gross Savings Analysis Report is Q4 2023. This Gross Savings Analysis study will also encompass the Home Energy Ratings Pilot sub-initiative discussed above.</p>	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Comm/Ind/Ag	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	REV Campus Challenge
<b>Initiative Period</b>	2016 (new) – present; active initiative
<b>Initiative Description</b>	
Colleges and universities in New York State have already demonstrated leadership in adopting clean energy practices. The REV Campus Challenge initiative promotes further clean energy actions by providing recognition to higher education institutions for completing such actions. Knowledge transfer about clean energy actions is also promoted between peers.	
<b>Gross Savings Methodology</b>	
Energy savings are calculated using the formulas and factors found in the Technical Resource Manual and through other sound engineering practices. These engineering practices are industry standard and implemented by independent contractors. These methods are reviewed and verified by NYSERDA. The FlexTech RR finalized in 2012 and determined to be 0.86 for electric and 0.77 for fuel has been used as a guide for projects that are cost-shared through this initiative. For Energy to Lead projects undertaken within this initiative, awardees will conduct appropriate M&V at their sites depending upon the actions taken. This M&V is reported to NYSERDA and will be used to adjust estimated savings.	
<b>Realization Rate (RR)</b>	
The initial VGS RR is 2.04 for electric savings, and 2.30 for natural gas, heating oil, and LPG, respectively was calculated for Campus Challenge for program years 2016- 2021 in the REV Campus Challenge Impact Evaluation filed Q4 2022. This VGS RR is applied retrospectively and prospectively until completion of the next Gross Savings Analysis.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis was undertaken for REV Campus Challenge for program years 2016-2021. Details related to the Gross Savings Analysis methodology were submitted in an EM&V Plan filed in Q1 2022 (entitled Commercial Impact Evaluation Plan). Independent evaluator DNV conducted the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Focus Area: Codes, Standards and Other Multisector Initiatives	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	REV Connect
<b>Initiative Period</b>	2016 – present (active)
<b>Initiative Description</b>	
REV Connect is a structure to facilitate the deployment of new technologies and business models in the New York market. REV Connect will help DER providers connect with New York State utilities to advance high quality REV demonstrations, non-wire alternatives and other innovative projects. For companies with a technology, product, service or business model innovation that creates value for energy customers in partnership with the utility, REV Connect will offer a channel to submit project ideas and to receive expert guidance, feedback, facilitation, and matchmaking with New York utilities and other potential market partners. REV Connect will also publicize opportunities, share good practices and convene market participants to enhance the culture of innovation and collaboration in NY State.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the REV Connect initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Single Family Market Rate Transition
<b>Initiative Period</b>	2016-2019; inactive initiative
<b>Initiative Description</b>	
The Single Family Market Rate Transition initiative was initially offered in 2016. This was a continuation of NYSERDA's long-standing Home Performance with ENERGY STAR program. This initiative was 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.	
<b>Gross Savings Methodology</b>	
Energy savings were estimated from modeling tools used by contractors when conducting home audits. Quality assurance inspections were provided to 10% of completed market rate, on average, across the program to ensure proper installation of measures which can affect measure performance.	
<b>Realization Rate (RR)</b>	
The initial VGS of 0.82 for electric savings and 0.45 for MMBtu savings were calculated for the Single Family Market Rate Transition initiative for program years 2017- Q1 2019 and filed Q4 2022 (entitled Residential Retrofit Impact Evaluation). This initial VGS RR is applied retrospectively and prospectively until the next Gross Savings Analysis. Note that a prior NYSERDA impact evaluation filed Q4 2020 (Residential Retrofit Impact Evaluation, Program Year 2012-2016) assessed program period 2012-2016 and calculated VGS RRs of 0.51 for electric savings and 0.42 for MMBtu savings. These 2012-2016 findings are included here for informational purposes only; given the vintage of these findings, they are not applied to reported savings.	
<b>Verified Gross Savings Approach</b>	
Gross Savings Analysis was undertaken for the Single Family Market Rate Transition initiative for program years 2017 – Q1 2019 and filed in Q4 2022. Details related to the Gross Savings Methodology were submitted in an EM&V Plan filed in Q4 2022 (entitled Residential Retrofit Programs Evaluation Plan). Independent evaluator NMR Group conducted the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewable DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Small Wind Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Small Wind Transition initiative was originally offered in 2016 and was an extension of a prior Renewable Portfolio Standard customer sited tier small wind program. The initiative offered 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. Additionally, the program supported eligible wind turbines operating under a Community Distributed Generation (CDG) business model.	
<b>Gross Savings Methodology</b>	
Implementation assistance projects, as part of this program, were reviewed by a NYSERDA technical reviewer prior to approval and payment; this initiative was not intended to provide technical review services for ineligible projects. In addition to the technical review services, all participants were subject to NYSERDA inspection, and a sampling of projects were to undergo project-level data collection and M&V.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Renewables/DER	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Solar Plus Energy Storage
<b>Initiative Period</b>	2019 (new) – 2021; inactive initiative
<b>Initiative Description</b>	
This Solar Plus Energy Storage initiative worked in conjunction with the Reducing Barriers to Deploying Distributed Energy Storage to address soft cost barriers, as well as enabling industry and utilities to address interconnection, metering and compensation mechanisms associated with paired combination systems sooner than otherwise would have occurred. This energy storage market support was closely related to new Value of Distributed Energy Resource tariffs in that it improved the value of distributed renewable energy by shifting the energy output to more valuable times of day.	
<b>Gross Savings Methodology</b>	
As per the New York State Energy Storage Roadmap, the resulting public benefits of the deployment of 3,000 MW of energy storage are expected to include over \$3 billion in gross lifetime benefits to New York’s utility customers, approximately 30,000 new jobs, the elimination of approximately 2 million metric tons of greenhouse gas (GHG) emissions, and the avoidance of criteria air pollutant emissions such as nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter deployed in New York over the life of the storage assets. The carbon benefits from adding energy storage grow substantially as the state approaches higher levels of renewable generation that would otherwise be curtailed, especially at night. Charging the storage with off-peak renewable energy to discharge and displace fossil generation during peak periods of demand will provide a substantial benefit to the state’s carbon footprint and air quality.	
<b>Realization Rate (RR)</b>	
No RR has been determined for this program within the preceding five-year time frame	
<b>Planned Verified Gross Savings Approach</b>	
Solar Plus Energy Storage will undergo Gross Savings Analysis for program period 2019-2022. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan in Q4 2022. The estimated completion of the Gross Savings Analysis Report is Q4 2023 as part of the comprehensive Solar PV + Energy Storage evaluation. Independent evaluator DNV is performing the Gross Savings Analysis.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Area:</b> Clean Heating & Cooling	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Solar Thermal Transition
<b>Initiative Period</b>	2016 – 2019; inactive initiative
<b>Initiative Description</b>	
The Solar Thermal Transition initiative was initially offered in 2016 and was an extension of a Renewable Portfolio Standard solar thermal program. The initiative 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.	
<b>Gross Savings Methodology</b>	
Growth and geographic representation of the list of eligible installers were monitored to ensure the installer network could support consumer demand. All technical and implementation assistance projects, as part of this program, were reviewed by a NYSERDA technical reviewer prior to approval and payment.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Exemption from EAM Status</b>	

<b>Focus Area:</b> Workforce Development	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Talent Pipeline
<b>Initiative Period</b>	2018 – present (active)
<b>Initiative Description</b>	
The Talent Pipeline initiative will create a clean energy, electrification, and energy efficiency talent pipeline, through a proactive approach of defining, attracting and developing the right mix of critical talent in a pool of internal and external candidates. Through increasing training capacity, incenting businesses to train new hires through on-the-job training, and an internship program, the initiative will ensure that New York has the skilled workers necessary to meet clean energy and energy efficiency business needs.	
<b>Gross Savings Methodology</b>	
Energy savings are not calculated for the Talent Pipeline initiative.	
<b>Realization Rate (RR)</b>	
Gross Savings Analysis will not be undertaken for this initiative.	
<b>Planned Verified Gross Savings Approach</b>	
Gross Savings Analysis will not be undertaken for this initiative; however, impact evaluation consultants have provided analysis in support of the indirect impact assessment of this initiative. Market evaluation (encompassing the aforementioned indirect impact assessment) has been conducted on this initiative and will be combined with a Gross Savings Analysis and market evaluation of the Building Operations and Maintenance initiative that will be filed in alignment with the Q3 2022 CEF report.	
<b>Exemption from EAM Status</b>	
N/A	

<b>Focus Areas:</b> Comm/Ind/Ag and Multifamily Residential	<b>Date of CEF filing:</b> November 1, 2022
<b>Initiative Name</b>	Technical Services
<b>Initiative Period</b>	<u>Initiative Period by Focus Area:</u> Comm/Ind/Ag: 2018 – present; active initiative Multifamily Residential: 2020 – present; active initiative
<b>Sub-initiatives</b>	
<b>Sub-Initiatives</b>	Commercial Technical Services (FlexTech and On-Site Energy Manager); Multifamily FlexTech; Industrial Flex Tech Agriculture Energy Audit (FlexTech)
<b>Initiative Description</b>	
<p>The Technical Services initiative was initially offered in 2018 and was a continuation of a long-standing NYSERDA program. The benefits of energy efficiency measures are not always apparent to end-users. Technical Services seeks to show the benefits of clean energy technologies through pilot programs which can demonstrate value to users, through cost-sharing of site-specific energy efficiency studies (FlexTech), as well as establishing best practices for these actions. This initiative encompasses the Commercial, Industrial, Agriculture and Multifamily sectors and is comprised of Commercial Technical Services (FlexTech and On-Site Energy Manager), Multifamily FlexTech, Industrial FlexTech and Agriculture Energy Audit (FlexTech).</p>	
<b>Gross Savings Methodology</b>	
<p><b>Commercial and Multifamily FlexTech:</b> Energy savings calculated using the formulas and factors found in the Technical Resource Manual or through other sound engineering practices. These engineering practices are industry standard calculation methodologies and implemented by contractors. These methodologies are reviewed and validated by NYSERDA.</p> <p><b>Commercial On-Site Energy Manager:</b> Acquired savings are reported as measures are installed. There is no additional program M&amp;V to determine energy savings.</p> <p><b>Industrial FlexTech:</b> Energy savings from the FlexTech effort are calculated by FlexTech consultants. The FlexTech savings reports are then reviewed by a NYSERDA project manager and reviewed for Quality Assurance and Quality Control by Program staff and a technical review contractor under contract by Program.</p> <p><b>Agriculture Energy Audit (FlexTech):</b> Savings from the Agriculture Energy Audit effort are calculated by FlexTech consultants. The FlexTech savings reports are then reviewed by a NYSERDA project manager and reviewed for Quality Assurance and Quality Control by Program staff and a technical review contractor under contract by Program.</p>	
<b>Realization Rate (RR)</b>	
No RR has been determined for this initiative within the preceding five-year time frame.	
<b>Planned Verified Gross Savings Approach</b>	
<p><b>Commercial FlexTech:</b> Technical Services will undergo Gross Savings Analysis for program period 2017-2019. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan in Q1 2023. The estimated completion of this report is Q4 2023. An independent evaluation contractor will be competitively procured by NYSERDA to perform these analyses.</p> <p><b>Commercial OSEM:</b> Gross Savings Analysis for Commercial OsEM is currently underway for program period 2018-2022. Michaels Energy was competitively selected by NYSERDA to perform this analysis. Details related to the Gross Savings Analysis methodology were submitted in an EM&amp;V Plan filed Q3 2022. A follow up to this study, employing an incremental impact evaluation approach whereby data is analyzed on a frequent, periodic basis and findings shared to offer more real-time feedback on program performance, is expected to be complete by Q2 2023.</p> <p><b>Industrial FlexTech:</b> Industrial FlexTech will undergo Gross Savings Analysis for program period 2017-2019. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan in Q1 2023. The estimated completion of this report is Q4 2023. An independent evaluation contractor will be competitively procured by NYSERDA to perform these analyses.</p> <p><b>Agriculture Energy Audit:</b> The Agricultural Energy Audit sub-initiative will undergo Gross Savings Analysis for program period 2017-2019. Details related to the Gross Savings Analysis methodology will be submitted in an EM&amp;V Plan filed in Q4 2022. The estimated completion of the report is Q2 2023. Independent evaluator, Michaels Energy, will conduct the Gross Savings Analysis. In addition to the Agriculture Energy Audit sub-initiative, the Gross Savings Analysis will also evaluate the Advancing Agricultural Energy Technologies and Greenhouse Lighting and Systems Engineering (GLASE) initiatives.</p> <p><b>Multifamily FlexTech:</b> No Gross Savings Analysis is currently planned for this sector.</p>	
<b>Exemption from EAM Status</b>	
N/A	

# Clean Energy Fund

## Compiled Investment Plans

# Section IV

## Budgets and Benefits Plan

### Contents

Budget and Benefit Summary (Tables 1 – 11)  
Performance Management, Analyses &  
Evaluation Budget (Table 12)

## Budgets and Benefits Summary Tables

**Table 1. CEF Performance Targets & Tracking Metrics**

Performance Targets and Definitions		Performance Target 2025	Performance Target 2030	Lifetime Benefits <sup>2</sup>
Energy Efficiency (EE)	Cumulative Annual Gross Site EE Acquired <sup>1</sup>	53 TBTU	79 TBTU	1,150 TBTU
	Cumulative Annual Gross Electricity Savings - approximate	23 TBTU (6.7 million MWH)	34 TBTU (10 million MWH)	440 TBTU (130 million MWH)
	Cumulative Annual Gross Natural Gas Savings - approximate	25 TBTU	38 TBTU	490 TBTU
	Cumulative Annual Gross Other Fuels Savings - approximate	15 TBTU	17 TBTU	220 TBTU
Renewable Energy (RE)	RE Distributed Solar Capacity Installed in NYS	6 GW	10 GW	n/a
Mobilize Clean Energy Investment	Mobilization/Leveraged Funds	\$20 billion	n/a	n/a
Equity for Disadvantaged Communities	Benefits of CEF Investments Accruing to Disadvantaged Communities	40%	40%	n/a
Tracking Metrics & Definitions		2025	2030	Lifetime Benefits <sup>2</sup>
Emission Reductions	Annual CO <sub>2</sub> e Million Metric Tons (MMT) <sup>3</sup>	9	14	252
Clean Energy Jobs	Statewide Clean Energy Industry Jobs	To be tracked and reported		n/a
	Priority Populations Trained and Employed in Clean Energy			
Participant Bill Savings	Energy Bill Savings for Participating Customers	To be tracked and reported		
	Energy Bill Savings for Participating LMI Households			
Local Air Quality	Reduced On-Site Fossil Fuel Combustion in EJ Areas	To be tracked and reported		

1 Cumulative Annual EE Acquired is less than the sum of Electricity, Natural Gas and Other Fuels savings due to netting out usage associated with electrification and other fuel switches.

2 Lifetime Benefits are calculated values and not considered performance targets; they are estimated and provided here to give a full understanding of the longer-term expected Return on Investment (ROI) of the CEF.

3 Carbon factors used in this metrics proposal are: 1,100 lbs/MWH electricity, 117 lbs/MMBTU natural gas, and 162 lbs/MMBTU as a value for all other fuels.

**Table 2. Market Development and Innovation & Research Portfolio Budgets**

	Program Authorization	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total	% of Program Authorization
<b>Market Development</b>																		
Program Funds	\$2,399,728,000	\$28,330,769	\$74,998,896	\$108,565,573	\$158,895,757	\$183,968,185	\$209,032,904	\$205,469,752	\$242,981,083	\$287,477,700	\$308,518,768	\$233,108,035	\$152,143,947	\$88,770,505	\$38,837,209	\$6,073,079	\$2,327,172,162	98%
NYS Cost Recovery Fee		\$732,593	\$1,202,947	\$1,582,111	\$1,911,061	\$2,213,325	\$2,505,054	\$2,373,927	\$2,780,263	\$3,187,257	\$3,420,828	\$2,545,923	\$1,610,088	\$942,484	\$418,279	\$90,931	\$27,517,071	
<b>Innovation &amp; Research</b>																		
Program Funds	\$631,672,000	\$400,620	\$5,166,206	\$21,682,230	\$24,919,357	\$40,715,279	\$54,957,026	\$46,120,930	\$70,230,574	\$112,778,173	\$92,262,173	\$52,778,369	\$33,612,045	\$10,081,484	\$380,125	\$0	\$566,084,591	91%
NYS Cost Recovery Fee		\$10,172	\$73,012	\$318,550	\$287,036	\$489,822	\$574,562	\$532,865	\$803,702	\$1,250,235	\$1,018,539	\$580,053	\$356,475	\$107,036	\$4,094	\$0	\$6,406,154	
<b>Administration</b>	\$274,400,000	\$13,732,321	\$25,207,817	\$28,885,275	\$23,097,895	\$24,478,353	\$24,517,046	\$24,378,705	\$27,742,711	\$28,759,300	\$29,608,642	\$13,800,257	\$0	\$0	\$0	\$0	\$264,208,322	96%
<b>Evaluation</b>	\$124,200,000	\$146,687	\$1,024,008	\$1,386,268	\$1,707,429	\$4,214,978	\$7,375,946	\$14,709,880	\$17,433,189	\$14,746,031	\$13,948,926	\$12,578,892	\$10,827,500	\$6,100,000	\$3,020,000	\$3,020,000	\$112,239,733	90%
<b>Total</b>	<b>\$3,430,000,000</b>	<b>\$43,353,163</b>	<b>\$107,672,885</b>	<b>\$162,420,007</b>	<b>\$210,818,534</b>	<b>\$256,079,942</b>	<b>\$298,962,537</b>	<b>\$293,586,061</b>	<b>\$361,971,522</b>	<b>\$448,198,696</b>	<b>\$448,777,876</b>	<b>\$315,391,529</b>	<b>\$198,550,054</b>	<b>\$106,001,509</b>	<b>\$42,659,707</b>	<b>\$9,184,010</b>	<b>\$3,303,628,033</b>	<b>96%</b>

**Table 3. Market Development and Innovation & Research Budgets by Focus Area and Initiative**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
<b>Innovation &amp; Research</b>	\$ 410,792	\$ 5,239,218	\$ 22,000,780	\$ 25,206,393	\$ 41,205,101	\$ 55,531,588	\$ 46,653,796	\$ 71,034,277	\$ 114,028,408	\$ 93,280,712	\$ 53,358,421	\$ 33,968,520	\$ 10,188,520	\$ 384,219	\$ -	\$ 572,490,745
Buildings Innovation	\$ -	\$ 67,932	\$ 400,220	\$ 1,573,179	\$ 1,715,348	\$ 2,354,620	\$ 4,268,560	\$ 10,216,667	\$ 20,180,260	\$ 13,005,000	\$ 10,030,001	\$ 7,237,475	\$ 3,950,738	\$ -	\$ -	\$ 75,000,000
ClimateTech Commercialization Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,666,666	\$ 7,666,667	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,000,000
NextGen Buildings	\$ -	\$ 67,932	\$ 400,220	\$ 1,573,179	\$ 1,715,348	\$ 2,354,620	\$ 4,101,894	\$ 8,050,000	\$ 12,513,593	\$ 13,005,000	\$ 10,030,001	\$ 7,237,475	\$ 3,950,738	\$ -	\$ -	\$ 65,000,000
Clean Transportation Innovation	\$ -	\$ 153,233	\$ 844,622	\$ 1,965,472	\$ 2,373,086	\$ 3,232,087	\$ 2,760,000	\$ 5,890,000	\$ 12,150,000	\$ 10,150,000	\$ 6,772,470	\$ 3,203,284	\$ 855,746	\$ -	\$ -	\$ 50,350,000
Electric Vehicle Innovation	\$ -	\$ 153,233	\$ 666,820	\$ 1,356,710	\$ 1,133,772	\$ 1,899,493	\$ 1,680,000	\$ 4,050,000	\$ 9,000,000	\$ 6,550,000	\$ 3,706,470	\$ 1,653,502	\$ -	\$ -	\$ -	\$ 31,850,000
Public Transportation and Electrified Rail	\$ -	\$ -	\$ 177,803	\$ 608,762	\$ 1,239,314	\$ 1,332,594	\$ 1,080,000	\$ 1,840,000	\$ 3,150,000	\$ 3,600,000	\$ 3,066,000	\$ 1,549,782	\$ 855,746	\$ -	\$ -	\$ 18,500,000
Climate Resilience Innovation	\$ -	\$ 653	\$ -	\$ -	\$ 172,555	\$ 303,144	\$ 50,000	\$ 1,390,000	\$ 1,963,302	\$ 2,168,600	\$ 1,930,000	\$ 772,400	\$ -	\$ -	\$ -	\$ 8,750,653
Hydrogen Innovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 490,000	\$ 1,639,000	\$ 2,168,600	\$ 1,930,000	\$ 772,400	\$ -	\$ -	\$ -	\$ 7,000,000
Market Characterization & Design Innovation & Research	\$ -	\$ 653	\$ -	\$ -	\$ 172,555	\$ 303,144	\$ 50,000	\$ 900,000	\$ 324,302	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,750,653
Energy Focused Environmental Research	\$ -	\$ 97,601	\$ 1,189,333	\$ 1,899,070	\$ 9,266,067	\$ 5,505,804	\$ 5,221,394	\$ 6,276,000	\$ 5,977,000	\$ 4,177,000	\$ 3,777,000	\$ 2,633,606	\$ 1,400,000	\$ 380,125	\$ -	\$ 47,800,000
Energy-Related Environmental Research	\$ -	\$ 97,601	\$ 1,189,333	\$ 1,899,070	\$ 9,266,067	\$ 5,505,804	\$ 5,221,394	\$ 6,276,000	\$ 5,977,000	\$ 4,177,000	\$ 3,777,000	\$ 2,633,606	\$ 1,400,000	\$ 380,125	\$ -	\$ 47,800,000
Gas Innovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,946,000	\$ 9,612,000	\$ 11,814,000	\$ 7,848,000	\$ 6,780,000	\$ -	\$ -	\$ -	\$ 40,000,000
Hydrogen Innovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,646,000	\$ 3,612,000	\$ 4,660,000	\$ 3,848,000	\$ -	\$ -	\$ -	\$ -	\$ 20,000,000
Long Duration Energy Storage	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,800,000	\$ 4,000,000	\$ 5,080,000	\$ 4,000,000	\$ 2,120,000	\$ -	\$ -	\$ -	\$ 17,000,000
Utility Thermal Network Technical Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500,000	\$ 2,000,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,000,000
Grid Modernization	\$ 400,620	\$ 4,732,411	\$ 14,396,838	\$ 7,595,754	\$ 7,028,794	\$ 12,514,270	\$ 6,630,954	\$ 13,475,960	\$ 19,077,778	\$ 20,404,789	\$ 14,894,200	\$ 9,542,121	\$ 2,800,000	\$ -	\$ -	\$ 133,494,490
Future Grid Performance Challenge	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,350,000	\$ 5,400,000	\$ 8,900,000	\$ 10,750,000	\$ 8,400,000	\$ 5,400,000	\$ 2,800,000	\$ -	\$ -	\$ 43,000,000
Grid ClimateTech Ready Capital	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 730,000	\$ 1,600,000	\$ 2,900,000	\$ 2,070,000	\$ 1,700,000	\$ -	\$ -	\$ -	\$ 9,000,000
High Performing Electric Grid	\$ 400,620	\$ 1,409,833	\$ 3,092,036	\$ 5,523,134	\$ 7,034,304	\$ 12,514,270	\$ 5,280,954	\$ 7,345,960	\$ 8,577,778	\$ 6,754,789	\$ 4,424,200	\$ 2,442,121	\$ -	\$ -	\$ -	\$ 64,800,000
Power Electronics Manufacturing Consortium	\$ -	\$ 3,322,578	\$ 11,304,802	\$ 2,072,620	\$ (5,510)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,694,490
Negative Emissions Technologies	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 125,000	\$ 1,640,995	\$ 2,158,495	\$ 3,333,494	\$ 3,728,495	\$ 3,225,000	\$ 2,327,500	\$ 1,075,000	\$ -	\$ -	\$ 17,613,980
CarbonTech Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 125,000	\$ 1,640,995	\$ 1,595,995	\$ 1,608,494	\$ 28,495	\$ -	\$ 115,000	\$ -	\$ -	\$ -	\$ 5,113,980
Natural Carbon Solutions	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 562,500	\$ 3,700,000	\$ 3,225,000	\$ 2,212,500	\$ 1,075,000	\$ -	\$ -	\$ -	\$ 12,500,000
NYS Cost Recovery Fee Innovation & Research	\$ 10,172	\$ 73,012	\$ 318,550	\$ 287,036	\$ 489,822	\$ 574,562	\$ 532,865	\$ 803,702	\$ 1,250,235	\$ 1,018,539	\$ 580,053	\$ 356,475	\$ 107,036	\$ 4,094	\$ -	\$ 6,406,154
NYS Cost Recovery Fee Innovation & Research	\$ 10,172	\$ 73,012	\$ 318,550	\$ 287,036	\$ 489,822	\$ 574,562	\$ 532,865	\$ 803,702	\$ 1,250,235	\$ 1,018,539	\$ 580,053	\$ 356,475	\$ 107,036	\$ 4,094	\$ -	\$ 6,406,154
Renewables Optimization	\$ -	\$ 19,605	\$ 744,429	\$ 2,926,255	\$ 3,932,320	\$ 5,737,084	\$ 7,485,000	\$ 11,950,000	\$ 15,110,000	\$ 9,144,649	\$ 3,900,000	\$ 1,050,658	\$ -	\$ -	\$ -	\$ 62,000,000
Energy Storage Technology and Product Development	\$ -	\$ 19,605	\$ 741,849	\$ 1,185,296	\$ 2,091,577	\$ 2,450,000	\$ 2,450,000	\$ 7,700,000	\$ 11,200,000	\$ 3,900,000	\$ 3,900,000	\$ 1,050,658	\$ -	\$ -	\$ -	\$ 39,500,000
National Offshore Wind Research & Development Consortium	\$ -	\$ -	\$ 2,581	\$ 1,740,959	\$ 1,070,743	\$ 3,646,068	\$ 5,035,000	\$ 4,250,000	\$ 3,910,000	\$ 2,844,649	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,500,000
Technology to Market	\$ -	\$ 94,771	\$ 4,106,787	\$ 8,959,627	\$ 16,227,110	\$ 25,185,018	\$ 18,064,027	\$ 14,927,452	\$ 25,374,340	\$ 17,669,639	\$ 401,698	\$ 65,000	\$ -	\$ -	\$ -	\$ 131,075,468
CarbonTech Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 175,000	\$ 2,916,505	\$ 3,821,505	\$ 4,459,005	\$ 2,879,005	\$ 46,000	\$ 65,000	\$ -	\$ -	\$ -	\$ 14,362,020
Catalytic Capital for ClimateTech	\$ -	\$ -	\$ 741,882	\$ 1,955,107	\$ 4,124,468	\$ 6,066,285	\$ 3,416,015	\$ 1,664,179	\$ 1,291,885	\$ 100,408	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,360,229
ClimateTech Commercialization Support	\$ -	\$ 55,175	\$ 2,853,190	\$ 3,338,569	\$ 5,214,382	\$ 11,053,435	\$ 6,336,261	\$ 5,869,271	\$ 10,870,424	\$ 8,915,187	\$ 355,698	\$ -	\$ -	\$ -	\$ -	\$ 54,861,590
ClimateTech Expertise & Talent	\$ -	\$ -	\$ 32,469	\$ 676,270	\$ 1,840,958	\$ 1,991,930	\$ 2,508,014	\$ 1,769,054	\$ 1,836,838	\$ 1,393,743	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,049,276
Manufacturing Corps	\$ -	\$ 39,596	\$ 445,328	\$ 2,214,178	\$ 2,712,191	\$ 4,692,031	\$ 2,123,969	\$ 518,726	\$ 2,156,470	\$ 2,156,470	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 17,058,959
Novel Business Models and Offerings	\$ -	\$ -	\$ 33,918	\$ 775,504	\$ 2,335,111	\$ 1,206,337	\$ 763,263	\$ 1,284,717	\$ 4,759,717	\$ 2,224,827	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,383,394
<b>Market Development</b>	\$ 29,063,362	\$ 76,201,843	\$ 110,147,684	\$ 160,806,818	\$ 186,181,510	\$ 211,537,958	\$ 207,843,680	\$ 245,761,346	\$ 290,664,957	\$ 311,939,596	\$ 235,653,958	\$ 153,754,034	\$ 89,712,989	\$ 39,255,488	\$ 6,164,010	\$ 2,354,689,233
Clean Heat & Cooling	\$ 53,589	\$ 2,848,494	\$ 12,936,668	\$ 22,898,631	\$ 14,097,090	\$ 17,090,001	\$ 15,980,521	\$ 16,292,373	\$ 13,014,784	\$ 9,582,377	\$ 3,932,184	\$ -	\$ -	\$ -	\$ -	\$ 128,726,712
Heat Pumps Phase 1 (2017)	\$ -	\$ 2,043,606	\$ 10,667,927	\$ 19,117,883	\$ 10,592,795	\$ 6,506,785	\$ 2,075,582	\$ 2,806,508	\$ 2,139,443	\$ 1,541,157	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,491,685
Heat Pumps Phase 2 (2020)	\$ -	\$ -	\$ -	\$ -	\$ 390,966	\$ 8,084,173	\$ 13,179,437	\$ 13,033,617	\$ 10,875,342	\$ 8,041,221	\$ 3,932,184	\$ -	\$ -	\$ -	\$ -	\$ 57,536,939
Renewable Heat NY - Clean and Efficient Biomass Heating	\$ -	\$ 730,210	\$ 2,170,500	\$ 3,719,735	\$ 3,113,328	\$ 2,499,043	\$ 725,502	\$ 452,248	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,410,575
Solar Thermal Transition	\$ 53,589	\$ 74,678	\$ 98,232	\$ 61,013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 287,513
Codes and Standards, & Other Multisector Initiatives	\$ 316,111	\$ 2,518,648	\$ 4,635,251	\$ 4,283,387	\$ 5,336,361	\$ 7,376,110	\$ 9,622,218	\$ 15,911,535	\$ 25,127,919	\$ 27,613,870	\$ 15,405,547	\$ 6,939,328	\$ 5,759,824	\$ 805,402	\$ -	\$ 131,651,510
Codes and Standards for Carbon Neutral Buildings	\$ -	\$ 11,548	\$ 362,842	\$ 751,224	\$ 2,066,850	\$ 3,188,782	\$ 3,806,653	\$ 5,465,000	\$ 9,085,000	\$ 12,525,000	\$ 10,050,000	\$ 5,250,000	\$ 4,151,698	\$ 285,402	\$ -	\$ 57,000,000
Information Products and Brokering	\$ -	\$ -	\$ -	\$ 332,912	\$ 304,928	\$ 657,530	\$ 470,000	\$ 440,000	\$ 1,183,260	\$ 1,471,370	\$ 640,000	\$ -	\$ -	\$ -	\$ -	\$ 5,500,000
Market Characterization & Design Market Development	\$ 256,956	\$ 1,289,446	\$ 3,329,618	\$ 2,432,445	\$ 2,497,104	\$ 2,224,061	\$ 3,106,158	\$ 4,231,155	\$ 5,090,599	\$ 5,679,921	\$ 315,047	\$ -	\$ -	\$ -	\$ -	\$ 30,452,510
Product and Appliance Standards	\$ -	\$ -	\$ -	\$ 151,061	\$ 21,777	\$ 605,862	\$ 1,705,907	\$ 4,443,380	\$ 5,969,060	\$ 4,584,000	\$ 4,400,500	\$ 1,689,328	\$ 1,608,126	\$ 520,000	\$ -	\$ 25,699,000
REV Connect	\$ 59,155	\$ 1,217,655	\$ 942,791	\$ 615,745	\$ 445,701	\$ 699,875	\$ 533,500	\$ 1,332,000	\$ 3,800,000	\$ 3,353,579	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000,000
Commercial / Industrial / Agriculture	\$ 1,755,713	\$ 9,360,200	\$ 17,910,145	\$ 34,108,763	\$ 40,104,949	\$ 46,821,275	\$ 31,027,287	\$ 41,621,543	\$ 63,572,569	\$ 77,128,225	\$ 58,025,268	\$ 47,222,885	\$ 38,801,997	\$ 21,426,746	\$ -	\$ 528,887,564
Advancing Agricultural Energy Technologies	\$ -	\$ -	\$ 1,929	\$ 14,508	\$ 154,704	\$ 119,907	\$ -	\$ 875,000	\$ 1,225,000	\$ 1,368,952	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,760,000
Agriculture Transition	\$ 582,121	\$ 1,530,330	\$ 1,277,431	\$ 192,950	\$ 12,755	\$ 3,235	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,598,821
Commercial Transition	\$ 202,172	\$ 1,526,403	\$ 2,115,468	\$ 2,599,697	\$ 2,802,752	\$ 1,238,789	\$ 657,518	\$ 330,000	\$ 350,000	\$ 450,000	\$ 286,349	\$ -	\$ -	\$ -	\$ -	\$ 12,559,148
Energy Management Practices	\$ -	\$ 1,158,498	\$ 1,891,601	\$ 2,132,176	\$ 2,266,377	\$ 2,571,649	\$ 2,627,500	\$ 3,539,500	\$ 4,665,580	\$ 4,538,930	\$ 2,477,577	\$ 643,632	\$ 181,879	\$ 181,879	\$ -	\$ 28,876,778
Energy Management Technology	\$ 23,799	\$ 743,407	\$ 2,222,557	\$ 5,914,210	\$ 9,632,706	\$ 12,822,799	\$ 8,220,088	\$ 10,491,000	\$ 14,848,458	\$ 20,557,407	\$ 12,683,249	\$ 9,601,385	\$ 537,797	\$ -	\$ -	\$ 108,298,862
Greenhouse Lighting and Systems Engineering	\$ -	\$ 233,148	\$ 337,744	\$ 416,250	\$ 522,485	\$ 814,583	\$ 609,125	\$ 482,648	\$ 812,095	\$ 609,707	\$ 162,215	\$ -	\$ -	\$ -		

**Table 3. Market Development and Innovation & Research Budgets by Focus Area and Initiative**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
LMI Pilots	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 213,166	\$ 639,499	\$ 397,717	\$ 397,717	\$ 397,717	\$ 397,717	\$ -	\$ -	\$ -	\$ 2,443,533
Low Rise New Construction Transition - LMI	\$ 40,382	\$ 314,675	\$ 1,119,597	\$ 1,716,840	\$ 2,027,074	\$ 1,476,859	\$ 403,182	\$ 375,000	\$ 473,872	\$ 22,895	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,970,376
Multifamily New Construction Transition - LMI	\$ 79,298	\$ 523,640	\$ 683,573	\$ 523,008	\$ 876,894	\$ 1,327,081	\$ 640,000	\$ 810,000	\$ 1,559,578	\$ 1,397,911	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,420,981
New Construction - LMI	\$ -	\$ 6,461	\$ 132,302	\$ 563,965	\$ 2,130,071	\$ 3,812,657	\$ 10,351,469	\$ 5,384,699	\$ 15,967,356	\$ 24,317,211	\$ 31,269,969	\$ 23,079,788	\$ 17,615,414	\$ -	\$ -	\$ 134,631,362
NYS Healthy Homes Value Based Payment Pilot	\$ -	\$ -	\$ -	\$ 1,628	\$ 920,862	\$ 285,393	\$ 621,679	\$ 3,780,136	\$ 3,590,620	\$ 590,976	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,791,294
Regional Clean Energy Hubs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 27,840	\$ 4,652,223	\$ 9,473,115	\$ 9,936,875	\$ 9,371,878	\$ 9,078,069	\$ -	\$ -	\$ -	\$ -	\$ 42,000,000
RetrolitNY - LMI	\$ -	\$ 196,977	\$ 615,393	\$ 795,471	\$ 1,467,628	\$ 787,174	\$ 1,454,847	\$ 5,353,383	\$ 10,771,999	\$ 7,726,200	\$ 1,126,522	\$ 207,907	\$ -	\$ -	\$ -	\$ 30,503,500
REvitalize	\$ -	\$ 19,908	\$ 128,344	\$ 84,643	\$ 58,612	\$ (84)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 291,424
Single Family - Low Income	\$ 14,070,422	\$ 25,534,554	\$ 26,251,482	\$ 32,074,370	\$ 34,712,813	\$ 39,592,700	\$ 52,146,000	\$ 11,245,112	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 235,627,453
Single Family - Moderate Income	\$ 5,411,774	\$ 10,185,655	\$ 10,187,601	\$ 11,117,565	\$ 13,025,570	\$ 27,687,667	\$ 16,940,000	\$ 5,535,802	\$ 2,660,202	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 102,751,836
Solar for All	\$ -	\$ 3,999	\$ 386,142	\$ 908,286	\$ 1,282,578	\$ 894,885	\$ 1,300,000	\$ 1,300,000	\$ 1,248,048	\$ 1,200,000	\$ 1,187,108	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ -	\$ 13,011,046
Multifamily Residential	\$ 46,554	\$ 89,195	\$ 199,742	\$ 1,459,255	\$ 1,838,709	\$ 3,717,869	\$ 5,426,935	\$ 13,281,869	\$ 17,299,969	\$ 14,586,784	\$ 8,440,071	\$ 5,974,187	\$ 1,057,120	\$ 1,225,206	\$ -	\$ 74,643,467
Energy Management Technology	\$ -	\$ 11,181	\$ 168,097	\$ 1,459,255	\$ 1,708,959	\$ 1,693,268	\$ 1,260,319	\$ 2,226,026	\$ 2,700,000	\$ 1,899,582	\$ 972,551	\$ -	\$ -	\$ -	\$ -	\$ 14,099,239
Market Challenges	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 650,721	\$ 1,068,197	\$ 1,327,024	\$ 4,250,000	\$ 2,671,104	\$ 32,954	\$ -	\$ -	\$ -	\$ -	\$ 10,000,000
Multifamily Low Carbon Pathways	\$ -	\$ -	\$ -	\$ -	\$ 15,189	\$ 218,517	\$ 1,649,078	\$ 3,900,954	\$ 5,224,995	\$ 6,010,078	\$ 4,182,450	\$ 3,358,976	\$ 77,778	\$ -	\$ -	\$ 24,638,016
Multifamily Market Rate Transition	\$ 46,554	\$ 78,014	\$ 31,645	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 156,214
Technical Services	\$ -	\$ -	\$ -	\$ -	\$ 114,561	\$ 1,155,362	\$ 1,449,340	\$ 5,827,866	\$ 5,124,974	\$ 4,006,020	\$ 3,252,116	\$ 2,615,211	\$ 979,342	\$ 1,225,206	\$ -	\$ 25,749,999
New Construction	\$ 492,452	\$ 2,123,690	\$ 2,858,857	\$ 3,705,904	\$ 7,198,039	\$ 5,822,798	\$ 4,958,182	\$ 4,401,359	\$ 16,211,804	\$ 27,112,615	\$ 29,288,893	\$ 24,481,888	\$ 16,444,881	\$ 11,930,204	\$ 5,773,079	\$ 162,804,647
Commercial New Construction Transition	\$ 104,002	\$ 963,193	\$ 1,469,257	\$ 1,577,158	\$ 2,362,664	\$ 1,502,912	\$ 555,000	\$ 750,000	\$ 1,744,174	\$ 2,066,270	\$ 1,551,353	\$ -	\$ -	\$ -	\$ -	\$ 14,645,983
Low Rise New Construction Transition - Market Rate	\$ 346,032	\$ 886,120	\$ 845,395	\$ 834,336	\$ 495,311	\$ 1,477,205	\$ 148,182	\$ 137,359	\$ 115,000	\$ 96,346	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,381,285
Multifamily New Construction Transition - Market Rate	\$ 42,418	\$ 268,317	\$ 213,189	\$ 239,080	\$ 312,259	\$ 111,179	\$ 175,000	\$ 124,000	\$ 141,431	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,626,873
New Construction - Market Rate	\$ -	\$ 6,060	\$ 331,016	\$ 1,055,329	\$ 4,027,805	\$ 3,731,502	\$ 4,080,000	\$ 3,390,000	\$ 14,211,199	\$ 24,950,000	\$ 27,737,540	\$ 24,481,888	\$ 16,444,881	\$ 11,930,204	\$ 5,773,079	\$ 142,150,505
NYS Cost Recovery Fee Market Development	\$ 732,593	\$ 1,202,947	\$ 1,582,111	\$ 1,911,061	\$ 2,213,325	\$ 2,505,054	\$ 2,373,927	\$ 2,780,263	\$ 3,187,257	\$ 3,420,828	\$ 2,545,923	\$ 1,610,088	\$ 942,484	\$ 418,279	\$ 90,931	\$ 27,517,071
NYS Cost Recovery Fee Market Development	\$ 732,593	\$ 1,202,947	\$ 1,582,111	\$ 1,911,061	\$ 2,213,325	\$ 2,505,054	\$ 2,373,927	\$ 2,780,263	\$ 3,187,257	\$ 3,420,828	\$ 2,545,923	\$ 1,610,088	\$ 942,484	\$ 418,279	\$ 90,931	\$ 27,517,071
Renewables / Distributed Energy Resources (DER)	\$ 1,223,748	\$ 9,650,664	\$ 11,595,136	\$ 16,009,922	\$ 16,110,838	\$ 14,100,734	\$ 16,081,507	\$ 50,717,389	\$ 19,826,904	\$ 4,936,317	\$ 3,526,248	\$ 2,079,244	\$ 845,317	\$ 300,000	\$ 300,000	\$ 167,303,968
Anaerobic Digesters Transition	\$ -	\$ 91,160	\$ 360,755	\$ 686,047	\$ 2,310,889	\$ 744,204	\$ 903,201	\$ 4,050,000	\$ 2,274,468	\$ 450,000	\$ 450,000	\$ 363,309	\$ 350,000	\$ 300,000	\$ 300,000	\$ 13,634,032
Clean Energy Siting and Soft Cost Reduction	\$ -	\$ -	\$ 114,419	\$ 287,058	\$ 615,279	\$ 288,386	\$ 337,808	\$ 1,313,777	\$ 1,316,828	\$ 1,972,176	\$ 1,383,333	\$ 1,165,935	\$ -	\$ -	\$ -	\$ 8,795,000
Combined Heat & Power Transition	\$ 265,275	\$ 3,157,588	\$ 5,491,461	\$ 7,952,317	\$ 7,541,382	\$ 6,808,305	\$ 4,141,142	\$ 12,124,782	\$ 10,609,657	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 58,091,908
Fuel Cells	\$ -	\$ -	\$ 35,733	\$ 49,297	\$ 852,819	\$ 1,848,789	\$ 500,000	\$ 2,156,250	\$ 1,756,256	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,199,144
Offshore Wind Master Plan	\$ 450,000	\$ 786,410	\$ 3,507,474	\$ 174,531	\$ 20	\$ 37,219	\$ 10,227	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,965,882
Offshore Wind Pre-Development Activities	\$ 7,666	\$ 4,213,949	\$ (847,410)	\$ 3,189,046	\$ 1,072,991	\$ 1,067,282	\$ 743,129	\$ 342,809	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,789,462
ORES Support	\$ -	\$ -	\$ -	\$ -	\$ 667,646	\$ 1,229,407	\$ 500,000	\$ 2,250,000	\$ 2,500,000	\$ 1,250,000	\$ 602,947	\$ -	\$ -	\$ -	\$ -	\$ 9,000,000
Reducing Barriers to Distributed Deployment	\$ -	\$ 226,753	\$ 2,700,481	\$ 2,889,619	\$ 2,911,544	\$ 387,482	\$ 235,000	\$ 1,330,000	\$ 1,369,696	\$ 1,264,141	\$ 1,089,967	\$ 550,000	\$ 495,317	\$ -	\$ -	\$ 15,450,000
Small Wind Transition	\$ 500,807	\$ 1,174,803	\$ 232,224	\$ 782,007	\$ 138,267	\$ 265,160	\$ 464,499	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,557,768
Solar Plus Energy Storage	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,424,500	\$ 8,246,500	\$ 27,149,772	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 36,820,772
Single Family Residential	\$ 4,704,744	\$ 5,848,114	\$ 5,629,439	\$ 7,987,373	\$ 4,882,460	\$ 4,686,550	\$ 6,283,293	\$ 18,192,829	\$ 21,607,595	\$ 16,905,445	\$ 7,483,251	\$ -	\$ -	\$ -	\$ -	\$ 104,211,093
Consumer Awareness	\$ -	\$ -	\$ -	\$ 12,733	\$ 924,424	\$ 948,689	\$ 365,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,251,671
Heat Pumps Phase 2 (2020)	\$ -	\$ -	\$ -	\$ -	\$ 178,339	\$ 435,443	\$ 686,208	\$ 1,700,000	\$ 3,350,000	\$ 4,400,000	\$ 1,250,011	\$ -	\$ -	\$ -	\$ -	\$ 12,000,000
Pay for Performance	\$ -	\$ -	\$ 6,162	\$ 170,423	\$ 257,728	\$ 199,750	\$ 450,186	\$ 1,900,000	\$ 2,360,000	\$ 2,300,000	\$ 1,785,915	\$ -	\$ -	\$ -	\$ -	\$ 9,430,163
Residential	\$ -	\$ -	\$ 219,459	\$ 1,991,640	\$ 1,868,454	\$ 3,009,366	\$ 4,766,748	\$ 14,592,829	\$ 15,897,595	\$ 10,205,445	\$ 4,447,325	\$ -	\$ -	\$ -	\$ -	\$ 56,998,862
Single Family Market Rate Transition	\$ 4,704,744	\$ 5,848,114	\$ 5,403,818	\$ 5,812,577	\$ 1,653,515	\$ 93,301	\$ 14,327	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,530,396
Transportation	\$ -	\$ 4,396,761	\$ 7,587,903	\$ 9,576,797	\$ 14,981,337	\$ 2,639,165	\$ 200,000	\$ 118,037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46,700,000
Electric Vehicles - Rebate	\$ -	\$ 4,396,761	\$ 7,587,903	\$ 9,576,797	\$ 14,981,337	\$ 2,639,165	\$ 200,000	\$ 118,037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 39,500,000
EV Charging and Engagement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,250,000	\$ 3,400,000	\$ 1,900,000	\$ 595,000	\$ 55,000	\$ -	\$ -	\$ -	\$ 7,200,000
Workforce Development	\$ -	\$ 247,935	\$ 1,193,788	\$ 3,490,056	\$ 7,210,983	\$ 11,497,534	\$ 10,326,376	\$ 12,021,005	\$ 15,427,127	\$ 21,260,850	\$ 17,125,622	\$ 7,884,815	\$ 658,908	\$ -	\$ -	\$ 108,345,000
Building Operations and Maintenance Partnerships	\$ -	\$ 247,935	\$ 1,192,699	\$ 2,074,385	\$ 2,062,657	\$ 2,488,058	\$ 2,397,053	\$ 2,717,188	\$ 3,536,132	\$ 5,573,750	\$ 5,490,350	\$ 5,130,885	\$ 433,908	\$ -	\$ -	\$ 33,345,000
Talent Pipeline	\$ -	\$ -	\$ 1,089	\$ 1,415,671	\$ 5,148,326	\$ 9,009,476	\$ 7,929,324	\$ 9,303,818	\$ 11,890,995	\$ 15,687,100	\$ 11,635,272	\$ 2,753,930	\$ 225,000	\$ -	\$ -	\$ 75,000,000
<b>Grand Total</b>	<b>\$ 29,474,154</b>	<b>\$ 81,441,060</b>	<b>\$ 132,148,464</b>	<b>\$ 186,013,211</b>	<b>\$ 227,386,611</b>	<b>\$ 267,069,545</b>	<b>\$ 254,497,475</b>	<b>\$ 316,795,623</b>	<b>\$ 404,693,365</b>	<b>\$ 405,220,308</b>	<b>\$ 289,012,380</b>	<b>\$ 187,722,554</b>	<b>\$ 99,901,509</b>	<b>\$ 39,639,707</b>	<b>\$ 6,164,010</b>	<b>\$ 2,927,179,978</b>

## Benefits Tables

Tables 4 through 11 provide information on benefits associated with the Market Development and Innovation & Research initiatives for which funding is represented in Tables 2 and 3.

Table 4 provides an overall summary of energy efficiency benefits by fuel type and year for each Portfolio and in total. The Indirect Benefits reflected in Table 4 shall reflect 50% of the projected Indirect benefits anticipated to account for overlap within the portfolio and uncertainty associated with the timing and measurement of Indirect benefits. All past-year direct savings values shown below are acquired savings as reported. Indirect savings in this table are a mix of estimated and evaluated values and are continuously updated as studies conclude and this information can be reported. All current and future year values are planned or forecasted savings across the portfolio of initiatives.

Tables 5 through 7 reflect fuel specific energy efficiency savings.

Tables 8 through 10 reflect additional fuel usage resulting from beneficial fuel switching.

Table 11 reflects leveraged funds.

**Table 4. Energy Efficiency Benefits Summary (Annual MWh, MMBtu)**

Portfolio / Metric	Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total	% of 2025 Target	% of 2030 Target
<b>Market Development</b>																			
MWh	Direct	14,144	79,497	152,199	271,936	384,099	387,717	372,290	692,936	698,903	544,104	314,588	228,888	136,647	64,323	8,714	4,350,983	-	-
	Indirect	-	171	21,299	30,894	69,328	69,844	177,189	342,011	559,844	906,635	710,552	711,726	687,604	689,252	764,885	5,741,230	-	-
MMBtu (Gas)	Direct	166,769	237,906	1,032,559	1,916,088	1,336,914	1,847,400	2,475,113	2,241,359	2,643,190	2,918,570	2,973,251	2,792,570	2,055,017	1,310,086	122,419	26,069,213	-	-
	Indirect	-	200	22,429	34,952	163,308	220,478	590,041	993,288	1,615,810	2,939,561	2,263,528	2,468,640	2,143,200	2,293,160	3,599,911	19,348,505	-	-
MMBtu (Other)	Direct	73,320	280,313	9,294,415	655,323	967,832	580,150	385,117	377,832	459,832	573,697	429,515	395,701	174,803	144,224	12,007	14,804,081	-	-
	Indirect	-	-	6,699	-	323,346	423,295	579,794	804,648	1,092,823	1,551,344	1,261,057	1,253,231	1,215,199	1,231,007	1,669,176	11,411,618	-	-
<b>Innovation &amp; Research</b>																			
MWh	Direct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indirect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MMBtu (Gas)	Direct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indirect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MMBtu (Other)	Direct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indirect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total MWh</b>	<b>Direct</b>	<b>14,144</b>	<b>79,497</b>	<b>152,199</b>	<b>271,936</b>	<b>384,099</b>	<b>387,717</b>	<b>372,290</b>	<b>692,936</b>	<b>698,903</b>	<b>544,104</b>	<b>314,588</b>	<b>228,888</b>	<b>136,647</b>	<b>64,323</b>	<b>8,714</b>	<b>4,350,983</b>		
	<b>Indirect</b>	<b>-</b>	<b>171</b>	<b>21,299</b>	<b>30,894</b>	<b>69,328</b>	<b>69,844</b>	<b>177,189</b>	<b>342,011</b>	<b>559,844</b>	<b>906,635</b>	<b>710,552</b>	<b>711,726</b>	<b>687,604</b>	<b>689,252</b>	<b>764,885</b>	<b>5,741,230</b>	<b>86%</b>	<b>101%</b>
<b>Total MMBtu (Gas)</b>	<b>Direct</b>	<b>166,769</b>	<b>237,906</b>	<b>1,032,559</b>	<b>1,916,088</b>	<b>1,336,914</b>	<b>1,847,400</b>	<b>2,475,113</b>	<b>2,241,359</b>	<b>2,643,190</b>	<b>2,918,570</b>	<b>2,973,251</b>	<b>2,792,570</b>	<b>2,055,017</b>	<b>1,310,086</b>	<b>122,419</b>	<b>26,069,213</b>		
	<b>Indirect</b>	<b>-</b>	<b>200</b>	<b>22,429</b>	<b>34,952</b>	<b>163,308</b>	<b>220,478</b>	<b>590,041</b>	<b>993,288</b>	<b>1,615,810</b>	<b>2,939,561</b>	<b>2,263,528</b>	<b>2,468,640</b>	<b>2,143,200</b>	<b>2,293,160</b>	<b>3,599,911</b>	<b>19,348,505</b>	<b>94%</b>	<b>120%</b>
<b>Total MMBtu (Other)</b>	<b>Direct</b>	<b>73,320</b>	<b>280,313</b>	<b>9,294,415</b>	<b>655,323</b>	<b>967,832</b>	<b>580,150</b>	<b>385,117</b>	<b>377,832</b>	<b>459,832</b>	<b>573,697</b>	<b>429,515</b>	<b>395,701</b>	<b>174,803</b>	<b>144,224</b>	<b>12,007</b>	<b>14,804,081</b>		
	<b>Indirect</b>	<b>-</b>	<b>-</b>	<b>6,699</b>	<b>-</b>	<b>323,346</b>	<b>423,295</b>	<b>579,794</b>	<b>804,648</b>	<b>1,092,823</b>	<b>1,551,344</b>	<b>1,261,057</b>	<b>1,253,231</b>	<b>1,215,199</b>	<b>1,231,007</b>	<b>1,669,176</b>	<b>11,411,618</b>	<b>123%</b>	<b>154%</b>

**Table 5. Electricity Savings, Annual (MWh)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
<b>Innovation &amp; Research</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buildings Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Commercialization Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NextGen Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Transportation Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric Vehicle Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Public Transportation and Electrified Rail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Climate Resilience Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Characterization & Design Innovation & Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Focused Environmental Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy-Related Environmental Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gas Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Duration Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility Thermal Network Technical Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid Modernization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Future Grid Performance Challenge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid ClimateTech Ready Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High Performing Electric Grid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Electronics Manufacturing Consortium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Negative Emissions Technologies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CarbonTech Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Carbon Solutions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewables Optimization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Storage Technology and Product Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
National Offshore Wind Research & Development Consortium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technology to Market	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CarbonTech Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Catalytic Capital for ClimateTech	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Commercialization Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Expertise & Talent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manufacturing Corps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Novel Business Models and Offerings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Resilience Through Finance and Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Market Development</b>	<b>14,144</b>	<b>79,497</b>	<b>152,199</b>	<b>271,936</b>	<b>384,099</b>	<b>387,717</b>	<b>372,290</b>	<b>692,936</b>	<b>698,903</b>	<b>544,104</b>	<b>314,588</b>	<b>228,888</b>	<b>136,647</b>	<b>64,323</b>	<b>8,714</b>	<b>4,350,983</b>
Clean Heat & Cooling	-	125	941	1,087	403	5	-	-	-	-	-	-	-	-	-	2,562
Heat Pumps Phase 1 (2017)	-	125	941	1,087	403	5	-	-	-	-	-	-	-	-	-	2,562
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Heat NY - Clean and Efficient Biomass Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Thermal Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Codes and Standards, & Other Multisector Initiatives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Codes and Standards for Carbon Neutral Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Information Products and Brokering	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Characterization & Design Market Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Product and Appliance Standards	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REV Connect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial / Industrial / Agriculture	2,530	18,712	98,211	205,260	274,818	248,995	234,759	354,837	510,614	408,321	182,458	97,744	70,397	47,844	-	2,755,500
Advancing Agricultural Energy Technologies	-	-	-	-	-	162	162	162	162	162	-	-	-	-	-	810
Agriculture Transition	1,508	8,755	3,712	433	-	-	-	-	-	-	-	-	-	-	-	14,407
Commercial Transition	-	362	6,018	19,057	20,335	32,024	7,153	20	-	-	-	-	-	-	-	84,969
Energy Management Practices	-	-	16,054	25,097	76,847	34,602	14,420	9,738	13,936	16,428	21,644	4,746	1,297	1,297	-	236,106
Energy Management Technology	-	-	6,265	9,845	16,797	10,530	94,539	265,574	363,386	174,549	52,663	4,732	-	-	-	998,880
Greenhouse Lighting and Systems Engineering	-	-	-	-	-	-	-	800	2,670	-	-	-	-	-	-	3,470
Industrial Transition	1,023	9,595	65,174	49,561	92,647	53,645	27,918	6,378	20,412	10,773	-	-	-	-	-	337,124
Market Challenges	-	-	-	-	-	-	7,421	13,030	23,592	55,042	11,754	13,711	19,982	15,587	-	160,120
P-12 Schools	-	-	-	-	-	905	7,671	9,000	20,000	20,000	20,000	20,000	20,000	16,739	-	134,315
Pay for Performance	-	-	-	-	-	-	218	-	-	45,759	43,580	26,148	5,930	-	-	121,635
Real Estate Tenant	-	-	-	-	-	-	-	14,796	28,388	51,098	5,678	-	-	-	-	99,959
REV Campus Challenge	-	-	-	100,630	22,698	51,731	10,000	1,100	1,100	1,100	-	-	-	-	-	188,360
Technical Services	-	-	988	637	45,494	65,395	65,257	34,239	36,969	33,409	27,140	28,407	23,188	14,221	-	375,343

**Table 5. Electricity Savings, Annual (MWh)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Communities	6,257	52,360	32,335	38,463	10,420	34,458	13,325	20,000	30,000	25,000	-	-	-	-	-	262,617
Clean Energy Communities	6,257	52,360	32,335	38,463	10,420	34,458	13,325	20,000	30,000	25,000	-	-	-	-	-	262,617
Community Energy Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI	3,634	3,355	4,367	6,797	7,693	19,334	16,043	8,944	22,761	38,813	32,789	23,357	14,475	3,857	1,929	208,149
Healthy Homes Feasibility Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Multifamily	-	-	-	889	3,134	11,293	9,016	5,384	11,295	22,577	17,207	8,870	-	-	-	89,664
LMI Outreach & Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Pilots	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - LMI	4	152	1,084	2,142	1,939	1,655	250	250	450	-	-	-	-	-	-	7,926
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - LMI	-	-	-	-	110	605	1,500	1,500	3,000	4,000	-	-	-	-	-	10,714
New Construction - LMI	-	-	-	59	297	1,457	1,210	1,250	7,629	12,090	14,850	14,332	14,475	3,857	1,929	73,434
NYS Healthy Homes Value Based Payment Pilot	-	-	-	-	-	0	15	150	135	-	-	-	-	-	-	300
Regional Clean Energy Hubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RetrofitNY - LMI	-	-	-	-	-	-	93	-	137	146	732	155	-	-	-	1,264
REVitalize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family - Low Income	2,610	2,592	2,801	3,330	1,683	3,202	3,385	257	-	-	-	-	-	-	-	19,861
Single Family - Moderate Income	1,020	611	483	376	530	1,122	574	153	115	-	-	-	-	-	-	4,985
Solar for All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Residential	-	-	-	3,932	3,423	2,390	21,751	23,341	39,592	32,750	34,274	32,750	3,357	3,022	1,785	202,365
Energy Management Technology	-	-	-	3,932	3,033	910	20,000	20,000	22,101	27,714	27,714	27,714	-	-	-	153,118
Market Challenges	-	-	-	-	-	-	-	-	13,132	-	-	-	-	-	-	13,132
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Market Rate Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technical Services	-	-	-	-	390	1,480	1,751	3,341	4,359	5,036	6,560	5,036	3,357	3,022	1,785	36,116
New Construction	493	2,547	7,296	4,276	4,887	5,993	2,145	2,515	9,090	12,910	14,390	13,490	14,000	9,600	5,000	108,632
Commercial New Construction Transition	-	1,097	6,617	3,012	3,016	3,606	500	500	1,500	2,500	1,000	-	-	-	-	23,348
Low Rise New Construction Transition - Market Rate	493	1,450	678	1,264	497	514	130	300	300	220	-	-	-	-	-	5,847
Multifamily New Construction Transition - Market Rate	-	-	-	-	-	626	225	225	350	-	-	-	-	-	-	1,426
New Construction - Market Rate	-	-	-	-	1,374	1,247	1,290	1,490	6,940	10,190	13,390	13,490	14,000	9,600	5,000	78,011
Renewables / Distributed Energy Resources (DER)	-	1,490	8,180	10,813	78,382	33,328	62,028	172,679	-	-	-	-	-	-	-	366,900
Anaerobic Digesters Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Energy Siting and Soft Cost Reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Heat & Power Transition	-	1,490	8,180	10,813	21,897	33,328	22,400	106,400	-	-	-	-	-	-	-	204,508
Fuel Cells	-	-	-	-	56,486	-	39,628	66,279	-	-	-	-	-	-	-	162,393
Offshore Wind Master Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Pre-Development Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORES Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing Barriers to Distributed Deployment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Wind Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Plus Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	1,228	908	869	894	1,237	1,235	1,288	10,620	14,846	16,310	5,161	-	-	-	-	54,596
Consumer Awareness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pay for Performance	-	-	-	-	-	-	23	113	135	180	-	-	-	-	-	450
Residential	-	-	-	10	1,067	1,231	1,265	10,507	14,711	16,130	5,161	-	-	-	-	50,082
Single Family Market Rate Transition	1,228	908	869	884	170	4	-	-	-	-	-	-	-	-	-	4,064
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric Vehicles - Rebate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV Charging and Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workforce Development	-	-	-	415	2,835	41,980	20,952	100,000	72,000	10,000	45,516	61,547	34,417	-	-	389,661
Building Operations and Maintenance Partnerships	-	-	-	415	2,835	41,980	20,952	100,000	72,000	10,000	45,516	61,547	34,417	-	-	389,661
Talent Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>14,144</b>	<b>79,497</b>	<b>152,199</b>	<b>271,936</b>	<b>384,099</b>	<b>387,717</b>	<b>372,290</b>	<b>692,936</b>	<b>698,903</b>	<b>544,104</b>	<b>314,588</b>	<b>228,888</b>	<b>136,647</b>	<b>64,323</b>	<b>8,714</b>	<b>4,350,983</b>

**Table 6. Natural Gas Savings, Annual (MMBtu)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
<b>Innovation &amp; Research</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buildings Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Commercialization Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NextGen Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Transportation Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric Vehicle Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Public Transportation and Electrified Rail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Climate Resilience Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Characterization & Design Innovation & Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Focused Environmental Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy-Related Environmental Research	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gas Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen Innovation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Duration Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility Thermal Network Technical Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid Modernization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Future Grid Performance Challenge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid ClimateTech Ready Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High Performing Electric Grid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Electronics Manufacturing Consortium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Negative Emissions Technologies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CarbonTech Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Carbon Solutions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewables Optimization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Storage Technology and Product Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
National Offshore Wind Research & Development Consortium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technology to Market	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CarbonTech Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Catalytic Capital for ClimateTech	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Commercialization Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ClimateTech Expertise & Talent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manufacturing Corps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Novel Business Models and Offerings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Resilience Through Finance and Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Market Development</b>	<b>166,769</b>	<b>237,906</b>	<b>1,032,559</b>	<b>1,916,088</b>	<b>1,336,914</b>	<b>1,847,400</b>	<b>2,475,113</b>	<b>2,241,359</b>	<b>2,643,190</b>	<b>2,918,570</b>	<b>2,973,251</b>	<b>2,792,570</b>	<b>2,055,017</b>	<b>1,310,086</b>	<b>122,419</b>	<b>26,069,213</b>
Clean Heat & Cooling	-	297	11,943	33,771	31,475	134,063	-	-	-	-	-	-	-	-	-	211,549
Heat Pumps Phase 1 (2017)	-	297	11,943	33,771	31,475	134,063	-	-	-	-	-	-	-	-	-	211,549
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Heat NY - Clean and Efficient Biomass Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Thermal Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Codes and Standards, & Other Multisector Initiatives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Codes and Standards for Carbon Neutral Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Information Products and Brokering	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Characterization & Design Market Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Product and Appliance Standards	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REV Connect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial / Industrial / Agriculture	1,190	62,778	842,894	1,497,558	1,021,609	903,811	1,798,307	693,107	1,046,569	1,392,275	1,384,454	1,275,359	1,223,564	1,108,180	-	14,251,655
Advancing Agricultural Energy Technologies	-	-	-	-	-	-	-	-	43	43	-	-	-	-	-	86
Agriculture Transition	38	16,734	1,545	186	-	-	-	-	-	-	-	-	-	-	-	18,503
Commercial Transition	-	-	5,642	29,431	55,283	65,979	4,157	3,000	20,000	25,000	15,290	-	-	-	-	223,782
Energy Management Practices	-	-	80,289	332,669	229,905	210,460	464,874	44,275	38,725	74,645	234,525	26,100	10,292	10,291	-	1,757,050
Energy Management Technology	-	-	3,576	34,655	21,582	9,765	76,401	314,918	335,979	245,222	78,041	3,010	-	-	-	1,123,151
Greenhouse Lighting and Systems Engineering	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industrial Transition	1,151	46,045	751,902	376,175	392,959	84,787	75,484	70,977	75,318	-	-	-	-	-	-	1,874,798
Market Challenges	-	-	-	-	-	-	949,398	59,980	14,997	467,091	565,267	798,501	823,576	773,408	-	4,452,218
P-12 Schools	-	-	-	-	-	20,440	26,488	45,000	147,000	147,000	147,000	147,000	147,000	93,210	-	920,138
Pay for Performance	-	-	-	-	-	-	110	-	-	23,100	22,000	13,200	3,102	-	-	61,512
Real Estate Tenant	-	-	-	-	-	-	-	7,485	27,485	66,989	9,497	-	-	-	-	111,456
REV Campus Challenge	-	-	-	725,104	63,874	328,179	41,000	6,600	6,600	6,600	-	-	-	-	-	1,177,957

**Table 6. Natural Gas Savings, Annual (MMBtu)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Technical Services	-	-	(60)	(662)	258,006	184,200	160,395	140,872	380,422	336,585	312,834	287,548	239,594	231,270	-	2,531,003
Communities	17,425	35,325	25,368	102,724	19,010	85,691	20,000	20,000	20,000	20,000	-	-	-	-	-	365,542
Clean Energy Communities	17,425	35,325	25,368	102,724	19,010	85,691	20,000	20,000	20,000	20,000	-	-	-	-	-	365,542
Community Energy Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI	90,463	89,031	119,531	157,393	171,866	246,980	286,568	274,448	416,521	812,115	562,455	456,787	73,250	20,357	10,179	3,787,942
Healthy Homes Feasibility Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Multifamily	-	-	-	19,841	35,875	61,369	129,944	223,301	318,333	692,603	452,286	369,708	-	-	-	2,303,260
LMI Outreach & Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Pilots	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - LMI	102	2,149	13,620	19,608	37,338	20,234	1,400	1,400	2,500	-	-	-	-	-	-	98,351
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - LMI	-	-	-	-	839	3,392	15,000	18,000	28,000	32,000	-	-	-	-	-	97,231
New Construction - LMI	-	-	-	638	1,340	12,596	12,600	12,750	56,348	85,413	99,675	84,857	73,250	20,357	10,179	470,003
NYS Healthy Homes Value Based Payment Pilot	-	-	-	-	-	-	400	4,100	3,700	-	-	-	-	-	-	8,200
Regional Clean Energy Hubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RetrofitNY - LMI	-	-	-	-	-	-	2,328	-	1,970	2,099	10,494	2,222	-	-	-	19,112
REVitalize	-	-	-	9,000	-	-	-	-	-	-	-	-	-	-	-	9,000
Single Family - Low Income	51,520	57,806	84,711	83,949	69,302	92,131	96,600	7,337	-	-	-	-	-	-	-	543,355
Single Family - Moderate Income	38,841	29,076	21,200	24,358	27,173	57,257	28,296	7,560	5,670	-	-	-	-	-	-	239,430
Solar for All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Residential	-	36	793	62,229	(2,646)	32,047	115,294	196,579	276,172	357,172	430,479	360,611	157,276	141,549	94,240	2,221,831
Energy Management Technology	-	-	-	62,229	21,944	5,625	35,000	38,500	45,612	104,779	98,479	98,479	-	-	-	510,646
Market Challenges	-	-	-	-	-	-	-	-	19,840	-	-	-	-	-	-	19,840
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	6,740	8,239	16,479	24,718	26,218	-	-	-	82,394
Multifamily Market Rate Transition	-	36	793	-	-	-	-	-	-	-	-	-	-	-	-	829
Technical Services	-	-	-	-	(24,590)	26,422	80,294	151,339	202,480	235,914	307,282	235,914	157,276	141,549	94,240	1,608,122
New Construction	16,464	32,950	17,723	41,389	44,579	36,446	19,150	25,500	69,063	88,063	92,163	73,213	46,000	40,000	18,000	660,704
Commercial New Construction Transition	-	1,923	675	1,910	16,899	15,884	10,000	15,000	20,000	25,000	15,000	-	-	-	-	122,290
Low Rise New Construction Transition - Market Rate	16,464	31,027	17,048	39,479	8,308	1,095	50	400	400	400	-	-	-	-	-	114,671
Multifamily New Construction Transition - Market Rate	-	-	-	-	-	5,800	2,100	2,100	3,000	-	-	-	-	-	-	13,000
New Construction - Market Rate	-	-	-	-	19,372	13,668	7,000	8,000	45,663	62,663	77,163	73,213	46,000	40,000	18,000	410,742
Renewables / Distributed Energy Resources (DER)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anaerobic Digesters Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Energy Siting and Soft Cost Reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Heat & Power Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel Cells	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Master Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Pre-Development Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORES Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing Barriers to Distributed Deployment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Wind Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Plus Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	41,228	17,490	14,308	17,330	26,372	34,715	61,945	131,726	154,866	153,945	33,750	-	-	-	-	687,674
Consumer Awareness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pay for Performance	-	-	-	-	-	-	2,146	10,730	12,876	17,168	-	-	-	-	-	42,920
Residential	-	-	-	381	23,083	34,715	59,799	120,996	141,990	136,777	33,750	-	-	-	-	551,490
Single Family Market Rate Transition	41,228	17,490	14,308	16,949	3,289	-	-	-	-	-	-	-	-	-	-	93,263
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric Vehicles - Rebate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV Charging and Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workforce Development	-	-	-	3,695	24,648	373,648	173,849	900,000	660,000	95,000	469,950	626,600	554,927	-	-	3,882,317
Building Operations and Maintenance Partnerships	-	-	-	3,695	24,648	373,648	173,849	900,000	660,000	95,000	469,950	626,600	554,927	-	-	3,882,317
Talent Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>166,769</b>	<b>237,906</b>	<b>1,032,559</b>	<b>1,916,088</b>	<b>1,336,914</b>	<b>1,847,400</b>	<b>2,475,113</b>	<b>2,241,359</b>	<b>2,643,190</b>	<b>2,918,570</b>	<b>2,973,251</b>	<b>2,792,570</b>	<b>2,055,017</b>	<b>1,310,086</b>	<b>122,419</b>	<b>26,069,213</b>



**Table 7. Other Fuel Savings, Annual (MMBtu)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Technical Services	-	-	360	7,714	47,544	297,351	126,846	1,942	10,714	10,714	10,714	10,718	8,772	8,772	-	542,160
Communities	4,751	37,775	30,499	33,110	6,232	22,213	5,000	5,000	5,000	5,000	-	-	-	-	-	154,580
Clean Energy Communities	4,751	37,775	30,499	33,110	6,232	22,213	5,000	5,000	5,000	5,000	-	-	-	-	-	154,580
Community Energy Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI	38,428	48,096	48,523	58,004	55,642	81,281	84,887	84,568	116,415	244,864	187,619	167,409	2,750	1,071	536	1,220,092
Healthy Homes Feasibility Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Multifamily	-	-	-	(0)	844	2,503	26,467	74,924	108,252	241,901	181,821	163,282	-	-	-	799,994
LMI Outreach & Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Pilots	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - LMI	-	-	-	903	312	-	-	-	-	-	-	-	-	-	-	1,215
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - LMI	-	-	-	-	1,633	-	-	-	2,303	2,438	3,175	3,571	2,750	1,071	536	17,477
NYS Healthy Homes Value Based Payment Pilot	-	-	-	-	-	-	100	900	800	-	-	-	-	-	-	1,800
Regional Clean Energy Hubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RetrofitNY - LMI	-	-	-	-	-	-	582	-	492	525	2,623	556	-	-	-	4,778
REVitalize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family - Low Income	16,705	28,962	28,235	37,883	29,994	40,721	34,944	2,654	-	-	-	-	-	-	-	220,098
Single Family - Moderate Income	21,723	19,134	20,288	19,218	22,858	38,058	22,794	6,090	4,568	-	-	-	-	-	-	174,731
Solar for All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Residential	-	-	-	3,598	42,843	5,702	25,831	39,793	49,831	72,949	79,094	71,331	17,475	15,728	10,471	434,646
Energy Management Technology	-	-	-	3,598	9,583	1,665	15,000	16,500	19,548	44,905	42,205	42,205	-	-	-	195,209
Market Challenges	-	-	-	-	-	-	-	-	4,960	-	-	-	-	-	-	4,960
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	749	915	1,831	2,746	2,913	-	-	-	9,155
Multifamily Market Rate Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technical Services	-	-	-	-	33,260	4,037	10,831	22,544	24,407	26,213	34,142	26,213	17,475	15,728	10,471	225,321
New Construction	1,037	551	152	381	290	30	-	50	2,688	2,868	3,338	3,188	2,750	2,250	1,000	20,573
Commercial New Construction Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - Market Rate	1,037	551	152	381	-	30	-	-	-	-	-	-	-	-	-	2,151
Multifamily New Construction Transition - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - Market Rate	-	-	-	-	290	-	-	50	2,688	2,868	3,338	3,188	2,750	2,250	1,000	18,422
Renewables / Distributed Energy Resources (DER)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anaerobic Digesters Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Energy Siting and Soft Cost Reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Heat & Power Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel Cells	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Master Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Pre-Development Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORES Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing Barriers to Distributed Deployment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Wind Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Plus Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	27,814	28,144	18,923	22,446	10,575	7,162	15,542	87,084	112,500	116,625	33,750	-	-	-	-	480,566
Consumer Awareness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pay for Performance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential	-	-	-	108	5,636	7,162	15,542	87,084	112,500	116,625	33,750	-	-	-	-	378,408
Single Family Market Rate Transition	27,814	28,144	18,923	22,338	4,939	-	-	-	-	-	-	-	-	-	-	102,158
Transportation	-	126,089	221,668	254,774	425,104	72,302	-	-	-	-	-	-	-	-	-	1,099,937
Electric Vehicles - Rebate	-	126,089	221,668	254,774	425,104	72,302	-	-	-	-	-	-	-	-	-	1,099,937
EV Charging and Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workforce Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building Operations and Maintenance Partnerships	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Talent Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>73,320</b>	<b>280,313</b>	<b>9,294,415</b>	<b>655,323</b>	<b>967,832</b>	<b>580,150</b>	<b>385,117</b>	<b>377,832</b>	<b>459,832</b>	<b>573,697</b>	<b>429,515</b>	<b>395,701</b>	<b>174,803</b>	<b>144,224</b>	<b>12,007</b>	<b>14,804,081</b>



**Table 8. Electricity Usage, Annual (MWh)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Technical Services	-	-	-	-	(1,874)	996	(139)	-	-	-	-	-	-	-	-	(1,017)
Communities	(15)	(1,582)	(264)	(103)	(27)	(4)	(20)	(175)	(225)	(200)	-	-	-	-	-	(2,615)
Clean Energy Communities	(15)	(1,582)	(264)	(103)	(27)	(4)	(20)	(175)	(225)	(200)	-	-	-	-	-	(2,615)
Community Energy Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI	(55)	(69)	(89)	(146)	(540)	(1,168)	(317)	(84)	(63)	-	-	-	-	-	-	(2,532)
Healthy Homes Feasibility Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Multifamily	-	-	-	(2)	(1)	16	-	-	-	-	-	-	-	-	-	14
LMI Outreach & Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Pilots	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NYS Healthy Homes Value Based Payment Pilot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Regional Clean Energy Hubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RetrofitNY - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REVitalize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family - Low Income	-	(3)	(1)	(9)	(26)	(23)	(3)	(0)	-	-	-	-	-	-	-	(65)
Single Family - Moderate Income	(55)	(66)	(87)	(135)	(514)	(1,161)	(314)	(84)	(63)	-	-	-	-	-	-	(2,481)
Solar for All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Residential	-	-	-	-	-	(388)	-	(296)	(362)	(723)	(1,085)	(1,151)	-	-	-	(4,005)
Energy Management Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Challenges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	(296)	(362)	(723)	(1,085)	(1,151)	-	-	-	(3,617)
Multifamily Market Rate Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technical Services	-	-	-	-	-	(388)	-	-	-	-	-	-	-	-	-	(388)
New Construction	-	-	-	-	(625)	(472)	-	-	-	-	-	-	-	-	-	(1,097)
Commercial New Construction Transition	-	-	-	-	(625)	(470)	-	-	-	-	-	-	-	-	-	(1,095)
Low Rise New Construction Transition - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - Market Rate	-	-	-	-	-	(2)	-	-	-	-	-	-	-	-	-	(2)
Renewables / Distributed Energy Resources (DER)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anaerobic Digesters Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Energy Siting and Soft Cost Reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Heat & Power Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel Cells	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Master Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Pre-Development Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORES Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing Barriers to Distributed Deployment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Wind Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Plus Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	(141)	(83)	(125)	(59)	(203)	(116)	(69)	(8,197)	(11,966)	(13,462)	(4,487)	-	-	-	-	(38,908)
Consumer Awareness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pay for Performance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential	-	-	-	-	(193)	(116)	(69)	(8,197)	(11,966)	(13,462)	(4,487)	-	-	-	-	(38,489)
Single Family Market Rate Transition	(141)	(83)	(125)	(59)	(10)	-	-	-	-	-	-	-	-	-	-	(419)
Transportation	-	(6,499)	(11,778)	(14,218)	(23,858)	(4,174)	-	-	-	-	-	-	-	-	-	(60,528)
Electric Vehicles - Rebate	-	(6,499)	(11,778)	(14,218)	(23,858)	(4,174)	-	-	-	-	-	-	-	-	-	(60,528)
EV Charging and Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workforce Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building Operations and Maintenance Partnerships	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Talent Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>(225)</b>	<b>(14,013)</b>	<b>(29,350)</b>	<b>(47,235)</b>	<b>(30,983)</b>	<b>(8,864)</b>	<b>(5,555)</b>	<b>(9,117)</b>	<b>(13,004)</b>	<b>(16,917)</b>	<b>(18,532)</b>	<b>(12,736)</b>	<b>(12,705)</b>	<b>(11,495)</b>	<b>-</b>	<b>(230,732)</b>



**Table 9.** Gas Usage, Annual (MMBtu)

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Healthy Homes Feasibility Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Multifamily	-	-	-	(871)	(2,212)	(15,548)	-	-	-	-	-	-	-	-	-	(18,631)
LMI Outreach & Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LMI Pilots	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Rise New Construction Transition - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NYS Healthy Homes Value Based Payment Pilot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Regional Clean Energy Hubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RetrofitNY - LMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REVitalize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family - Low Income	(489)	(961)	(684)	(572)	(478)	(226)	(588)	(45)	-	-	-	-	-	-	-	(4,043)
Single Family - Moderate Income	(1,295)	(1,604)	(1,368)	(1,058)	(1,169)	(1,150)	(1,231)	(329)	(247)	-	-	-	-	-	-	(9,451)
Solar for All	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Residential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Management Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Market Challenges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Low Carbon Pathways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily Market Rate Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technical Services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction	-	(1,318)	(5,639)	(5,355)	(377)	(2,138)	-	-	-	-	-	-	-	-	-	(14,827)
Commercial New Construction Transition	-	(1,318)	(5,639)	(5,355)	(377)	(2,138)	-	-	-	-	-	-	-	-	-	(14,827)
Low Rise New Construction Transition - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Multifamily New Construction Transition - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Construction - Market Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewables / Distributed Energy Resources (DER)	-	(9,023)	(49,534)	(65,476)	(572,620)	(201,821)	(417,006)	(1,031,761)	-	-	-	-	-	-	-	(2,347,241)
Anaerobic Digesters Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clean Energy Siting and Soft Cost Reduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Heat & Power Transition	-	(9,023)	(49,534)	(65,476)	(132,597)	(201,821)	(135,643)	(644,316)	-	-	-	-	-	-	-	(1,238,410)
Fuel Cells	-	-	-	-	(440,023)	-	(281,363)	(387,445)	-	-	-	-	-	-	-	(1,108,831)
Offshore Wind Master Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind Pre-Development Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ORES Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing Barriers to Distributed Deployment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Wind Transition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Plus Energy Storage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Residential	(2,349)	(1,950)	(1,618)	(1,207)	(144)	-	-	-	-	-	-	-	-	-	-	(7,268)
Consumer Awareness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Pumps Phase 2 (2020)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pay for Performance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Family Market Rate Transition	(2,349)	(1,950)	(1,618)	(1,207)	(144)	-	-	-	-	-	-	-	-	-	-	(7,268)
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric Vehicles - Rebate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV Charging and Engagement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workforce Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building Operations and Maintenance Partnerships	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Talent Pipeline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>(4,428)</b>	<b>(14,888)</b>	<b>(7,195,103)</b>	<b>(103,832)</b>	<b>(577,082)</b>	<b>(220,883)</b>	<b>(418,825)</b>	<b>(1,032,135)</b>	<b>(2,303)</b>	-	-	<b>(12,850)</b>	-	-	-	<b>(9,582,329)</b>







**Table 11. Leveraged Funds (\$ Million)**

Portfolio / Focus Area / Initiative	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Technical Services	\$ -	\$ -	\$ 0.53	\$ 2.53	\$ 10.19	\$ 18.54	\$ 5.22	\$ 17.39	\$ 33.45	\$ 33.70	\$ 31.81	\$ 29.76	\$ 27.01	\$ 25.68	\$ -	\$ 235.82
Communities	\$ 2.67	\$ 39.14	\$ 5.48	\$ 19.54	\$ 9.06	\$ 27.12	\$ 19.99	\$ 5.00	\$ 6.00	\$ 4.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 138.01
Clean Energy Communities	\$ 2.67	\$ 39.14	\$ 5.48	\$ 19.54	\$ 9.06	\$ 27.12	\$ 19.00	\$ 5.00	\$ 6.00	\$ 4.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 137.02
Community Energy Engagement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.99	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.99
LMI	\$ 7.65	\$ 10.36	\$ 12.28	\$ 19.64	\$ 34.18	\$ 63.94	\$ 29.50	\$ 276.63	\$ 389.43	\$ 414.28	\$ 417.50	\$ 176.82	\$ 10.93	\$ -	\$ -	\$ 1,863.13
Healthy Homes Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Heat Pumps Phase 2 (2020)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LMI Multifamily	\$ -	\$ -	\$ -	\$ 2.62	\$ 12.22	\$ 23.05	\$ 4.88	\$ 263.18	\$ 353.24	\$ 365.60	\$ 351.24	\$ 146.06	\$ -	\$ -	\$ -	\$ 1,522.08
LMI Outreach & Engagement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LMI Pilots	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Low Rise New Construction Transition - LMI	\$ 0.02	\$ 0.45	\$ 3.41	\$ 5.70	\$ 5.68	\$ 3.51	\$ 0.50	\$ 0.50	\$ 0.80	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20.56
Multifamily Low Carbon Pathways	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Multifamily New Construction Transition - LMI	\$ -	\$ -	\$ -	\$ -	\$ 0.66	\$ 4.12	\$ 4.00	\$ 6.00	\$ 10.00	\$ 10.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34.78
New Construction - LMI	\$ -	\$ -	\$ -	\$ 0.17	\$ 1.05	\$ 4.24	\$ 3.54	\$ 3.65	\$ 17.13	\$ 32.86	\$ 36.86	\$ 24.86	\$ 10.93	\$ -	\$ -	\$ 135.27
NYS Healthy Homes Value Based Payment Pilot	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Regional Clean Energy Hubs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RetrofitNY - LMI	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.23	\$ -	\$ 5.80	\$ 5.82	\$ 29.40	\$ 5.90	\$ -	\$ -	\$ -	\$ 51.15
REVitalize	\$ -	\$ -	\$ -	\$ 1.57	\$ 2.03	\$ 1.03	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.63
Single Family - Low Income	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Single Family - Moderate Income	\$ 7.63	\$ 9.91	\$ 8.87	\$ 9.58	\$ 12.54	\$ 28.00	\$ 12.35	\$ 3.30	\$ 2.47	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 94.66
Solar for All	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Multifamily Residential	\$ -	\$ 0.07	\$ 0.00	\$ 5.24	\$ 24.07	\$ 13.86	\$ 8.25	\$ 22.10	\$ 32.78	\$ 41.19	\$ 28.25	\$ 24.25	\$ 0.95	\$ 0.26	\$ -	\$ 201.27
Energy Management Technology	\$ -	\$ -	\$ -	\$ 5.24	\$ 24.02	\$ 11.56	\$ 7.68	\$ 11.53	\$ 11.53	\$ 14.96	\$ 12.00	\$ 12.00	\$ 0.49	\$ -	\$ -	\$ 111.01
Market Challenges	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15.00	\$ 15.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30.00
Multifamily Low Carbon Pathways	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.99	\$ -	\$ 8.84	\$ 5.07	\$ 10.14	\$ 15.21	\$ 11.44	\$ -	\$ -	\$ -	\$ 51.70
Multifamily Market Rate Transition	\$ -	\$ 0.07	\$ 0.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.07
Technical Services	\$ -	\$ -	\$ -	\$ -	\$ 0.05	\$ 1.31	\$ 0.56	\$ 1.73	\$ 1.18	\$ 1.10	\$ 1.04	\$ 0.81	\$ 0.46	\$ 0.26	\$ -	\$ 8.49
New Construction	\$ 1.21	\$ 3.12	\$ 3.86	\$ 3.83	\$ 6.04	\$ 7.29	\$ 4.23	\$ 5.45	\$ 16.35	\$ 19.30	\$ 19.25	\$ 14.75	\$ 11.50	\$ 9.25	\$ 4.90	\$ 130.32
Commercial New Construction Transition	\$ -	\$ 0.39	\$ 1.64	\$ 0.43	\$ 3.06	\$ 3.11	\$ 1.50	\$ 2.00	\$ 3.50	\$ 4.50	\$ 2.00	\$ -	\$ -	\$ -	\$ -	\$ 22.13
Low Rise New Construction Transition - Market Rate	\$ 1.21	\$ 2.73	\$ 2.22	\$ 3.40	\$ 1.23	\$ 1.14	\$ 0.31	\$ 0.35	\$ 0.35	\$ 0.30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13.24
Multifamily New Construction Transition - Market Rate	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1.69	\$ 0.23	\$ 0.50	\$ 1.50	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.91
New Construction - Market Rate	\$ -	\$ -	\$ -	\$ -	\$ 1.75	\$ 1.35	\$ 2.20	\$ 2.60	\$ 11.00	\$ 14.50	\$ 17.25	\$ 14.75	\$ 11.50	\$ 9.25	\$ 4.90	\$ 91.04
Renewables / Distributed Energy Resources (DER)	\$ 0.70	\$ 15.08	\$ 10.12	\$ 22.00	\$ 92.12	\$ 35.57	\$ 50.84	\$ 104.25	\$ 2.42	\$ 0.05	\$ 0.03	\$ -	\$ -	\$ -	\$ -	\$ 333.18
Anaerobic Digesters Transition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1.90	\$ 5.21	\$ 2.37	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9.48
Clean Energy Siting and Soft Cost Reduction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Combined Heat & Power Transition	\$ -	\$ 13.93	\$ 9.87	\$ 20.87	\$ 60.17	\$ 34.99	\$ 15.97	\$ 49.89	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 205.68
Fuel Cells	\$ -	\$ -	\$ -	\$ -	\$ 31.74	\$ -	\$ 24.50	\$ 34.99	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 91.23
Offshore Wind Master Plan	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Offshore Wind Pre-Development Activities	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ORES Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reducing Barriers to Distributed Deployment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.77	\$ 0.05	\$ 0.05	\$ 0.05	\$ 0.03	\$ -	\$ -	\$ -	\$ -	\$ 3.95
Small Wind Transition	\$ 0.70	\$ 1.15	\$ 0.26	\$ 1.13	\$ 0.21	\$ 0.36	\$ 0.24	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.04
Solar Plus Energy Storage	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.23	\$ 4.46	\$ 14.11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18.80
Single Family Residential	\$ 16.19	\$ 19.60	\$ 21.07	\$ 25.96	\$ 6.04	\$ 4.36	\$ 16.12	\$ 33.33	\$ 29.81	\$ 21.79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 194.25
Consumer Awareness	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Heat Pumps Phase 2 (2020)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pay for Performance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.37	\$ 1.83	\$ 2.19	\$ 2.92	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7.30
Residential	\$ -	\$ -	\$ -	\$ 0.04	\$ 1.48	\$ 4.33	\$ 15.75	\$ 31.50	\$ 27.62	\$ 18.87	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 99.60
Single Family Market Rate Transition	\$ 16.19	\$ 19.60	\$ 21.07	\$ 25.91	\$ 4.56	\$ 0.02	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 87.35
Transportation	\$ -	\$ 103.25	\$ 186.94	\$ 197.68	\$ 317.00	\$ 54.25	\$ -	\$ 4.75	\$ 11.25	\$ 8.55	\$ 2.20	\$ -	\$ -	\$ -	\$ -	\$ 885.86
Electric Vehicles - Rebate	\$ -	\$ 103.25	\$ 186.94	\$ 197.68	\$ 317.00	\$ 54.25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 859.11
EV Charging and Engagement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.75	\$ 11.25	\$ 8.55	\$ 2.20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 26.75
Workforce Development	\$ -	\$ -	\$ -	\$ 2.34	\$ 4.12	\$ 9.95	\$ 8.32	\$ 6.09	\$ 7.01	\$ 9.83	\$ 9.14	\$ 4.82	\$ 1.88	\$ -	\$ -	\$ 63.49
Building Operations and Maintenance Partnerships	\$ -	\$ -	\$ -	\$ 1.16	\$ 0.19	\$ 2.55	\$ 1.50	\$ 2.36	\$ 2.25	\$ 6.62	\$ 7.42	\$ 3.77	\$ 1.84	\$ -	\$ -	\$ 29.65
Talent Pipeline	\$ -	\$ -	\$ -	\$ 1.18	\$ 3.92	\$ 7.40	\$ 6.82	\$ 3.73	\$ 4.76	\$ 3.21	\$ 1.72	\$ 1.05	\$ 0.05	\$ -	\$ -	\$ 33.83
<b>Grand Total</b>	<b>\$ 30.10</b>	<b>\$ 252.07</b>	<b>\$ 666.20</b>	<b>\$ 884.88</b>	<b>\$ 1,136.45</b>	<b>\$ 1,492.04</b>	<b>\$ 1,807.57</b>	<b>\$ 1,357.28</b>	<b>\$ 1,414.21</b>	<b>\$ 1,260.34</b>	<b>\$ 943.38</b>	<b>\$ 574.59</b>	<b>\$ 357.43</b>	<b>\$ 281.27</b>	<b>\$ 237.26</b>	<b>\$ 12,695.08</b>

**Table 12.** Performance Management, Analyses, & Evaluation Budget (\$)

<b>Evaluation Budget Elements</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>Total</b>
<b>Initiative-Specific Evaluations</b>	\$ 106,687	\$ 839,309	\$ 1,117,328	\$ 1,378,886	\$ 1,823,204	\$ 3,545,330	\$ 2,986,655	\$ 5,198,785	\$ 5,771,406	\$ 6,258,301	\$ 6,085,000	\$ 4,400,000	\$ 1,900,000	\$ 2,600,000	\$ 2,900,000	\$ 46,910,890
<b>Cross-Cutting Activities and Analyses</b>	\$ 40,000	\$ 184,699	\$ 268,940	\$ 328,543	\$ 2,391,774	\$ 3,830,616	\$ 11,723,226	\$ 12,234,404	\$ 8,974,625	\$ 7,690,625	\$ 6,493,892	\$ 6,427,500	\$ 4,200,000	\$ 420,000	\$ 120,000	\$ 65,328,843
Market Fundamentals	\$ -	\$ -	\$ 31,795	\$ 158,257	\$ 350,845	\$ 1,480,501	\$ 5,355,570	\$ 7,156,541	\$ 5,029,625	\$ 3,372,125	\$ 3,117,500	\$ 5,232,500	\$ 3,500,000	\$ 120,000	\$ 120,000	\$ 35,025,258
Impact Evaluations	\$ -	\$ 144,699	\$ 197,145	\$ 130,285	\$ 1,968,899	\$ 2,192,410	\$ 4,474,680	\$ 4,727,863	\$ 3,545,000	\$ 3,918,500	\$ 2,976,392	\$ 895,000	\$ 400,000	\$ -	\$ -	\$ 25,570,874
Supporting Resources	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 72,030	\$ 157,705	\$ 1,892,976	\$ 350,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ -	\$ 4,732,711
Data Sets	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 72,030	\$ 157,705	\$ 1,892,976	\$ 100,000	\$ 150,000	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 2,732,711
Technical Assistance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ 250,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ -	\$ 2,000,000
<b>Grand Total</b>	\$ 146,687	\$ 1,024,008	\$ 1,386,268	\$ 1,707,429	\$ 4,214,978	\$ 7,375,946	\$ 14,709,880	\$ 17,433,189	\$ 14,746,031	\$ 13,948,926	\$ 12,578,892	\$ 10,827,500	\$ 6,100,000	\$ 3,020,000	\$ 3,020,000	\$ 112,239,733

# Clean Energy Fund Compiled Investment Plans

## Appendix

### Contents

Appendix A: Focus Area Funding Tracking  
Appendix B: Focus Area Budgets

## Appendix A: Focus Area Funding Tracking

Shifts in CEF Focus Area Funding (budgets) utilizing the flexibility granted by the Commission in the September 9 2021 CEF Order must be tracked in a consistent and transparent manner using the tables below. Focus Areas are listed first by portfolio, then alphabetically, with each relevant revisions recorded chronologically by filing date.

Market Development Focus Area	Ordered Focus Area Budget (\$M)	Date Of CIP Filing	Increase/Decrease to Ordered Focus Area Budgets With Respect To Other Focus Areas (\$M)		Increase/Decrease to Ordered Focus Area Budget From Reserve (\$M)		Modified Focus Area Budget as of the CIP Filing Date (\$M)
			Increment	Cumulative	Increment	Cumulative	
Clean Heating & Cooling	135.8	n/a	-	-	-	-	n/a
Codes and Standards, & Other Multisector Initiatives	134.3	8/16/2022	(0.4)	(0.4)	-	-	133.9
Commercial / Industrial / Agriculture	501.2	5/20/2022	-	-	17.8	17.8	519.0
		8/16/2022	-	-	5.0	22.8	524.0
		11/1/2022	4.8	4.8	-	-	528.9
Communities	85.7	n/a	-	-	-	-	n/a
Low-to-Moderate Income (LMI)	761.2	5/20/2022	-	-	14.1	14.1	775.3
		8/16/2022	-	-	5.0	19.1	780.3
		11/1/2022	7.9	7.9	-	-	788.2
Multifamily Residential	71.2	5/20/2022	-	-	3.5	3.5	74.6
		8/16/2022	0.4	0.4	(0.4)	3.1	74.6
New Construction	180.4	n/a	-	-	-	-	n/a
Renewables/Distributed Energy Resources	188.9	11/1/2022	(12.7)	(12.7)	-	-	176.2
Single Family Residential	109.2	5/20/2022	-	-	0.6	0.6	109.8
		8/16/2022	-	-	(0.6)	-	109.2
Transportation	46.7	n/a	-	-	-	-	n/a
Workforce Development	108.3	n/a	-	-	-	-	n/a
<b>Market Development Totals</b>			<b>\$ 0.0</b>		<b>\$ 45.0</b>		

Innovation & Research Focus Area	Ordered Focus Area Budget (\$M)	Date Of CIP Filing	Increase/Decrease to Ordered Focus Area Budgets With Respect To Other Focus Areas (\$M)		Increase/Decrease to Ordered Focus Area Budget From Reserve (\$M)		Modified Focus Area Budget as of the CIP Filing Date (\$M)
			Increment	Cumulative	Increment	Cumulative	
Buildings Innovation	75.0	n/a	-	-	-	-	n/a
Clean Transportation Innovation	54.0	n/a	-	-	-	-	n/a
Climate Resilience Innovation	20.0	n/a	-	-	-	-	n/a
Energy Focused Environmental Research	47.0	5/20/2022	-	-	0.8	0.8	47.8
Gas Innovation	40.0	n/a	-	-	-	-	n/a
Grid Modernization	134.0	n/a	-	-	-	-	n/a
Negative Emissions Technologies	32.0	n/a	-	-	-	-	n/a
Renewables Optimization	62.0	n/a	-	-	-	-	n/a
Technology to Market	141.0	n/a	-	-	-	-	n/a
<b>Innovation &amp; Research Totals</b>			<b>\$ -</b>		<b>\$ 0.8</b>		

## Appendix B: Focus Area Budgets

All budgets are current through the period of this filing. Percentage of Total Focus Area Budget Planned is measured from the Modified Focus Area Budget when present, and the Ordered Focus Area Budget everywhere else. The totals below do not include Administration, Cost Recovery Fee, or Evaluation budgets. Reference Section IV, Budgets and Benefits Plan Table 2.

Market Development Focus Area	Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Total Planned Funding as of this CIP Filing (\$M)	Change in Planned Funding Associated with this CIP (\$M)	Percentage of Total Focus Area Budget Planned
Clean Heating & Cooling	135.8		128.7	0.5	95%
Codes and Standards, & Other Multisector Initiatives	134.3	133.9	131.7	-	98%
Commercial / Industrial / Agriculture	501.2	528.9	528.9	4.8	100%
Communities	85.7		85.7	-	100%
Low-to-Moderate Income (LMI)	761.2	788.2	788.2	7.9	100%
Multifamily Residential	71.2	74.6	74.6	-	100%
New Construction	180.4		162.8	(0.4)	90%
Renewables/Distributed Energy Resources	188.9	176.2	167.3	(5.8)	95%
Single Family Residential	109.2	109.2	104.2	(0.6)	95%
Transportation	46.7		46.7	-	100%
Workforce Development	108.3		108.3	-	100%
<i>Market Development Reserve*</i>	45.0	0.0	n/a	-	n/a
<b>Market Development Totals</b>	<b>2,367.9</b>		<b>2,327.2</b>	<b>6.4</b>	<b>98%</b>

Innovation & Research Focus Area	Ordered Focus Area Budget (\$M)	Modified Focus Area Budget (\$M)	Total Planned Funding (\$M)	Change in Planned Funding Associated with this CIP (\$M)	Percentage of Total Focus Area Budget Planned
Buildings Innovation	75.0		75.0	15.0	100%
Clean Transportation Innovation	54.0		50.4	-	93%
Climate Resilience Innovation	20.0		8.8	7.0	44%
Energy Focused Environmental Research	47.0	47.8	47.8	-	100%
Gas Innovation	40.0		40.0	20.0	100%
Grid Modernization	134.0		133.5	-	100%
Negative Emissions Technologies	32.0		17.6	-	55%
Renewables Optimization	62.0		62.0	-	100%
Technology to Market	141.0		131.1	(0.2)	93%
<i>Innovation &amp; Research Reserve*</i>	18.0	17.2	n/a	-	n/a
<b>Innovation &amp; Research Totals</b>	<b>623.0</b>		<b>566.1</b>	<b>41.8</b>	<b>91%</b>

\* In accordance with the September 9, 2021 CEF Order, NYSERDA has revised Cost Recovery Fee estimates for each portfolio, reducing each budget to more accurately reflect historical and projected spend. The excess funds were moved into each respective portfolio Reserve with the 12/22/21 initial filing of the Compiled Investment Plans with \$8M being added to the \$37M Market Development Reserve and \$2M added to the \$16M Innovation & Research Reserve.

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