

# CEF Annual Performance Report

## Final Report through December 31, 2022

Final Report | March 2023



**NYSERDA**

## **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.

# NYSERDA Record of Revision

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Document Title
CEF Annual Performance Report Final Report through December 31,2022

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# **CEF Annual Performance Report**

*Final Report through December 31, 2022*

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Albany, NY

March 2023

## About This Report

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The Clean Energy Fund (CEF) supports New York State's advancement of clean energy and climate goals along with a more affordable and resilient energy system. Energy efficiency is a cornerstone of the State's strategy to promote clean energy solutions for consumers while addressing climate change. The New Efficiency New York recommendations, as advanced in the white paper issued by the Department of Public Service (DPS) and New York State Energy Research and Development Authority (NYSERDA or the Authority) on April 26, 2018, and as adopted by the Commission in its December 13, 2019 order, establishes a new 2025 energy efficiency target of 185 trillion British thermal units (TBtu) of cumulative annual site energy savings.<sup>1</sup> The Climate Leadership and Community Protection Act (Climate Act), signed July 2019 and effective January 1, 2020, adopted this energy efficiency target and puts the State on a path to complete carbon neutrality across all sectors of the economy, including power generation, transportation, buildings, industry, and agriculture. The Climate Act mandates the following:

- 85% reduction in GHG emissions by 2050
- 100% zero-emission electricity by 2040
- 70% renewable energy by 2030
- 9,000 MW of offshore wind by 2035
- 3,000 MW of energy storage by 2030<sup>2,3</sup>
- 6,000 MW of solar by 2025 and 10,000 MW of solar by 2030<sup>4</sup>
- 22 million tons of carbon reduction through energy efficiency and electrification
- Minimum 35% of the benefits of clean energy investments are directed to disadvantaged communities.

With these goals, New York State is undertaking one of the most aggressive clean energy agendas in the nation. Through the CEF and its other portfolios, NYSERDA works to foster the transformation of markets, pushing them to accurately value clean energy, energy efficiency, and resiliency, while encouraging competition and innovation that delivers value to consumers.

Progress and performance of the CEF is represented within this report for each of the four CEF portfolios: Market Development (MD), Innovation and Research (IR), NY-Sun, and NY Green Bank.

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# Executive Summary

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NYSERDA is pleased to present the sixth Annual Metrics and Financial Report for New York State's Clean Energy Fund (CEF). The CEF was designed to support New York State's clean energy agenda by working with market participants to develop clean energy market opportunities at scale and advance progress toward the State's nation-leading clean energy goals. The CEF has evolved to serve as a major vehicle to achieve the State's clean energy goals, including the Climate Leadership and Community Protection Act (Climate Act).

The CEF is comprised of four portfolios: Market Development, Innovation and Research, NY Green Bank, and NY-Sun. These portfolios work collectively toward meeting New York State's ambitious energy, environmental, and economic goals and are expected to contribute significantly toward the broader New York State Energy Plan. The CEF offers solutions that will promote the following:

- Reduce barriers to the deployment and adoption of energy efficiency.
- Significantly reduce energy-related carbon emissions.
- Deliver billions of dollars in customer bill savings over the life of the CEF.
- Accelerate growth of the State's clean energy economy.
- Mobilize investment, leveraging billions of dollars over the life of the CEF.

Seven years into the CEF and based on the progress through the end of 2022 as well as the level of achievement anticipated to occur in future years, NYSERDA remains on pace to meet the minimum CEF ordered targets over the life of the fund. It has been noted that forecasts for delivering nearer-term targets (through 2025) have been hampered by market factors of the last few years. A closer analysis of progress and plans at this stage show that:

- The pace of acquiring direct benefits in the Market Development and Innovation and Research portfolios is well aligned with the pace of expended funding through the end of 2022, providing strong indication that NYSERDA is building a portfolio of investments that are delivering results.
- NYSERDA achieved 89% of total cumulative forecasted direct energy savings along with 148% of leveraged funds forecasted through the end of the year. Early indirect benefits reporting from studies completed in 2022 exceeds forecasted plans for these programs and is helping to close the direct benefits gap noted.
- NYSERDA forecasts that the delivery of near-term benefits will continue to be impacted by current challenges facing the clean energy market today, specifically challenges with supply chain, skilled labor availability, and rising construction costs, all of which are delaying or slowing projects and contributing to NYSERDA's lower outlook for the 2025 timeframe.



- NY-Sun’s completed projects and pipeline (statewide) total nearly 8 gigawatt (GW) positioning New York State to achieve the 10 GW installed target by 2025.
- NY Green Bank (NYGB) committed more than \$240 million during the 2022 calendar year. In December of 2022, NYGB eclipsed its 10-year CEF investment goal, a full three years ahead of schedule. NYGB will continue recycling its capital into new investments during the year and propelling a multitude of projects forward with funding uniquely suited to catalyze clean energy projects.
- NYSERDA is making meaningful progress toward meeting the target to deliver 40% of the benefits of its investment across the CEF to disadvantaged communities, working alongside other New York State agencies and authorities to finalize a benefits framework and initial progress reporting on all associated metrics. The Climate Justice Working Group (CJWG) finalized the criteria for identifying disadvantaged communities (DAC) late March 2023 and NYSERDA has already begun to focus CEF investments and resources in ways that will increase community engagement, identify opportunities for addressing barriers to accessing clean energy solutions, and prioritizing projects benefitting disadvantaged communities.

# 1 Progress Summary

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## 1.1 Overall CEF Performance

Figures 1 and 2 below present a comprehensive picture of progress against the CEF authorized budget and associated benefit targets reflecting all four CEF Portfolios (MD, IR, NY-Sun, and NY Green Bank). Progress shown against each key performance metric represents results through December 31, 2022, and nets out overlap across portfolios where it is known to occur. Additional detail on the individual portfolios can be found in subsequent Metrics and Financial Reporting sections, Tables 1–9.

Figure 1 captures the status of CEF funding while Figure 2 depicts progress of the combined portfolios against the latest CEF ordered benefit targets. Both figures should be viewed together to properly relate investments to results. In each of these visuals, progress is combined with the remaining expected (planned) results to demonstrate total portfolio projections toward NYSERDA’s targets. The summary of benefit progress reflects evaluated totals, incorporating verified gross acquired savings where evaluations have been completed, and gross savings values everywhere else. Indirect benefits from market transformation are included in acquired totals where they have been quantified through evaluation. Indirect benefits are also included in remaining plans, discounted by 50%, consistent with other plan filings to account for uncertainty in timing of delivery and potential overlap across the portfolio that has yet to be fully evaluated. Known CEF overlap is addressed between NY-Sun and NY Green Bank (distributed solar capacity, leveraged funds), NY-Sun and Market Development (distributed solar capacity, leveraged funds), and NY Green Bank and Market Development (energy efficiency savings, leveraged funds).

Broadly speaking, Figures 1 and 2 illustrate that the sum of expended, committed, and remaining planned funding across the CEF has reached 97% of the total authorized budget while projections for total energy savings are 94% through 2025 and 110% through 2030. Leveraged funding (the only metric not factoring anticipated indirect impacts at this time) is currently projected to exceed the 2025 target, setting the CEF on a trajectory for long-term success. The figures viewed together demonstrate that the combined portfolios are projected to deliver benefits with a strong return on investment at this stage in the development and execution of the CEF’s 10-year commitment timeline.

Progress and performance observations are documented within each of the portfolio sections that follow Figure 1 and 2. More granular metrics data is available to all stakeholders in NYSERDA’s quarterly report filing (Excel scorecard), the Clean Energy Dashboard<sup>5</sup>, and the associated Open NY data set that accompanies the dashboard.

**Figure 1. CEF Portfolio Expected Investment versus Targets through December 2022**

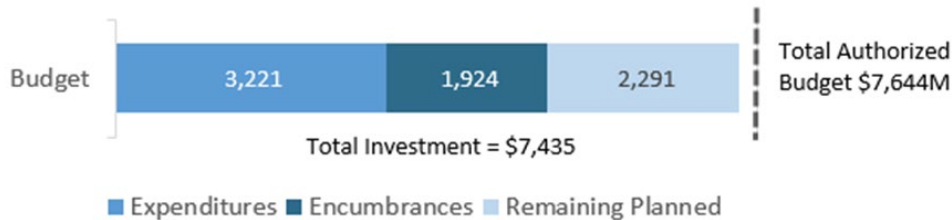


Figure 1 Supporting data		Total Authorized Budget	Budget Approved		Expended Funds		Encumbered Funds		Remaining Planned		Funding Not Yet Approved
			Current Total	% of Authorized	Current Total	% of Authorized	Current Total	% of Authorized	Total Balance	% of Authorized	
Market Development (MD)	Program Funds	\$ 2,399.7 M	\$ 2,320.7 M	98%	\$ 988.3 M	42%	\$ 662.1 M	28%	\$ 670.2 M	29%	\$ 51.9 M
	NYS Cost Recovery Fee		\$ 27.2 M		\$ 12.7 M		\$ 0.0 M		\$ 14.4 M		
Innovation & Research (IR)	Program Funds	\$ 631.7 M	\$ 524.3 M	84%	\$ 200.7 M	32%	\$ 238.6 M	38%	\$ 85.0 M	14%	\$ 101.4 M
	NYS Cost Recovery Fee		\$ 5.9 M		\$ 2.4 M		\$ 0.0 M		\$ 3.6 M		
MD and IR combined	Administration	\$ 274.4 M	\$ 257.7 M	94%	\$ 163.0 M	59%	\$ 0.0 M	0%	\$ 94.7 M	35%	\$ 16.7 M
	Evaluation	\$ 124.2 M	\$ 85.5 M	69%	\$ 27.3 M	22%	\$ 18.7 M	15%	\$ 39.4 M	32%	\$ 38.7 M
	<b>MD and IR Total</b>	<b>\$ 3,430.0 M</b>	<b>\$ 3,221.3 M</b>	<b>94%</b>	<b>\$ 1,394.5 M</b>	<b>41%</b>	<b>\$ 919.4 M</b>	<b>27%</b>	<b>\$ 907.3 M</b>	<b>28%</b>	<b>\$ 208.7 M</b>
NY-Sun	Program Funds	\$ 3,162.8 M	\$ 3,162.8 M	100%	\$ 849.5 M	27%	\$ 1,002.8 M	32%	\$ 1,310.5 M	41%	\$ 0.0 M
	NYS Cost Recovery Fee	\$ 41.8 M	\$ 41.8 M	100%	\$ 8.1 M	19%	\$ 0.0 M	0%	\$ 33.7 M	81%	\$ 0.0 M
	Administration	\$ 58.8 M	\$ 58.8 M	100%	\$ 20.9 M	36%	\$ 0.3 M	0%	\$ 37.6 M	64%	\$ 0.0 M
	Evaluation	\$ 3.5 M	\$ 3.5 M	100%	\$ 0.8 M	24%	\$ 1.2 M	33%	\$ 1.5 M	43%	\$ 0.0 M
<b>NY-Sun Total</b>	<b>\$ 3,266.8 M</b>	<b>\$ 3,266.8 M</b>	<b>100%</b>	<b>\$ 879.3 M</b>	<b>27%</b>	<b>\$ 1,004.2 M</b>	<b>31%</b>	<b>\$ 1,383.3 M</b>	<b>42%</b>	<b>\$ 0.0 M</b>	
NY Green Bank	Total	\$ 947.1 M	\$ 947.1 M	100%	\$ 947.1 M	100%	\$ 0.0 M	-	\$ 0.0 M	-	-
<b>CEF Total</b>		<b>\$ 7,643.9 M</b>	<b>\$ 7,435.2 M</b>	<b>97%</b>	<b>\$ 3,220.9 M</b>	<b>42%</b>	<b>\$ 1,923.6 M</b>	<b>25%</b>	<b>\$ 2,290.6 M</b>	<b>30%</b>	<b>\$ 208.7 M</b>

<sup>a</sup> Authorized Funding per Order: Approving Clean Energy Fund Modifications, issued and effective September 9, 2021 and inclusive of the approved 10 GW Distributed Solar Roadmap in April 2022. Excludes \$655 million in non-CEF NYSERDA funded solar projects.

<sup>b</sup> For purposes of this graph, NYGB funding deployments are capped at \$947.1 million, representing the total authorized CEF funding for capitalization. At the end of Q4 2022, NYGB had made over \$2 billion of cumulative principal deployments and received over \$1.5 billion in cumulative principal repayments. NYGB Current Portfolio, net of any portfolio losses, was \$704.4 million.

**Figure 2. CEF Portfolio Expected Benefits versus Targets Through December 2022**

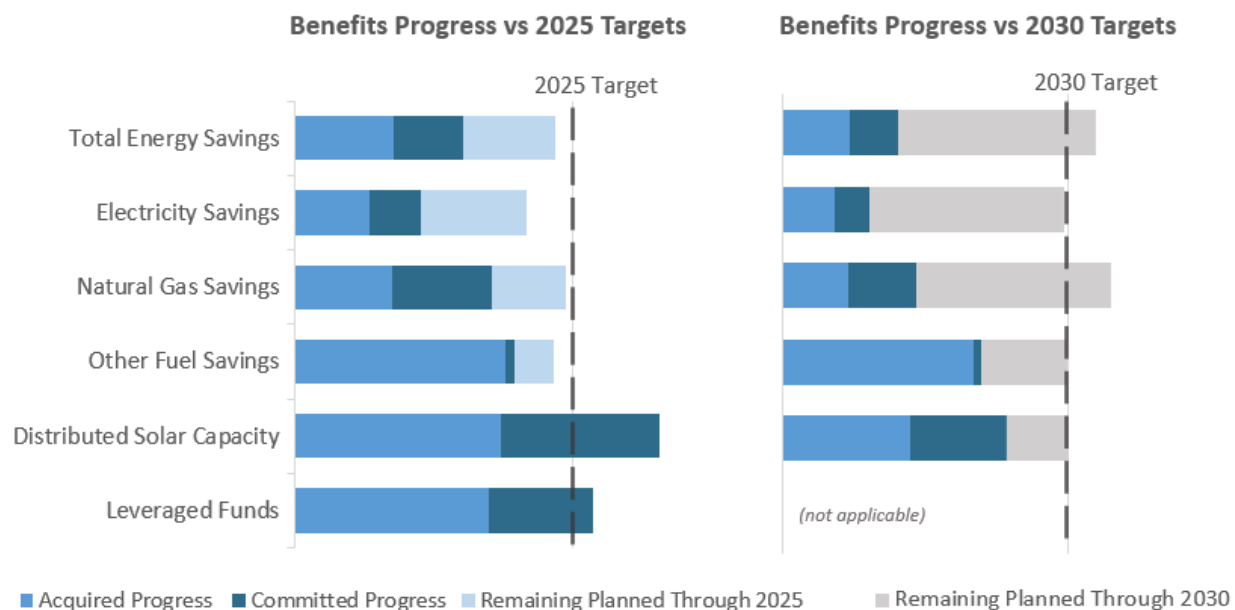


Figure 2 Supporting Data	Acquired Progress	Committed Progress	Remaining Planned Through 2025	Total Expected Through 2025	2025 Order Target	Remaining Planned Through 2030	Total Expected Through 2030	2030 Order Target
Total Energy Savings (MMBtu equivalent, millions)	18.7	13.4	17.7	49.8	53.0	54.6	86.8	79.0
Electricity Savings (MWh, millions)	1.8	1.2	2.6	5.6	6.7	6.9	9.9	10.0
Natural Gas Savings (MMBtu, millions)	8.8	9.0	6.6	24.4	25.0	26.1	43.9	38.0
Other Fuels Savings (MMBtu, millions)	11.4	0.5	2.1	14.0	15.0	5.1	16.9	17.0
Distributed Solar Capacity (Renewable MW)	4,460	3,426	-	7,886	6,000	2,158	10,044	10,000
Leveraged Funds (\$ millions)	\$14,024	\$7,460	-	\$21,484	\$20,000	-	\$21,484	n/a

Benefits Metrics Progress as Percent of Totals	Acquired + Committed (values summed from above)	→	Acquired + Committed as a Percentage of the Expectations / Targets			
			Total Expected Through 2025	2025 Order Target	Total Expected Through 2030	2030 Order Target
Total Energy Savings (MMBtu equivalent, millions)	32.2		65%	61%	37%	41%
Electricity Savings (MWh, millions)	3.0		54%	45%	31%	30%
Natural Gas Savings (MMBtu, millions)	17.8		73%	71%	40%	47%
Other Fuels Savings (MMBtu, millions)	11.9		85%	79%	70%	70%
Distributed Solar Capacity (Renewable MW)	7,886		100%	131%	79%	79%
Leveraged Funds (\$ millions)	\$21,484		100%	107%	100%	n/a

- <sup>a</sup> Energy savings values are annual; Total Energy Savings measures the combined Electricity and Fuel savings net of usage; therefore, may not sum to the total of individual electric and fuel savings values.
- <sup>b</sup> CEF initiatives not dedicated to building energy efficiency have been excluded from progress toward energy saving targets above, including Electric Vehicles - Rebate, Combined Heat and Power, and Fuel Cells.
- <sup>c</sup> Overlap where it is known or perceived to exist between portfolios has been removed from progress reported.

Table notes are continued on the next page.

- d Since the CEF launched in 2016 NYSERDA has maintained a single MMBtu Fuel Savings plan to forecast and measure performance for all fuel types. With the September 2021 CEF Order revision, NYSERDA is now required to break out reporting (and subsequently planning) of fuel savings for both natural gas and all other fuels (grouped). Until this planning can be fully implemented in each individual plan through NYSERDA’s annual reforecast process that culminates in a filing of the Compiled Investment Plans, November 1, 2022, NYSERDA will estimate the plans for these two distinct fuel groups at the portfolio level for performance management and reporting purposes.
- e Distributed Solar Capacity includes 1,093 MW of non-NYSERDA installations taken from the Statewide Solar Projects dashboard, which is populated with data from utility interconnection inventories. This data set includes all distributed solar interconnected in NYS, including hundreds of MWs which did not receive NYSERDA funding. Committed project data is maintained by NYSERDA independently of interconnection data. Since the two data sets define project completion date differently, some projects reported as committed may also be included as acquired under the “Non-NYSERDA Statewide Installations” (interconnection balance) figure. As the pipeline of NYSERDA commitments are drawn down over time (projects are considered acquired in both data sources), this overlap will be systematically eliminated.
- f Leveraged Funds progress here includes non-CEF NYSERDA funded solar projects of \$1,918 million acquired and \$120 million committed, consistent with overall reporting toward CEF distributed solar targets which include all solar statewide.
- g Leveraged funds expected benefits does not currently include anticipated indirect impacts.
- h Benefits metrics that have not been given 2030 Targets in the Order are shown as “not applicable.”
- i Neither Distributed Solar or Leveraged Funds Total Expected Through 2025 and 2030 values include forward-looking estimates from NY Sun or NY Green Bank portfolios at this time.
- j Benefits metrics that have not been given 2030 Targets in the Order are shown as “not applicable.”
- k NYSERDA makes no claim to the environmental attributes or any New York Generation Attribute Tracking System (NYGATS) certificates that may be associated with these projects.

Additionally, NYSERDA is required to track and report other reference metrics outlined in appendix C of the CEF Order. Carbon emissions reductions and bill saving metrics are presented below for the combined CEF portfolios.

**Table 1. Other Anticipated Benefits through 2025 and 2030**

<b>Annual Benefits Metrics</b> ** Direct + Indirect Benefits ** Overlap Accounted	<b>Acquired Progress</b>	<b>Committed Progress</b>	<b>Total Progress as of Current Reporting Period</b>	<b>2025 Order Expectation (Anticipated Benefit)</b>	<b>2030 Order Expectation (Anticipated Benefit)</b>
Emissions Reductions (CO2e Metric Tons, millions)	4.9	3.4	8.2	9.0	14.0
Participant Bill Savings (\$ millions)	\$966	\$725	\$1,691	n/a	n/a

<sup>a</sup> These metrics reflect all the same inclusions/exclusions and assumptions, including overlap—where known or perceived—between the four CEF portfolios and their reported benefits, as is applied to Figures 1 and 2 above.

## **Serving Disadvantaged Communities**

The September 2021 CEF Order set a target for NYSERDA to achieve 40% of the benefits of investment across the entire CEF portfolio in disadvantaged communities (DACs). With the signing of the Climate Act, NYSERDA began to adapt programs and increase focus on DAC investments across the CEF portfolio, investing in capacity building and engagement within frontline and underserved communities through initiatives such as the Regional Clean Energy Hubs; prioritizing the funding of projects benefitting disadvantaged communities through initiatives such as NY Sun and P-12 Schools, as well as the introduction of geographic eligibility through EmPower NY; and increasing investment in affordable housing. Through continued engagement with residents of disadvantaged communities and market actors serving these communities, NYSERDA will continue to evolve sector strategies to maximize benefits to disadvantaged communities.

On March 27, 2023 the Climate Justice Working Group (CJWG) finalized the criteria for identifying disadvantaged communities. NYSERDA will begin to incorporate these formal definitions along with forthcoming guidance on the tracking and reporting benefits related to DACs. Consistent with discussions at CJWG meetings and the Climate Action Council, NYSERDA still anticipates that direct programmatic investments (dollars) in DACs will be the primary metric for tracking compliance with the Climate Act investment mandate while other co-benefit metrics beyond dollars invested will be tracked and reported. In the interim, NYSERDA has worked to increase the use of geo-coding of project-level investments in its portfolios, which will support ongoing management of the portfolio to meet the DAC investment target as well as produce accurate, transparent progress reporting.

## **1.2 Market Development and Innovation and Research**

The progress and performance of these two portfolios through the end of 2022 can be examined in greater detail with data presented in Figures 1 and 2, Figure 3, Tables 3–5 (metrics), and Table 8 (financial) later in the report.

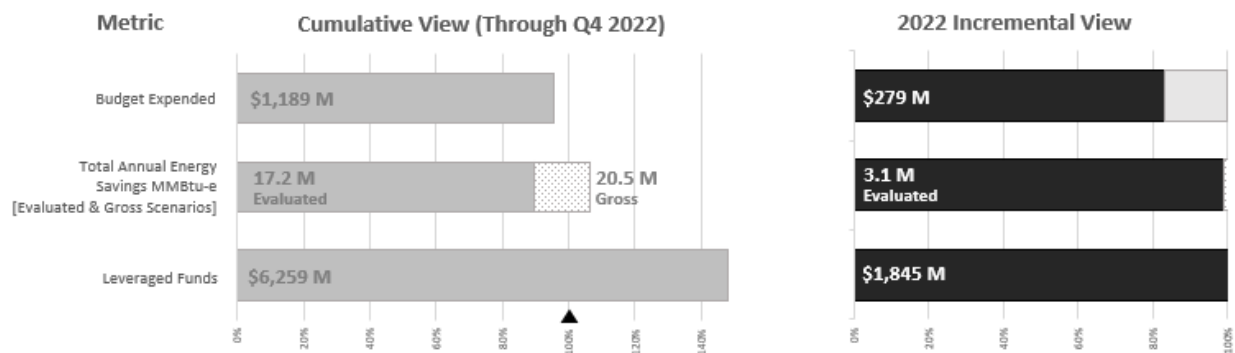
Each fall NYSERDA completes its annual update to forecasts for all CEF initiatives, which incorporates reported historical progress and revises forward looking plans to account for that history and any new learning from the market. Cumulative performance against these latest filed plans is the ultimate measure of success for delivering on the CEF benefits targets. NYSERDA also monitors incremental progress toward the current year goal to provide another viewpoint from which to assess performance, including how quickly funds are put to work in the market based on near-term expectations.

Unlike the broader CEF view presented in Figures 1 and 2, Figure 3 below reframes the analysis solely on these two portfolios, measuring progress toward expended funding and direct benefit plans of all MD/IR initiatives through Q4 2022.

Key points to interpret Figure 3 include:

1. The Cumulative View (through Q4 2022) represents years 2016–2022, plus all four quarters of 2022; 100% in this view represents the cumulative *planned* amounts for that timeframe.
2. The 2022 Incremental View represents progress made in the current calendar year against the current calendar year plan, with an expectation that 100% of the plan should be achieved by the end of the year. Note that the incremental goal for the current year is updated to reflect any under or over performance to plan reported in Q4 of the previous year. Total Annual Energy Savings is measured in MMBtu equivalents consistent with Figure 2; Gross and Evaluated (Verified Gross) reported savings scenarios are reflected in these progress bars to illustrate both viewpoints of progress as the results from evaluation studies become more prominent in NYSERDA progress reporting.
3. For each of these metrics all CEF, MD, and IR initiatives are included (no exclusions); CEF Admin, Evaluation, and NYS Cost Recovery Fees are excluded from the budget totals.

**Figure 3. Market Development/Innovation and Research Progress and Performance**



Performance to plan in 2022 for NYSERDA marks two consecutive years with strong progress across the field of metrics, with most core metrics achieving both cumulative and incremental goals established for the portfolios. The general alignment between progress and plan shown in these metrics is as much a testament to NYSERDA’s improvements in forecasting as it is to executing the collective plans. Evaluation results for both direct and indirect impacts continue to be incorporated into reporting. Direct gross total annual energy savings are 107% of plan through Q4 2022. When realization rates from impact evaluations to date are applied, direct gross total annual energy savings are reduced to 84% of plan, however updates to several of these studies are underway and planned for follow-on analysis for subsequent years (more mature CEF operations) and NYSERDA anticipates many of the

realization rates will improve, helping to close the energy savings shortfall noted. Indirect impacts reported through Q4 2022 yield an additional 1.9 million (M) MMBtu in total annual energy savings. Additional indirect impacts are expected to accrue and will continue to be measured in the later part of the CEF and even beyond the 10-year funding time frame, as markets transform.

#### General Observations

- As NYSERDA noted during the 2021 CEF review conducted by the Public Service Commission (PSC), strengthening the processes and tools used to effectively manage the portfolio has been a key focus of the organization. NYSERDA has taken steps to improve both process and tools, refining the focus of quarterly performance discussions and bolstering the annual planning process used to set expectations for the immediate year ahead as well as the longer-term view of individual initiative and collective portfolio goals.
- Seven years into the ten-year CEF timeline, NYSERDA has committed 69% of the total authorized funding and 56% of the total 2025 CEF total energy savings target (53 TBtu formalized in the most recent Order).

#### Energy Savings

- The data shows that NYSERDA has programmed initiatives anticipated to meet 94% of the aggressive energy targets set forth in the CEF Order for 2025 (53 TBtu) and exceed them through what is expected to be acquired by 2030 (79 TBtu)
- Nearly seven years into the CEF, the acquisition of benefits is accelerating and will continue to do so as early-CEF commitments transition to completed projects at a much more rapid pace and as evaluation studies conclude and report indirect impacts.
- Acquired and committed electricity savings (MWh) total has lagged the pace of funding and fuel savings but is still forecasted to reach CEF minimum targets as projects are completed when assessing against the longer-term 2030 targets.
- Fuel savings remain on pace with the significantly increased target adopted in the September 2021 CEF Order, with realized benefits on par with MD spending through the end of 2022. NYSERDA expects this trend to continue.

#### Leveraged Funding

- Acquired and committed progress is outpacing other metrics, showing strong realization relative MD/IR investments through the end of 2022. The longer-term outlook for leveraged funding planned is expected to increase further over time as indirect impacts are better understood and carefully assessed.

Appendix A of this report contains a detailed breakdown of progress for each Focus Area and initiative comprising NYSERDA's MD and IR portfolios. These summaries include performance metrics, milestone updates, output and outcome indicator updates, and concise narratives speaking to the status of the initiative.



### **1.3 NY-Sun**

NY-Sun represents the most mature of the four CEF portfolios. In April 2022, the Public Service Commission's 10 GW Order Expanding the NY-Sun Program codified a new program target of 10 GW of distributed solar by 2030, expanding the total program budget to \$3.3 billion. The expanded NY-Sun program will provide enough solar capacity to power nearly 700,000 homes with at least 35% of new solar capacity delivering benefits to statutorily defined disadvantaged communities, environmental justice communities, and low- to moderate-income New Yorkers.

Approximately eight years into the initiative, the program is performing well, having surpassed the original 2023 goal for 3 GW of distributed solar in March 2021. Through year end 2022, NY Sun has nearly \$1.9 billion in programmatic funding committed and 4.5 GW of projects installed, of which 3.4 GW have received NY-Sun incentives. This past year marks New York State's most active year yet for distributed solar deployment, with 851 MW installed statewide (749 MW with NYSERDA funding), representing a nearly 12% growth over 2021 statewide completions. The program is well on track to achieve its goals of 6 GW by 2025 and 10 GW by 2030. Annual and cumulative completion data are available on NYSERDA's solar dashboard web pages.<sup>6</sup>

According to Greentech Media's most recent US Solar Market Insights report, New York State ranked first in the country for community solar installed in the first three quarters of 2022, as well as first for all-time community solar installations. Furthermore, according to the latest Solar Jobs Census report, the State now ranks fourth in the country with a total of 10,524 full-time solar jobs.<sup>7</sup>

### **1.4 NY Green Bank**

NY Green Bank (NYGB) began commercial operations in summer 2014. During the first two years of the CEF, NYGB achieved two key milestones. First, it generated positive annual net income a full year earlier than planned. Second, during the third calendar quarter of 2017, NYGB earned cumulative revenue on its investments greater than its cumulative expenses and losses. Since these milestones NYGB has continued to deploy capital into clean energy projects and sustainable infrastructure; as of December 31, 2022, NYGB had over \$1.9 billion in new investment opportunities. As of December 31, NYGB had deployed over \$2.0 billion and \$1.5 billion of the deployed principal had been repaid and made available for recycling into subsequent transactions over the horizon of the CEF.

NYGB's investments are anticipated to support the delivery of 518,705 MMBtu total energy savings (MMBtu equivalent) annually and distributed solar capacity of 1,460 MW to New Yorkers. As of calendar year end 2022, NYGB's counterparties have completed systems that provide 106,532 MMBtu in annual energy savings and installed 750MW of distributed solar capacity. These benefits will further increase as NYGB's counterparties continue to draw down on capital commitments to fund new project installations, and NYGB continues to close new transactions in 2023 and beyond.

## 2 Metrics Reporting

Portfolio-level benefit metrics progress updates for each of the four CEF portfolios follows. The cumulative progress and expected benefits from all four portfolios, alongside CEF Order Targets, are shown combined in Table 2. Order Targets for 2025 and 2030 timeframes are from the Order Approving Clean Energy Fund Modifications, issued and effective September 9, 2021. NYSERDA removes overlap among its CEF portfolios in this roll-up table while individual portfolio tables remain whole; therefore, the sum of individual portfolio tables presented later will not match the totals in Table 2. Subsequent Tables 3–7 provide a view of progress for each portfolio and their relevant metrics individually.

**Table 2. CEF Combined Portfolios Year-End Progress and Projected Benefits**

CEF (All Portfolios) Annual Benefit Metrics ** Direct + Indirect Progress ** Overlap Accounted	Evaluated Totals (verified gross where evaluated; gross where not)						
	Cumulative Acquired Benefits Through 2022	Committed Benefits as of Q4 2022 (Committed but not acquired)	Total Progress Thru 2022 (Total Acquired + Committed)	Total Expected Benefits Through 2025	2025 Order Target	Total Expected Benefits Through 2030	2030 Order Target
Total Energy Savings (MMBtu-e)	18,740,417	13,435,051	32,175,468	49,829,829	53,000,000	86,770,352	79,000,000
Electricity Savings (MWh)	1,812,324	1,224,975	3,037,299	5,611,519	6,700,000	9,896,381	10,000,000
Natural Gas Fuel Savings (MMBtu)	8,784,406	8,982,664	17,767,070	24,407,837	25,000,000	43,880,606	38,000,000
Other Fuel Savings (MMBtu)	11,377,077	509,985	11,887,062	14,026,838	15,000,000	16,944,846	17,000,000
Distributed Solar Capacity (MW)	4,460	3,426	7,886	7,886	6,000	7,886	10,000
Leveraged Funds (\$ millions)	\$14,024	\$7,460	\$21,484	\$21,484	\$20,000	\$21,484	n/a

- <sup>a</sup> Figures include both direct and indirect benefits; indirect progress is reported only for initiatives in which studies have concluded; indirect plans as represented in the “Total Expected” columns conservatively include only 50% of the estimated total indirect benefits from market transformation to avoid overlap in these values and to account for uncertainty associated with the forecasting and measurement of indirect benefits over time.
- <sup>b</sup> Progress reported here is a blend of verified gross and gross savings. Where evaluation studies have been completed and yield realization rates, verified gross acquired savings are reported. Where studies are not yet complete, those initiatives and/or time periods will continue reporting gross savings.
- <sup>c</sup> Verified savings as a percent of total reported direct savings varies by metric and includes electricity (64% verified), natural gas (75%), and other fuels (12%). The measurement and verification work to verify savings is done on a periodic basis, most commonly covering at least 1-2 years of program activity. This work can only begin once adequate post-installation operation has occurred. Additionally, methods and data availability vary significantly between electricity, natural gas, and other fuels, which is one of the underlying causes of varying percentages of savings verified. Indirect savings are not included in these percentages figures.

*Table notes are continued on the next page.*

- <sup>d</sup> Total Energy Savings measures the combined electricity and fuel savings net of usage; therefore, may not sum to the total of individual electric and fuel savings values.
- <sup>e</sup> CEF initiatives not dedicated to building energy efficiency have been excluded from progress toward energy saving targets above, including Electric Vehicles—Rebate, Combined Heat and Power, and Fuel Cells.
- <sup>f</sup> Since the CEF launched in 2016, NYSERDA has maintained a single MMBtu Fuel Savings plan to forecast and measure performance for all fuel types. With the September 2021 CEF Order revision, NYSERDA is now required to break out reporting (and subsequently planning) of fuel savings for both natural gas and all other fuels (grouped). Until this planning can be fully implemented in each individual plan through NYSERDA’s annual reforecast process that culminates in a filing of the Combined Investment Plans, November 1, 2022, NYSERDA will estimate the plans for these two distinct fuel groups at the portfolio level for performance management and reporting purposes.

*Table notes are continued on the next page.*

- g Distributed Solar Capacity includes 1,093 MW of non-NYSERDA solar capacity from statewide interconnection data.
- h Leveraged funds expected benefits does not currently include anticipated indirect impacts.
- i Benefits metrics that have not been given 2030 Targets in the Order are shown as “not applicable.”
- j Total Expected Benefits values do not include future expected impacts from NY-Sun and NY Green Bank portfolios.
- k NYSERDA makes no claim to the environmental attributes or any New York Generation Attribute Tracking System (NYGATS) certificates that may be associated with these projects.

**Table 3. Market Development Year-End Progress and Projected Direct Benefits**

Market Development Annual Benefits Metrics ** Direct Only **	Evaluated Totals (verified gross where evaluated; gross where not)					
	Cumulative Acquired Benefits Through 2022	Cumulative Planned Benefits Through 2022	Committed Benefits as of Q4 2022 (Committed but	Total Progress Through 2022 (Total Acquired + Committed)	Total Expected Benefits Through 2025	Total Expected Benefits Through 2030
Total Energy Savings (MMBtu equivalent)	17,228,381	19,273,462	12,642,965	29,871,346	34,001,825	44,539,328
Electricity Savings (MWh)	1,644,551	2,044,626	1,451,767	3,096,318	3,776,244	4,560,824
Total Fuel Savings (MMBtu)	20,445,023	22,456,936	9,492,649	29,937,672	31,766,358	39,692,706
Natural Gas Fuel Savings (MMBtu)	8,036,133	9,488,849	8,982,664	17,018,797	17,692,713	24,816,211
Other Fuel Savings (MMBtu)	12,408,890	12,968,087	509,985	12,918,875	14,073,646	14,876,495
Distributed Solar Capacity (Renewable MW)	19	25	4	23	37	37
Total Leveraged Funds (\$M)	\$2,889	\$2,893	\$2,097	\$4,986	\$5,021	\$6,084

- a Progress reported here is a blend of verified gross and gross savings. Where studies have been completed and yield realization rates, verified gross acquired savings are reported. Where studies are not complete, those initiatives and/or time periods will continue reporting gross savings. Verified savings as a% of total reported direct savings varies by metric and includes electricity (64% verified), natural gas (75%), and other fuels (12%).
- b MD initiatives not dedicated to building energy efficiency have been excluded from progress toward energy saving targets above, including Electric Vehicles—Rebate, Combined Heat and Power, and Fuel Cells.
- c As noted earlier in the report, fuel savings are currently only planned at the total fuels level; NYSERDA will be implementing new CEF Order requirements to break out reporting of natural gas and other fuels in 2022 and adopting those plans in 2023.
- d NYSERDA makes no claim to the environmental attributes or any New York Generation Attribute Tracking System (NYGATS) certificates that may be associated with these projects.

Indirect benefits are defined as long-term market effects from follow-on market activity not directly funded by NYSERDA. Progress is reported as market impacts are verified through the completion of market evaluation studies which will occur gradually and grow over time, depending upon the period of each study, which varies from one initiative to another. Market evaluation studies continued to assess indirect impacts in 2022. Additional detail on those studies can be found in appendix C of this report.

**Table 4. Market Development Year-End Progress and Projected Indirect Benefits**

Market Development Annual Benefit Metrics ** Indirect Benefits Only **	Evaluated Totals (from completed studies)		
	Cumulative Acquired Benefits Reported Through 2022	Total Indirect Benefits Expected Through 2025	Total Indirect Benefits Expected Through 2030
Total Energy Savings (MMBtu equivalent)	1,905,393	15,742,386	42,145,407
Electricity Savings (MWh)	319,886	2,216,260	5,716,541
Total Fuel Savings (MMBtu)	816,433	8,195,588	22,660,017
Natural Gas Fuel Savings (MMBtu)	748,273	6,715,124	19,064,395
Other Fuel Savings (MMBtu)	68,160	1,480,463	3,595,622
Renewable Energy Capacity (MW)	58	301	406

- a Indirect benefits are reported for the initiatives and specific time periods where studies have concluded.
- b Indirect impacts will be added over time as additional studies conclude, regularly growing these evaluated totals.
- c Indirect plans as represented in the “Total Expected” columns conservatively include only 50% of the estimated total indirect benefits from market transformation to avoid overlap in these values and to account for uncertainty associated with the forecasting and measurement of indirect benefits over time.
- d Indirect leveraged funding will be captured with future assessments.
- e MD initiatives not dedicated to building energy efficiency have been excluded (as it pertains to indirect savings, Electric Vehicles—Rebate is excluded).

**Table 5. Innovation and Research Year-end Progress and Projected Benefits**

Innovation and Research Annual Benefits Metrics	Gross Totals					
	Cumulative Acquired Benefits Through 2022	Cumulative Plan Through 2022	Committed Benefits as of Q4 2022 (Committed but not acquired)	Total Progress Through 2022 (Total Acquired + Committed)	Total Expected Benefits Through 2025	Total Expected Benefits Through 2030
Total Leveraged Funds (\$M)	\$3,371	\$1,337	\$1,527	\$4,897	\$2,663	\$3,563

Progress of the NY-Sun portfolio is shown in Table 6. Cumulative progress represents benefits from all projects completed or in the pipeline. Unlike the other portfolios of the CEF, NY-Sun does not have a progressive build format; therefore, Total Expected Benefits as of December 31, 2022 equals Cumulative Progress through December 31, 2022.

**Table 6. NY-Sun Year-End Benefits Progress**

NY-Sun Annual Benefit Metrics	Evaluated Totals (verified gross where evaluated)		
	Cumulative Acquired Benefits Thru 2022	Committed Benefits as of Q4 2022	Total Progress Thru 2022 (Acquired + Committed)
Total Distributed Solar Capacity (Renewable MW)	4,460	3,426	7,886
NYSERDA CEF Installations	2,778	3,376	6,154
NYSERDA (non-CEF) Installations	589	50	638
non-NYSERDA Statewide Installations	1,093	-	1,093
Total Leveraged Funds (\$ million, CEF only)	5,391	272	5,663

- <sup>a</sup> Distributed Solar Capacity MW reported as acquired are taken from the Statewide Solar Projects dashboard, which is populated with data from utility interconnection inventories. This dataset includes all distributed solar interconnected in NYS, including hundreds of MWs which did not receive NYSERDA funding. Committed project data is maintained by NYSERDA independently of interconnection data. Since the two datasets define project completion date differently, some projects reported as committed may also be included as acquired under the “Non-NYSERDA Statewide Installations” (interconnection balance) figure. As the pipeline of NYSERDA commitments are drawn down over time and these projects are considered acquired in both data sources, this overlap will be eliminated.
- <sup>b</sup> Acquired benefits are installed projects while committed are considered pipeline (contracted but not yet completed as well as applications approved, but not yet contracted).
- <sup>c</sup> Leveraged funds reflect the sum of all solar project costs reported to NYSERDA by participating contractors, minus the total NYSERDA incentives paid on these projects.
- <sup>d</sup> NYSERDA makes no claim to the environmental attributes or any New York Generation Attribute Tracking System (NYGATS) certificates that may be associated with these projects.

Progress of the NY Green Bank portfolio is shown in Table 7. Cumulative progress through December 31, 2022 represents benefits from clean energy measures deployed in New York State. Total expected benefits from executed transactions as of December 31, 2022 will be the result, no later than 2025, from full implementation of all NY Green Bank transactions executed by this date.<sup>8</sup>

**Table 7. NY Green Bank Year-End Benefits Progress**

NY Green Bank Annual Benefit Metrics	Evaluated Totals (verified gross where evaluated)		
	Cumulative Acquired Benefits Thru 2022	Committed Benefits as of Q4 2022	Overall Investments Thru 2022 (Acquired + Committed)
Total Energy Savings (MMBtu equivalent)	106,532	412,173	518,705
Electricity Savings (MWh)	28,480	159,811	188,290
Total Fuel Savings (MMBtu)	9,360	1,866,235	1,875,595
Natural Gas Fuel Savings (MMBtu)	9,360	1,866,235	1,875,595
Other Fuel Savings (MMBtu)	-	-	-
Distributed Solar Capacity (Renewable MW)	750	933	1,682
Total Project Costs (\$ million)	1,831	2,604	4,435

- <sup>a</sup> Cumulative Progress is the Actual Clean Energy system deployed in NYS, reported by NYGB’s clients, as a result of NYGB’s participation in financing these projects in the State.

*Table notes are continued on the next page.*

- b Overall Investments as of December 31, 2022 represents the sum of the low end of the range for all First-Year estimated energy savings, energy generation, and GHG emissions reductions (as also reported in NYGB Quarterly Metrics Reports).
- c Total Energy Savings measures the combined electricity and fuel savings net of usage; therefore, may not sum to the total of individual electric and fuel savings values.
- d Cumulative Progress and Overall Investments are the same measure as reflected in the corresponding Cumulative Annual Benefits calculations, but for each NYGB investment, the relevant annual measure is multiplied by the expected measure life and summed to total cumulative progress or overall investments.
- e Total Project Costs representing Overall, reflect the low end of the range for estimated system deployment to be achieved by the end of the availability period for each transaction, aggregated across all NYGB investments.
- f The NYGB Metrics, Reporting and Evaluation Plan and in this table, define Total Project Costs to include fair market value (FMV) data for a subset of NYGB's investments. FMV is an estimated market valuation of fully installed energy projects provided by NYGB's counterparties and is often required for federal income tax purposes, by institutional investors and for certain grant program purposes unconnected with NYGB. As projects progress and the cost of installed equipment and labor are known and reported to NYGB by its counterparties, NYGB will seek to adjust reported values and replace FMV in its aggregated data sets and periodic reporting with those actual costs.
- g NYSERDA makes no claim to the environmental attributes or any New York Generation Attribute Tracking System (NYGATS) certificates that may be associated with these projects.

### 3 Financial Reporting

Portfolio-level financial progress updates for each of the four CEF portfolios follows.

**Table 8. Market Development, Innovation and Research Portfolio-Level Funding and Financial Metrics**

Budget Progress (\$M)	Total Authorized Budget	Total Approved As of Dec. 31 2022	Expended Funds	% of Approved Budget Expended	Committed Funds As of Dec. 31 2022	Total Progress (Expended + Committed)	% of Approved Budget Expended + Committed	Budget Approved Remaining Balance
<b>Market Development (MD)</b>	\$2,399.7	\$2,347.8	\$1,001.1	43%	\$662.1	\$1,663.2	71%	\$684.6
Program Funds	\$2,399.7	\$2,320.7	\$988.3	43%	\$662.1	\$1,650.5	71%	\$670.2
NYS Cost Recovery Fee		\$27.2	\$12.7	47%	n/a	\$12.7	47%	\$14.4
<b>Innovation &amp; Research (IR)</b>	\$631.7	\$530.3	\$203.1	38%	\$238.6	\$441.7	83%	\$88.5
Program Funds	\$631.7	\$524.3	\$200.7	38%	\$238.6	\$439.3	84%	\$85.0
NYS Cost Recovery Fee		\$5.9	\$2.4	40%	n/a	\$2.4	40%	\$3.6
<b>Administration</b>	\$274.4	\$257.7	\$163.0	63%	\$0.0	\$163.0	63%	\$94.7
<b>Evaluation</b>	\$124.2	\$85.5	\$27.3	32%	\$18.7	\$46.0	54%	\$39.4
<b>Total MD &amp; IR</b>	<b>\$3,430.0</b>	<b>\$3,221.3</b>	<b>\$1,394.5</b>	<b>43%</b>	<b>\$919.4</b>	<b>\$2,314.0</b>	<b>72%</b>	<b>\$907.3</b>

<sup>a</sup> The data contained in this table is inclusive of all initiatives approved under these two CEF portfolios, with plans representing the CEF Chapters currently filed and approved as of December 31, 2022.

**Table 9. NY-Sun Portfolio-Level Funding and Financial Metrics**

Budget Progress (\$M)	Total Authorized Budget	Expended Funds	% of Authorized Budget Expended	Committed Funds As of Dec. 31 2021	Total Progress (Expended + Committed)	% of Authorized Budget Expended + Committed	Budget Authorized Remaining Balance
<b>NY-Sun</b>	\$3,204.6	\$857.6	27%	\$1,002.8	\$1,860.4	58%	\$1,344.2
Program Funds	\$3,162.8	\$849.5	27%	\$1,002.8	\$1,852.3	59%	\$1,310.5
NYS Cost Recovery Fee	\$41.8	\$8.1	19%	n/a	\$8.1	19%	\$33.7
<b>Administration</b>	\$58.8	\$20.9	36%	\$0.3	\$21.1	36%	\$37.6
<b>Evaluation</b>	\$3.5	\$0.8	24%	\$1.2	\$2.0	57%	\$1.5
<b>Total NY-Sun</b>	<b>\$3,266.8</b>	<b>\$879.3</b>	<b>27%</b>	<b>\$1,004.2</b>	<b>\$1,883.5</b>	<b>58%</b>	<b>\$1,383.3</b>

<sup>a</sup> The data contained in this table is limited to only NY-Sun contract commitments.

<sup>b</sup> NYSERDA supported solar installations not funded through the CEF total \$655 million and are reported elsewhere.

Funding and financial status of NY Green Bank is provided in the collection of tables that follow.

NY Green Bank is presented separately from the other CEF portfolios to accurately represent NY Green Bank’s unique characteristics (e.g., funds invested by NY Green Bank are ultimately returned and recycled, and revenues are generated to continue to support self-sufficiency and reinvestment).



**Table 10. NY Green Bank Portfolio-Level Funding and Financial Metrics (group)**

Net Position vs Budgeted Funds

Program Costs & Revenue (\$M)	Total Authorized Budget	Deployed Funds (drawn)	Committed Funds (undrawn)	Current Portfolio Total	Net Income Earned on Investments	Sale of Loans and Financing Receivables	Available Capital <sup>c</sup>	Net Position
NY Green Bank	\$947.1	\$515.8	\$188.6	\$704.4	\$89.2	(\$12.6)	\$242.7	\$1,023.7

Cumulative Principal Deployed and Repaid

Cumulative Principal Deployed	Cumulative Principal Repaid
\$2,010.4	\$1,489.1

Investments to Date

CEF 10-Year Investment Goal	Overall Investments to Date	Remaining (\$)	Remaining (%)
\$1,900.0	\$1,963.8	Achieved on Dec 19, 2022	

Other Costs

Administrative Costs	Budgeted Funds	Cumulative Expended	Remaining Balance
Operating Expenses (Program Administration)	\$12.8	\$12.8	\$0.0
Program Evaluation	\$4.0	\$1.0	\$3.0
NYS Cost Recovery Fee	\$0.5	\$0.5	\$0.0
<b>Total Other Costs</b>	<b>\$17.2</b>	<b>\$14.3</b>	<b>\$3.0</b>

- <sup>a</sup> Deployed Funds include capitalized interest and fees; as such the value does not reflect the difference between Cumulative Principal Deployed and Cumulative Principal Repaid.
- <sup>b</sup> Available Capital reflects the amount of NYGB's initial \$1.0 billion capitalization confirmed in the CEF Order that is not currently Deployed or Committed, less \$52.9 million of reallocated RGGI funds. As NYGB investments mature and are redeployed into new projects, Available Capital gives a snapshot in time of the funds available for clean energy investment.
- <sup>c</sup> NYGB Operating Expenses reflect reporting of the budget and actual expenses from "start-up" administrative funding approved through Public Service Commission Order. Operating expenses in excess of the originally approved amount are being funded from NYGB revenues and are not reported in this table but are reflected in its annual financial statement.

# Report Endnotes

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- <sup>1</sup> NYS Department of Public Service Commission Files  
<http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=18-M-0084> .
- <sup>2</sup> Governor Hochul proposes expansion of distributed solar target (10 GW by 2030) and energy storage target (6 GW by 2030), both of which can be referenced in the 2022 State of the State Book  
<https://www.governor.ny.gov/sites/default/files/2022-01/2022StateoftheStateBook.pdf>
- <sup>3</sup> New York’s 6GW Energy Roadmap: Policy Options for Continued Growth in Energy Case 18-E- 030:  
<https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=18-E-0130&CaseSearch=Search>
- <sup>4</sup> DPS and NYSERDA jointly filed the Distributed Solar Roadmap on December 17, 2021, which proposed a pathway to a statewide goal of 10 GW of distributed solar by 2030. This goal is in alignment with Governor Kathy Hochul's previously announced target.
- <sup>5</sup> NYSERDA’s Clean Energy Dashboard:<https://www.nysesda.ny.gov/Researchers-and-Policymakers/Clean-Energy-Dashboard/View-the-Dashboard>
- <sup>6</sup> Statewide completion data are available at <https://www.nysesda.ny.gov/All-Programs/NY-Sun/Solar-Data-Maps/Statewide-Projects>. NYSERDA-supported completion data are available at <https://www.nysesda.ny.gov/All-Programs/NY-Sun/Solar-Data-Maps/NYSERDA-Supported-Solar-Projects>.
- <sup>7</sup> National Solar Jobs Census 2021.
- <sup>8</sup> NYSERDA’s NY Green Bank Metrics, Reporting and Evaluation Report through December 31, 2022 was filed in the Department of Public Service’s Document Matter Management System under case 13-M-0412 on February 28, 2023 and can also be found at: <https://greenbank.ny.gov/Resources/Public-Filings>

# Appendix A. Performance and Milestone Summaries

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The CEF Annual Performance Report, and specifically the individual initiative performance summaries contained within this appendix, highlight the link between the performance of an initiative and the plan for continuation, modification, or termination of those initiatives. Following the Clean Energy Fund (CEF) principles of “test-measure-adjust,” the performance of each Market Development and Innovation & Research initiative is carefully assessed, along with other information, to adjust future plans, including future budget and benefit estimates defined in each CEF investment plan.

The progress and performance summaries that follow are organized consistent with the CEF Compiled Investment Plans (CIP) in that they are presented by Focus Area and Initiative. Initiatives are plotted to the eleven Market Development and nine Innovation & Research Focus Areas they impact in the directory tables that follow this summary. The reader can use links in these directory tables to navigate to each relevant report section. Resource Acquisition Transition initiatives were launched at the onset of the CEF in 2016 and do not contain milestones, outputs, & outcomes as subsequent CEF initiatives do. CEF initiatives that are part of the Statewide Low-to-Moderate Income Implementation Plan co-administered with Utilities are reported in the Annual LMI Report filed April 1 each year. Cumulative Plan vs. Progress Through 2022 metrics of both groups are contained within this appendix for reference.

Each summary contains the following components (reading top to bottom):

1. Timeline of Funding Deployment (both funding commitments and expenditures)
2. Summary (narrative) of Performance and Future Plans
3. Cumulative Plan vs. Progress Through 2022 Table (CEF budget and direct benefits metrics)
4. A summary of Activities associated with each initiative as documented in the CIP
5. A summary of Milestones with status and progress narrative
6. A summary of Output & Outcome indicators with targets by year and cumulative progress to date

Performance to date represents a cumulative look back at the period from program launch through December 31, 2022. Therefore, all planned values represent those contained in NYSERDA’s approved investment plans as of December 31, 2022. Where applicable updates are provided for milestones as well as output/outcome indicator metrics through 2022.

The full CEF Compiled Investment Plan including plan activity tables summarized within this report can be downloaded from NYSERDA’s website under Archive – the September 9, 2022 filing<sup>1</sup>.

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<sup>1</sup> <https://www.nyserra.ny.gov/-/media/Project/Nyserda/Files/About/Clean-Energy-Fund/compiled-investment-plan.pdf>

Market Development Initiatives

	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	Status
Advancing Agricultural Energy Technologies		X									Active
Building Operations and Maintenance Partnerships										X	Active
Clean Energy Communities			X								Active
Clean Energy Siting and Soft Cost Reduction						X					Active
Codes and Standards for Carbon Neutral Buildings	X										Active
Community Energy Engagement			X								Inactive
Consumer Awareness							X				Active
Electric Vehicles - Rebate								X			Inactive
Energy Management Practices		X									Active
Energy Management Technology		X		X							Active
EV Charging & Engagement								X			Active
Greenhouse Lighting and Systems Engineering		X									Active
Heat Pumps Phase 1 (2017)	X										Inactive
Heat Pumps Phase 2 (2020)	X			X			X				Active
Information Products and Brokering		X									Active
Market Challenges		X		X							Active
Multifamily Low-Carbon Pathways				X							Active
New Construction - Market Rate					X						Active
Offshore Wind Master Plan						X					Inactive
Offshore Wind Pre-Development Activities						X					Inactive
ORES Support						X					Active
P-12 Schools		X									Active
Pay for Performance		X					X				Active
Product and Appliance Standards	X										Active
Real Estate Tenant		X									Inactive
Reducing Barriers to Distributed Deployment						X					Active
Renewable Heat NY - Clean and Efficient Biomass Heating	X										Inactive
Residential							X				Active
REV Campus Challenge		X									Active
REV Connect	X										Active
Solar Plus Energy Storage						X					Inactive
Talent Pipeline										X	Active
Technical Services		X		X							Active

## Market Development Initiatives

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

Status

### Low-to-Moderate Income Initiatives

NYSDERDA jointly files the *LMI Statewide Portfolio Annual Report* with the Utilities on April 1 of each year. This report contains detailed information on the progress of all LMI-related initiatives and can be found in the Department of Public Service's Document Matter Master (DMM) system under case 14-M-0094.

Healthy Homes Feasibility Study					X							Inactive
LMI Multifamily					X							Active
LMI Outreach & Engagement					X							Active
LMI Pilots					X							Active
New Construction - LMI					X							Active
NYS Healthy Homes Value Based Payment Pilot					X							Active
Regional Clean Energy Hubs					X							Active
RetrofitNY - LMI					X							Active
REVitalize					X							Inactive
Single Family - Low Income					X							Active
Single Family - Moderate Income					X							Active
Solar for All					X							Inactive

### Resource Acquisition Transition Initiatives (all Inactive)

Agriculture Transition			X									Inactive
Anaerobic Digesters Transition								X				Inactive
Combined Heat & Power Transition								X				Inactive
Commercial New Construction Transition							X					Inactive
Commercial Transition			X									Inactive
Fuel Cells								X				Inactive
Industrial Transition			X									Inactive
Low Rise New Construction Transition - LMI					X							Inactive
Low Rise New Construction Transition - Market Rate							X					Inactive
Multifamily Market Rate Transition						X						Inactive
Multifamily New Construction Transition - LMI					X							Inactive
Multifamily New Construction Transition - Market Rate							X					Inactive
Single Family Market Rate Transition									X			Inactive
Small Wind Transition								X				Inactive
Solar Thermal Transition	X											Inactive

Innovation & Research Initiatives

	Buildings Innovation	Clean Transportation Innovation	Climate Resilience Innovation	Energy Focused Environmental Research	Gas Innovation	Grid Modernization	Negative Emissions Research	Renewables Technologies	Technology to Market	Status
CarbonTech Development							X		X	Active
Catalytic Capital for Climatetech									X	Active
Climatetech Commercialization Support	X								X	Active
Climatetech Expertise & Talent									X	Active
Electric Vehicle Innovation		X								Active
Energy Storage Technology and Product Development							X			Active
Energy-Related Environmental Research			X							Active
Future Grid Performance Challenges					X					Active
Grid ClimateTech Ready Capital					X					Active
High-Performing Electric Grid					X					Active
Long Duration Energy Storage				X						Active
Manufacturing Corps									X	Active
National Offshore Wind Research & Development Consortium							X			Active
Natural Carbon Solutions							X			Active
NextGen Buildings	X									Active
Novel Business Models and Offerings									X	Active
Power Electronics Manufacturing Consortium						X				Inactive
Public Transportation and Electrified Rail		X								Active
Utility Thermal Network Technical Support				X						Active

**Performance Summary**

Expected Timeline Of Funding Deployment												Committed (COM), Expended (EXP)			
Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start	End							
EXP							Start	End							

Summary of Performance and Future Plans
NYSERDA added funding to this initiative in 2022. This program is moving at pace with what has been projected.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	766,666	325,000	42%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	14,952,272	-	0%

**Activities Summary**

Activity	Activity #
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.	1

***Milestones Summary***

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue award to an Empire Technology Prize program administrator.	2022	The program administrator for the Empire Technology Prize program was awarded on 3/15/2022.	Complete	2022	1

***Outputs and Outcomes Summary***

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Corporate parties engaged through Corporate Challenges	-	20	1	-	-	-	1
Output: Number of teams engaged	-	10	0	-	-	-	1
Outcome: Corporate and strategic partnerships formed	-	10	579	-	-	-	1



**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start												End		
EXP			Start										End		

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	12,648,573	9,010,080	71%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	36,289,129	5,512,826	15%

**Summary of Performance and Future Plans**

NYSERDA's NextGen HVAC Innovation Challenge (PON 3519) completed Round 6 in 2022. Round 6 added a new challenge to support innovative solutions for increasing building participation in Clean Thermal District Systems and resulted in five commercialized products that are seeing utilization and increasing adoption in the State. Twelve projects with an investment of \$14.6M were initiated in 2022 to accelerate the development and commercialization of innovative products and solutions to enable broader adoption of heat pump solutions for mid-rise buildings, thermal energy storage, and building envelope solutions. Projects focus on cold climate performance, cost compression, refrigerant usage, peak load reduction, building envelope improvements, and heat pump solution needs unique to New York's stock of buildings. In addition to these activities, support was provided to the Clean Heat 4 All initiative being led by NYPA, NYCHA and NYSERDA to develop and commercialize a 120V cold climate window mounted heat pump. The expected products will offer a practical and economic solution for the deployment of heat pumps in multi-family buildings beyond NYCHA's portfolio of properties. The team will issue a set of priority innovation challenges under Round 7 of PON 3519 in 2023. A challenge area will be included for Intelligent Grid Interactive Buildings (iBuildings).

**Activities Summary**

Activity	Activity #
<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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).</li> </ul> <p>Outputs and outcomes include activities with international companies attracted to offered product and to doing business in NYS.</p>	1
<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• Tech-to-Market Support. Tech-to-market support will be provided to technology developers to help drive the commercialization of new innovations.</li> </ul> <p>Outputs and outcomes include activities with international companies attracted to offered product and to doing business in NYS.</p>	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue annual awards from each round of Innovation Challenge - Round 6	2022	12 awards were issued in December 2022.	Complete	2022	1
Issue annual awards from each round of Innovation Challenge - Round 1	2022	This will be included in round 7 of PON 3519. Round 7 is expected to be issued in Q2 2023. Awards will be made end of Q3.	Delayed		2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: number of companies supported or other partnership (baseline = 39).	53	59	46	65	69	-	1
Output: number of demonstration projects started (baseline = 22).	32	35	26	39	41	-	1
Output: number of product development projects started (baseline = 17).	21	24	28	26	28	-	1
Output: number of projects (product development and demonstration) completed (baseline = 5).	7	15	10	22	40	52	1
Outcome: number of products commercialized (baseline = 4).	5	7	5	9	12	15	1
Outcome: number of replications from demonstration projects (baseline = 147).	180	225	147	300	375	450	1
Outcome: revenue (\$M) to companies commercializing products (baseline = \$1.6M).	\$2.5M	\$7M	\$9.3M	\$22M	\$67M	\$202M	1
Output: Envelope Retrofit Technical and Economic Potential Assessment Study (value proposition, scalability, market size, energy benefits, GHG reduction) has been completed	-	1	-	-	-	-	2
Output: number of companies supported or other partnership (baseline = 0).	-	7	-	21	28	-	2
Output: number of demonstration projects contracted (baseline = 0).	-	3	-	9	12	-	2
Output: number of product development projects contracted (baseline = 0).	-	4	-	12	16	-	2
Output: number of projects (product development and demonstration) completed (baseline = 0).	-	-	-	2	7	16	2
Output: Thermal Storage Technical and Economic Potential Assessment Study (value proposition, scalability, market size, energy benefits, GHG reduction) has been completed	-	1	-	-	-	-	2
Outcome: number of products commercialized (baseline = 0).	-	-	-	2	4	8	2
Outcome: number of replications from demonstration projects (baseline = 0).	-	-	-	10	40	120	2
Outcome: revenue (\$M) to companies commercializing products (baseline = \$0M).	-	-	-	\$10M	\$40M	\$120M	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start				End									
EXP		Start								End					

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	51,706,162	52,410,305	101%
Total Energy Savings, Annual (MMBtu eq.)	732,410	300,633	41%
Electricity Savings, Annual (MWh)	3,237	2,562	79%
Natural Gas Savings, Annual (MMBtu)	50,978	236,086	463%
Other Fuel Savings, Annual (MMBtu)	876,356	135,540	15%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	142,051,754	161,922,083	114%

**Summary of Performance and Future Plans**

No new applications have been accepted into the Air Source Heat Pump (ASHP) and Ground Source Heat Pump (GSHP) Incentive Programs after they were formally transitioned to the Utilities in Q2 2020 under the NYS Clean Heat program. All remaining GSHP projects that remained with NYSERDA have either been canceled or had their final incentive payment made. The Geothermal Clean Energy Challenge program, a joint program with the New York Power Authority that focused on large campus GSHP screenings and installations, was closed. None of the prospective projects moved to installation and project funds have been disencumbered. Program insights were carried over to Phase 2 initiatives, such as the Community Heat Pump Systems solicitation. 2022 Clean Heating & Cooling campaigns efforts continued to focus on driving more enrollments into campaigns, while maintaining similarly high conversion rates as 2021 (18%). Enrollments and installations tracked by Clean Heating and Cooling Community campaigns in 2022 were 40% higher than in 2021. Clean Heating and Cooling Campaign contracts will ramp down between now and 2025 as campaign work evolves and transitions to the Clean Energy Hubs. The balance of Heat Pumps Phase 1 funds has been re-forecasted into more active initiatives within Heat Pumps Phase 2.

There are currently no milestones to report.

### Outputs and Outcomes Summary

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: # of case studies demonstrating successful cost reduction strategies and/or customer value (baseline = 0).	-	20	9	-	-	-	N/A
Output: # of community campaign enrollees (baseline = 200).	-	2,900	8,918	-	-	-	N/A
Output: # of community campaigns (baseline = 1).	-	72	92	-	-	-	N/A
Output: # of completed projects through the GSHP incentive program (baseline = 0).	-	1,100	1,468	-	-	-	N/A
Output: # of installers and drillers qualified by community campaigns and GSHP incentive program (baseline = 0).	-	50	119	-	-	-	N/A
Output: # of large commercial/institutional facility and campus installations completed (baseline = 0).	-	36	0	-	-	-	N/A
Output: # of large commercial/institutional facility and campus schematic designs completed (baseline = 0).	-	72	4	-	-	-	N/A
Output: # of large commercial/institutional facility and campus screening studies completed (baseline = 0).	-	75	91	-	-	-	N/A
Output: # of program-qualified GSHP consultants and designers (baseline = 0).	-	15	84	-	-	-	N/A
Output: # of projects completed by community campaign participants (baseline = 90).	-	3,660	1,597	-	-	-	N/A
Outcome: # of communities continuing campaigns without NYSERDA direct financial support (baseline = 0).	-	8	N/A	-	-	-	N/A
Outcome: # of International Ground Source Heat Pump Association (IGSHP) - certified designers, installers and drillers active in NYS (baseline = 82).	-	110	112	-	-	-	N/A
Outcome: Cost (\$ per ton) in installed systems in community campaigns and for college and university campuses is reduced (baseline = 0%).	-	20% decrease	N/A	-	-	-	N/A
Outcome: Increased awareness of RH&C technologies in communities with campaigns (baseline = 0%).	-	20%	N/A	-	-	-	N/A

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start				End				
EXP							Start								End

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	22,196,246	19,437,491	88%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Summary of Performance and Future Plans**

Heat Pump Phase 2 is one of several CEF initiatives supporting the NYS Clean Heat Market Development plan. Progress reported to date is driven by commitments for Marketing and Consumer Awareness activity.

- The NYS Clean Heat statewide marketing framework, which is a comprehensive consumer awareness campaign with the Joint Utilities and NYSERDA, was launched in Q2 2021. Clean Heating and Cooling campaigns will be delivered through the Clean Energy Hubs, with contracts signed in 2022.
- The first Community Heat Pump Systems solicitation (PON 4614) was released in 2021, with additional solicitation rounds offered through 2022 due to strong market interest. Additional funds for the program were procured from the Regional Greenhouse Gas Initiative (RGGI), which allows for participation from customers that do not pay into the Systems Benefit Charge (SBC). Additional heat pump pilots for low-to-moderate income (LMI) customers are in discussion and development which will build off insights from previous demonstration studies and stakeholder feedback. The Building Electrification Roadmap was delayed but is expected to be issued in 2023 for stakeholder input.

**Activities Summary**

Activity	Activity #
<p>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 challenge. Assess potential impacts as markets shift and new challenges emerge, and support the evolution of the NYS Clean Heat framework.</li> </ul>	<p>1</p>
<p>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.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide technical assistance funding for initial scoping, pre-development, and environmental impact studies.</li> <li>• Provide technical assistance to cost-share detailed design work that will develop cost estimates and a financial plan for the proposed system.</li> <li>• Provide installation incentives for construction of competitively selected clean thermal district demonstration projects</li> <li>• Use multibuilding aggregation to load smooth across different building demands to deliver a more cost-effective solution than a single building solution.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul> <p>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.</p>	<p>2</p>
<p>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:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• Engage industry experts and stakeholders to ensure relevant, informed, and market- and customer-oriented work.</li> </ul>	<p>3</p>

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Finalize and release the Heat Pump Pattern Book through a public web-based interface	2021	Phase 1 on the Heat Pump Pattern Book in the form of .pdf documents has been published on NYSERDA's and NYS Clean Heat's consumer facing websites. An interactive web-based interface is under development.	Complete	2021	1
Development of revised QA/QC protocols to support the NYS Clean Heat Pump incentive program.	2021	The revised QA/QC contractor enrollment requirements will improve the quality of the ASHP installations. The protocols became a requirement in the New York State Clean Heat program in Jan 2022.	Complete	2021	1
Support 18,900 installations of energy-efficient electrified space and water heating technologies through NYS Clean Heat.	2022	There have been 40,900 installations through year end 2022.	Complete	2022	1
Release new Phase 2 solicitation for future Community Campaigns.	2022	Funding for future Community Campaigns was included in the Clean Energy Hubs solicitation.	Complete	2022	1
Award contracts to experts to support scoping, design and construction of district systems.	2021	A solicitation (PON 4614) was issued on February 4, 2021, with multiple due dates (rounds). Three rounds of awardees were selected in 2021, with 35 awardees receiving nearly \$5.7 million of funding.	Complete	2021	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Coop advertising campaign costs offset, in dollars (baseline = 0).	\$3,150,000	\$5,850,000	\$8,983,000	\$8,250,000	\$9,500,000	-	1
Output: Customer acquisition costs offset, in dollars (baseline = 0).	\$600,000	\$1,000,000	\$5,270,600	\$1,600,000	\$2,250,000	\$3,000,000	1
Output: Number of energy-efficient electrified space and water heating technologies installed through NYS Clean Heat (baseline = 0).	18,200	32,500	43,039	55,900	88,400	130,000	1
Output: Number of leads generated for contractors (baseline = 1).	140,000	250,000	431,394	430,000	680,000	1,000,000	1
Outcome: Increase in awareness of CH&C technologies (baseline = TBD).	-	15%	N/A	-	-	50%	1
Output: Number of Clean Thermal District System projects supported by NYSEDA (baseline = 0).	-	-	3	2	-	-	2
Outcome: Reduce the cost of heat pump installations in New York State (baseline = 0).	-	10%	N/A	-	-	25%	2
Outcome: Replication of Clean Thermal District System projects beyond NYSEDA supported projects (baseline = 0).	-	-	N/A	-	1	2	2



**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start				End									
EXP		Start						End							

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	12,927,998	12,786,126	99%
Total Energy Savings, Annual (MMBtu eq.)	68,005	68,927	101%
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	68,005	68,927	101%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	13,556,723	13,866,810	102%

Summary of Performance and Future Plans
<p>The majority of Renewable Heat New York (RHNY) applications received were for wood pellet stove incentives, 40% of which served residential low-to-moderate (LMI) customers. The level of uptake has enabled the program to exceed all three air quality outcomes (PM2.5, CO, SO2) ahead of schedule. The RHNY program stopped accepting new applications on 8/20/2021 after funds were fully allocated and all residential pellet stove and wood boiler projects are complete. Pellet stoves were added as an eligible measure to the Empower and Assisted Home Performance programs to continue offering incentives for low-to-moderate income (LMI) customers. There are 3 commercial projects currently being supported that are anticipated to be complete in mid-2023. NYSERDA’s Research &amp; Development team released the Interim Report on the Integrated-Duty Cycle (IDC) test method for woodstoves, and the Environmental Protection Agency (EPA) has accepted the method as a broadly applicable alternative test method. EPA announced that they intend to adopt the IDC test protocols, which will elevate technologies to higher efficiencies and lower emissions nationally. There are no major technology or market developments expected in this industry in the long term, however.</p>

**Solar Thermal Transition [Inactive]**

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	287,513	287,513	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	123	123	100%
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	82,288	82,288	100%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
COM		Start							End							
EXP		Start											End			

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	7,830,029	6,204,240	79%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	8,711,264	4,017,110	46%

**Summary of Performance and Future Plans**

This program was revised in 2022. New activities around policy development and fleet education started in 2022 and new solicitations for EV demonstrations and research will launch in 2023, focused on vehicle-grid interaction and medium- and heavy-duty vehicles.

**Activities Summary**

Activity	Activity #
<p>Solicit and Support New Technology and Business Model Demonstration Projects:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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).</li> <li>• Rigorously collect data from demonstrations and use it to help design future programs and facilitate replication of successful demonstrations.</li> </ul> <p>Participants engaged include auto manufacturers, charging station manufacturers, fleet operators, technology developers, academic researchers, utilities, disadvantaged communities and their representatives, and the financial sector.</p>	1
<p>Educate and Support Fleet Operators’ Transportation Electrification Efforts:</p> <ul style="list-style-type: none"> <li>• Gather information from industry on innovative business models for charging, purchasing, and financing medium- and heavy-duty EVs. Work with experts to evaluate responses.</li> <li>• 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.</li> <li>• 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.</li> </ul> <p>Participants include auto manufacturers, charging station manufacturers, operators, and installers, financial institutions, fleet operators, consultants, and other state agencies.</p>	2
<p>Support State and Local EV Policy Development and Implementation:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Develop a plan for school bus electrification that identifies how to remove barriers to school bus electrification.</li> <li>• Collaborate with DPS and utilities to design and demonstrate technologies and policies that encourage off-peak charging and/or managed charging.</li> <li>• 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.</li> <li>• Work with utilities and DPS to quantify the benefits utilities and ratepayers may derive from medium- and heavy-duty EV adoption.</li> <li>• Work with municipalities and other stakeholders to encourage the adoption of EV-friendly permitting, zoning, and building codes.</li> </ul> <p>Participants include utilities, other State and federal agencies and other states, municipalities, consultants, and NGOs and advocates.</p>	3

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue award for Electric Truck and Bus Challenge.	2022	Awards for the Electric Truck and Bus Challenge were announced in November 2022.	Complete	2022	1
Complete school bus electrification roadmap	2022	The School Bus Electrification Roadmap is underway and is expected to be completed in Q2 2023.	Delayed		3

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Product development and demonstration companies supported (baseline = 0).	20	23	26	26	-	-	1
Output: Product development and demonstration projects initiated (baseline = 0).	25	30	27	35	-	-	1
Outcome: Replications from demonstration projects (baseline = 0).	2	6	N/A	6	8	15	1
Outcome: Case studies and guides published (baseline = 0).	0	1	0	4	6	8	2
Outcome: NYS school bus operators purchasing electric buses (baseline = 5).	5	15	16	50	150	300	2
Output: Policy studies completed (baseline = 0).	5	8	11	11	-	-	3

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start								End						
EXP			Start										End		

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	6,115,890	5,333,014	87%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	6,391,757	103,881,351	1,625%

**Summary of Performance and Future Plans**

This initiative is generally performing well with respect to planned activities and progress to date, especially in terms of leveraged funds as a result of significant follow-on investment for one of the companies NYSERDA supported in the program. Revisions for this plan are in progress and will reorient the program to focus more directly on supporting innovations that will define the future of public transportation and mobility, post-COVID. The program is expected to continue working with transit operators and other partners on innovative approaches to public transportation and mobility in line with current and future needs.

**Activities Summary**

Activity	Activity #
<p>Solicit and Support New Product Development and Demonstration Opportunities:</p> <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> <p>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.</p>	<p>1</p>
<p>Support Transit Operators in Integrating New Technologies into Their Operations:</p> <ul style="list-style-type: none"> <li>• Work with transit agencies to develop procurement specifications for new products that encourage competition and open-source standards wherever possible.</li> <li>• Advise transit agencies directly or contract with experts to help the agencies find solutions to logistical and operational barriers to new technology adoption.</li> <li>• Investigate opportunities to provide aggregate purchasing opportunities for transit agencies that can use similar energy-saving technologies.</li> <li>• 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.</li> <li>• Work with transit agencies to pilot behavioral approaches that make taking transit easier, faster, and more cost-effective.</li> <li>• 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.</li> <li>• Develop case studies and “how to” materials to facilitate replication of successful demonstrations.</li> </ul> <p>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.</p>	<p>2</p>

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards from solicitation.	2022	NYSERDA issued awards from PON 5109 in Q4 2022.	Complete	2022	1
Complete advisory project with transit operator.	2022	NYSERDA completed advisory projects with Metropolitan Transit Authority and five other transit operators on topics related to bus electrification in 2022.	Complete	2022	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Companies supported (baseline = 0).	18	24	29	28	-	-	1
Output: Demonstration projects completed (baseline = 0).	3	8	5	14	18	-	1
Output: Projects initiated (baseline = 0).	25	34	31	40	-	-	1
Outcome: Products commercialized (baseline = 0).	1	3	5	5	-	-	1
Output: New operational approaches piloted (baseline = 0).	2	3	7	6	-	-	2
Output: Transit advisory projects completed (baseline = 0).	0	2	4	4	-	-	2
Outcome: Replications of successful demonstrations (baseline = 0).	2	4	N/A	8	10	-	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start									End				
EXP		Start													End



**Summary of Performance and Future Plans**

Core work for code advancement and training continues to move forward expeditiously and proposals for the next State code update are underway. Contracts were finalized for two pilots and for updated code training offerings. All of these items are moving forward, but expenditures finished below 2022 plan as result of the delays. Initiative plan and progress to date consists of indirect benefits only, and through the initial study completed, indirect benefits measured exceeded plan for the period evaluated. This study shows that NYSERDA's long-standing engagement in this space is responsible for more than 3 TBtu of total energy savings, of which approximately 1.2 TBtu's is attributed to CEF-specific efforts.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	13,678,020	11,167,747	82%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
Develop, deploy, and support training, tools and resources to increase code and policy compliance and support authorities having jurisdiction with their enforcement duties.	1
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.	2
Use pilots to test, refine, and scale new approaches to code and policy development, advancement, enactment, compliance and enforcement.	3
Support the adoption and enactment of State and local policies to promote efficiency, flexibility and decarbonization in buildings.	4

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards for training solicitations.	2021	Two rounds of training have been contracted since the new code was launched in 2020.	Complete	2021	1
Issue awards for pilots.	2022	16 communities were awarded contracts to participate in pilots.	Complete	2022	3
Policies or codes adopted at the state or local level with support from NYSERDA.	2021	The Codes & Standards Act of 2022 was passed and signed into law in July 2022. In addition, 43 communities have adopted NYStretch 202 as their base energy code.	Complete	2022	4
Policies or codes adopted at the state or local level with support from NYSERDA.	2022	The Codes & Standards Act of 2022 was passed and signed into law in July 2022. In addition, 43 communities have adopted NYStretch 202 as their base energy code.	Complete	2022	4



**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Training attendance, number of seats filled (baseline = 2,041).	4,000	8,000	At least 9,220 code officials and building professionals trained; 48,854 trainings completed (seats filled) since March 2020	12,000	16,000	20,000	1
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%	8%–16% increase depending on sector and construction	5%	5%	5%	1
Output: Number of regulations or policies developed or updated to promote efficiency, flexibility, and decarbonization (baseline = 0).	-	2	3	2	2	4	2
Output: Number of communities adopting pilot approaches (baseline = TBD).	-	5	16	15	25	35	3
Output: Number of policies or codes adopted at the state or local level (baseline = 0).	20	25	42	26	27	28	4
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	Yes	4

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM				Start					End						
EXP				Start									End		

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

The pace of budget commitments and expenditures is trending favorable to plan. Activities are focused on tools and resources that support customer-specific value propositions for building decarbonization.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	1,736,382	1,900,857	109%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<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>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Host data hackathon that leverages building asset data to identify decarbonization strategies for a variety of building and customer types.	2021	NYSERDA supported a data hackathon in 2021 focused on tenant energy consumption data, in partnership with real estate orgs and BEex.	Complete	2021	1
Host data hackathon that leverages building asset data to identify decarbonization strategies for a variety of building and customer types.	2022	NYSERDA supported two data hackathons in 2022; one focused on building decarbonization solutions and the other focused on leveraging RTEM data to identify energy management opportunities.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: number of awards issued from hackathons (baseline = 0).	6	9	24	-	-	-	1
Output: number of customer targeting tools developed for vendors (baseline = 0).	2	-	2	-	-	-	1
Output: number of participants in data hackathons (baseline = 0).	175	300	430	-	-	-	1
Output: number of value proposition calculators developed for customers and vendors (baseline = 0).	-	-	2	1	-	-	1
Outcome: web-based tool and platform developers and solution providers serving NY energy markets without support from NYSERDA (baseline = 0).	-	-	N/A	12	20	-	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start									End				
EXP				Start									End		



**Summary of Performance and Future Plans**

NYSERDA successfully adopted 21 appliance standards for New York State by th 1/1/23. The core work to implement those standards is now underway. Funding commitments and expenditures have steadily increased throughout the year and are expected to further ramp up as the program is expanded. Given the late date of passage and current resource levels, NYSERDA expenditures for 2022 did not reach the original plan. This initiative plan consists of only indirect benefits, which will be reported in the future as measured by evaluation studies.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	3,448,730	1,999,991	58%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<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>	1
Regulatory and Compliance. 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.	2
Market Readiness. 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 them for the market.	3

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Once legislation is in effect, propose state-level appliance standards.	2022	NYSERDA proposed 21 state level appliance standards and promulgated regulations for them before the end of 2022. Those appliance standards go into effect in June 2023.	Complete	2022	1
Issue solicitation to support compliance with product standards.	2022	Issued solicitation and contracted for appliance standards compliance.	Complete	2022	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of standards in effect in NYS (baseline = 0).	-	-	21	10	15	17	1
Outcome: Increased sales and stocking of covered products (baseline = TBD).	-	-	N/A	TBD	TBD	TBD	1
Output: Number of products covered by compliance regime (baseline = 0).	-	-	21	10	20	30	2
Outcome: Increased compliance rate (baseline = TBD).	-	-	N/A	TBD	TBD	TBD	2
Output: Sales of covered products in retail partners (baseline = TBD).	-	-	N/A	TBD	TBD	TBD	3

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start							End							
EXP	Start									End					

Summary of Performance and Future Plans
<p>Activities associated with the utility innovation platform continue to be consistent with plan although program remains behind schedule for budget because evolution to coordinated statewide innovation platform has taken longer to come to fruition than planned. Work is expected to get underway in earnest in this area in early 2023. Activities associated with market tests are behind schedule due to a project cancellation in early 2022 and contractual delays associated with other projects; final market tests will enter market in early 2023.</p>

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	6,257,852	4,469,256	71%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	13,640,300	9,771,221	72%

**Activities Summary**

Activity	Activity #
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 need 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.	1
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.	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Host innovation sprints to publicize utility needs and identify market partners in areas of interest to the state and to utilities.	2021	Hosted Grid Edge Flexibility sprint in Feb 2021 and received record number of submissions.	Complete	2021	1
Host workshops with utility company contacts and industry experts on interest areas to inform a possible future sprint.	2021	Workshops were hosted on Accelerating the Gas Transition in Sept 2021 that included utility contacts and industry experts to identify areas where a future sprint could address the "future of gas."	Complete	2021	1
Develop innovation plan for activity beyond 2022	2022	A plan was developed for a centralized framework approach for a future evolution for REV Connect.	Complete	2022	1
Initial in-field market tests enter the market.	2021	The first tests entered the market in April 2021.	Complete	2021	2
Remainder of in-field market tests enter the market.	2022	One additional market test entered the market in 2022 but others were delayed and are expected to enter in 2023.	Delayed		2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of market solution provider submissions to utility identified areas of interest (baseline = 122).	-	-	540	-	600	-	1
Output: Number of market solution providers participating in webinars (baseline = 241).	-	-	1,343	-	1,200	-	1
Output: Number of utility/solution provider workshops/sprints (baseline = 2).	-	-	20	-	22	-	1
Outcome: Number of innovative, value-producing utility partnerships or demonstration projects in place (baseline = 8).	-	-	11	-	10	-	1
Outcome: Number of new grid modernization technologies and business models (baseline = 0).	-	-	2	-	3	-	1
Output: Number of market solution providers applying to NYSERDA market test funding opportunities (baseline = 0).	57	60	171	-	-	-	2
Outcome: Number of NYSERDA-supported market tests (baseline = 0).	2	2	6	4	-	-	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start								End				

**Summary of Performance and Future Plans**

Case studies showing pilot results for two of the four were developed in 2022. Remaining program demonstrations continue to move toward completion.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	517,611	306,049	59%
Total Energy Savings, Annual (MMBtu eq.)	9,940	1,125	11%
Electricity Savings, Annual (MWh)	2,900	162	6%
Natural Gas Savings, Annual (MMBtu)	43	-	0%
Other Fuel Savings, Annual (MMBtu)	2	572	28,600%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	294,225	52,076	18%

**Activities Summary**

Activity	Activity #
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.	1



There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of case studies developed and disseminated (baseline = 0).	2	3	2	-	-	-	1
Output: Number of farm sites hosting demonstration projects (baseline = 2).	2	3	3	-	-	-	1
Output: Number of open houses hosted (baseline = 0).	4	6	5	-	-	-	1
Outcome: Number of farms knowledgeable of energy efficiency opportunities provided by underused or emerging technologies (baseline = 82).	87	100	82	-	-	-	1

## Agriculture Transition [Inactive]

## Commercial/Industrial/Agriculture Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	3,598,821	3,598,821	100%
Total Energy Savings, Annual (MMBtu eq.)	79,635	79,637	100%
Electricity Savings, Annual (MWh)	14,301	14,407	101%
Natural Gas Savings, Annual (MMBtu)	16,706	18,503	111%
Other Fuel Savings, Annual (MMBtu)	14,134	15,654	111%
Renewable Energy Generation, Annual (MWh)	1,137	1,137	100%
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	15,390,233	15,390,233	100%

## Commercial Transition [Inactive]

## Commercial/Industrial/Agriculture Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	11,531,480	11,402,198	99%
Total Energy Savings, Annual (MMBtu eq.)	560,313	843,723	151%
Electricity Savings, Annual (MWh)	71,118	114,343	161%
Natural Gas Savings, Annual (MMBtu)	196,438	209,486	107%
Other Fuel Savings, Annual (MMBtu)	121,222	244,100	201%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	32,704,221	42,667,806	130%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM															
EXP															



**Summary of Performance and Future Plans**

Strategic Energy Management market response continues to increase in 2022. The methodology behind savings assumptions for projects in this program was recently updated, requiring a reduction to the reported amount. An evaluation study concluded earlier in the year has confirmed the energy performance of this program with a strong realization rate. Evaluation updates are in development now and future reports will detail results.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	14,291,544	12,982,513	91%
Total Energy Savings, Annual (MMBtu eq.)	1,711,655	1,423,653	83%
Electricity Savings, Annual (MWh)	114,452	121,901	107%
Natural Gas Savings, Annual (MMBtu)	1,072,867	865,610	81%
Other Fuel Savings, Annual (MMBtu)	248,277	142,115	57%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	56,758,295	26,681,712	47%

**Activities Summary**

Activity	Activity #
Conduct outreach to educate industrial companies on the value of On-site Energy Manager and promote program participation.	1
<ul style="list-style-type: none"> <li>Lead facilities through Strategic Energy Management training and implementation of Strategic Energy Management activities</li> <li>Develop and disseminate templates and resources for Strategic Energy Management.</li> </ul>	2

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of case studies, testimonials developed, webinars or knowledge transfer sessions conducted (baseline = 0).	15	23	20	27	35	37	1
Output: Number of energy efficiency projects identified and completed during program engagement (baseline = 0).	210	215	380	220	225	230	1
Output: Number of energy management plans with energy reduction target developed (baseline = 0).	18	32	29	36	40	44	1
Outcome: Number of energy managers hired/retained within program facilities (baseline = 0).	5	7	3 of 7	11	15	20	1
Outcome: Number of industrial plants (beyond program participants) adopting on-site Energy Manager role (baseline = 110 or 15% of addressable market).	218	230	184	240	250	260	1
Outcome: Number of projects implemented involving more complex CapEx and process improvements as a result of this strategy (baseline = 0).	44	49	44	54	58	60	1
Output: Number of commercial participants (baseline = 0 participants).	-	10	3	20	30	40	2
Output: Number of industrial participants (baseline = 0 participants).	66	100	73	135	170	205	2
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).	-	-	1,097	-	-	1,996	2
Outcome: Number of industrial facilities (beyond program participants) that have adopted SEM (baseline = 0 participants).	-	-	1 of 4	-	-	30	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start						End								
EXP	Start											End			



**Summary of Performance and Future Plans**

The Commercial sector strategy for Real Time Energy Management (RTEM) is on track with outputs, outcomes and expenditures. Most of the initiative's funding has been committed to projects and the focus is presently on managing the pipeline of projects to successful completion. Progress of expenditures was on target to the plan for 2022. Gross energy savings progress continues to lag plan; funding is expended 12-18 months prior to reporting acquired gross savings, and the plan was adjusted during the recent annual reforecast to better reflect the real lag observed on projects. Data collection efforts are ongoing for all projects. A verified gross savings analysis significantly reduced energy performance from the gross values reported. A notable amount of this reduction is due to delayed installation of capital improvement measures (observed across several NYSERDA initiatives) and a longer-than-anticipated timeline for measure installations. An update to this study is underway to reassess performance and is anticipated to be complete Q1 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	43,128,535	43,786,921	102%
Total Energy Savings, Annual (MMBtu eq.)	1,638,296	277,580	17%
Electricity Savings, Annual (MWh)	384,603	56,490	15%
Natural Gas Savings, Annual (MMBtu)	309,433	84,309	27%
Other Fuel Savings, Annual (MMBtu)	16,598	528	3%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	293,589,385	277,396,173	94%

**Activities Summary**

Activity	Activity #
Apply the knowledge and experience gained from initial installations to replicate success and build market confidence in EM investment. <ul style="list-style-type: none"> <li>• Publish case studies, technical guidance and datasets that demonstrate effectiveness of EM systems and services.</li> <li>• Provide open enrollment incentives to support EM systems and services for small to medium businesses.</li> <li>• Incentive pilots 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. Analyze trends in identified energy efficiency opportunities, persistence, and common practices to share with the marketplace to spur replication.</li> </ul>	1
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>	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Make publicly available anonymized RTEM project data to support market confidence in performance of EM systems and services.	2022	NYSERDA sponsored the "RTEM Data Hackathon" on July 2022, a public competition with over 400 participants from 27 countries, which gave \$55,000 in awards for the development and demonstration of novel & unique EM strategies using real-time data.	Complete	2022	1
Create open enrollment incentives for EM systems and services that support RTEM projects in small to medium businesses.	2021	NYSERDA launched the "RTEM for Small Business" spinoff program in January 2021, providing distinct cost-share structures and project scope requirements aimed at supporting small to medium business sites receive more effective EM services.	Complete	2021	1
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.	2021	NYSERDA released the RTEM+Tenants Qualified Vendor List in March 2021, which provides the market a clear list of vendors capable of delivering advanced EM systems and service capabilities to both building owners & commercial tenants.	Complete	2021	2
Create open enrollment incentives for EM systems and services that extend into tenant spaces.	2021	NYSERDA launched the RTEM+Tenants program in April 2021, which provides cost-share incentives for holistic building system integration, and engages tenants in EM strategies and outcomes.	Complete	2021	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of comprehensive building specific data sets submitted to NYSERDA (baseline = 0).	200	400	550	-	-	-	1
Output: number of pilots complete (baseline = 0).	-	10	12	-	-	-	1
Output: number of qualified providers on NYSERDA list (baseline = 0).	90	100	180	120	-	-	1
Output: number of small to medium business RTEM projects supported by NYSERDA (baseline = 0).	-	10	54	80	200	-	1
Outcome: Awareness of EM among building owners/managers (baseline = 0).	-	40%	28%	-	-	-	1
Outcome: Percent of EM projects that institute an energy efficiency goal (baseline = 0).	-	65%	65%	-	-	-	1
Outcome: Persistence of EM service contracts (i.e., how many customers extend their subscription with an RTEM provider beyond 5 years) (baseline = 0).	-	60%	65%	-	-	-	1
Outcome: Size of market as indicated by vendor sales (baseline = \$10M).	-	\$40M	N/A	-	-	-	1
Output: # of qualified vendors with capabilities of providing EM services for tenant spaces (baseline = 0).	5	10	17	15	25	-	2
Output: number of commercial real estate portfolio owners deploying RTEM + Tenants projects within their buildings (baseline = 0).	1	3	2	7	15	-	2
Output: total square feet (millions) of RTEM + Tenants project supported by NYSERDA (baseline = 0).	1	5	12	15	30	-	2
Outcome: % of commercial portfolio owners who invest in EM systems and services for Local Law compliance (baseline = 0).	-	-	N/A	5%	15%	25%	2
Outcome: % of RTEM + Tenants projects that monitor at least 75% of a building’s tenant energy consumption (baseline = 0).	-	-	100%	10%	15%	25%	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM															
EXP			Start												End

**Summary of Performance and Future Plans**

Consortium membership increased 15% in 2022 to thirty total members with a variety of controlled environment agriculture market actors. Webinars, academic meeting presentations, and short course training increased the consortium exposure to the marketplace.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	3,499,523	2,933,335	84%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
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.	1
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.	2
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.	3



**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Contract with core Consortium members.	2021	Contracts have been fully executed.	Complete	2018	1
Review and approve Scientific Advisory Panel structure.	2021	Selection of members is completed. Contractual arrangements are also completed between members and universities regarding how they be reimbursed for participation.	Complete	2018	1
Review and approve Consortium business plan to attain financial self-sustainability by 2023.	2021	The Executive Director of GLASE submitted the initial business plan Q2 2018. It is anticipated that the business plan will be updated on an annual basis.	Complete	2019	1
Formal training offered to service providers.	2022	A plant lighting short course was offered to greenhouse service providers and growers. 220 people attended the virtual short course.	Complete	2021	3

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of paid Consortium memberships (baseline = 0).	25	-	30	-	-	30	1
Outcome: Consortium remains viable after NYSERDA milestones are completed	-	-	N/A	-	-	Assess	1
Output: Greenhouse area used for pilot testing (sq ft) (baseline = 0).	-	26,000	34,600	-	-	-	2
Output: Number of product variations tested in pilot systems (baseline = 0).	-	8	4	-	-	-	2
Output: Number of services developed (baseline = 0).	-	3	5	-	-	-	2
Outcome: Number of intellectual properties or technology disclosures filed (baseline = 0).	-	8	5	-	-	-	2
Output: Number of case studies developed (baseline = 0).	-	4	0	-	-	-	3
Outcome: Average market penetration of improved technologies in New York State greenhouse acreage in the lettuce and tomato sectors (baseline = 0).	-	-	N/A	-	25%	-	3
Outcome: Number of acres of greenhouses in New York State (beyond pilot participants) adopting the improved technologies (baseline = 0).	-	-	N/A	-	23	-	3
Outcome: Reduced electricity usage per participating greenhouse in NYS (depending on NYS climate zone)	-	-	N/A	-	70%	-	3



<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	46,067,230	43,551,172	95%
Total Energy Savings, Annual (MMBtu eq.)	4,767,966	4,660,971	98%
Electricity Savings, Annual (MWh)	331,430	311,711	94%
Natural Gas Savings, Annual (MMBtu)	1,843,999	1,739,692	94%
Other Fuel Savings, Annual (MMBtu)	8,978,773	9,028,350	101%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	463,846,151	510,640,195	110%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start										End		

Committed (COM), Expended (EXP)



**Summary of Performance and Future Plans**

Commercial: The Market Challenges - Commercial sector initiatives are achieving target milestones, outputs and outcomes. Progress of expenditures fared well against the 2022 plan. To-date, all spending has been toward engineering studies, which do not claim energy benefits. Demonstration projects for C&I Carbon Challenge are lagging due to various economic factors and anticipating additional expenditures and acquiring the first project benefits in 2023. During the recent Compiled Investment Plan filing on February 1, 2023, funding was increased to the Challenges within this initiative to support additional projects. The first projects funded under the Empire Building Challenge are in the very initial stages of implementation, and benefits are not expected to be acquired until 2024 at the earliest.

Industrial: Progress of expenditures slightly lagged against the 2022 plan. Demonstration projects for C&I Carbon Challenge continue to lag due to various economic factors; acquisition of the first project benefits are expected in 2023. During the recent Compiled Investment Plan filing on February 1, 2023, funding was increased to support additional projects.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	15,417,809	12,548,298	81%
Total Energy Savings, Annual (MMBtu eq.)	850,970	-	0%
Electricity Savings, Annual (MWh)	41,513	-	0%
Natural Gas Savings, Annual (MMBtu)	596,882	-	0%
Other Fuel Savings, Annual (MMBtu)	113,692	-	0%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	24,111,100	-	0%

**Activities Summary**

Activity	Activity #
<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>	1
Fund carbon reduction project portfolios for large industrial, commercial, and/or multifamily ratepayers through a competitive solicitation and leverage projects to share learnings on low-carbon energy and manufacturing strategies.	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Announce the participating real estate owners and their public commitments from solicitations.	2021	The solicitation to select the first cohort of real estate partners was launched in Q3 2020 and a public announcement of the first cohort of real estate partners was made in Q1 2021.	Complete	2021	1
Issue awards following release of competitive solicitation.	2021	The Solicitation was executed in the Consolidated Funding Application (CFA), in Q2 2021 and awards issued in Q4 2021.	Complete	2021	1
Announce the participating real estate owners and their public commitments from solicitations.	2022	All real estate partners have been publicly recognized for being selected as Empire Building Challenge (EBC) Partners. This includes a public announcement on each partner's commitment to carbon neutrality, at their participating building(s).	Complete	2022	1
Announce awards following the release of competitive solicitation.	2022	The second funding round for Empire Building Challenge was held in Q3-Q4 2022. Awarded projects will be publicly announced once contracts are executed.	Delayed		1
Issue awards following release of competitive solicitation (commercial).	2021	The solicitation for the first round of retrofit project funding was issued Q4 2021. As a results of the solicitation, 4 low carbon retrofit projects have been funded.	Complete	2021	2
Issue awards following release of competitive solicitation (commercial).	2022	The second funding round for Empire Building Challenge was held in Q3-Q4 2022. Contracts are being drafted and awards will be issued as soon as contracts are executed.	Delayed		2
Issue awards following release of competitive solicitation (industrial).	2022	Awards for the 2022 round of the C&I Carbon Challenge were announced in December 2022.	Complete	2022	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
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	10	12	-	1
Outcome: Commercial replication projects within portfolios as measured by total square footage (baseline = 0).	-	-	N/A	0.5M	1.5M	2.5M	1
Output: Number of sites participating (baseline = 0).	32	50	51	62	-	-	2
Outcome: Awarded participants employ advanced decarbonization solutions in their project portfolios	8	14	N/A	16	17	-	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start												End



**Summary of Performance and Future Plans**

Progress of both expenditures and energy savings finished the year in good standing compared to plan. Further analysis of evaluation results are being conducted through a subsequent study and expected to result in updates to realization rates for reporting of verified gross savings in the near future.

In April 2022, the P12 Schools Initiative launched the Clean Green Schools Initiative which focuses on improving the environmental sustainability of under-resourced public schools by reducing school energy loads, decarbonizing their building portfolio, improving indoor air quality (IAQ), and providing clean energy educational opportunities. The program has had strong uptake in both Track I (e.g. technical assistance) and Track II (e.g. implementation). In addition, the Benchmarking Program stopped accepting applications in March 2022 and the Energy Solutions program stopped accepting applications in December 2022.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	6,505,750	6,787,406	104%
Total Energy Savings, Annual (MMBtu eq.)	60,004	93,699	156%
Electricity Savings, Annual (MWh)	6,715	13,687	204%
Natural Gas Savings, Annual (MMBtu)	29,674	47,760	161%
Other Fuel Savings, Annual (MMBtu)	7,418	5,036	68%
Renewable Energy Generation, Annual (MWh)	-	5,389	-
Renewable Energy Capacity (MW)	-	5	-
Leveraged Funds (\$)	10,888,644	17,382,110	160%

**Activities Summary**

Activity	Activity #
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.	1
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.	2
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.	3
Publish and promote guidance documents and project results along with case studies and green design documents.	4

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of schools engaging with NYSERDA to conduct clean energy benchmarking (baseline = 0).	310	500	585	525	550	600	1
Outcome: Number of schools utilizing benchmarking data and energy master plans to make informed decisions toward future clean energy projects (baseline = 0).	75	75	N/A	75	80	100	1
Output: Number of projects implemented because of P12 initiative funding (baseline = 0).	4	4	3	4	15	30	2
Output: Number of schools that receive NYSERDA funding (baseline = 0).	45	100	645	100	350	500	2
Output: Number of schools utilizing NYSERDA funding for student and faculty engagement (i.e. workforce development efforts) (baseline = 0).	-	25	0	50	75	100	2
Output: Number of information downloads from the website (baseline = 0).	1,000	1,100	5,324	1,150	1,200	1,350	3
Outcome: Number of schools receiving recognition (baseline = 0).	3	3	N/A	3	4	6	3
Outcome: Number of schools reporting a greater understanding of benefits of clean energy at their school (baseline = 0).	800	800	N/A	800	900	1,000	3
Output: Number of case studies developed and disseminated (baseline = 0).	20	20	10	22	25	30	4
Outcome: Number of schools utilizing clean energy case studies to make informed decisions towards future clean energy projects (baseline = 0).	150	150	N/A	150	175	200	4

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start										End		

**Summary of Performance and Future Plans**

The Pay for Performance initiatives developed the necessary collaboration framework and platform to support initial pilots, including engaging aggregators and launching into both residential and commercial markets. Market developments and challenges in rolling out these pilots, however, led NYSERDA and its partners to conclude that the program should not be continued, a status represented in the CIP filed February of 2023. Unspent funds will be redirected to the residential and commercial programs to support other activities.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	2,640,035	1,624,526	62%
Total Energy Savings, Annual (MMBtu eq.)	1,028	-	0%
Electricity Savings, Annual (MWh)	269	-	0%
Natural Gas Savings, Annual (MMBtu)	110	-	0%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	57,381	-	0%

**Activities Summary**

Activity	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.	1
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.	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Continue Business Energy Pro pilot with Con Edison.	2021	Business Energy Pro pilot continued operation in 2021 but one of the two portfolio managers ended their participation in Q3 2021, and program team anticipated pilot would come to close in 2022.	Complete	2021	1
Continue Business Energy Pro pilot with Con Edison.	2022	NYSERDA concluded that the program should not be continued after no projects were obtained by portfolio managers in contracted time.	Cancelled		1
Gather lessons learned from procurement model approach to inform new pilot design parameters.	2021	NYSERDA concluded that the program should not be continued after assessing results from the pilots.	Cancelled		2
Gather lessons learned from procurement model approach to inform new pilot design parameters.	2022	NYSERDA concluded that the program should not be continued after assessing results from the pilots.	Cancelled		2
Obtain stakeholder feedback to complete open-market program design.	2021	NYSERDA concluded that the program should not be continued after assessing results from the pilots.	Cancelled		2
Obtain stakeholder feedback to complete open-market program design.	2022	NYSERDA concluded that the program should not be continued after assessing results from the pilots.	Cancelled		2



**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of datasets published on OpenNY (baseline = 0).	-	1	0	-	-	-	1
Output: Number of participating aggregators (baseline = 0).	1	2	2	-	-	-	1
Output: Total number of projects implemented in commercial sector (baseline = 0).	3	-	0	75	-	-	1
Outcome: Number of additional market actors involved in P4P pilot (non-aggregator involvement such as financial institutions, subcontractors, etc) (baseline = 0).	2	4	0	-	-	-	1
Outcome: Number of utilities committed to offering P4P programs post pilot (baseline = 0).	-	1	0	-	-	-	1
Output: Increase in Number of business types serving as aggregators (baseline = number of business types in procurement model ...).	-	-	0%	200%	-	-	2
Output: Increased participation by aggregators in open-market approach versus procurement approach (baseline = number in procurement model).	-	-	0%	100%	-	-	2
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).	-	-	0%	25%	-	-	2
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).	-	-	0%	50%	-	-	2

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>COM</b>	Start					End									
<b>EXP</b>	Start								End						

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	12,487,292	13,247,629	106%
Total Energy Savings, Annual (MMBtu eq.)	-	354,427	-
Electricity Savings, Annual (MWh)	-	56,897	-
Natural Gas Savings, Annual (MMBtu)	-	82,597	-
Other Fuel Savings, Annual (MMBtu)	-	122,951	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	55,958,632	-

**Summary of Performance and Future Plans**

Active projects that were in the pipeline when the Real Estate program closed in 2021 continue to be completed, as technical assistance reports are submitted and approved. At this time, there are only 6 projects that remain active in the program; they are projected to be completed by the end of 2023. Acquired savings are now being reported, consistent with the measure adoption rate that was identified during the Program Evaluation completed in June 2022.

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of buildings participating in the program (baseline = 0).	-	400	621	-	-	-	N/A
Output: Number of case studies developed (baseline = 0).	-	30	7	-	-	-	N/A
Output: Number of tenant spaces participating in the program (baseline = 0).	-	1,200	1,132	-	-	-	N/A
Output: Partner engagement: number of brokers and A&E firms that include in depth energy models and package development in their standard practice (baseline = 0).	-	40	TBD	-	-	-	N/A
Output: Partner engagement: number of brokers and A&E firms trained (baseline = 0).	-	100	50	-	-	-	N/A
Output: Partner engagement: Number of CRE building owners and managers that offer building specific packages (baseline = 0).	-	40	69	-	-	-	N/A
Output: Square footage of participating tenant spaces in the program (baseline = 0).	-	65,000,000	65,990,376	-	-	-	N/A
Outcome: Market Engagement: Number of Brokers and A&E firms that include in depth energy models and package development in their standard practice (baseline = 6).	-	40	N/A	-	-	-	N/A
Outcome: Package Development costs of building specific package per square foot (baseline = \$0.13/SF).	-	\$0.05/SF	\$0.08-\$0.15/SF	-	-	-	N/A
Outcome: Percent of the total addressable square footage in NYS that is covered by a building specific package (baseline = 0).	-	10%	N/A	-	-	-	N/A
Outcome: Percentage of Architecture and Engineering firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice (baseline = 0).	-	60%	N/A	-	-	-	N/A
Outcome: Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in the leasing dialogues with tenant (baseline = <5%).	-	5%	N/A	-	-	-	N/A
Outcome: Tenant Spaces completed by the market without NYSERDA funding (baseline = 141).	-	400	N/A	-	-	-	N/A

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start						End								
EXP	Start											End			



**Summary of Performance and Future Plans**

Progress of both expenditures and energy savings finished the year in good standing compared to plan. A verified gross savings analysis has confirmed the energy performance of this program with a strong realization rate. The very high realization rate suggests that program methods to account for acquired savings may be overly conservative; future savings projections were adjusted accordingly during the recent annual reforecast and will be reflected in 2023 planning.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	10,441,070	11,399,410	109%
Total Energy Savings, Annual (MMBtu eq.)	864,696	1,824,011	211%
Electricity Savings, Annual (MWh)	93,847	174,348	186%
Natural Gas Savings, Annual (MMBtu)	530,772	1,173,000	221%
Other Fuel Savings, Annual (MMBtu)	13,716	58,219	424%
Renewable Energy Generation, Annual (MWh)	346	7,254	2,097%
Renewable Energy Capacity (MW)	-	6	-
Leveraged Funds (\$)	34,241,772	42,211,398	123%

**Activities Summary**

Activity	Activity #
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.	1

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of REV Campus Challenge members (baseline = 0).	130	135	143	140	145	150	1
Output: Number of REV Campus Challenge Members reporting new clean energy curricula or curriculum integration (as reported through the annual survey) (baseline = 0).	49	50	66	51	52	53	1
Output: Number of REV Campus Challenge Members reporting new clean energy projects on campus (as reported through the annual survey) (baseline = 0).	83	85	111	90	93	95	1
Outcome: Number of REV Campus Challenge Members reporting a greater understanding of clean energy opportunities on their campus (as reported through the annual survey) (baseline = 0).	71	75	60	80	85	90	1
Outcome: Number of REV Campus Challenge Members reporting greater buy-in and support from management for clean energy projects and initiatives (as reported through the annual survey) (baseline = 0).	52	55	46	58	60	65	1
Outcome: Number of REV Campus Challenge Members reporting improved community relations as a result of clean energy strategies (as reported through the annual survey) (baseline = 0).	46	48	43	50	52	55	1
Outcome: Number of REV Campus Challenge Members with new or updated climate action plans, energy master plans, or GHG inventories (baseline = 0).	73	75	85	77	80	85	1
Outcome: Number of REV Campus Challenge Members with staff assigned to manage clean energy/sustainability goals (as reported through the annual survey) (baseline = 82%; 18/22).	91	91	98	93	95	95	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start									End				
EXP		Start													End



**Summary of Performance and Future Plans**

This initiative finished 2022 in good standing with respect to both budget and energy benefits. NYSERDA continues to see strong participation from each commercial, industrial, multifamily, and agriculture sectors served. During the recent Compiled Investment Plan (CIP) filing on February 1, 2023, funding was added to Technical Services to ensure studies will have adequate support in future quarters. Multiple evaluations reflecting the various sectors are assessing this effort or will be soon. Future reports will detail results from these studies.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	23,395,492	24,946,831	107%
Total Energy Savings, Annual (MMBtu eq.)	1,263,644	1,992,698	158%
Electricity Savings, Annual (MWh)	123,905	215,726	174%
Natural Gas Savings, Annual (MMBtu)	764,858	651,623	85%
Other Fuel Savings, Annual (MMBtu)	82,418	613,790	745%
Renewable Energy Generation, Annual (MWh)	1,811	10,588	585%
Renewable Energy Capacity (MW)	1	3	300%
Leveraged Funds (\$)	63,508,710	75,187,429	118%

**Activities Summary**

Activity	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>	1
Continue providing building and portfolio-level assessments of low-carbon solutions to drive clean energy adoption through the successful FlexTech Program.	2
Continue providing site-specific industrial technical engineering support of low-carbon solutions to drive clean energy adoption through the FlexTech Program.	3

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of best practice guides delivered (baseline = 0).	0	500	N/A	2,033	-	-	1
Outcome: Percentage rate in which clean energy technologies are adopted by participants receiving best practice guides (baseline = 0).	-	-	N/A	20%	20%	20%	1
Output: Number of case studies developed (baseline = 0).	2	2	22	40	40	50	2
Output: Number of qualified energy-focused firms (baseline = 39).	49	49	91	82	82	85	2
Output: Number of studies assessing electrification options completed (baseline = 0).	6	26	82	50	80	100	2
Outcome: Increase in the number of beneficial electrification installations (baseline = 0).	0	TBD	N/A	-	-	-	2
Outcome: Increase the rate at which clean energy technologies are adopted by non-participants through sharing of best practices and case studies (baseline = 25%).	30%	30%	N/A	30%	30%	30%	2
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by participants (baseline = 65%).	65%	65%	65%	65%	65%	65%	2
Outcome: Increase the rate at which clean energy technologies are adopted by non-participants through sharing of best practices and case studies (baseline = 25%).	30%	30%	N/A	30%	30%	30%	3
Outcome: Maintain or (best case) increase the rate at which clean energy technologies are adopted by participants (baseline = 65%).	65%	65%	65%	65%	65%	65%	3

**Performance Summary**

Expected Timeline Of Funding Deployment													Committed (COM), Expended (EXP)			
Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
COM	Start						End									
EXP	Start						End									



**Summary of Performance and Future Plans**

Progress of expenditures finished the year in good standing relative to plan. Evaluation results being reported are for the program onset years of 2016-2018. While the overall results fell below expectations, there were many high impact actions that did exceedingly well. The largest negative impact to the overall results was due to one key high impact action that was originally planned as a directly measured benefit. The evaluation study concluded that the most appropriate measurement of this action is by indirect impacts only as it is viewed as a feeder program with direct benefits being claimed through other initiatives. The follow up impact evaluation for this program is currently in the planning stages and is expected to kick-off in Q4 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	22,074,054	24,453,968	111%
Total Energy Savings, Annual (MMBtu eq.)	1,943,237	1,109,481	57%
Electricity Savings, Annual (MWh)	244,468	192,317	79%
Natural Gas Savings, Annual (MMBtu)	875,119	312,023	36%
Other Fuel Savings, Annual (MMBtu)	239,662	148,081	62%
Renewable Energy Generation, Annual (MWh)	627,624	222,139	35%
Renewable Energy Capacity (MW)	704	513	73%
Leveraged Funds (\$)	89,853,307	128,496,401	143%

**Activities Summary**

Activity	Activity #
<ul style="list-style-type: none"> <li>• Refine and update the Clean Energy Communities program and related technical assistance, tools, and resources.</li> <li>• Launch a Battle of the Buildings competition where municipalities encourage commercial, multifamily and municipal buildings to compete on the basis of energy use reduction.</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 both mandatory and voluntary benchmarking programs.</li> <li>• Target outreach and engagement efforts to influence electrification and other clean heating and cooling activities.</li> </ul>	1



**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Launch Clean Energy Communities Leadership Round.	2021	Leadership round launched January 26, 2021	Complete	2021	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of certified Climate Smart Communities (baseline = 45).	73	85	97	100	110	115	1
Output: Number of communities that have completed one or more high impact action (baseline = 592).	690	715	1,483 (811 direct)	735	745	750	1
Output: Number of completed Community Campaigns (baseline = 80).	150	180	236	210	220	225	1
Output: Number of completed high impact actions (baseline = 1,785).	2,400	3,000	3,327	3,500	3,900	4,200	1
Output: Number of designation communities (baseline = 315).	375	400	471	440	470	500	1
Outcome: Number of communities implementing CCA (baseline = 24).	45	55	74	-	-	-	1
Outcome: Number of communities implementing NYStretch (baseline = 0).	20	30	40	-	-	-	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start					End								
EXP		Start					End								

**Summary of Performance and Future Plans**

CEF funding for this initiative has been fully committed and expenditures were paid out in first half of 2022. A new program, Clean Energy Hubs, has been implemented to provide further community-based outreach and engagement.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	4,407,818	4,388,546	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	1,057,431	994,123	94%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start							End						
EXP		Start												End	

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	24,752,071	23,587,274	95%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Summary of Performance and Future Plans**

The program continues to fund work to evaluate the effectiveness of energy-related air quality management strategies by for example undertaking a methane emissions monitoring study in 2022 at natural gas compressor stations within the state. We anticipate expanding the methane emissions research portfolio further in 2023 via a new competitive solicitation to coincide with federal climate mitigation funding opportunities and state agency interest. The CEF continues to support development of refined projections of future climate impacts across the state. These climate projections will be paired with additional, sector-focused research in anticipation of publishing a Statewide Climate Impact Assessment in 2023. The Program has reassessed and streamlined State and federally supported long-term monitoring networks and has selected a new contractor through a competitively selected process. NYSERDA continues to work collaboratively to continually adapt these monitoring networks to anticipate emerging information needs, reduce costs and maintain the integrity of policy-relevant data to inform and provide accountability for meeting state and federal policy goals. Future research will continue to inform state efforts to complete the work identified in the Investment Plan, and where that plan can support meeting Climate Act obligations in a responsible and cost-effective manner.

**Activities Summary**

Activity	Activity #
Air Quality and Health, Ecosystem Response and Climate Adaptation, and Resilience Research.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Publish quarterly progress updates on NYSERDA's website.	2021	Quarterly research updates for the Environmental Research program can be viewed here: <a href="https://www.nyserda.ny.gov/All-Programs/Environmental-Research/Research-Updates">https://www.nyserda.ny.gov/All-Programs/Environmental-Research/Research-Updates</a>	Complete	2021	1
Publish quarterly progress updates on NYSERDA's website.	2022	Quarterly research updates for the Environmental Research program can be viewed here: <a href="https://www.nyserda.ny.gov/All-Programs/Environmental-Research/Research-Updates">https://www.nyserda.ny.gov/All-Programs/Environmental-Research/Research-Updates</a>	Complete	2023	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of publications/products	30	60	221	90	120	150	1
Output: Number of sponsored workshops, conferences, seminars or facilitated meetings to inform decision making	25	50	180	75	100	125	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start			End					
EXP								Start				End			

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	-	-	-
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Summary of Performance and Future Plans**

Originally introduced in 2022 as a component of the "Energy Storage Technology and Product Development" initiative, this program committed greater than \$14.1M (89% of Plan) in 2022. These commitments included 4 awards from the second Long Duration Energy Storage PON. This PON received 13 proposals. The third and final Long Duration Energy Storage PON will be released in 2023 with the goal of committing the remaining funding. Expenditures are expected to commence in 2023.

**Activities Summary**

Activity	Activity #
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.	1

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	2026 Target	Activity #
Output: Number of companies supported (baseline = 0).	1	0	2	-	-		1
Output: Number of studies, demonstrations, and product development projects completed (baseline = 0).	-	0	-	-	2		1
Output: Number of studies, demonstrations, and product development projects initiated (baseline = 0).	1	0	2	-	-		1
Outcome: Number of products commercialized (baseline = 0).	-	0	-	-	1		1
Outcome: Number of replications from demonstration projects (baseline = 0).	-	N/A	-	-	2	3	1
Outcome: Number of test sites for new technologies (baseline = 0).	-	0	-	3	-		1
Outcome: Revenue (\$M) to companies commercializing products (baseline = 0).	-	N/A	-	-	\$15M		1

**Performance Summary**

Expected Timeline Of Funding Deployment												Committed (COM), Expended (EXP)			
Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM								Start			End				
EXP								Start			End				

Summary of Performance and Future Plans
<p>NYSERDA contracted with a qualified consultant in Feb 2023. This support contract provides the Department of Public Service (DPS) consultant support and technical assistance to review the Utility Thermal Energy Network Pilot Project Proposals filed on 1/9/23. Support includes providing DPS support reviewing pilot project filings, meeting with DPS Staff &amp; Utilities, reviewing public comments, and recommendations to DPS Staff on implementation of the pilot projects.</p> <p>These technical support services will help DPS Staff to carry out the provisions of the Utility Thermal Energy Network Job Act (UTENJA) (S.9422 / A.10493). The UTENJA directs the Public Service Commission (PSC) to develop a regulatory structure for utility thermal energy networks that scales affordable and accessible building electrification, protects customers, and balances the role of incumbent monopoly utilities with other market and public actors. The UTENJA also directs each of the seven largest utilities to propose 1 to 5 pilot projects to the PSC for approval.</p>

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	-	-	-
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<p>Procure the services of one or more consulting firms to support the Utility Thermal Network Act, including, but not limited to:</p> <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>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Execute contract(s) with consulting firms.	2022	NYSDERDA contracted with a qualified consultant in Feb 2023. This support contract provides DPS consultant support and technical assistance to review the Utility Thermal Energy Network Pilot Project Proposals filed on 1/9/23.	Delayed		1
Provide expertise and input on any Working Groups associated with the Utility Thermal Networks Pilot Projects initiated	2022	Support consultant contracted in Feb 2023 will provide DPS support reviewing pilot project filings, meeting with DPS Staff & Utilities, reviewing public comments, and making recommendations to DPS Staff to support the implementation of the pilot projects.	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Utility-Scale Thermal Network Pilots commenced in New York. (baseline = 0).	-	7-14	0	-	-	-	1



**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start				End				
EXP							Start								End

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	1,830,000	5,487,156	300%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	4,000,000	1,065,716	27%

**Summary of Performance and Future Plans**

Progress on funding commitments and expenditures for this program performed beyond expectations. The program committed \$16.4m in funds in 2022 for demonstration of grid enhancing technologies prioritized in the Department of Public Service January 20, 2022 order on smart grid needs such as Dynamic Line ratings and power flow controls. The program is seeing strong progress from utilities in terms of embracing these new technologies and collaboration with industry wide solution providers. We plan to leverage the success of the first year of this portfolio in 2023 and continue collaborating with the Advanced Technologies Working Group and Joint Utilities to focus on storage as a transmission & distribution asset and technologies to improve situational awareness to the operators e.g Distributed Energy Resources Management System.

**Activities Summary**

Activity	Activity #
<p>Launch program solicitations targeting solution providers, in partnership with NYS utilities, to deliver key gap-bridging technologies. Program solicitations will be targeted to:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Develop Performance Challenge solicitations that specifically target identified performance gaps.</li> <li>• Competitively select product development, pilot, and demonstration projects that validate innovative technologies to bridge performance gaps.</li> <li>• 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</li> </ul>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Complete initial Performance Gap identification studies.	2021	Initial performance gap identification studies were completed in November 2022.	Complete	2022	1
Issue targeted Performance Gap solicitation.	2022	The targeted performance gap solicitation was issued in Q4 2022.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Critical and actionable performance gaps identified (baseline = 0).	2	8	5	12	-	-	1
Output: Participants engaged including companies supported and partnerships with utilities, manufacturers, and grid-technology companies (baseline = 0).	2	16	20	34	52	77	1
Outcome: Pilots and demonstrations of technology solutions to bridge performance gaps for the future electric grid (baseline = 0).	-	2	9	4	6	8	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start		End						
EXP							Start					End			

**Summary of Performance and Future Plans**

Driving innovation funding toward grid resilience and flexibility remains an important priority for NYSERDA's Innovation & Research portfolio. Commitments of funding in 2022 have been delayed while NYSERDA staff seeks to align the expected outcomes of this investment plan with other strategic planning currently underway to fully leverage all investments made in grid resilience. In preparation for 2023, extensive stakeholder engagement has been conducted including outreach for a partnership with joint utilities. NYSERDA will seek to shape future solicitations in 2023 around this market feedback.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	140,000	-	0%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
Launch program solicitation targeting solution providers, such as grid-technology companies, start-ups, and universities in partnership with utilities and demonstration host sites.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Launch competitive solicitation	2022	The solicitation has been delayed as NYSERDA explores potential modifications to the investment plan.	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Companies supported (baseline = 0).	-	1	0	3	4	-	1
Outcome: Pilots and demonstrations of power grid infrastructure technology in progress (baseline = 0).	-	-	0	-	2	4	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start												End		
EXP	Start												End		

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	33,631,347	36,442,413	108%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	34,010,867	21,862,969	64%

**Summary of Performance and Future Plans**

This initiative continues to perform well. The updated strategy to establish Future Grid Challenge and Grid ClimateTech Ready Capital as separate demonstration-focused initiatives so that High Performing Electric Grid can be focused solely on identifying and defining specific grid-related performance gaps that slow progress toward the goals of the Climate Act has been very successful. NYSERDA met and exceeded 2022 goals for funding commitments and expenditures, with the gaps analysis on integrating more than 9GW of Offshore Wind driving engagement with New York Independent System Operators, the Department of Public Service and the joint utilities.

**Activities Summary**

Activity	Activity #
<p>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>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards following release of broad competitive solicitation.	2021	Awards were made in Q1 2021.	Complete	2021	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of companies supported, utility touchpoints/partnerships, other partnerships with established manufacturers or grid technology companies (baseline = 0).	51	64	72	-	-	-	1
Output: Number of studies, demonstrations, and product development projects completed (baseline = 0).	48	67	65	-	-	-	1
Output: Number of studies, demonstrations, and product development projects initiated (baseline = 0).	100	109	114	-	-	-	1
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	-	-	-	1
Outcome: Application of advanced grid-management tools to predict failures, prevent disruptions, and support self-healing (baseline = 0).	1	2	1	-	-	-	1
Outcome: Application of power flow optimization systems (combination of computer systems and hardware to dynamically manage power flow) (baseline = 0).	1	1	1	-	-	-	1
Outcome: Tests and pilots of technologies/systems that enable system condition prediction and restoration (baseline = 0).	1	2	1	-	-	-	1

**Power Electronics Manufacturing Consortium [Inactive]**

**Grid Modernization Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	16,694,490	16,694,490	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	135,000,000	1,200,000,000	889%

**Healthy Homes Feasibility Study [Inactive]**

**LMI Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	212,147	179,282	85%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

## Heat Pumps Phase 2 (2020) [Active]

LMI Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	7,041,889	6,060,736	86%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

## LMI Multifamily [Active]

LMI Focus Area



Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	34,473,092	28,078,017	81%
Total Energy Savings, Annual (MMBtu eq.)	514,460	218,318	42%
Electricity Savings, Annual (MWh)	24,514	21,989	90%
Natural Gas Savings, Annual (MMBtu)	398,719	177,125	44%
Other Fuel Savings, Annual (MMBtu)	50,936	40,251	79%
Renewable Energy Generation, Annual (MWh)	-	289	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	131,283,668	63,995,617	49%



**LMI Outreach & Engagement [Active]**

LMI Focus Area

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	3,191,874	2,245,214	70%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**LMI Pilots [Active]**

LMI Focus Area

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	213,166	468,966	220%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Low Rise New Construction Transition - LMI [Inactive]**

**LMI Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	7,079,047	7,031,830	99%
Total Energy Savings, Annual (MMBtu eq.)	121,370	123,134	101%
Electricity Savings, Annual (MWh)	7,242	7,346	101%
Natural Gas Savings, Annual (MMBtu)	95,445	96,856	101%
Other Fuel Savings, Annual (MMBtu)	1,215	1,215	100%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	19,354,033	19,585,217	101%

**Multifamily New Construction Transition - LMI [Inactive]**

**LMI Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	4,993,574	5,567,887	112%
Total Energy Savings, Annual (MMBtu eq.)	32,683	67,412	206%
Electricity Savings, Annual (MWh)	2,814	5,569	198%
Natural Gas Savings, Annual (MMBtu)	23,081	48,409	210%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	10,780,999	21,336,938	198%

## New Construction - LMI [Active]

LMI Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	13,461,878	22,517,812	167%
Total Energy Savings, Annual (MMBtu eq.)	59,054	65,146	110%
Electricity Savings, Annual (MWh)	5,740	4,721	82%
Natural Gas Savings, Annual (MMBtu)	36,673	47,405	129%
Other Fuel Savings, Annual (MMBtu)	2,796	1,633	58%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	15,274,702	13,637,294	89%

## NYS Healthy Homes Value Based Payment Pilot [Active]

LMI Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	3,357,663	1,735,404	52%
Total Energy Savings, Annual (MMBtu eq.)	1,102	7	1%
Electricity Savings, Annual (MWh)	30	2	7%
Natural Gas Savings, Annual (MMBtu)	800	-	0%
Other Fuel Savings, Annual (MMBtu)	200	1	1%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

## Regional Clean Energy Hubs [Active]

LMI Focus Area

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	4,680,063	1,653,528	35%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

## RetrofitNY - LMI [Active]

LMI Focus Area



Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	9,103,512	4,339,715	48%
Total Energy Savings, Annual (MMBtu eq.)	3,227	2,907	90%
Electricity Savings, Annual (MWh)	93	-	0%
Natural Gas Savings, Annual (MMBtu)	2,328	2,910	125%
Other Fuel Savings, Annual (MMBtu)	582	-	0%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	4,232,000	13,177,324	311%

**REVitalize [Inactive]**

LMI Focus Area

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	291,424	291,424	100%
Total Energy Savings, Annual (MMBtu eq.)	9,000	9,000	100%
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	9,000	9,000	100%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	4,629,714	4,629,714	100%

**Single Family - Low Income [Active]**

LMI Focus Area

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	207,836,786	229,228,371	110%
Total Energy Savings, Annual (MMBtu eq.)	979,601	850,471	87%
Electricity Savings, Annual (MWh)	27,737	19,658	71%
Natural Gas Savings, Annual (MMBtu)	678,128	552,791	82%
Other Fuel Savings, Annual (MMBtu)	213,742	239,002	112%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Single Family - Moderate Income [Active]**

**LMI Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	91,710,682	91,591,105	100%
Total Energy Savings, Annual (MMBtu eq.)	414,327	316,840	76%
Electricity Savings, Annual (MWh)	7,929	4,712	59%
Natural Gas Savings, Annual (MMBtu)	321,365	225,792	70%
Other Fuel Savings, Annual (MMBtu)	153,843	164,654	107%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	89,390,604	86,802,569	97%

**Solar for All [Inactive]**

**LMI Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	4,775,889	4,312,533	90%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start							End	
EXP							Start								End



**Summary of Performance and Future Plans**

The Multifamily sector focus for this initiative is performing to plan for outputs, outcomes and expenditures. This component of the broader Real Time Energy Management (RTEM) scope was closed to new project applications in 2022. The focus of the initiative is presently on managing the pipeline of projects to successful completion.

Gross energy savings progress continues to lag plan; funding is expended 12-18 months prior to reporting acquired gross savings, and the plan was adjusted during the recent annual reforecast to better reflect the real lag observed on projects. Data collection efforts are ongoing for all projects. A verified gross savings analysis significantly reduced energy performance from the gross values reported. A notable amount of this reduction is due to delayed installation of capital improvement measures (observed across several NYSERDA initiatives) and a longer-than-anticipated timeline for measure installations. An update to this study is underway to reassess performance and is anticipated to be complete Q1 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	6,407,492	6,284,660	98%
Total Energy Savings, Annual (MMBtu eq.)	568,445	155,266	27%
Electricity Savings, Annual (MWh)	70,824	10,596	15%
Natural Gas Savings, Annual (MMBtu)	266,911	99,926	37%
Other Fuel Savings, Annual (MMBtu)	59,882	19,187	32%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	43,082,747	51,381,106	119%

**Activities Summary**

Activity	Activity #
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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue revised open enrollment incentives for EM systems and services that support Multifamily market.	2021	NYSERDA issued revised incentive structures for Multifamily buildings in January 2021, and after committing all funding, recently closed the sector to new applications in June 2022.	Complete	2021	1
NYSERDA makes publicly available anonymized RTEM project data to support market confidence in performance of RTEM systems and services.	2022	NYSERDA sponsored the "RTEM Data Hackathon" on July 2022, a public competition with over 400 participants from 27 countries, which gave \$55,000 in awards for the development and demonstration of novel & unique EM strategies using real-time data.	Complete	2022	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of multifamily buildings participating in incentive program (baseline = 0).	300	400	358	500	-	-	1
Output: Number of qualified providers on NYSERDA list serving Multifamily sector (baseline = 0).	20	30	30	-	-	-	1
Outcome: large multifamily portfolio owners deploy RTEM across four or more of their buildings (baseline = 1 owner).	-	-	5	3	5	10	1
Output: Number of comprehensive building specific data sets submitted to NYSERDA (baseline = 0).	-	50	550	100	-	-	2
Output: Number of pilots complete (baseline = 0).	-	-	12	5	-	-	2
Outcome: Awareness of EM among building owners/managers (baseline = TBD).	-	-	28%	40%	50%	-	2
Outcome: Persistence of EM service contracts (i.e., how many customers extend their subscription with an RTEM provider beyond 5 years)	-	-	65%	-	40%	60%	2
Outcome: Size of market as indicated by vendor sales (baseline = \$10M).	-	\$40M	N/A	-	-	-	2



**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM						Start			End						
EXP							Start				End				

Committed (COM), Expended (EXP)



**Summary of Performance and Future Plans**

The Multifamily sector work of this initiative is achieving target milestones, outputs and outcomes when compared to plan. Progress of expenditures also fared well against the plan through 2022. To-date, all spending has been toward engineering studies, which do not claim energy benefits. The first projects funded under the Empire Building Challenge are in the very initial stages of implementation, and benefits are not expected to be acquired until 2024 at the earliest.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	500,000	2,121,360	424%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<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>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Announce the participating real estate owners and their public commitments from round 1 of solicitation.	2021	The solicitation to select the first cohort of real estate partners was launched in Q3 2020 and a public announcement of the first cohort of real estate partners was made in Q1 2021.	Complete	2021	1
Announce the partnering of real estate owners and their public commitments from round 2 of solicitation.	2022	All real estate partners have been publicly recognized for being selected as Empire Building Challenge (EBC) Partners. This includes a public announcement on each partner's commitment to carbon neutrality, at their participating building(s).	Complete	2022	1
Announce awards following the release of competitive solicitation.	2022	The second funding round for Empire Building Challenge was held in Q3-Q4 2022. Awarded projects will be publicly announced once contracts are executed.	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
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	6	10	-	-	1
Outcome: Multifamily replication projects within portfolios as measured by total household units served (baseline = 0).	-	-	N/A	500	1,500	2,500	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM					Start					End					
EXP					Start							End			

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	1,933,930	526,250	27%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	993,294	-

**Summary of Performance and Future Plans**

The program has accumulated 8 submitted applications for an aggregated 816 dwelling units to date since launch. The program has 2 projects found in disadvantaged community regions based on the interim definition. The projects have identified multiple measures for the scope of work. Buildings have included on average 4 measures, with envelope, the measure with the greatest incentive, included in the statement of work for 5 of the projects. With these projects, 25% of the incentive budget has been committed. Fifty percent of the projects are downstate and 50% are upstate. Two of the projects also received technical assistance through other NYSERDA programs. Overall, 2022 funding commitments and expenditures lag projections. In 2023, the program will have case studies and video testimonials released to improve market awareness of the program. NYSERDA expects that completed technical assistance and other Low Carbon Capital Planning projects will yield further installation of recommended measures.

**Activities Summary**

Activity	Activity #
<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>	1
<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>	2
<p>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.</p> <ul style="list-style-type: none"> <li>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</li> <li>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.</li> </ul> <p>Participants engaged include large portfolio owners and property management firms, A&amp;E firms and energy service providers.</p>	3

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
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).	2022	We have a contract in place to support the development of tools and resources as needed. Low Carbon Multifamily Retrofit Playbooks were completed in March 2021 to provide guidance for building owners interested in retrofitting.	Delayed		1
Publish case studies with owners for first cohort of low carbon demonstration projects.	2022	Due to delayed construction timelines and the internal constraint of requiring a press release announcement prior to sharing project learnings w/ the market – this is delayed and expected to be accomplished in 2023.	Delayed		2
Develop preliminary method of collecting information from multifamily stakeholders on the value of non-energy benefits and their connection with low carbon retrofits.	2021	Finished implementing a resident survey that is being utilized to collect information from multifamily stakeholders on the value of non-energy benefits and their connection with low carbon retrofits.	Complete	2022	3
Develop preliminary method of collecting information from multifamily stakeholders on the value of non-energy benefits and their connection with low carbon retrofits.	2022	Finished implementing a resident survey that is being utilized to collect information from multifamily stakeholders on the value of non-energy benefits and their connection with low carbon retrofits.	Complete	2022	3
Collect and review data from preliminary market stakeholder assessments to determine need and design considerations for a non-energy benefits pilot.	2022	Delayed due to resource constraints. In the upcoming year, NYSERDA plans to finalize the scope of work to enable execution in outer years, dependent on project progress.	Delayed		3

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Publish low carbon playbooks for a total of five prevalent multifamily building typologies	5	-	N/A	-	-	-	1
Output: Number of low carbon technology demonstrations in units (baseline = 0 units).	96	1,141	1,622	3,314	6,696	11,274	2
Outcome: Number of multifamily buildings adopting high-performance retrofits s (baseline = 0).	-	-	21 buildings (consists of 7 projects, some with multiple buildings)	-	-	3,040 (This target number is subject to change with more accurate population data)	2
Outcome: Number of multifamily buildings with awareness of low carbon implementation pathways and non-energy benefits of high-performance technologies (baseline = 0).	-	-	N/A	-	-	19,002 (This target number is subject to change with more accurate population data)	2
Output: Number of non-energy benefit pilot projects (baseline = 0).	-	TBD	0	TBD	TBD	TBD	3

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	156,214	156,214	100%
Total Energy Savings, Annual (MMBtu eq.)	829	829	100%
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	829	829	100%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	70,547	70,547	100%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM					Start					End					
EXP					Start										End



**Summary of Performance and Future Plans**

This initiative finished 2022 in good standing with respect to both budget and energy benefits. NYSERDA continues to see strong participation from each commercial, industrial, multifamily, and agriculture sectors served. During the recent Compiled Investment Plan (CIP) filing on February 1, 2023, funding was added to Technical Services to ensure studies will have adequate support in future quarters. Multiple evaluations reflecting the various sectors are assessing this effort or will be soon. Future reports will detail results from these studies. In early 2022, a solicitation update established a process to qualify affordable housing projects, improving budget management.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	4,275,973	4,093,287	96%
Total Energy Savings, Annual (MMBtu eq.)	132,481	288,523	218%
Electricity Savings, Annual (MWh)	2,681	11,192	417%
Natural Gas Savings, Annual (MMBtu)	78,607	212,597	270%
Other Fuel Savings, Annual (MMBtu)	44,726	71,398	160%
Renewable Energy Generation, Annual (MWh)	-	1,643	-
Renewable Energy Capacity (MW)	-	2	-
Leveraged Funds (\$)	1,816,844	11,781,187	648%

**Activities Summary**

Activity	Activity #
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.	1

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by non-participants (baseline = 25%).	-	30%	N/A	30%	30%	30%	1
Outcome: maintain or (best case) increase the rate at which clean energy technologies are adopted by participants (baseline = 65%).	-	65%	N/A	65%	65%	65%	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM						Start		End							
EXP							Start		End						

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	128,495	277,500	216%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	1,625,100	-	0%

**Summary of Performance and Future Plans**

This program is performing well against the expenditure plan through 2022. There are a few clarifications with respect to benefits reporting. First, progress is reported on a lag and will be updated for the second half of 2022 in early 2023. Second, there are barriers to reporting that NYSERDA is working to address. At various stages of development, NYSERDA's Innovation & Research portfolio supports companies across multiple CEF initiatives. NYSERDA is working on a solution that avoids duplicative reporting of benefits and will resume reporting of follow-on leveraged funding once in place.

**Activities Summary**

Activity	Activity #
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.	1



**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards from competitive solicitation for program administrator.	2021	The competitive solicitation for Program Administrator launched on April 7, 2021 and awards were made in 2021.	Complete	2021	1
At least \$2.5M in cost share due from the program administrator.	2021	The program administrator was selected in 2021 and collected in excess of \$2,500,000 during 2021.	Complete	2021	1
At least \$2.2M in external funding opportunities awarded by the program administrator.	2022	NYSERDA anticipates that the milestone will be completed by Q3 2023 after contract delays in 2022.	Delayed		1
At least 10 corporate partners secured as partners of the Carbontech Development initiative.	2022	NYSERDA anticipates that the milestone will be completed by Q3 2023 after contract delays in 2022.	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: New awards issued	-	2	N/A	4	6	8	1
Output: New products created	-	-	N/A	1	2	3	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	COM							Start			End				
EXP							Start				End				

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	2,875,000	25,160	1%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	5,000,000	-	0%

**Summary of Performance and Future Plans**

After some initial delays in program launch, Natural Carbon Solutions (PON 5180) completed its first solicitation round in 2022. This opportunity sought activities to catalyze novel approaches to significantly increase the scale of negative emissions, carbon sequestration, reduce waste-related methane, and advance New York’s clean energy goals. Three challenge areas were included in Round 1: (1) buildings materials, designs, and strategies for “low to carbon negative” envelope retrofits and/or new construction; (2) enabling products, services, and strategies to reduce waste methane, increase carbon sequestration, optimize use of land, energy, natural resources; and (3) advancements in measurement, monitoring, reporting and verification (MMRV) of greenhouse gas emissions and Co-Benefits. Eight CEF awards (\$11.15M) were made in December 2022 alongside two additional awards funded through RGGI (\$1.17M). Planning work has begun for Round 2 which will be issued in 2023.

**Activities Summary**

Activity	Activity #
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.	1
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.	2

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
NYSERDA completes initial stakeholder engagement process to finalize scope of solicitations	2022	NYSERDA received responses to RFI in August of 2022, the solicitation was issues on our website in Q4 of 2022.	Complete	2022	1
NYSERDA releases evergreen solicitation (\$1.65M).	2022	This milestone is on hold pending a review of program activities, as this solicitation may no longer be needed.	Delayed		1
NYSERDA completes initial stakeholder engagement process to finalize scope of solicitations.	2022	NYSERDA received responses to RFI in August of 2022, the solicitation was issues on our website in Q4 of 2022.	Complete	2022	2
NYSERDA Round 1 Innovation challenge awards (\$4.5M).	2022	8 CEF, 2 RGGI awards were made in December 2022. A total of \$11.15M CEF funds and \$1.7M in RGGI were awarded.	Complete	2022	2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of new projects supported (baseline = 0).	-	5	0	7	10	15	1
Output: Number of stakeholders engaged (baseline = 0).	-	50	400	75	100	200	1
Outcome: Number of projects receiving follow-on funding with at least 5x leverage ratio of NYSERDA funding (baseline = 0).	-	-	N/A	2	4	8	1
Output: Number of new projects supported (baseline = 0).	-	15	0	15	20	-	2
Output: Number of stakeholders engaged (baseline = 0).	-	50	400	75	100	200	2
Outcome: Number of new industrial partners, or co-investors contributing leverage funds to scale up in NYS (baseline = 0).	-	2	0	5	10	20	2
Outcome: Number of new technologies or businesses/business models entering the NYS market (baseline = 0).	-	-	N/A	1	2	5	2
Outcome: Number of project replications (baseline = 0).	-	-	N/A	-	5	10	2

**Commercial New Construction Transition [Inactive]**

**New Construction Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	9,307,785	8,540,929	92%
Total Energy Savings, Annual (MMBtu eq.)	102,144	96,311	94%
Electricity Savings, Annual (MWh)	19,874	18,445	93%
Natural Gas Savings, Annual (MMBtu)	49,166	54,368	111%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	10,414,076	10,357,306	99%

**Low Rise New Construction Transition - Market Rate [Inactive]**

**New Construction Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	3,883,955	4,051,385	104%
Total Energy Savings, Annual (MMBtu eq.)	158,396	157,767	100%
Electricity Savings, Annual (MWh)	6,395	6,536	102%
Natural Gas Savings, Annual (MMBtu)	134,455	133,315	99%
Other Fuel Savings, Annual (MMBtu)	2,121	2,151	101%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	11,834,599	12,261,418	104%

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	1,323,856	1,349,934	102%
Total Energy Savings, Annual (MMBtu eq.)	4,694	13,889	296%
Electricity Savings, Annual (MWh)	350	1,078	308%
Natural Gas Savings, Annual (MMBtu)	3,500	10,210	292%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	950,000	2,455,394	258%

### Performance Summary

#### Expected Timeline Of Funding Deployment

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start									End				
EXP		Start													End



#### Summary of Performance and Future Plans

The initiative exceeded projections on new commitments for open enrollment programs and competitive programs. Carbon Neutral Community for Economic Development and Buildings of Excellence, received extremely large responses from the market and NYSERDA expects to commit all funding for both programs by Q1 2023. Supply chain issues and broader economic issues continue to hamper new construction market activity, materializing in the moderate lag against the plan for both expenditures and energy savings. A robust review of projects under contract was completed and high-risk projects unlikely to advance were closed. The remaining projects are expected to advance, but at a slower and rather unpredictable rate due to the challenges noted above and other variables such as financial deal closings, code reviews, and approvals, etc. During the recent Compiled Investment Plan filing on February 1, 2023, \$10M funding was added to expand support for Buildings of Excellence (Multifamily Housing) and Carbon Neutral Community Economic Development. Single-family new construction evaluation results will be finalized in Q1 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	17,200,173	14,549,909	85%
Total Energy Savings, Annual (MMBtu eq.)	73,397	61,646	84%
Electricity Savings, Annual (MWh)	7,559	3,489	46%
Natural Gas Savings, Annual (MMBtu)	46,026	49,458	107%
Other Fuel Savings, Annual (MMBtu)	1,579	290	18%
Renewable Energy Generation, Annual (MWh)	331	2,820	852%
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	9,791,521	8,029,336	82%

### Activities Summary

Activity	Activity #
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.	1
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.	2
<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>	3
<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>	4
<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>	5
<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>	6

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue Awards for the Carbon Neutral Community Economic Development program.	2021	In December 2021, NYSERDA announced the award of 19 projects for \$21 million through the Carbon Neutral Community Economic Development program.	Complete	2021	2
Issue Awards for the Carbon Neutral Community Economic Development program.	2022	In December 2022, NYSERDA announced the award of 10 projects for \$12 million through the Carbon Neutral Community Economic Development program.	Complete	2022	2
Issue Awards for the Buildings of Excellence Competition	2022	The awards ceremony for the Buildings of Excellence Competition is scheduled for Q1 2023.	Delayed		4
Issue Builder/Developer Network Solicitation	2021	In December 2021, NYSERDA launched the Building Better Homes Partner solicitation to develop a Builder or Developer's capacity to deliver carbon neutral single family homes.	Complete	2021	5
Issue Awards for each round of the Carbon Neutral Single Family Neighborhoods Competition	2022	Launch of the Carbon Neutral Single Family Neighborhood competition was delayed due to market conditions.	Delayed		5
Carbon Neutral Buildings Roadmap is published.	2021	The Carbon Neutral Buildings Roadmap was published in December 2022.	Complete	2022	6
Provide input and support to State and local governments to advance adoption of requirements for carbon neutral buildings in state/local laws and programs.	2021	In 2021, the New Construction team worked with the NYS Department of State to advance decarbonization through the Downtown Revitalization Initiative Round 5 program offering.	Complete	2021	6
Provide input and support to State and local governments to advance adoption of requirements for carbon neutral buildings in state/local laws and programs.	2022	In 2022, NYSERDA worked with the NYS Department of State to advance decarbonization through the Downtown Revitalization Initiative Round 6 program offering, and offered technical support to projects seeking DRI incentives.	Complete	2022	6

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Carbon Neutral Commercial Square Feet Completed (baseline = 0).	0.04M	0.08M	1.74M	0.25M	0.55M	1.0M	1
Output: Number of Carbon Neutral Commercial Buildings Completed (baseline = 0).	11	20	28	40	60	100	1
Output: Number of Market Participants that attend Conferences and Events (baseline = 4,979).	5,000	9,000	6,446	13,000	17,000	21,000	1
Output: Number of Market Participants that attend Trainings and Workshops (baseline = 2,372).	4,400	6,400	8,600	-	-	-	1
Output: Number of projects that completed performance analysis (baseline = 0).	5	12	41	20	30	45	1
Output: Published Case Studies (baseline = 0).	0	5	117	-	-	-	1
Output: Published Model Measure Packages (baseline = 0).	-	-	N/A	5	10	15	1
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%	N/A	8-15%	8-15%	5-10%	1
Outcome: Percent market penetration of commercial projects	3%	3%	N/A	6%	8%	10%	1
Output: Number of Carbon Neutral Community Economic Development Campus/ Community projects awarded (baseline = 3).	5	7	5	-	-	-	2
Output: Number of Carbon Neutral Community Economic Development facility projects awarded (baseline = 17).	27	37	45	-	-	-	2
Output: Carbon Neutral Market Rate Multifamily Square Footage Completed (baseline = 0).	0.10M	0.25M	0.45M	0.45M	0.90M	2.0M	3
Output: Carbon Neutral Market Rate Single Family Square Footage Completed (baseline = 0).	0.25M	0.38M	0.35M	0.63M	1.0M	2.5M	3
Output: Number of Carbon Neutral Market Rate Multifamily Units Completed (baseline = 0).	100	250	357	450	900	2,000	3
Output: Number of Carbon Neutral Market Rate Single Family Homes Completed (baseline = 0).	100	150	144	250	400	1,000	3
Output: Number of Market Participants that attend Conferences and Events (baseline = 4,979).	11,000	16,000	8,916	-	-	-	3
Output: Number of Market Participants that attend Trainings and Workshops (baseline = 2372).	4,400	6,400	8,960	8,400	10,400	12,400	3
Output: Number of Market Participants that receive mentoring Support (baseline = 16).	30	45	57	60	75	90	3



**Outputs and Outcomes Summary (continued)**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of Projects that completed performance analysis (baseline = 0).	15	30	36	45	60	75	3
Output: Published Case Studies (baseline = 0).	65	75	97	-	-	-	3
Output: Published Model Measure Packages (baseline = 0).	-	-	N/A	5	10	15	3
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%	N/A	4-10%	3-8%	2-5%	3
Outcome: Percent market penetration of multifamily projects >20,000 square feet, utilizing integrated design and construction practices (baseline = TBD).	3%	3%	N/A	6%	8%	10%	3
Output: Number of Buildings of Excellence projects awarded (baseline = 42 (both LMI and Market Rate)).	42	47	42	51	-	-	4
Output: Number of Builders and Developers in the Carbon Neutral Network (baseline = 0).	10	30	10	50	65	75	5
Output: Number of Carbon Neutral Neighborhoods Awarded (baseline = 0).	-	3	0	8	13	21	5

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	6,939,197	5,185,829	75%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	36,994	-	0%
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	6,633,392	-	0%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start									End			

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	1,642,951	1,720,254	105%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Summary of Performance and Future Plans**

This initiative is performing well compared to plans and measure targets through 2022. The program has been ramping up both in staff capacity and contracted technical support services to better serve local governments across the state. The number of communities receiving direct, one-on-one technical assistance continues to remain on track, while exceeding the 2022 goal of providing training workshops to 100 communities. At least 175 unique communities participated in one or more of Clean Energy Siting team training opportunities, already surpassing the 2023 target of 150. This successful joint initiative with the Clean Energy Communities program is providing many more communities with assistance preparing for solar and energy storage, and incorporating clean energy into their comprehensive plans. In addition, in 2023 NYSERDA is poised to release new resources and initiatives aimed at breaking down barriers to implementation of agrivoltaics, addressing the challenge of siting renewable energy facilities on agricultural lands and charting a path toward complementary industry practices that support both energy and agriculture’s roles in in New York’s economy.

**Activities Summary**

Activity	Activity #
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. 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 communities that actively reduce clean energy soft costs, including adopting and implementing local laws to responsibly regulate solar and energy storage, and to reward those communities with funding to implement related clean energy projects.</li> <li>• Support other funding and technical support opportunities for communities and stakeholders to reduce soft costs and accelerate project deployment timelines.</li> </ul>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Release solicitation for consultant support.	2021	NYSERDA released the solicitation and awarded contracts in 2022 and is working with awarded firms to finalize contracts. The kick-off meeting for the Clean Energy Siting Contractor Pool should be scheduled in early 2023.	Delayed		1
Launch updated educational campaign through CEC program.	2022	The County-Hosted Trainings High Impact Action was released through the Clean Energy Communities program in 2022. 70 trainings were delivered in 2022, with an additional 10 trainings scheduled in Q1 2023.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of AHJs receiving direct technical assistance (baseline = 355).	376	391	390	406	421	436	1
Output: Number of communities engaged in completing steps to reduce soft costs (baseline = 0).	-	25	33	100	175	200	1
Output: Number of communities that attended workshops (baseline = 0).	-	100	196	150	200	250	1
Output: Number of non-restrictive local storage laws adopted (baseline = 0).	-	8	33	50	125	200	1
Output: Soft cost solutions created or updated (baseline = 10).	11	12	12	13	14	15	1
Outcome: Cycle Time (in months) of projects from customer proposal to commissioning (baseline = BTM: 18; FTM: 23).	22	-	18	-	-	-	1
Outcome: Soft costs \$ per kWh of battery storage based on CEF strategies (baseline = BTM: Avg=\$89/kWh; FTM: Avg=\$92/kWh).	109	-	N/A	-	-	-	1

**Combined Heat & Power Transition [Inactive]****Renewables/ Distributed Energy Resources (DER) Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	44,540,175	36,380,373	82%
Total Energy Savings, Annual (MMBtu eq.)	(423,823)	(252,797)	60%
Electricity Savings, Annual (MWh)	173,755	95,628	55%
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	191,251,013	147,124,973	77%

**Fuel Cells [Inactive]****Renewables/ Distributed Energy Resources (DER) Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	6,837,530	3,286,644	48%
Total Energy Savings, Annual (MMBtu eq.)	(742,195)	(247,294)	33%
Electricity Savings, Annual (MWh)	154,645	56,486	37%
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	57,188,096	31,737,189	55%

**Offshore Wind Master Plan [Inactive]**

**Renewables/ Distributed Energy Resources (DER) Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	4,965,882	4,965,882	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Offshore Wind Pre-Development Activities [Inactive]**

**Renewables/ Distributed Energy Resources (DER) Focus Area**

<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	9,516,242	9,471,221	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM					Start				End						
EXP					Start				End						

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

Activities are generally consistent with plan. To date, seventeen (17) major renewable energy projects have submitted a full siting permit application. ORES expects to see a significant number of full siting permit applications as the pipeline of projects matures into full applications in the coming months. To date, the Office has issued eleven (11) final siting permits, totaling approximately 1,757 MW of renewable energy capacity, while ensuring the protection of the environment and consideration of all pertinent social, economic, and environmental factors, with input from local governments and host communities. The Office’s decisions follow a detailed review and robust public participation process to ensure that these facilities meet or exceed the requirements of section 94-c of the Executive Law and its implementing regulations. ORES expects to receive over thirty (30) new permit applications in 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	5,867,646	2,341,535	40%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Finalize regulations and uniform standards and conditions (complete)	2021	Draft regulations and uniform standards and conditions were issued by ORES for public comment on September 16, 2020, with final versions adopted and effective as of March 3, 2021.	Complete	2021	1
Implement permitting process. - 10%	2021	Within one year of the Office’s creation, as required by statute, the Office promulgated a comprehensive regulatory framework for the siting of major renewable energy facilities.	Complete	2021	1
Implement permitting process. - 60%	2022	As Executive Law § 94-c moves beyond the initial stage of implementation, the progress indicates that the Office’s new siting process is meaningfully advancing the State toward its nation-leading CLCPA goals in a timely and cost-effective manner.	Complete	2022	1

There are currently no outputs or outcomes to report.

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start						End								
EXP	Start											End			

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

In 2022, NYSERDA funded consultants that assisted NYC Department of Buildings (DOB) and Fire Department of New York City (FDNY) with finalizing their permitting process for energy storage systems and processing storage applications at the DOB Office of Technical Certification and Research (OTCR). Additionally, NYSERDA funds supported staff augmentation at FDNY who were instrumental in conducting site plan and equipment reviews on behalf of the Department. In the beginning of 2022, only one energy storage product had a Certificate of Approval through FDNY. In subsequent months three additional products attained the certification, with nearly ten additional products moving through the process. Further, the FDNY implemented comprehensive regulations on stationary energy storage system development, including a permitting process for indoor lithium-ion storage systems, in 2022.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	10,228,397	9,266,201	91%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	3,954,101	-	0%

**Activities Summary**

Activity	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.	1
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.	2

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of cost-share studies supported (baseline = 0).	12	14	13	18	22	25	1
Outcome: Number of projects deployed following studies (baseline = 0).	1	1	0	2	2	3	1
Outcome: Permitted indoor storage systems in NYC (baseline = 0).	-	-	0	5	10	20	2



Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	3,569,207	3,323,673	93%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	1,895	2,758	146%
Renewable Energy Capacity (MW)	2	2	100%
Leveraged Funds (\$)	3,653,666	4,248,402	116%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM				Start		End									
EXP						Start	End								

Summary of Performance and Future Plans
Through 2022, 14 projects were funded, with 6 operational and the remaining 8 at varying stages of development. NYSERDA anticipated that these remaining 8 projects would be completed in 2022 as most major equipment resides on-site, however several factors have combined to slow or stall progress. Slower-than-expected interconnection/permitting/construction, coupled with financing and equipment supply chain delays that emerged during COVID and dragged on, as well as some administrative challenges all impacted these remaining programs. Based on careful review, NYSERDA believes these projects will be complete in 2023. Since these CEF funds have been fully committed, NYSERDA's only currently open storage incentive program is funded by the Regional Greenhouse Gas Initiative specific to Long Island.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	40,000,000	12,396,272	31%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	20,152,010	6,163,926	31%

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: MW of storage capacity awarded for support (baseline = 0).	-	-	33.3	-	-	40	N/A
Output: MWh of storage awarded support (baseline = 0).	-	-	108.8	-	-	130	N/A
Output: Number of NY-Sun projects awarded support for storage (baseline = 0).	-	-	14	-	-	16	N/A

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start						End								
EXP	Start						End								

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	9,349,342	10,215,370	109%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	11,082,568	11,258,762	102%

**Summary of Performance and Future Plans**

The program increased total cumulative funding committed to \$32.4M through the end of 2022. These commitments included the remaining awards from the first solicitation of Long Duration Energy Storage solutions. The solicitation once again surpassed expectations with greater than 30 proposals requesting over \$100M received. A total of 5 projects were awarded with CEF funding representing a total project scope of over \$69M. All 5 projects were successfully contracted in early 2022 and execution on each has begun. These projects include a breadth of solutions and establish a strong foundation for the Long Duration Energy Storage portfolio expected to yield learning and products that will be critical to meeting New York's Climate Act objectives.

The third and final Long Duration Energy Storage solicitation will be released in 2023 to commit remaining funding.

**Activities Summary**

Activity	Activity #
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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Make awards from LDES Solicitation	2021	Awarded 5 Projects totaling \$16.4M with \$39M in Cost Share.	Complete	2021	1
Make awards from LDES Solicitation	2022	Awarded 4 Projects totaling 14.6M with over \$25M in cost share.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of companies supported (baseline = 50).	53	55	71	-	-	-	1
Output: Number of studies, demonstrations, and product development projects completed (baseline = 0).	-	-	21	1	2	5	1
Output: Number of studies, demonstrations, and product development projects initiated (baseline = 32).	42	50	49	52	53	-	1
Outcome: Number of products commercialized (baseline = 0).	-	-	2	-	-	2	1
Outcome: Number of replications from demonstration projects (baseline = 0).	-	-	0	-	-	2	1
Outcome: Number of test sites for new technologies (baseline = 3).	-	4	4	5	-	-	1
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/kWh).	-	>20%	>2 % Cost increase	-	-	-	1
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/kWh, battery only: \$350-\$500/kWh).	-	>20%	> 2% Cost Increase	-	-	-	1
Outcome: Revenue (\$M) to companies commercializing products (baseline = 0).	-	-	\$0.014M	-	-	\$10M	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start												End
EXP			Start												End

**Summary of Performance and Future Plans**

With over 50 projects in execution in the National Offshore Wind R&D Consortium by the end of 2022, expenditures ramped quickly as expected. Projects remain on schedule and, expenditures met or exceeded almost all project plans and the budget reforecast developed in September 2021. This focus in execution is recognized by the industry, the Department of Energy and the Consortium's board of directors and has resulted in development of multiple follow-on funding opportunities and projects currently in development or contracting.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	8,805,271	12,024,262	137%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	13,049,384	11,214,315	86%

**Activities Summary**

Activity	Activity #
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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Make Awards from third Consortium Solicitation	2022	Consortium third solicitation Rounds 1 and 2 awarded 11 projects for \$7.2M in 2022.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of companies/entities supported (baseline = 18).	20	22	52	-	-	-	1
Output: Number of pilots, demonstrations, and product development projects initiated (baseline = 22).	42	45	52	46	-	-	1
Output: Number of studies, demonstrations, and product development projects completed (baseline = 0).	-	3	6	6	9	31	1
Outcome: Number of products commercialized (baseline = 0).	-	-	6	-	-	3	1
Outcome: Number of replications from demonstration projects (baseline = 0).	-	-	0	-	-	4	1
Outcome: Revenue (\$M) to companies commercializing products (baseline = 0).	-	-	\$0M	-	-	\$10M	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM															
EXP				Start			End								

**Summary of Performance and Future Plans**

The Consumer Awareness and Education marketing campaign was deliberately concluded, ahead of schedule, in May of 2022. At that time, Con Edison had exhausted all available NYS Clean Heat incentive funds and requested NYSERDA halt all related marketing efforts. Aligning with Con Edison’s oversubscription, the marketing campaign had achieved extremely high levels of education and awareness among Westchester homeowners. At the time the campaign concluded, heat pump awareness was at 80 percent, and familiarity of their benefits at 44.6 percent. Energy efficiency familiarity was also extremely high, at 60%. The remaining marketing funds for this specific effort have been reallocated to the statewide NYS Clean Heat awareness and education marketing campaign already underway. Con Edison and NYSERDA are working in coordination on the appropriate time to restart the NYS Clean Heat consumer awareness and education marketing in Westchester County, taking market stability and available incentive levels into account.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	2,803,610	2,251,671	80%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<ul style="list-style-type: none"> <li>• Conduct a co-branded (Con Edison and NYSERDA) consumer awareness campaign in Westchester County to increase consumer awareness, interest, and familiarity with energy efficiency and clean heating and cooling technologies that can be adopted in partnership with utilities.</li> <li>• Proactively engage existing heating and cooling and energy efficiency contractors and suppliers so they are informed of energy efficiency and clean heating and cooling technology options and are committed to meet consumer demand.</li> <li>• Maintain and expand a web-based landing environment providing a single point of entry for consumers to access and learn about the opportunities available for their home or business.</li> </ul>	1

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Increase consumer familiarity of clean heating and cooling technology (baseline = extremely/very 22.3% not very/not at all 36.3%).	-	44.6% / 20%	44.6% / 20.0%	-	-	-	1
Output: Increase consumer familiarity of energy efficiency (baseline = extremely/very 36.6% not very/not at all 37.6%).	-	60% / 20%	43.5% / 29.5%	-	-	-	1
Output: Increase in consumer awareness of clean heating and cooling technology (baseline = aware of either 49%).	-	80%	80%	-	-	-	1
Output: Increase interest in adopting clean heating and cooling technology (baseline = extremely/very 20%).	-	40%	46%	-	-	-	1
Output: Likelihood to make homes energy efficient in next 0-18 months (baseline = extremely/very 5.5% not at all/slightly 78.5%).	-	10% / 60%	5.0% / 86%	-	-	-	1
Outcome: Increase in number of Westchester County service providers offering air source heat pump technology (baseline = 29).	-	38	162	-	-	-	1
Outcome: Increase in number of Westchester County service providers offering ground source heat pump technology (baseline = 45).	-	59	38	-	-	-	1
Outcome: Influence the installation of heat pump units (baseline = 224 units).	-	2,000	7,679	-	-	-	1
Outcome: Maintain energy efficiency service provider base in Westchester County (baseline = 25).	-	25	27	-	-	-	1



**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM					Start					End					
EXP					Start						End				

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

NYSERDA launched Clean Heat Connect, a network which now includes 5 HVAC manufacturers and 10 distributors, covering a majority of the New York State market, promoting adoption of educational and technical tools and resources through their contractor networks. Members include the top three heat pump manufacturers, Mitsubishi, Daikin, and Fujitsu and some of the largest distributors such as ABCO, CE, Ferguson, and Meier Supply. 15 market interventions have been created with over 30 individual items produced including supporting and promoting heat pump sizing and design trainings in coordination with New York State Clean Heat, a coordinated online training calendar hosted on the Clean Heat Connect website, the Northeast Energy Efficiency Partnership (NEEP) sizing and design visualization tool, eight sales and technical training short videos with more in production, summary sales sheets for NYS Clean Heat incentives by utility, promotional materials for NYSERDA’s Workforce Development and Cooperative Advertising and Training programs, IRA 25C tax rebates, and more. At least 300 HVAC contractors have been influenced by drawing from these resources across multiple categories including program guidance, marketing, business development support, technical training, and support, which has begun to shift attitudes toward the importance of quality heat pump installations.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	2,713,339	1,600,089	59%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	-	-	-

**Activities Summary**

Activity	Activity #
<p>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.</p> <ul style="list-style-type: none"> <li>• Conduct regional roundtables with distributors, vendors, and OEMs to define and describe the value proposition to the market through “value maps” and “market maps.”</li> <li>o 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.</li> <li>o 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.</li> <li>• 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.</li> <li>• Provide business development support and technical resources to help companies transition to building electrification solutions, focusing first on larger HVAC companies (25+ employees).</li> <li>• 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.</li> <li>• 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.</li> </ul>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Establish a network of trade allies.	2021	A framework for the Upstream Partners network has been created and outreach has begun. Recruitment and on-boarding started in Q3 2021. Actual launch of network occurred in Q1 2022.	Complete	2022	1
Launch Business Support tools and tactics to the marketplace to provide business development support and technical resources.	2021	Clean Heat Connect launched in January 2022 and has developed and launched 15 market intervention tools and resources, including over 30 individual contractor support pieces.	Complete	2022	1
Conduct market insight research including supply chain actor roundtables and develop a market map identifying key intervention points.	2021	HVAC supply chain market map completed in early 2022 based on roundtable efforts in 2021. Additional supply chain roundtables will occur in relation to geothermal contractors and the building envelope market.	Complete	2022	1
Develop and deploy strategic intervention workplan, informed by market map and insights research.	2022	Based on market insights work, the Clean Heat Connect and Experience Clean Heat interventions were developed and underway in 2022. Experience Clean Heat will launch in the market in early 2023.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Businesses provided with tools, technical support, and business development assistance (baseline = 0).	50	75	300	125	150	200	1
Output: Count of demonstration sites in the Experience Clean Heat initiative (baseline = 0).	0	0	0	30	65	115	1
Output: Count of partners signed on to participate in the Clean Heat Connect program (baseline = 0).	10	10	15	10	15	20	1
Output: Increase in consumer confidence that heat pumps deliver benefits (baseline = TBD).	TBD	TBD	N/A	TBD	TBD	TBD	1
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%).	61%	70%	N/A	75%	85%	90%	1
Outcome: Increase stocking of heat pumps above HARDI 2019 shipments (baseline = 0).	0%	20%	37%	30%	40%	50%	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start					End							
EXP			Start								End				

**Summary of Performance and Future Plans**

The Pay for Performance initiatives developed the necessary collaboration framework and platform to support initial pilots, including engaging aggregators and launching into both residential and commercial markets. Market developments and challenges in rolling out these pilots, however, led NYSERDA and its partners to conclude that the program should not be continued, a status represented in the CIP filed February of 2023. Unspent funds will be redirected to the residential and commercial programs to support other activities.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	1,084,249	880,553	81%
Total Energy Savings, Annual (MMBtu eq.)	2,223	-	0%
Electricity Savings, Annual (MWh)	23	-	0%
Natural Gas Savings, Annual (MMBtu)	2,146	-	0%
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	365,000	-	0%

**Activities Summary**

Activity	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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Launch residential sector pilot with National Grid.	2022	The residential sector pilot was launched to the public in April 2022.	Complete	2022	1
Support PSEG LI in release of their procurement effort for portfolio manager(s) for P4P pilot.	2021	With support from NYSERDA, PSEG LI issued an RFP for portfolio managers for a Long Island-based P4P pilot in Feb 2022.	Complete	2022	1
Provide technical and platform support for PSEG LI to launch their P4P pilot.	2021	PSEGLI did not receive any proposals through their P4P RFP and decided not to continue pursuing a P4P pilot.	Cancelled		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of datasets published in OpenNY (baseline = 0).	-	-	0	1	-	-	1
Output: Number of participating aggregators (baseline = 0).	-	1	1	-	-	-	1
Output: Total number of projects implemented in residential sector (baseline = 0).	-	50	0	300	600	1,000	1
Outcome: Number of additional market actors involved in P4P pilot (non-aggregator involvement such as financial institutions, subcontractors, etc) (baseline = 0).	0	4	0	10	-	-	1
Outcome: Number of utilities committed to offering P4P programs post pilot (baseline = 0).	-	-	0	-	1	-	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start									End			

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	13,394,526	12,373,370	92%
Total Energy Savings, Annual (MMBtu eq.)	132,695	152,180	115%
Electricity Savings, Annual (MWh)	5,147	4,370	85%
Natural Gas Savings, Annual (MMBtu)	90,967	110,294	121%
Other Fuel Savings, Annual (MMBtu)	26,762	29,275	109%
Renewable Energy Generation, Annual (MWh)	-	65	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	23,306,978	24,966,947	107%

**Summary of Performance and Future Plans**

The pace of budget commitments and associated impact metrics continued to grow in 2022. The Comfort Home Pilot program doubled the number of project completion in 2022 over prior years. The Residential Energy Assessment Program added 40 new participating companies to complete assessments in later 2022, putting the program in a position to grow the number of homes served with energy assessments in 2023. NYSERDA continues to invest in strategies to allow for low- or no-touch customer engagement and electrification-focused home assessments. In Summer 2022, NYSERDA amended its energy assessment report and process to have a more dedicated focus on heat pump recommendations. In addition, two remote assessment pilots are in market with another 4-5 expected to launch in 2023. Findings from these pilots will inform larger consumer engagement activities in 2023. In addition, NYSERDA continues to work in broad support of the market. In 2022, more than 85,000 unique users interacted with the residential "Life Moments" campaign's website. Some examples of NYSERDA's 2022 work with the trade ally and upstream partner market include sponsoring the 2022 Clean Energy for Homes Conference, which brought in more than 400 attendees (the first in-person conference by the Building Performance Association since the COVID-pandemic), hosting quarterly meetings and dedicated working groups with the Residential Market Advisory Group, and growing the contractor base across all of the Single-Family Residential Programs.

**Activities Summary**

Activity	Activity #
<p>Consumer Awareness &amp; Education</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Funnel targeted customers via Life Moments campaign to 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.</li> <li>• Educate consumers on energy efficiency measures they can take regardless of fuel type to reduce energy consumption.</li> <li>• Test different means of providing consumers with clear, relevant, actionable information about the energy performance of their homes.</li> <li>• 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.</li> </ul>	<p>1</p>
<p>Energy Assessments</p> <ul style="list-style-type: none"> <li>• Support updated home energy audit practices through Green Jobs - Green New York audits, including field testing of remote and virtual audit strategies and deployment of electrification-focused audit 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>	<p>2</p>
<p>Market Support Tools &amp; Activities</p> <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>	<p>3</p>
<p>Comfort Home</p> <ul style="list-style-type: none"> <li>• Market and implement Comfort Home pilot to demonstrate standardized package offer and facilitate optimized heat pump equipment selection and design.</li> <li>• 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.</li> <li>• Provide contractor support to facilitate innovative service models using data-driven market segmentation, targeting, and streamlined sales processes.</li> <li>• Collaborate with utilities to align energy efficiency and heat pump programs and support rapid expansion and statewide deployment.</li> </ul>	<p>4</p>

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Relaunch Life Moments marketing campaign based on learning and findings of the 2021 campaign	2022	A new Life Moments campaign, focused on promoting participation within the Comfort Home Program's "seal and insulate" packages was launch in October 2022 and will be in market through March 31, 2023.	Complete	2022	1
Measure/Analyze assets, adjust to optimize campaign performance.	2021	NYSERDA's marketing firm completed detailed analysis of campaign performance which was used to develop the tactical strategy for the 2022 campaign. Areas for optimization were identified and deloyed.	Complete	2022	1
Deploy targeted consumer awareness digital outreach to drive participation in energy audits and Comfort Home pilot.	2022	Digital outreach in the form of paid search, social media Reels and advertisements were deployed. Comfort Home participants were the leading target market, with other customers directed to the audit program.	Complete	2022	1
Close out ratings pilot and develop and distribute resources supporting home energy ratings as part of home sales.	2022	The pilot is closed and evaluation efforts on participants that will be used to develop a final report is being finalized and expected to be completed by mid-2023.	Delayed		2

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Count of unique users who interact with NYSERDA's campaign websites each year (baseline = 0).	177,211	TBD	84,830	TBD	TBD	TBD	1
Output: Increase prospective air sealing and insulation package customers through Comfort Home (baseline = 2,051).	2,051	3,000	2,128	6,000	8,000	-	1
Outcome: Increase in percentage of consumers who favor heat pumps (baseline = 59%).	70%	TBD	N/A	TBD	TBD	TBD	1
Output: Count of participant companies providing assessments/audits (baseline = 0).	85	100	122	120	140	160	2
Output: Count of remote and onsite assessments/audits (baseline = 0).	3,208	7,700	5,400	18,700	38,700	61,200	2
Outcome: Increase in electrification and electrification-ready measure adoption rate for assessments and audits (baseline = TBD).	NA	TBD	N/A	TBD	TBD	TBD	2
Outcome: Increase in private investment in electrification-ready measures for audit projects (baseline = TBD).	NA	TBD	N/A	TBD	TBD	TBD	2
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	220	265	320	3
Output: Count of users who have engaged with resources whose development has been supported by NYSERDA (baseline = 0).	-	25	300	50	125	200	3
Outcome: Increase in contractor confidence that heat pumps and/or building electrification/decarbonization efforts deliver benefits (baseline = TBD).	-	TBD	N/A	TBD	TBD	TBD	3
Output: Count of Comfort home projects completed (baseline = 0).	630	2,130	1,447	5,130	7,815	-	4
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	1	5	6	6	4



<b>Cumulative Plan vs. Progress Thru 2022</b>	<b>Planned</b>	<b>Progress</b>	<b>% To Plan</b>
Budget Expenditures (\$)	23,532,771	23,528,344	100%
Total Energy Savings, Annual (MMBtu eq.)	224,665	158,943	71%
Electricity Savings, Annual (MWh)	4,687	4,064	87%
Natural Gas Savings, Annual (MMBtu)	156,862	93,263	59%
Other Fuel Savings, Annual (MMBtu)	102,158	102,157	100%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	87,348,846	87,348,846	100%

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM						Start			End						
EXP							Start			End					

**Cumulative Plan vs. Progress Thru 2022**

	Planned	Progress	% To Plan
Budget Expenditures (\$)	2,054,005	1,452,500	71%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	4,875,300	-	0%

**Summary of Performance and Future Plans**

This program fell behind its funding commitment plan early in 2022, but is back on schedule and expects that expenditures will follow suit. There are a few clarifications with respect to benefits reporting. First, progress is reported on a lag and will be updated for the second half of 2022 in early 2023. Second, there are barriers to reporting that NYSERDA is working to address. At various stages of development, NYSERDA's Innovation & Research portfolio supports companies across multiple CEF initiatives. NYSERDA is working on a solution that avoids duplicative reporting of benefits and will resume reporting of follow-on leveraged funding once in place.

**Activities Summary**

Activity	Activity #
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.	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards from competitive solicitation for program administrator	2021	The competitive solicitation for Program Administrator launched on April 7, 2021 and awards were made in 2021.	Complete	2021	1
At least \$2.5M in cost share due from the program administrator.	2021	The program administrator was selected in 2021 and collected in excess of \$2,500,000 during 2021.	Complete	2021	1
Issue awards from Fellowship partner solicitation that is released in 2021.	2022	NYSERDA anticipates that this milestone will be reached by Q3 2023 after contract delays in 2022.	Delayed		1
At least \$2.2M in external funding opportunities awarded by the program administrator.	2022	NYSERDA anticipates that this milestone will be reached by Q3 2023 after contract delays in 2022.	Delayed		1
At least 10 corporate partners secured as partners of the Carbontech Development Initiative.	2022	NSERDA anticipates that this milestone will be completed in Q2 2023.	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: New Awards Issued	-	9	2	18	27	36	1
Output: New Products Created	-	3	N/A	7	11	15	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start				End								
EXP			Start				End								

**Summary of Performance and Future Plans**

This program is moving at pace and made the majority of its planned commitments and expenditures in 2022.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	19,360,229	17,047,152	88%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	1,628,279	1,437,252	88%

**Activities Summary**

Activity	Activity #
<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>	1

***Milestones Summary***

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue awards from Ignition solicitation	2021	Awards were made during 2021.	Complete	2021	1

***Outputs and Outcomes Summary***

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Companies engaged	141	508	400	-	-	-	1
Outcome: Customer Agreements Executed	-	-	5,304	36	40	44	1
Outcome: Investor Agreements Executed	-	6	95	8	22	24	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start									End				
EXP		Start									End				

**Summary of Performance and Future Plans**

NYSERDA added funding to this initiative in 2022. Expenditures were on pace with forecasts for the year and the program has exceeded expectations for leveraged funding, primarily due to a lag in reporting of progress across projects from the previous year, and due to greater than anticipated investment being reported.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	28,806,770	30,694,074	107%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	884,108,838	1,731,926,882	196%

**Activities Summary**

Activity	Activity #
<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>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Extend existing Incubator contracts through 2022	2021	Contracts were successfully extended.	Complete	2021	1
Startups accepted into the first Corporate Challenge cohort	2021	Both active corporate challenges accepted their respective 1st cohorts.	Complete	2021	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Businesses formed as result of Corporate Challenges	10	40	23	-	-	-	1
Output: Companies engaged	143	175	332	225	260	285	1
Output: Companies graduated from Incubators	12	23	52	28	33	38	1
Output: Corporate parties engaged through Corporate Challenges	-	5	102	5	15	20	1
Output: Teams engaged through Corporate Challenges	2	57	65	82	92	122	1
Outcome: Corporate and Strategic Partnerships Formed	10	20	579	42	65	69	1
Outcome: Customer Agreements Executed	5	30	5,304	51	77	103	1
Outcome: Demonstration Projects Completed	4	15	10	24	38	50	1
Outcome: Investor Agreements Executed	20	67	95	100	132	160	1
Outcome: Products Commercialized	25	50	180	75	105	135	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start						End						
EXP			Start						End						

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

Expenditures for this program are on track. There are a few clarifications with respect to benefits reporting. First, progress is reported on a lag and will be updated for the second half of 2022 in early 2023. Second, there are barriers to reporting that NYSERDA is working to address. At various stages of development, NYSERDA's Innovation & Research portfolio supports companies across multiple CEF initiatives. NYSERDA is working on a solution that avoids duplicative reporting of benefits and will resume reporting of follow-on leveraged funding once in place. NYSERDA is currently planning to release a new solicitation for one of the key projects within this initiative which will increase spending in 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	7,107,930	7,139,736	100%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	44,429,000	1,425	0%

**Activities Summary**

Activity	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>	1



**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue Awards for Innovation Advisors	2021	Solicitation launched and applications received. Three awards were made in Q1 2021.	Complete	2021	1
Issue Awards for Innovation Advisors	2022	This program has exhausted funding and no longer anticipates any new awards.	Cancelled		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Companies engaged	52	130	450	150	175	225	1
Output: Innovation Advisors deployed (baseline = 3).	7	19	4	-	-	-	1
Outcome: Corporate and Strategic Partnerships Formed	5	10	579	15	20	25	1
Outcome: Customer Agreements Executed	10	20	530	30	40	50	1
Outcome: Demonstration Projects Completed	5	10	0	15	20	25	1
Outcome: Investor Agreements Executed	10	20	95	30	40	50	1
Outcome: Products Commercialized	2	4	180	6	8	10	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start							End						
EXP		Start							End						

**Summary of Performance and Future Plans**

This program is performing well and spending faster than expected due to a new grant program created under the M-Corps initiative.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	8,438,953	12,226,554	145%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	61,624,600	272,831,235	443%

**Activities Summary**

Activity	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.	1

*There are currently no milestones to report.*

***Outputs and Outcomes Summary***

<b>Indicators</b>	<b>2021 Target</b>	<b>2022 Target</b>	<b>Progress as of 12/31/2022</b>	<b>2023 Target</b>	<b>2024 Target</b>	<b>2025 Target</b>	<b>Activity #</b>
Output: Manufacturing agreements signed between startups and manufacturers	24	24	268	66	75	80	1
Output: Manufacturing strategies developed for cleantech products	24	24	69	66	-	-	1
Outcome: Agreements to invest in climatetech startup companies signed (baseline = 70).	-	-	5	14	20	25	1
Outcome: Climatetech products manufactured total (baseline = 221).	24	24	41	66	68	70	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

		Committed (COM), Expended (EXP)													
Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start												End
EXP			Start												End

**Summary of Performance and Future Plans**

This program finished moderately below plan for expenditures through 2022. There are a few clarifications with respect to benefits reporting. First, progress is reported on a lag and will be updated for the second half of 2022 in early 2023. Second, there are barriers to reporting that NYSERDA is working to address. At various stages of development, NYSERDA's Innovation & Research portfolio supports companies across multiple CEF initiatives. NYSERDA is working on a solution that avoids duplicative reporting of benefits and will resume reporting of follow-on leveraged funding once in place.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	7,317,274	6,029,286	82%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	70,682,029	5,748,703	8%

**Activities Summary**

Activity	Activity #
<p>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.</p> <ul style="list-style-type: none"> <li>• NYSERDA will solicit proposals from companies with novel business models (NBM) and offerings. These will be evaluated competitively with multiple opportunities per year.</li> <li>• 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.</li> <li>• 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.</li> </ul>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Issue second solicitation under this initiative	2021	The second solicitation under Novel Business Models and Offerings, Insurance Innovation for Climate Technology Solutions (PON 5163) was issued 9/1/2022.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of companies supported (baseline = 0).	16	33	14	35	-	-	1
Output: Number of validation and scaling projects completed (baseline = 0).	14	46	8	49	-	-	1
Output: Number of validation and scaling projects initiated	-	46	11	-	-	-	1
Outcome: Number of new business models successfully scaled by supported companies (baseline = 0).	4	8	5	11	-	-	1
Outcome: Number of new business relationships formed with utilities by supported companies (baseline = 0).	2	6	0	-	-	-	1
Outcome: Number of supported companies raising additional capital (baseline = 0).	-	11	8	14	-	-	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM		Start					End								
EXP		Start					End								



**Summary of Performance and Future Plans**

CEF funding for this initiative has been fully committed and all rebates have been paid out as of Q1 2021. A verified gross savings analysis reduced energy performance from the gross values reported. This reduction is attributed to lower vehicle miles traveled as compared to the program assumptions. An initial assessment of indirect benefits was completed on EV-Rebates. However, given the ongoing presence of rebates through RGGI funding, no indirect savings were estimated as part of this study. Evaluation studies will continue to assess indirect impacts going forward.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	39,500,000	39,364,501	100%
Total Energy Savings, Annual (MMBtu eq.)	1,240,428	893,449	72%
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	1,527,271	1,099,973	72%
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	859,110,000	859,110,000	100%

There are currently no milestones to report.

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: % of rebate recipients completing follow-up surveys (baseline = N/A).	-	25%	22%	-	-	-	N/A
Output: Number of rebates issued (baseline = N/A).	-	46,000	86,281	-	-	-	N/A
Outcome: EV market share (EV sales as a percentage of total car sales in NYS (baseline = 0.60%).	-	5%	6%	-	-	-	N/A
Outcome: Number of EVs registered in NYS (baseline = 16,131).	-	150,000	127,763	-	-	-	N/A

**Table Notes**

- Targets and Progress for "Number of rebates issued" includes non-CEF funding.

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM							Start	End							
EXP							Start	End							

Committed (COM), Expended (EXP)

**Summary of Performance and Future Plans**

This initiative was approved in mid-2022. The program activities are currently under development and will be launched in Q2 2023.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	435,000	-	0%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	900,000	-	0%

**Activities Summary**

Activity	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. <ul style="list-style-type: none"> <li>• Initiate Level 2 EVSE rebate program targeting workplace, MUD, and public DAC charging stations</li> <li>• Create accompanying incentive system for rebate recipients that take additional steps to promote EVs among their employees and tenants</li> <li>• 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</li> </ul>	1



**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Launch EV charging and engagement incentive program.	2022	This program is currently under development and expected to launch in Q2 2023	Delayed		1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of employers and MUDs completing EV outreach actions (baseline = 0).	-	-	N/A	20	60	100	1
Output: Number of Level 2 charging stations installed through program (baseline = 0).	-	-	N/A	600	1,500	3,000	1
Outcome: Charging stations installed in NYS (2022 baseline = 9,300).	-	-	N/A	12,500	-	25,000	1
Outcome: Verified new EVs purchased by employees and tenants of participating entities (baseline = 0).	-	-	N/A	400	2,000	5,000	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM	Start						End								
EXP	Start											End			



**Summary of Performance and Future Plans**

While progress of expenditures and gross reported energy savings finished the year below plan, verified gross savings have propelled the initiative to achieve the target energy savings for 2022. There were four solicitation due dates in 2022. Eighteen projects were completed in the final quarter, while another four projects are expected to be completed in Q1 2023. Market and impact evaluations were completed for this initiative in Q3 2022. Realization rates were high and indirect impacts were assessed; both have been incorporated into reporting. An update to these evaluation studies is in development now. The program produced five sector-specific Fact Sheets that included case studies, and NYSERDA engaged consultants to focus on outreach and education related to building O&M training opportunities and the value proposition to property owners/managers to spur program participation moving forward. While the evaluated performance and efficiency of building systems outcome is tracking lower than target, the projects included in the analysis experienced COVID-related disruptions during their training delivery. The number of workers trained is tracking behind target, impacted by the total number of operators at participating buildings who can benefit from the training being lower than originally anticipated.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	12,108,136	10,719,151	89%
Total Energy Savings, Annual (MMBtu eq.)	1,112,460	1,065,868	96%
Electricity Savings, Annual (MWh)	89,829	94,119	105%
Natural Gas Savings, Annual (MMBtu)	805,964	690,893	86%
Other Fuel Savings, Annual (MMBtu)	-	53,840	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	7,259,576	7,030,054	97%

**Activities Summary**

Activity	Activity #
<p>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.</p> <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.</li> </ul> <p>Activities will be tailored to the various sectors that can benefit from the results and lessons learned.</p>	1

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Continue to promote and offer competitive solicitations annually.	2021	There were four due dates for PON 3715 in 2021 (2/25/21, 5/20/21, 8/19/21, 11/18/21)	Complete	2021	1
Continue to promote and offer competitive solicitations annually.	2022	There were 4 Due Dates for PON 3715 in 20212 (5/19/22, 8/18/22, 9/22/22, 11/16/22)	Complete	2022	1
Develop and distribute 4-5 case studies annually.	2021	NYSERDA published and distributed four case studies of Building O&M Training Projects in 2021.	Complete	2021	1
Develop and distribute 4-5 case studies annually.	2022	NYSERDA published five updated sector-specific Fact Sheets for the Building O&M Training Program in 2022 that included condensed sector-specific case studies.	Complete	2022	1
Execute a contract to develop and implement an outreach and education strategy that will be implemented over 24-30 months.	2022	NYSERDA engaged two consultants focusing on outreach and education related to building O&M training opportunities, the value proposition to property owners and managers, etc.	Complete	2022	1

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Increase in % of trainees obtaining certifications (baseline = 15%).	20%	22%	14%. 488 certifications total	25%	28%	30%	1
Output: Increase in number of workers trained (electrification target in parenthesis) (baseline = 20).	3,000 (0)	5,000 (100)	3,553 (0)	6,500 (250)	7,500 (400)	9,600 (1,000)	1
Outcome: Improve performance and efficiency of building systems (baseline = 0).	5%	5%	2.9%	5%	7%	-	1
Outcome: Increase number of organizations developing new curricula (baseline = 370 organizations).	380	392	833	408	426	446	1
Outcome: Increase number of staff qualified to train others (baseline = 4,322).	4,382	4,482	4,322	4,622	4,792	4,992	1
Outcome: Square footage of buildings whose owners invest in training infrastructure without NYSERDA funding (baseline = 0 SF).	-	-	6M	-	-	125M	1

**Performance Summary**

**Expected Timeline Of Funding Deployment**

Committed (COM), Expended (EXP)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM			Start								End				
EXP			Start									End			

**Summary of Performance and Future Plans**

Talent Pipeline commitments, expenditures, and uptake in terms of number of participants are all ahead of program plan. Overall program participants total nearly 20,000 trainees to date, so the initiative is nearly 2/3 of the way to the total training participant goal. In 2022, three rounds of the Energy Efficiency and Clean Technology Training PON and one round of the Career Pathways for High Efficiency HVAC and Heat Pump PON resulted in 7 new training project awards. NYSERDA relaunched the Offshore Wind Training program offering. Both the On-the-Job Training Program and Clean Energy Internship Program maintain steady participation and have reached full subscription for the non-building electrification funding category. NYSERDA completed stakeholder engagement for an update to the Climate Justice Fellowship program which launched Q1 2023. Other funding initiatives, such as Building Electrification webinar and training on district heat pumps were well attended. Overall outcomes and outputs for this initiative generally meet or exceed plan for 2022 targets.

Cumulative Plan vs. Progress Thru 2022	Planned	Progress	% To Plan
Budget Expenditures (\$)	23,413,095	24,994,367	107%
Total Energy Savings, Annual (MMBtu eq.)	-	-	-
Electricity Savings, Annual (MWh)	-	-	-
Natural Gas Savings, Annual (MMBtu)	-	-	-
Other Fuel Savings, Annual (MMBtu)	-	-	-
Renewable Energy Generation, Annual (MWh)	-	-	-
Renewable Energy Capacity (MW)	-	-	-
Leveraged Funds (\$)	22,851,950	21,578,554	94%

**Activities Summary**

Activity	Activity #
Continue to administer and market the On-the-Job Training Program on an open enrollment basis.	1
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.	2
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.	3
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.	4

**Milestones Summary**

Milestone	Planned	Explanation of Progress	Status	Completed	Activity #
Promote and offer the open enrollment program annually through 2025.	2021	Clean Energy Internship and On-the-Job Training solicitations were promoted and offered throughout 2021.	Complete	2021	1
Promote and offer the open enrollment program annually through 2025.	2022	Clean Energy Internship and On-the-Job Training solicitations were promoted and offered throughout 2022.	Complete	2022	1
Release due date solicitations and associated awards for the Fellowship Program.	2021	The 1st due date for the Climate Justice Fellowship Program was 10/28/21, and four awarded projects were contracted in 2021.	Complete	2021	2
Release due date solicitations and associated awards for the Fellowship Program.	2022	The 2nd due date for the Climate Justice Fellowship Program was 1/31/22, and 12 awarded projects were contracted in 2022.	Complete	2022	2
Release competitive solicitations and award contracts to train existing workers and address training gaps in the market.	2021	Solicitation Due Dates for training of existing workers in 2021 included: PON 3981 (01/14/2021, 05/03/2021, 10/13/2021) and PON 4595 (03/16/2021). Total projects contracted in 2021 = 17 (projects train new workers, existing workers, or both).	Complete	2021	3
Release competitive solicitations and award contracts to train existing workers and address training gaps in the market.	2022	Solicitation Due Dates for training of existing workers in 2022 included: PON 3981 (03/10/2022, 07/26/2022, 10/27/2022). Total projects contracted in 2022 = 10 (training new or existing workers, or both).	Complete	2022	3
Release competitive solicitations & award contracts to train new workers.	2021	Due Dates for training of new workers in 2021 included: PON 3981 (01/14/2021, 05/03/2021, 10/13/2021); PON 4463 (05/25/2021, 10/06/2021), and PON 4595 (03/16/2021). Total projects contracted in 2021 = 17 (training new or existing workers, or both).	Complete	2021	4
Release competitive solicitations & award contracts to train new workers.	2022	Solicitation Due Dates for training of existing workers in 2022 included: PON 3981 (03/10/2022, 07/26/2022, 10/27/2022). Total projects contracted in 2022 = 10 (training new or existing workers, or both).	Complete	2022	4

**Outputs and Outcomes Summary**

Indicators	2021 Target	2022 Target	Progress as of 12/31/2022	2023 Target	2024 Target	2025 Target	Activity #
Output: Number of New Hires (electrification target in parentheses) (baseline = 0).	650 (170)	900 (250)	1,044 (417)	1,100 (350)	1,400 (450)	1,700 (600)	1
Outcome: Percent reduced cost to recruit and hire new workers (baseline = 0%).	30%	30%	0%	30%	30%	30%	1
Outcome: Percent reduced time for workers to reach full productivity (baseline = 19%).	20%	20%	19%	20%	20%	20%	1
Output: Number of Interns and Fellows (electrification target in parenthesis) (baseline = 0).	1,050 (18)	1,200 (100)	1,206 (71)	1,350 (200)	1,600 (350)	2,000 (500)	2
Output: Number of existing workers upskilled (electrification target in parenthesis) (baseline = 0).	3,440 (1,200)	7,000 (2,200)	15,516 (5,552)	10,000 (3,500)	13,000 (6,000)	16,000 (8,000)	3
Output: Number of new curriculum developed, or curriculum modified	55	60	76	70	75	-	3
Output: Number of trainers trained	83	90	154	100	110	120	3
Outcome: Number of new business and training provider partnerships created (baseline = 60).	50	65	60	75	85	90	3
Output: number of individuals trained for new job placements (electrification target in parenthesis) (baseline = 0).	925 (120)	2,200 (600)	2,314 (1,049)	4,000 (1,200)	6,000 (2,000)	9,000 (3,000)	4
Output: Number of new curriculum developed, or curriculum modified	55	60	89	70	75	-	4
Output: Number of students placed in internships by training providers (baseline = 0).	128 (0)	300 (75)	277 (25)	400 (150)	500 (225)	600 (300)	4
Outcome: Number of new business and training provider partnerships created (baseline = 60).	50	65	60	75	85	90	4

## **Appendix B. Service Territory Report**

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The Annual Service Territory Report, a new requirement for NYSERDA beginning with the 2021 Annual Report, utilizes data on location-specific projects reported to date to estimate NYSERDA's program impact by Utility service territory. The tables that follow provide estimated impacts with respect to the unique electric and gas service territory combinations found across NYSERDA projects. Investments considered statewide in nature (not specific to any utility territory) are reported as such. Additional analysis of NY Green Bank data is required before NYSERDA can draw conclusions on service territory impacts, therefore it is not included in this report.

**Table 1. Market Development and Innovation & Research Portfolio Distribution**

Table notes that provide additional information about the contents of this report can be found on the next page.

Electric Utility Service Territory	Gas Utility Service Territory	Expenditures		Electricity Savings Annual MWh		Electricity Usage Annual MWh		Natural Gas Savings Annual MMBtu		Natural Gas Usage Annual MMBtu		Other Fuel Savings Annual MMBtu		Other Fuel Usage Annual MMBtu	
		Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022
<b>Market Development Program Expenditures &amp; Direct Benefits</b>															
Central Hudson	Central Hudson	\$ 1.52	\$ 27.14	4,308	57,115	(918)	(6,980)	24,602	180,133	(428)	(10,535)	5,595	111,967	-	(622)
	National Grid	\$ 0.02	\$ 0.09	-	35	(31)	(26)	171	442	-	(197)	98	598	-	-
	NYSEG	\$ -	\$ 0.08	-	32	-	(42)	-	-	-	-	-	1,165	-	-
	Other/None	\$ 2.82	\$ 13.04	379	6,293	(2,024)	(2,174)	30,502	57,714	(119)	(3,480)	10,653	44,315	(4)	(955)
Sub-totals		\$ 4.37	\$ 40.34	4,687	63,474	(2,974)	(9,223)	55,274	238,289	(548)	(14,213)	16,346	158,045	(4)	(1,577)
Con Edison	Con Edison	\$ 32.41	\$ 138.15	176,700	472,832	(329)	(26,092)	482,428	1,283,893	(150,459)	(548,807)	348,971	592,637	(3)	(284)
	National Grid - NYC	\$ 16.71	\$ 68.43	16,318	125,096	(313)	(12,382)	109,424	373,784	(4,836)	(26,118)	31,768	170,562	-	-
	Other/None	\$ 8.77	\$ 41.33	11,384	155,640	(5)	(687)	32,460	123,376	(1,733)	(421,544)	31,722	60,725	-	(186)
Sub-totals		\$ 57.89	\$ 247.91	204,402	753,568	(647)	(39,160)	624,312	1,781,053	(157,027)	(996,468)	412,461	823,924	(3)	(470)
National Grid	National Grid	\$ 45.58	\$ 164.68	63,959	274,505	(2,061)	(17,041)	208,716	1,866,758	(44,126)	(77,041)	31,441	402,476	(810)	(8,921)
	NFG	\$ 15.08	\$ 53.73	16,569	117,858	(57)	(5,258)	103,196	429,237	(700)	(5,522)	8,553	195,390	(45)	(951)
	NYSEG	\$ 1.20	\$ 8.17	3,164	12,655	(157)	(768)	30,110	61,287	(227)	(5,799)	5,799	21,633	(43)	(1,541)
	RG&E	\$ 1.88	\$ 8.38	5,791	7,340	(10)	(792)	27,276	50,123	-	(1,529)	2,172	19,798	(98)	(2,186)
	Central Hudson	\$ -	\$ 0.10	-	-	-	(35)	-	-	-	-	-	531	-	-
	Other/None	\$ 12.45	\$ 64.66	10,677	39,301	(683)	(4,203)	6,910	269,415	(370)	(6,090)	76,927	270,943	(411)	(22,208)
Sub-totals		\$ 76.18	\$ 299.73	100,160	451,660	(2,968)	(28,097)	376,207	2,676,820	(45,424)	(95,981)	124,892	910,770	(1,407)	(35,807)
NYSEG	NYSEG	\$ 11.08	\$ 71.82	6,587	91,862	(4,268)	(8,746)	122,565	710,008	(629)	(67,267)	27,734	191,808	(289)	(7,090)
	Central Hudson	\$ 0.04	\$ 0.81	-	1,265	-	(386)	-	3,197	-	-	-	9,516	-	(18)
	Con Edison	\$ 0.00	\$ 1.49	10	2,666	(16)	(924)	191	5,415	-	(4,292)	-	19,433	-	(7)
	National Grid	\$ 0.35	\$ 1.57	142	2,145	-	(449)	252	8,952	-	(94)	462	9,786	-	(57)
	NFG	\$ 1.01	\$ 11.09	950	10,611	(10)	(1,938)	7,191	129,977	(257)	(721)	6,851	40,244	-	(538)
	RG&E	\$ 0.25	\$ 1.22	346	728	-	(84)	2,306	5,235	-	(403)	1,731	4,360	-	(134)
	Other/None	\$ 11.78	\$ 58.67	8,040	53,070	(3,897)	(5,718)	19,844	1,239,607	-	(2,726)	78,505	224,967	(387)	(9,009)
Sub-totals		\$ 24.51	\$ 146.67	16,075	162,346	(8,191)	(18,245)	152,347	2,102,391	(886)	(75,502)	115,283	500,114	(676)	(16,853)
O&R	O&R	\$ 18.22	\$ 37.02	9,182	34,808	(37)	(3,522)	22,060	94,017	(20)	(3,849)	2,623	59,498	-	(135)
	NYSEG	\$ 0.45	\$ 0.90	2,336	2,825	-	(192)	108	4,343	(9,500)	(7,456)	-	2,940	-	(85)
	Central Hudson	\$ 0.06	\$ 0.43	180	817	-	(1,072)	122	5,617	-	(1)	72	10,896	-	-
	Other/None	\$ 5.17	\$ 10.33	83	836	-	(205)	155	3,055	-	(102)	3,962	9,200	-	(20)
Sub-totals		\$ 23.89	\$ 48.69	11,781	39,285	(37)	(4,991)	22,445	107,032	(9,520)	(11,408)	6,658	82,535	-	(240)
RG&E	RG&E	\$ 22.62	\$ 126.58	13,707	157,715	(1,696)	(8,777)	207,822	1,103,048	(1,049)	(7,196,390)	21,376	9,892,275	(172)	(3,200)
	NYSEG	\$ 0.65	\$ 4.54	2,816	13,075	(5)	(304)	1,738	19,671	(187)	(445)	715	7,115	(135)	(855)
	NFG	\$ 0.07	\$ 1.02	12	607	(42)	(226)	51	2,409	(1)	(67)	348	5,262	-	(551)
	Other/None	\$ 1.31	\$ 7.18	81	2,822	(73)	(348)	390	5,419	-	(2,284)	11,574	28,849	-	(2,363)
Sub-totals		\$ 24.65	\$ 139.32	16,616	174,218	(1,816)	(9,655)	210,001	1,130,548	(1,238)	(7,199,186)	34,013	9,933,502	(307)	(6,969)
Utility Totals		\$ 211.49	\$ 922.66	353,721	1,644,551	(16,632)	(109,372)	1,440,586	8,036,133	(214,643)	(8,392,757)	709,652	12,408,890	(2,398)	(61,916)
Market Development Statewide Program Expenditures <sup>1</sup>		\$ 14.20	\$ 65.67	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Innovation and Research Statewide Program Expenditures <sup>2</sup>		\$ 52.90	\$ 200.74	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Admin, Evaluation and Cost Recovery Fee		\$ 38.12	\$ 205.45	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>Grand Totals</b>		<b>\$ 316.71</b>	<b>\$ 1,394.52</b>	<b>353,721</b>	<b>1,644,551</b>	<b>(16,632)</b>	<b>(109,372)</b>	<b>1,440,586</b>	<b>8,036,133</b>	<b>(214,643)</b>	<b>(8,392,757)</b>	<b>709,652</b>	<b>12,408,890</b>	<b>(2,398)</b>	<b>(61,916)</b>



**Table 1 Notes**

- a. The data presented in this table reflects reported expenditures and acquired *direct* energy impacts through the end of the reporting period, December 31, 2022.
- b. NYSERDA reports acquired benefits in Market Development and can directly attribute a significant portion of these reported benefits to specific locations. Benefits that cannot be pinpointed are reported consistent with the distribution of projects that can be. Similarly, not all program costs are project-specific, however all funding is distributed consistent with the project-specific spend.
- c. Progress reported here is a blend of verified gross and gross savings. Where studies have been completed and yield realization rates, verified gross acquired savings are reported. Where studies are not complete, those initiatives and/or time periods will continue reporting gross savings.
- d. Verified gross savings included in this report have been based on the program-level realization rates, and not derived from realization rates specific to utility territories. Evaluation of verified gross savings, and therefore any associated sampling, is generally done at the statewide program level. The resultant realization rate is meant to be applied and is assessed for its statistical confidence/precision at the program level. For the purposes of this territory report, realization rates are applied to each territory equally.
- e. Statewide expenditures in Market Development reflect initiatives that are statewide in nature and have no direct energy savings, including: Clean Energy Siting and Soft Cost Reduction, Code to Zero, Information Products and Brokering, Market Characterization, Offshore Wind Master Plan, Offshore Wind Pre-development Activities, ORES Support, Product Standards, and REV Connect.
- f. All Innovation & Research investments are characterized as “statewide” for the purposes of this report considering the vast majority of investments cannot easily be pinpointed to a particular territory, rather they are intended to drive advancement of technologies and business models that can have broad, statewide impacts as they flourish.

**Table 2. NY-Sun Portfolio Distribution**

Electric Utility Service Territory	Expenditures		Installed Capacity MW	
	Incremental 2022	Cumulative Thru 2022	Incremental 2022	Cumulative Thru 2022
Central Hudson	\$ 25.7	\$ 97.9	80.9	317.3
Con Edison	\$ 29.8	\$ 171.7	90.9	556.1
National Grid	\$ 70.9	\$ 294.4	309.5	953.8
NYSEG	\$ 33.3	\$ 187.7	141.8	608.0
O&R	\$ 11.1	\$ 60.0	37.9	194.2
RG&E	\$ 9.5	\$ 45.9	60.9	148.7
Administration, Evaluation & Cost Recovery Fee	\$ 3.4	\$ 21.7	n/a	n/a
<b>NY-Sun Totals</b>	<b>\$ 183.7</b>	<b>\$ 879.3</b>	<b>721.8</b>	<b>2778.1</b>

**Table 2 Notes**

- a. This table includes only investments and installed capacity resulting from CEF NY-Sun investments.

## **Appendix C. Evaluation, Measurement and Verification**

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In accordance with CE-05: Evaluation, Measurement, & Verification (EM&V) Guidance, NYSERDA is required to file all final EM&V Reports in the Document Matter Management system. This section will include a compilation of the high-level summaries of the EM&V Reports filed within the reporting period.

## Evaluation, Measurement, and Verification Summary

During 2022, 13 studies were finalized and summarized in CEF quarterly reports as listed in the table below by quarter. These study summaries are reproduced in the sections below. In addition, in the Q3 2022 CEF report, NYSERDA undertook an update to report recommendations deemed “pending”. A summary of recommendation updates from that Q3 2022 review follows the quarterly report summaries.

**Table 1. Evaluations Completed by Quarter 2022**

Quarter	Evaluated Program	Evaluation type	Evaluated program year(s)
Q1 2022	<i>No studies completed</i>		
Q2 2022	Real Estate Tenant	Impact	2016 Q1 - 2020 Q4
	P-12 Schools	Impact	2019 Q2 – 2021 Q2
	REV Campus Challenge	Impact	2015 Q4 – 2020 Q1
	Energy Management Practices	Impact	2018 Q1 – 2020 Q1
	EmPower/Home Performance	Impact	2017 Q1 – 2019 Q1
	Clean Transportation Market and Impact Evaluation	Impact and Market	2017 Q1 – 2020 Q4
	Heat Pumps Phase 1	Impact	2017 Q1 – 2018 Q4
	Residential ccASHP Building Electrification Study	Impact	2020-2021
	Clean Energy Communities	Market	2018 Q1 – 2020 Q4
Q3 2022	Energy Efficiency and Beneficial Electrification Soft Cost	Market	2021
	Workforce Development Building Operations and Maintenance Partnerships and Talent Pipeline	Impact & Market	Impact: 2016–2021 Market: 2019–2021
	Strategic Energy Management/On-Site Energy Manager	Market	2021
Q4 2022	Codes and Standards for Carbon Neutral Buildings	Market	2022

For more information on the schedule of studies as they pertain to NYSERDA’s Market Development and Innovation and Research initiatives, please reference the Compiled Investment Plan or view reporting for historical periods to see past summaries both on NYSERDA’s website.

The latest Compiled Investment Plans:

<https://www.nysERDA.ny.gov/About/Funding/Clean-Energy-Fund/>

Clean Energy Fund Reports:

<https://www.nysERDA.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/Clean-Energy-Fund-Reports>

## Q2 2022

### Commercial Tenant Impact Evaluation (Q1 2016 Q1 - Q4 2020)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the Commercial Tenant Impact Evaluation include<sup>1</sup>:

Given the program intervention mainly provides audits/recommendations of measures that can be adopted in tenant spaces, the first question to address through the evaluation pertained to how these audits/recommendations were used. The evaluated estimate of the overall Measure Adoption Rate (MAR) for program kWh savings is 54% and for program MMBtu (all fuels) savings is 26%<sup>2</sup>. This is the “peak” of the cumulative MAR for which the evaluation collected sufficient data, through a self-report survey method, to reliably estimate MAR and is the value recommended for NYSERDA use in estimating impacts.

The evaluation discovered inaccuracies in some tenants’ responses to the MAR Survey, with on-site M&V finding that some of the measures that tenants reported installed were either not installed or were installed at lower numbers than the reported total. The on-site M&V also found that additional spaces had been completed after basic or generic audits. This necessitated a correction factor, or MAR adjustment factor, of 76%.

- **Recommendation:** Increase program recognition among participants: Many participants were only aware of contractor names and unaware of program participation, reducing linkage of measure installation as an impact of the program’s recommendation.
  - **NYSERDA Response to Recommendation:** Rejected. Program is closed. If NYSERDA should issue a similar program in the future, these will be considered.
- **Recommendation:** Participants reported a need to support tenants in implementing measure installation. Further study could identify opportunities for program support.
  - **NYSERDA Response to Recommendation:** Implemented. When eligible, tenants have been referred to relevant incentive programs for implementation of measures.

In general, program savings estimates were found to be reasonable estimates of savings. For installed measures in the Commercial Tenant Program, this evaluation found a VGS RR of 96% and 88% for program kWh and MMBtu savings, respectively. The first-year gross savings of 29,391,377 kWh, installed in 51,013,659 square feet of audited space, equates to 0.58 kWh per sq ft.

- **Recommendation:** Ensure careful examination of hours and load calculations, as well as submitted projects from auditors with known estimation issue histories.
  - **NYSERDA Response to Recommendation:** Implemented: Technical reviewers have been made aware of these issues, as well as auditors.

For a subset of impact evaluated tenant spaces for which baseline energy consumption was available, verified gross savings as a percent of standard baseline tenant space electric consumption was found to be 4.8%. Baseline energy consumption was available for tenant spaces representing 25% of estimated savings for recommended measures.

In aggregate, the evaluation found that the program is moderately increasing MMBtu usage due to HVAC interactive effects (net increase of 4,014 MMBtu), primarily with lighting upgrades. As a tenant space-focused program, there are limited opportunities to save MMBtu as the major MMBtu-using end uses (heating and water heating) tend to be central systems outside of tenant space control.

- **Recommendation:** The program could estimate MMBtu usage increases with a MMBtu/kWh factor from this evaluation.
  - **NYSERDA Response to Recommendation:** Rejected. Given the evaluation confirmed very low opportunity to effectuate MMBtu fuel savings in tenant spaces, and the likelihood that a minor amount of ancillary MMBtu usage may continue to offset any savings, NYSERDA has made a managerial decision not to report/forecast MMBtu savings for this program. The overall effect of this program on MMBtu is not material nor cost-effective to pursue with the degree of precision needed to include in reporting and forecasting of benefits.

## **P-12 Schools Impact Evaluation (2019 – Q2 2021)**

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the P-12 Schools Impact Evaluation include<sup>3</sup>:

This evaluation found a VGS RR of 68% and -26% for program kWh and MMBtu savings, respectively. The negative gas savings and associated RR are due to co-mingling of savings with usage due to HVAC interactive effects from lighting measures which represented the majority of the efficiency upgrades installed.<sup>4</sup> The contributing factors to the realization rates are as follows:

1. The program is still in its early days and the evaluated savings calculated reflect installations over 1-2 years. The program should expect to see operational assessment measure savings in 5-10 years.
  2. The COVID-19 pandemic diverted the participants' attention toward safety and compliance with new health regulations, as such, energy efficiency was not a priority.
  3. Evaluated savings are based on the in-depth interviews and the data available. This method risks that some measures were not captured (potential low savings bias).
  4. Overall, participants find the program highly valuable in helping to plan capital projects, identify savings opportunities, and monitor progress.
- **Recommendation:** The program should consider incentivizing schools to report installed energy efficiency projects.
    - **NYSERDA Response to Recommendation:** Rejected. The Program offer is closed. NYSERDA will consider whether funding is available to provide such an incentive in future similar offers.
  - **Recommendation:** The program should acquire permission from the customer and collect two years of pre-participation utility billing data at the time of enrollment.

- **NYSERDA Response to Recommendation:** Rejected. The Program offer is closed. NYSERDA will consider this in future similar offers.

The evaluated savings of 6,934,063 kWh equates to 0.18 kWh/sq.ft. and 39.5 kWh/student. This reflects current progress made by early program adopters since they've had more time to plan and execute projects. The majority of participants are currently planning larger capital projects. Savings from these projects were not captured in this evaluation cycle. The program reported energy savings by estimating energy savings per building for each participating school and district. More than 95% of savings stem from lighting measures. The other 5% consists of HVAC controls (set-points and setbacks), weatherization, and window replacements. For districts and schools for which baseline energy consumption was available, verified gross savings as a percent of standard baseline electric consumption was found to be 2.8%.

- **Recommendation:** The program should track operational assessment recommendations to allow for Measure Adoption Rate (MAR) calculations and a more accurate evaluation.
  - **NYSERDA Response to Recommendation:** Implemented. The Program tracks operational assessment results.
- **Recommendation:** Evaluations should include participants enrolled for at least two years prior to the impact evaluation.
  - **NYSERDA Response to Recommendation:** Implemented. Program will review participant counts and timeframes with the evaluation team prior to engaging in an evaluation, to ensure that when there is a relevant population to conduct a statistically significant and informative evaluation.

## **REV Campus Challenge Impact Evaluation – (Q4 2015 – Q1 2020)**

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the REV Campus Challenge Impact evaluation include<sup>5</sup>:

This evaluation finds a VGS RR of 204% and 230% for program kWh and MMBtu savings, respectively. The contributing factors to the realization rates are as follows:

Program reported savings do not have an explicitly defined timeframe and are a function of participation tier, not campus size. Larger projects, a higher level of influence, and a longer evaluation time frame than the program had assumed are likely drivers of the high realization rate.

Since this was an evaluation of verified gross savings, savings from respondents that did not definitively assert program influence on decisions were still 100% associated with the program (potential high-savings bias).

- **Recommendation:** The program should consider a per square foot or per baseline energy usage metric to scale program-reported savings more accurately.
  - **NYSERDA Response to Recommendation:** Pending. The Program will consider this approach.
- **Recommendation:** The program should consider acquiring permission from the customer and collecting two years of pre-participation utility billing data at the time of enrollment for campuses where this is feasible.
  - **NYSERDA Response to Recommendation:** Pending. The Program anticipates nine additional colleges signing up to join REV Campus Challenge. Given the possible program cost of a change in process and to participation, this action may not be feasible at this time. This recommendation will be considered for future endeavors of a similar nature.

For campuses for which baseline energy consumption was available, verified gross savings as a percent of standard baseline was found to be 2.6%, and 1.4% for electric (kWh) and all other fuels (MMBtu), respectively. Evaluated savings are based on in-depth interviews and other available data. This approach presents a risk that some measures were not captured.

- **Recommendation:** The program should consider incentivizing campuses to report installed energy efficiency measures.
  - **NYSERDA Response to Recommendation:** Rejected. The Program does not have available funds to incentive this. This recommendation will be considered for future endeavors of a similar nature.
- **Recommendation:** The program should consider collecting basic campus information upon sign-up such as baseline energy use, building area, and number of students.
  - **NYSERDA Response to Recommendation:** Pending. The Program has historically asked for energy usage information in its annual survey. While useful for qualitative assessment, this data point was not received for a sufficient number of participants and in a manner that would facilitate impact evaluation. The Program will consider collecting this data for the remaining nine members. This recommendation will also be considered for future endeavors of a similar nature.
- **Recommendation:** Questions focused on energy savings in market research surveys should be developed in tandem with impact evaluators.
  - **NYSERDA Response to Recommendation:** Implemented. Current and future evaluations contain more defined and robust teaming and collaboration requirements between Market and Impact evaluators.

- **Recommendation:** The program should consider adding a benchmarking component (within campuses and/or across campuses) to REV CC.
  - **NYSERDA Response to Recommendation:** Rejected. The Program does not have available funds to offer this for free. Benchmarking is currently available as part of an energy study on a cost-shared basis. This recommendation will be considered for future endeavors of a similar nature.

## **Energy Management Practices Impact Evaluation (Q1 2018 – Q1 2020)**

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings from the Energy Management Practices Impact evaluation include<sup>6</sup>:

The evaluation estimated a verified gross savings realization rate (VGS RR) of 103% for Strategic Energy Management (SEM) electric savings and 151% for On-site Energy Manager (OsEM). Together, the evaluation found the verified gross savings realization rate of 125% for the combined Energy Management Practices (EMP) programs. The verified savings relative to baseline were 4.4% for SEM electric impacts and 6.1% for OsEM electric impacts.

The Impact Evaluation Team found that 69% of the sampled SEM (non-Wastewater Energy Coaching) electric savings were included as part of OsEM program savings (representing 39% of the OsEM program electric savings). The savings are likely influenced by OsEM program interventions, based on the timing of the impacts and the measures implemented. However, upon reviewing projects in the pipeline as well as completed projects outside of the sample set, it was discovered that this was an isolated circumstance whose effects will likely diminish over the course of the multi-phase impact evaluation. Therefore, these gross savings were verified for both programs, understanding overlap is not addressed at a program level.

The evaluation estimated a VGS RR of 101% for SEM natural gas savings and a VGS RR of 104% for OsEM. Together, the Impact Evaluation Team found the verified gross savings realization rate of 103% for the combined EMP programs. The verified savings relative to baseline was 3.5% for SEM natural gas impacts and 3.4% for OsEM natural gas impacts.

Project-level realization rates varied considerably for both programs, but the differences balanced when aggregated. The Impact Evaluation Team reviewed results from similar SEM programs in other jurisdictions and found that the verified savings relative to sites' baselines ranged from 1% to 8% for electric savings and 1% to 7% for natural gas savings. Savings from NYSERDA's SEM program are comparable to these results.

The evaluation calculated unit energy benefits (UEB) to assist in the calculation of indirect benefits from the EMP initiative. The UEB is the annual energy savings per end user resulting from implementing SEM and OsEM measures. UEB for SEM was 1.6 GWh and over 7,000 MMBtu. UEB for OsEM was 5.6 GWh and over 18,600 MMBtu.

Key recommendations from the Energy Management Practices Impact Evaluation include:



## SEM

While the Impact Evaluation Team found the SEM program's verified gross savings realization rate to be 101%, there was significant variance in the overall project level realization rates. To help reduce variance and potential risk in future projects, the following recommendations are provided.

- Continue to refine and improve modeling best practices and procedures and use them consistently.
- Where possible, identify and track dates (start and end) of any non-routine events (NREs). This may require more frequent model updates during the participation periods. The Impact Evaluation Team identified several potential NREs in the data used for this program. However, site contacts could not identify or pin down these events due to the significant time lapse between the event and this evaluation, so the Impact Evaluation Team did not make any non-routine adjustments (NRAs). It is noteworthy that some of those NREs appeared to have a significant, often negative, impact on the site's energy consumption and verified gross savings values. Had the Implementation Team better tracked and documented NREs, the verified gross savings likely would have been higher.
- Include additional energy driver variables where they make sense.
- Heating degree days (HDD) and cooling degree days (CDD) often are improvements over average temperature. HDD and CDD better model the non-linear effects of heating and cooling systems.
- Watch for scheduling variables (e.g., holidays) that can make a large impact on model accuracy.
- Watch for independent variables that:
  - Extend beyond 10% (or three standard deviations) of the max/min values seen in the baseline period. These values are generally not considered valid in the post-period.<sup>7</sup>
  - Meet statistical thresholds but don't have fundamentally correct underpinnings (e.g., production variables with negative coefficients)
  - Natural gas and electric models should cover the same periods unless there is a good reason they cannot. The Impact Evaluation Team suggests documenting reasons for different natural gas and electric model periods.

The program should claim one year of savings starting after the participants modeling workshop.

- **NYSERDA Response to Recommendation:** Accepted. In the current SEM program offering, not all participants will be undergoing energy modeling. Further, tracking NREs will not be possible within the scope of the program. However, where possible, the program will continue to refine and improve modeling practices per the specific list of recommendations provided.
- Some improvements to model tracking and documentation would help improve the evaluation process.
  - Models kept on file should match the claimed savings – several models were updated, but these models were slightly different than what was provided.

Where possible, track dates of large project implementations to explain model slope changes.

- **NYSERDA Response to Recommendation:** Accepted. In the current SEM program, not all participants will be undergoing energy modeling. However, where possible, the program will attempt to improve model tracking and documentation.

As the program shifts to commercial customers, consider, where possible, aligning the treasure hunts with cooling seasons and a heating season targeted mini-hunt (or vice versa). This cycle's treasure hunts occurred in October and November when the heating and cooling systems were likely to be operating at their lowest levels. The Impact Evaluation Team does not believe this substantially impacted the sites evaluated for this report. These were industrial sites with more uniform energy consumption patterns around production than the weather.

- **NYSERDA Response to Recommendation:** Pending. SEM is exploring the possibility of treasure hunts aligned with heating and cooling seasons.

## OsEM

Overall, the Impact Evaluation Team found the OsEM program to have a high realization rate. This is partially because the largest projects verified with IPMVP Option C showed significantly more savings at the sites than claimed.

The Impact Evaluation Team has the following recommendation:

- Although it will add some additional burden on the program participants, the Impact Evaluation Team recommends better data collection on baseline conditions (e.g., leak data), to provide more confidence in results.
- There were many projects lacking documentation of the claimed measure. For instance, several measures included a simple statement indicating the calculation was based off spot measurements, and the only documentation was a comment in the cell stating that's where the value came from. A photograph of the spot metering or short-term meter logging would provide better documentation and higher confidence in the savings. Once the existing conditions have been changed, through leak remediation or system reconfiguration, the baseline conditions are lost and it is nearly impossible to judge the true performance of the measure.
  - **NYSERDA Response to Recommendation:** Accepted. The program will recommend OsEMs collect comprehensive data on baseline conditions, but will not make it a requirement due to the burden it would put on them.

The Impact Evaluation Team also identified a barrier for On-Site Managers while conducting interviews:

- Several managers mentioned corporate culture and upper leadership challenges as being primary barriers to success. The Impact Evaluation Team believes these energy managers are experienced with identifying and shepherding energy projects, but some may struggle navigating complex organizational and political structures to get the right buy-in and leadership necessary to move projects through. Several contacts mentioned this was their biggest challenge in their role.

## Residential Retrofit Impact Evaluation (Q1 2017 - Q1 2019)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings from the Residential Retrofit Impact Evaluation include<sup>8</sup>:

This evaluation assessed both electric and gas consumption for NYSERDA's three single-family home retrofit programs: EmPower New York (low-income), Assisted Home Performance (moderate-income), and Home Performance (market rate). The impact evaluation team calculated the average home electric savings for the EmPower NY program to be 357 kWh/yr, which results in a realization rate of 62%. The average home electric savings for the Assisted Home Performance program are 238 kWh/yr, which results in a realization rate of 53%, and the average home electric savings for the Home Performance program are 295 kWh/yr, which results in a realization rate of 82%.

The average home natural gas savings for EmPower NY are 9.3 MMBtu/yr, which results in a realization rate of 73%. The average home gas savings for the Assisted home Performance program are 11.4 MMBtu/yr, resulting in a realization rate of 66%, and the average home gas savings for the Home Performance program are 5.4 MMBtu/yr, resulting in a realization rate of 45%.

Key recommendations from the study include:

- **Recommendation:** NYSERDA should consider conducting a process study of CEF-funded projects to examine the on-the-ground conditions that could be affecting the accuracy of savings models. The literature review identified the accuracy of the engineering models and their inputs to reflect real world situations, quality of measure installation, and end user behavior and occupancy changes as the potential drivers affecting ex ante savings. The process study could address a range of factors, including customer surveys and on-site visits to compare engineering and other assumptions versus actual conditions of the home, engineering model desk reviews to compare inputs used by contractors in the modeling software with the actual conditions of the home, in-depth interviews and ride-alongs with home performance contractors to understand the factors that inform their recommendations to participants as well as their installation practices, and pre- and post-metering and logging studies designed to update savings assumptions for specific measures. Such explorations seem most critical for households receiving natural gas measures.
- **NYSERDA Response to Recommendation:** Pending. NYSERDA will release a mini-bid for the next residential retrofit program impact evaluation, including a statewide analysis encompassing the new EmPower+ Program, in Q3 2022. This evaluation study will include a process evaluation.

- **Recommendation:** NYSERDA should consider conducting a more thorough impact evaluation drawing on multiple approaches to verify gross savings and estimate RRs. The results of the various approaches could be combined into a single RR through triangulation and, if needed, reliance on Delphi Panels or other similar structured expert consensus methods. Two suggested impact approaches include desktop verification of reported savings assumptions and their alignment with the TRM and program specific VGS Specifications, 2) independent third-party site visits that include visual inspections, metering, and testing to verify savings, and 3) the same surveys of customers mentioned above for the recommended process evaluation.
  - **NYSERDA Response to Recommendation:** Pending. The next evaluation is in the scoping process, and these suggestions are being considered for the methodology.
- **Recommendation:** NYSERDA should consider conducting a delivered fuels impact evaluation. This evaluation would require approaches to access delivered fuels consumption data, an approach that has proved challenging in the past. However, without such data, impact evaluations will continue to exclude a sizable portion of program participants and be unable to provide a full accounting of the energy savings associated with electrification.
  - **NYSERDA Response to Recommendation:** Pending. NYSERDA will include a delivered fuel analysis in the next impact evaluation.
- **Recommendation:** NYSERDA should consider working with the utilities to ensure utility data is received and has few estimated reads. Utility data was not received from two utilities for this evaluation. Additionally, the utility data that was received for this evaluation included data with excessive estimated reads (more than nine estimated reads out of twelve reads yearly). A much larger percentage of homes would be included in this analysis if the utility data was complete. This would present a more realistic view of the program and increase statistical significance in the results.
  - **NYSERDA Response to Recommendation:** Pending. NYSERDA is working with utilities to improve the utility data requesting process, which will increase the responses to utility requests. NYSERDA will discuss the number of estimated reads with utilities in preparation for the next residential retrofit evaluation.

## Clean Transportation Market and Impact Evaluation (2022)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

This study encompassed three volumes: EV-Rebate Market and Impact Evaluation; EV Innovation and Public Transportation and Electrified Rail Market Characterization Evaluation; and Market-Level and Cross-Cutting Insights. Key findings and associated recommendations from each volume are detailed below.<sup>9</sup>

### EV Rebate Program Market and Impact Evaluation

#### **1.1.1.1 EV Rebate Market Evaluation**

The indirect impact analysis took a scenario-based approach to developing an estimate of indirect impacts. Across most scenarios, the program is expected to motivate the purchase of additional, non-

rebated vehicles comparable with the numbers projected in the Transportation Focus Area Plan. Projected vehicle counts are combined with the VGS MMBtu estimates from the direct impact analysis to produce overall indirect savings. The CEF Investment Plan indirect impacts forecast represents approximately 260,000 additional vehicles from 2020 through 2030. This evaluation estimates that by 2030 there will be an additional 253,597 vehicles on the road due to program influence, using the assumption that in 2030, 80% of the market will be EVs.<sup>10</sup>

- **Recommendation:** Update the EV rebate amount and eligibility to better target consumers that are less likely to purchase an EV in absence of significant subsidy. In the near term, consider ways to restrict eligible recipients to further reduce the rebate amount available for EVs with MSRP >\$42,000.
  - **NYSERDA Response to Recommendation:** Pending. This recommendation is under review for feasibility of implementation.
- **Recommendation:** NYSERDA should supplement standard information provided at dealerships, and online, with simple messaging comparing total cost of ownership between the EV and a similar ‘average’ new vehicle.
  - **NYSERDA Response to Recommendation:** Rejected. There is already a lot of information about electric vehicles. NYSERDA will not add anything novel to the readily available existing materials.
- **Recommendation:** To improve upon NYSERDA’s existing Electric Vehicle Calculator, NYSERDA should advertise this tool to all personal vehicle customers interested in purchasing a new vehicle, not just those explicitly interested in EVs; this may also include building in the opportunity to compare to specific non-EV vehicles. To address concerns about range anxiety, NYSERDA should also include reference to their Electric Vehicle Station Locator tool in their Electric Vehicle Calculator tool.
  - **NYSERDA Response to Recommendation:** Pending. This recommendation is under review for feasibility of implementation.
- **Recommendation:** NYSERDA should coordinate with ongoing Federal efforts to increase the number of charging stations in geographies where drivers rely on street parking or larger, shared facilities for their “at home” parking, and improve the prominence of charging stations in public spaces. Increasing prominence of charging stations in public places through better signage and location provides an opportunity to inform non-EV drivers of the accessibility of charging stations in their community.
  - **NYSERDA Response to Recommendation:** Pending. This recommendation is under review for feasibility of implementation.

### **1.1.1.2 EV Rebate Impact Evaluation**

For the EV rebate program, savings were calculated by comparing the efficiency of the rebated vehicle to the efficiency of a counterfactual vehicle that the customer would have purchased in absence of the rebate program. Further, since the VGS assessed both avoided gasoline and an increase in electricity of EVs, the

VGS RR (72%) is applied to both gasoline MMBtu savings and kWh usage. The main reason the VGS RR varied from 100% was due to lower vehicle miles traveled as compared to the program assumptions.

- **Recommendation:** NYSERDA should study future program influence levels to monitor the program influence trend as well as to attempt to better identify reasons behind changes. There was a slight upward trend in vehicle miles traveled (VMT) for vehicles purchased from 2017 through 2019. Year 2020 ended that trend with a decrease that may not be entirely due to COVID-related changes, as participants from all program years responded to the survey at the same time. This may be an anomaly, or the start of a downturn in VMT for participating vehicles. Tracking VMT can help NYSERDA’s evaluators to better understand and quantify program influence.
  - **NYSERDA Response to Recommendation:** Pending. This will be discussed for the next impact evaluation.
- **Recommendation:** NYSERDA should include additional VMT questions in future studies, with the objective to determine whether program VMT is changing, why, and in what direction. This may include questions about how the household uses the program vehicle compared to their other vehicles and transportation alternatives.
  - **NYSERDA Response to Recommendation:** Rejected. This recommendation seems unlikely to improve data quality.
- **Recommendation:** NYSERDA should conduct a persistence study, designed to gauge whether the rebated vehicles are still in New York, can be used to determine what percent of vehicles continue to benefit the state and what percent may have moved out of the jurisdiction. Such a study could consist of a very short survey (do you still own this vehicle, is the vehicle still in the state, how many miles per year) or, if the Department of Motor Vehicles allows it, it may be possible to submit the list of VINs and have the DMV verify whether the vehicle is still active and domiciled in the state. EValuateNY provides counts of EVs by vehicle age and county or other information that can help the evaluation team assess how many vehicles are purchased outside of the program.
  - **NYSERDA Response to Recommendation:** Pending. The program team supports this recommendation, but has not yet discussed how to implement this recommendation.

## EV Innovation, Public Transportation, and Electrified Rail Market Characterization

A market evaluation was conducted on the EV Innovation, Public Transportation and Electrified Rail initiatives. The study sought to address key market indicators, such as the prevalence and availability of charging stations; an assessment of smart charging technologies and demonstrations of these technologies; and the investment in and commercialization of electrified transit in the state. Overall, NYSERDA funding was helpful according to most interviewees, and in most cases, grantees reported successful outcomes. However, several non-financial challenges to wider market adoption need to be addressed to improve funding outcomes. Establishing policy and regulation and identifying ways to improve information dissemination were highlighted as priorities for interviewees, areas where financial support cannot bridge the barriers to replication and broader commercialization.

When specifically looking at public charging stations, access to these stations is only available to ~4.6 percent of the average New York urban area's population. Expanding charging infrastructure to improve charging access remains a critical goal for NYSERDA's Clean Transportation Program.

- **Recommendation:** NYSERDA should determine what role they can play to further support EV Innovation partners. For example, coordination with other actors to address non-financial barriers and disseminate project findings and best practices would support grantees in continuing their important innovation and outreach work after NYSERDA project funding runs out. NYSERDA already provides some of this support, so if NYSERDA can take on even one additional role (e.g., developing procurement and proposal blueprints for transit agencies) the agency could provide significant additional value to the Clean Transportation EV Innovation Program and Public Transportation and Electrified Rail initiative.
  - **NYSERDA Response to Recommendation:** Pending. This recommendation is being considered on a number of different collaborations.
- **Recommendation:** NYSERDA should streamline the pipeline of project growth and development by providing support for grantees to help them to move past the “funding cliff,” where grantees may find it unclear how or with which funding source a successful project could be continued. This support is particularly needed for business models designed to benefit low-income customers, where the value comes from price subsidization (e.g., car sharing).
  - **NYSERDA Response to Recommendation:** Pending. The Tech to Market Team is working on this.
- **Recommendation:** In future requests for proposals, NYSERDA should require applicants to submit a plan for data collection and monitoring efforts from stakeholder engagement (who did they engage with the project?) to project outcomes (how many customers were reached by educational outreach or ride-and-drive events?). Improved coordination and data tracking will improve resources for evaluation efforts such as this one, as well as NYSERDA's ability to learn from and evaluate funded project outcomes. For example, understanding how many and what type of customers were reached by engagement and outreach can inform NYSERDA's requirements for future requests for proposals.

- **NYSERDA Response to Recommendation:** Pending. This will be implemented when the Clean Transportation team releases a new PON.
- **Recommendation:** NYSERDA should consider a structured approach to fostering coordination between EV Innovation partners and utilities. A structured approach to coordination is especially needed around streamlining interconnection applications, which is important to planning and managing charging station infrastructure expansion.
  - **NYSERDA Response to Recommendation:** Implemented. The Clean Transportation has done this more frequently through their Clean Transportation Prizes than they have in the past.
- **Recommendation:** NYSERDA should make available third-party planning or technical assistance to provide transit agencies with the help they need to make fleet replacement decisions or optimize routes to meet changing fuel needs. If NYSERDA is able to provide vehicle procurement and technical assistance for transition services for electric fleet operations, it would support transit operators in their planning and enable a faster rate of electric vehicle adoption among resource-limited transit agencies.
  - **NYSERDA Response to Recommendation:** Implemented. The Clean Transportation team has provided this kind of assistance to transit operators often.

## Heat Pump Impact Evaluation (2016-2108)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings from the Heat Pump Impact Evaluation include.<sup>11</sup>

- **Realization Rates (RR).** The Heat Pump Solar Thermal electricity RR is 20%; The Underutilized Products (ASHP) electricity RR is 79%, natural gas is 152%. All fossil fuels are reported as having a RR of 31%.<sup>12</sup>
- **Evaluated savings correlate with pre-existing system type and use.** Phase 1 and Phase 2 results demonstrated that savings are most realized when heat pumps are used as the primary heating equipment. Customers that no longer use pre-existing heating equipment achieved a 40% higher RR than customers continuing to use legacy systems.
- **Evaluated savings correlate with climate zone.** ASHP projects performed significantly better in upstate climate zones 5 and 6 as compared with downstate climate zone 4. Evaluators found that downstate ASHPs operated for fewer heating hours than upstate systems for two primary reasons: 1) higher likelihood of downstate customers using pre-existing heating systems, and 2) smaller conditioned square footage. Heating degree days for downstate customers are lower than for upstate customers, but weather was not as significant a factor as partial displacement frequency, customer usage patterns, and unit oversizing. GSHP projects in climate zone 5 achieved higher MMBtu savings than those in climate zone 6 by 43%.



- **Customers are adding cooling comfort to their lifestyle.** The Phase 1 web survey observed that 25% of spaces with a program heat pump installed were adding cooling to previously uncooled space.<sup>13</sup> For the 75% installed in spaces previously cooled with some type of compressor-based system, nearly four in every ten respondents in this study reported that they had decreased their cooling setpoint from the previous system, and the decrease was significant: an average of approximately 6 degrees. This change in temperature is a significant addition of cooling comfort that could reduce energy savings at the meter. Evaluation analysis models presume that setpoint adjustments would have been made to the baseline alternative system as well.

Key conclusions and associated recommendations from the study include:

- **Evaluated ASHP savings fell short of program-reported estimates.** Program-rebated ASHP installations led to 62% lower evaluated MMBtu savings compared to program-reported values. The key contributors to the 38% RR for ASHPs are summarized in bullets below.
- **Installed heat pumps provide less heating than assumed by the programs.** The primary driver of the ASHP RR is 56% lower annual heating output than assumed within program savings claims. Phase 2 metered data, extrapolated over a full year and correlated with installed equipment capacities, led to 565 average annual full-load heating hours across the ASHP population of projects, of which over 99% involved DMSHPs. While the body of heat pump evaluation research is rapidly growing, other DMSHP studies in the Northeast have shown similar findings of approximately 450 annual full-load heating hours.<sup>14</sup> In the context of the current New York TRM heat pump savings algorithm, evaluated ASHP projects demonstrated a sizing ratio of approximately 0.3 on average as compared to a typical whole-home heating load. For GSHPs, evaluators determined weighted average FLHs of 2,325 (per installed capacity) or 2,099 (per tracked Manual J building heating load), whereas the program’s savings calculator featured FLHs ranging from 2,230 to 2,604.
- **Contractors use sizing tools, but there is room for improvement.** Rightsizing is a point of emphasis in New York’s energy code and heat pump programs. Rightsizing maximizes savings. Installers were found to use fairly standard means of sizing, usually Manual J (63%, including three of the four largest contractors) or manufacturer/industry tools (17%). Others rely on experience, pre-existing equipment size, or other tools. This leaves room for improvements, which could be a point of emphasis in contractor engagement.
- **A single deemed savings value is not appropriate for heat pump installations.** With ASHPs encompassing 90% of the evaluation population, their results had significant impacts on the program-level VGS realization rates. The programs assumed a single deemed savings value per outdoor unit for all ASHP installations, not accounting for unit size, baseline, displacement share, or climate. The programs’ ASHP savings claims reflected oil offsets based on whole-home NEEP research, derated to account for displacement vs. replacement projects and an assumed 25% share of electric-to-HP projects. When the participant population consistently deviates from deemed assumptions, such as this program’s high proportion of downstate installations and their lower annual heating loads, use of a deemed value contributes to significant variability in evaluation results.

- **Recommendation:** Reflecting the above four conclusions, ASHP savings claims should be based on site-specific baseline fuel, system type if electric, unit size, location, and expected load displacement relative to size. This study’s ductless mini-split heat pump systems results suggest a default displacement factor of 0.3 relative to total building heating load. The current version of the New York TRM<sup>15</sup> provides detailed guidance on estimating heating and cooling loads for partial- and full-displacement installations. Use of either a quasi-prescriptive calculator, or deemed savings options based on displacement fraction, would markedly improve savings estimates. Crucial to the success of this recommendation is contractor training and oversight to ensure that installed systems are right-sized and credibly characterized based on the portions of heating and cooling loads to be satisfied by the heat pumps. Based on the evaluators’ review of its program manual, the Clean Heat Program requires administering utilities to abide by the current New York TRM. When an installation is not covered by a prescribed measure in the TRM, the program requires a custom track. <sup>16</sup>
- **Quantifying evaluated impacts by fuel proved difficult.** For all ASHP installations, the programs claimed all fossil fuel savings as oil, limiting the evaluators’ ability to expand evaluation results from the sample to the population of projects. Among 86 ASHP projects in the evaluation sample, we found that program-rebated installations led to a diversity of savings by fuel, including natural gas (comprising 29% of total MMBtu savings across all fuels), fuel oils (36%), propane (18%), and wood (5%). For GSHP installations, the program claimed a broader diversity of fuel-specific savings, though evaluators determined higher shares of natural gas and propane, and lower shares of fuel oils, than claimed.
- **Recommendation:** Heat pump savings claims should distinguish among different displaced heating fuels as documented by the installation contractor. Fuel-specific impacts are critical for measuring program success versus statewide carbon emissions reduction goals. A single installation might displace more than one heating fuel; therefore, approved contractors should be trained to collect defensible information on pre-existing heating fuel types and shares. When feasible, utility-led programs should leverage historical natural gas consumption data at the participant address to corroborate the tracked estimates for pre-existing natural gas systems.
- **A minority of participating customers would have installed heat pumps regardless of the program.** For 15% of rebated ASHPs, customers indicated via in-person interviews that they would have installed heat pumps regardless of program intervention. Heat pump baselines reduce the achievable savings significantly, as heat pumps can satisfy heating loads much more efficiently than fossil fuel- or resistance-based systems. Due to complexities with establishing the influence of the programs on accelerating the heat pump market in New York, evaluators calculated gross impacts for such ASHP projects by considering the most reasonable, code-compliant fossil fuel-fired system as baseline. Evaluators acknowledge that these predecessor heat pump programs likely included early adopter participants whose decision-making might not be representative of future heat pump program participants.

- **Recommendation:** For heat pump installations in new construction or end-of-life scenarios, savings should be informed by the customers' preferred alternative systems and fuel choices in the absence of the program. While accounting for program influence will continue to be a challenge, evaluators recommend that future heat pump installations comport with the guidance in the active New York TRM.<sup>17</sup> Eligible Program tracking databases should intake relevant site-specific variables and triangulate the most appropriate baseline against which new construction or end-of-life performance is measured.
  - **Evaluators observed a small share of GSHP-to-GSHP installations.** During the evaluation planning process, evaluators identified that an additional 20 GSHP installations in the population involved replacement of existing GSHP systems. These projects were removed from the evaluation sampling frame. The New York TRM currently does not accommodate a GSHP baseline.<sup>18</sup>
- **Recommendation:** GSHP-to-GSHP replacements should be considered as a prescribed scenario by the New York TRM Committee, as the team expects this to become more common as first generation GSHPs begin to reach their effective useful life. The Clean Heat Program does not appear to accommodate such a baseline, though new construction GSHP projects are required to be submitted through a custom track.
  - **A majority of participants continued to use pre-existing HVAC systems.** The Phase 1 web survey found that approximately 75% of program participants continued to use pre-existing heating and cooling systems after heat pump installation. These partial displacement scenarios reduce the achievable savings as demonstrated by lower-than-expected outputs and full-load hours as described above.
- **Recommendation:** Program administrators should consider a tiered incentive approach that rewards full-displacement installations. Training and requiring approved contractors to credibly collect and track this information is crucial to the success of this recommendation.
- **Recommendation:** Programs should reward partial-displacement installations that include integrated controls that manage heat pump use with legacy systems. There may be limitations to the ability of controls on older pre-existing systems that will need to be acknowledged in such an effort. Based on the evaluators' review of its program manual, the Clean Heat Program has established nine installation categories with varying incentive structures and eligibility criteria that distinguish among system types, partial- and full-displacement installations, and inclusion of integrated controls.<sup>19</sup>
- **Recommendation:** Programs should educate eligible contractors and participating customers on the best practices for optimal heat pump usage, particularly for installations that supplement existing heating systems. Heat pump adoption and savings potential rely heavily on customer awareness of heat pump benefits and their ability to satisfy heat loads during extreme winter temperatures. The Clean Heat Program manual recommends continuous contractor training, and its website includes a list of educational resources for participating contractors.<sup>20</sup> It is unclear if or how the program administrators ensure that contractors review such resources.

- **NYSERDA Response to Recommendations:** The NYS Joint Utilities, implementors of the current NYS Clean Heat Statewide Heat Pump (NYS Clean Heat) Program, and NYSERDA continually collaborate on enacting improvements through the NYS Clean Heat Program the Joint Management Committee. This collaboration includes incorporating lessons learned from NYSERDA’s now closed ASHP and GSHP programs as well as implementing adjustments based on learnings from the current running of the NYS Clean Heat Program since its 2020 rollout. A review of the Recommendations made in the Heat Pump Impact Evaluation Final Report will be included in the ongoing collaboration efforts between NYSERDA and the NYS Joint Utilities to act upon where deemed relevant and appropriate.

## **Residential ccASHP Building Electrification Impact Evaluation (2020-2021)**

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

In 2020 and 2021, NYSERDA co-funded a cold climate Air Source Heat Pump (ccASHP) impact evaluation with Massachusetts Clean Energy Center and E4TheFuture.

Key findings from this study include<sup>21</sup>:

- Customers are generally very satisfied with ccASHP heating and cooling performance.
- Whole-home systems tend to be utilized more often than primary with backup systems.
- Whole-home systems tended to be more expensive to install than primary with backup systems.
- The overall average seasonal heating performance of 2.34 sCOP is in line with similar studies.
- On average, seasonal heating performance was similar between primary with backup and whole-home applications, but varied significantly by home and system type, influenced by many factors.
- Winter Peak demand impacts of wide-scale ccASHP adoption will likely occur during early morning hours, not during traditional utility peak periods.
- Whole-home applications with electric resistance elements will have the greatest electric grid impact during extreme cold periods.
- Heating season demand impacts will be greater than cooling demand impacts.
- Contractors reported installation costs, aesthetics, customer misconceptions, and building logistics as the top cited barriers to wide-scale ccASHP deployment.
- A customer’s existing fuel type is an important factor to cost effectiveness. Natural gas customers will likely see overall utility bills increase by switching to electric ccASHP systems for heating due to the high cost of electricity relative to natural gas in the Northeast.

Key conclusions from this study include:

- Policymakers and utilities involved in the project sought to understand whether study results indicate a recommendation to focus on primary with backup vs. whole-home applications in ASHP programs and policies.
  - However, the study sample size (43 homes) is insufficient to draw statistically significant conclusions, and observations relevant to our research objectives should be considered as directional.

With regard to the team's research objectives comparing primary with backup and whole-home systems: (1) Comfort differences reported by customers were minimal (2) Observed differences in seasonal heating efficiency were minimal (3) Electrical demand was higher for whole-home systems during cold periods.

- Study data does not suggest there are significant trends that would warrant policy/program decisions encouraging or discouraging whole-home systems based on concerns around customer comfort or system performance.
  - However, the observed difference in electrical grid impacts (particularly in the context of mass market adoption) may be a more important factor for policymakers and utilities to consider for informing policy and programmatic decisions.

Cold snap periods were warmer and shorter than design conditions and did not reflect periods of prolonged extreme cold that could have greater impacts on customer comfort and grid demand. Further study with a larger sample during such a weather event may provide more definitive conclusions on comfort, performance, and grid impact issues that could influence policymakers and program administrators.

Key program and policy recommendations from this study include:

- **Recommendation:** Incentive levels. Based on the projects metered, most sites will not achieve a payback during the system lifetime based on the incentive received. Incentive levels have since increased substantially for many NY and MA sites, which may enable greater savings.
- **Recommendation:** Energy savings. Electric resistance and propane customers were most likely to see significant energy savings, as well as oil customers in NY. High electricity costs limit energy savings in MA. Utility rate structures (particularly in MA) with lower volumetric costs to reflect higher grid utilization may improve economics, though such structures may be inappropriate in the long term with increasing electrification and winter peak concerns.
  - **NYSERDA Response to Recommendations:** The NYS Joint Utilities, implementors of the current NYS Clean Heat Statewide Heat Pump (NYS Clean Heat) Program, and NYSERDA continually collaborate on enacting improvements to the NYS Clean Heat Program through the Joint Management Committee. This collaboration includes incorporating lessons learned from NYSERDA's now closed ASHP and GSHP programs as well as implementing

adjustments based on learnings from the current running of the NYS Clean Heat Program since its 2020 rollout. A review of the Recommendations made in the Residential ccASHP Building Electrification Impact Evaluation will be included in the ongoing collaboration efforts between NYSERDA and the NYS Joint Utilities to act upon, where deemed relevant and appropriate.

## Clean Energy Communities Market Evaluation (2018-2020)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings from the Clean Energy Communities Market Evaluation include: <sup>22</sup>

**Finding 1:** The program has successfully reached a majority of communities (84%) and has high retention. Communities tend to complete multiple program-defined actions. Yet, small-sized communities are less active in the program and are less likely to say clean energy is a priority.

- **Recommendation 1:** CEC program staff should consider research to understand whether enhanced support would result in greater program participation among small communities and if so, whether enhanced support could be provided cost-effectively.
- **NYSERDA Response to Recommendation:** Implemented. The program team concurs with the recommendation to research and understand whether enhanced support would also result in greater participation from small communities at a cost-effective manner.

**Finding 2:** Between Time 1 and Time 2, approximately 97 communities completed at least one High Impact Action indirectly, which represents 6% of the population. Two-thirds of actions completed indirectly were influenced by the program.

- **Recommendation 2:** The market evaluation team recommends that NYSERDA continue the CEC program, as a majority of indirect actions are influenced by the program. The team also recommends continuing to measure program influence for indirectly completed actions to ensure the program gets credit for actions it inspired.
- **NYSERDA Response to Recommendation:** Implemented. The program team will continue the program with an anticipated relaunch in 2023 after seeking feedback from participants, non-participants, and other community stakeholders.

**Finding 3:** Whether clean energy is a priority for a municipality is not something that program interventions have appreciably influenced, as indicated by the stability of this metric.

- **Recommendation 3:** The evaluation team recommends that this metric not be tracked, as currently defined, in future evaluation waves. The team does not believe that the lack of movement on this metric reflects an issue with program design or execution.
- **NYSERDA Response to Recommendation:** Implemented. The program will no longer track the clean energy as a priority metric.

## Q3-2022

### Energy Efficiency and Beneficial Electrification Soft Cost Market Evaluation

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the Energy Efficiency and Beneficial Electrification Soft Cost Market Evaluation include:<sup>23</sup>

This Soft Cost study represents the second iteration in a five-year longitudinal study to quantify soft costs across eight energy efficiency and electrification prototypical projects. Results from this year's study reflect significant fluctuations in the market stemming from the COVID-19 pandemic and the general economic environment (e.g., high inflation levels). As a result of these fluctuations, it is challenging to draw meaningful comparisons in costs between this year and the 2019 market baseline study. Nonetheless, research findings provide insights that NYSERDA (or other entities) can leverage to influence or assist market actors in reducing soft costs.

- **Recommendation:** Implement market condition monitoring. Several market forces have had a significant impact on energy efficiency and building electrification projects in New York State, likely contributing to observed increased in hard and soft costs.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA conducts cost surveys with participating contractors on an annual basis, at a minimum, to stay abreast of changes in both material and labor costs in the residential and multifamily sectors. NYSERDA also maintains a membership with Heating, Air-Conditioning Refrigeration Distributors International (HARDI) to access market data and insights in the HVAC industry, and NYSERDA's Clean Heat Connect upstream partners network serves as a resource for information regarding current market trends. Additionally, NYSERDA monitors market conditions for relevant focus areas in the multifamily, residential and commercial/industrial sectors.
- **Recommendation:** Provide standardized bid packages and trainings on approved relevant software. Increases in marketing and customer acquisition costs were driven by bid preparation costs, possibly representing increased interest in whole-home systems and the entrance of new service providers.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA provides training and technical support to all participating contractors and service providers in its residential and multifamily programs including use of program software and preparation of bid packages and proposals. However, since NYSERDA does not implement standard incentive programs for small businesses, this recommendation is not relevant for commercial sector.
- **Recommendation:** Create and educate contractors on standardized project design and installation procedures. Total soft costs are highly impacted by the cost associated with project design and installation work, which accounts for nearly half of total project soft costs across all sectors and are widely dispersed (i.e., contractors vary in how long it takes to complete a prototypical project installation).

- **NYSERDA Response to Recommendation:** Implemented. NYSERDA has created and market-tested standardized packages of envelope improvements via its Comfort Home pilot program and will be expanding those packages to include a wider range of housing typologies and measure packages for use in both its LMI and market rate residential programming. Similarly, NYSERDA has created standardized retrofit playbook guides for common multifamily building types and is testing standardized measure packages that align with common investment opportunities in Multifamily buildings through the Low Carbon Pathways program. The commercial/industrial sector is publishing best practices guidance and conducting educational webinars for relevant stakeholders focused on decarbonization in the commercial and industrial space.
- **Recommendation:** Expand or accelerate workforce development initiatives. For New York State to achieve its energy and climate goals, it is necessary to increase the number of contractors active in the clean energy market.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA is working to better market current initiatives underutilized by contractors and manufacturers. Any new initiatives are contingent on securing additional funding, as current funding is only available for building electrification training.
- **Recommendation:** Encourage the development of a unified and streamlined permitting process. Permitting can be a driver of variability in project costs, with substantial differences observed across sectors and regions.
  - **NYSERDA Response to Recommendation:** Rejected. This recommendation does not align with NYSERDA's approach to codes and permitting since creating separate permits for clean energy equipment in buildings creates new barriers to adoption. Instead, NYSERDA creates tools and resources to help authorities having jurisdiction to enforce the code more consistently. Those resources include statewide training, pilots to support third-party compliance and online permitting, and dynamic code compliance checklists to ensure that buildings are designed and built to code.



# Workforce Development Building Operations and Maintenance Partnerships and Talent Pipeline Market (2019–2021) and Impact Evaluation (2016–2021)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the Workforce Development (WFD) Building Operations and Maintenance (BOM) Partnerships and Talent Pipeline Market and Impact Evaluation<sup>24</sup> [1]:

## Workforce Development BOM Market Evaluation

The BOM Program helps employers and building owners implement workforce development and training, such as hands-on training, curriculum development, coaching/mentoring, train-the-trainer, and other activities designed to help build the technical skills of operations and maintenance (O&M) staff and reduce facility energy use.

Developing industry partnerships or engagement between training providers and the organizations receiving the training appears to be a very successful element of the program.

- **Recommendation:** The success of the association approach suggests the Program should continue to reach out to other trade organizations as a fruitful source of participants.
  - **NYSERDA Response to Recommendation:** Implemented. Program is continuing and will continue to reach out to other trade organizations to promote participation. An outreach contractor has been retained to increase program education and outreach.

The BOM initiative has accelerated O&M training among participating organizations. The participating organizations trained a significantly higher proportion of their O&M staff (76%) than non-participants (34%), on average.

The COVID-19 pandemic had a strong impact on the sectors often served by BOM, such as education (both K-12 and higher education) and offices. Participating university and K-12 organizations explained that New York universities and K-12 schools were shut down for a minimum of three months to over a year from the onset of the pandemic. Office vacancies are at a 40-year high even as COVID-19 cases decline. Furthermore, the BOM enrollments exhibited a steep decline in encumbered savings in 2020 and have not yet rebounded to pre-pandemic levels.

There is evidence of the market change the program is aiming to accomplish. The partnership approach discussed in the findings above (based on item #3 above) point to program success. That is, the BOM-funded partnerships appear to be accelerating infusion of new and modified curricula/knowledge in the O&M building sector. The impact evaluation has also identified indirect annual savings associated with BOM. The BOM enrollment pipeline of training projects shows a huge backlog (due to COVID-19), indicating a strong demand for the program.

In reviewing the initiative logic model, several of the program market and output indicators need re-assessment. Specifically:

- **Recommendation:** The electrification goal of increasing the number of workers trained may not be appropriate for BOM because the training is focused on the existing conditions of the buildings served by the staff. Re-assess the need for the electrification target.
  - **NYSERDA Response to Recommendation:** Pending. NYSERDA will work with DPS staff to revisit the electrification target in BOM.
- **Recommendation:** The logic model should be re-visited to assess the importance of outcomes such as new partnerships and employee retention outcome.
  - **NYSERDA Response to Recommendation:** Implemented. The outcomes of “new partnerships” and “employee retention” were removed from the most recent version of the BOM logic model because these outcomes were no longer the best indicators for this initiative. These and other metrics may be of interest to NYSERDA staff but were deemed less applicable as program success metrics.
- **Recommendation:** The BOM logic model should also eliminate outcomes that are not applicable to an existing (versus new) workforce including: (1) the time needed for employer to find and train new talent, (2) individuals placed into paid internships/apprenticeships, and (3) placement of disadvantaged workers in O&M careers. These outcomes are relevant for the Talent Pipeline and are included in that logic model.
  - **NYSERDA Response to Recommendation:** Implemented. These outcomes were removed as part of the updated Compiled Investment Plan, dated May 20, 2022.

### **Workforce Development BOM Impact Evaluation**

The evaluation has confirmed positive changes in terms of energy savings, across all five projects included in the gross savings analysis. However, the small sample size, and highly variable results led to low precision in this analysis. While the findings do not meet the precision targets, they reflect the best available data for this set of projects, especially given the impact of COVID and the limitation of collecting information from 2018 and 2019.

- **Recommendation:** Apply the Verified Gross Savings Realization Rate (VGS RR) identified as 120 percent for electric (MWH) and 125 percent for natural gas (MMBTU) to report verified gross savings.
  - **NYSERDA Response to Recommendation:** Implemented. The VGS RRs are being applied to acquired savings as of this Q3 2022 report.

- **Recommendation:** Improving the certainty of the results will require additional documentation corroborating the impacts of the training as recommended below. Since it is unrealistic to expect that these varied and sometimes subtle actions can be recalled accurately years later, it is also recommended that the necessary corroborating project data is collected and undergoes a quality assurance review at regular intervals soon after the reporting period has concluded. The BOM program may be a good candidate for a “real time” or embedded evaluation approach, where the evaluator collects some of the required data directly from the customers and conducts primary research of in-progress projects at regular intervals. The evaluator, for example, could collect the billing data and add follow-up questions about apparent non-routine events observed in recent billing data or confirm actions noted in an opportunity log.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA is starting a real-time evaluation of the program. Billing data release forms are currently being collected and the data will begin to be reviewed at more regular intervals.

As noted above, there is uncertainty in the estimates of savings. The billing analysis relied on six-month data intervals provided through the BOM Program about half of the time and monthly billing data for the balance. The project files rarely noted non-routine events which is critical in these dynamic properties.

The corroboration of savings was significantly hampered by the lack of supporting information in the project files for some of the projects. Detailed training curricula and related materials can be used to identify the kinds of actions staff were trained to conduct; however, these documents were not routinely included in the project files. A record or log of actions taken by staff during the two-year post period can be used to identify specific measures implemented by staff, but this type of information was not routinely included in the files.

- **Recommendation:** Acquire billing release and account data with regular utility billing updates. At project initiation, obtain program billing release and account numbers for all delivered fuels for all buildings participating in the program. NYSERDA should test and confirm the accounts by requesting the historical data for all accounts from the applicable utilities. Accounts that fail to be acquired can be cross-checked and corrected with the participant while NYSERDA has leverage. NYSERDA should request updates of billing data via the electronic data interchange (EDI) every six to twelve months as the project proceeds through the performance period. At this stage, only a confirmation of utility data received is required, not a detailed analysis.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA has already begun the process of obtaining signed customer releases to access utility data and collecting the data from utility providers. The data will be collected every six months using a process developed at NYSERDA for routine utility data collection.

- **Recommendation:** Report usage in monthly intervals in the program’s BOM Report. Capturing billing data continuously improves the availability of billing data. The program’s BOM Report includes unregulated fuels, which can be significant energy streams; it provides a cross-check to the utility billing data; and it allows the participant to observe progress. However, the current BOM design aggregates billing data into six-month intervals aggregated across the portfolio, which degrades the billing analysis. Monthly intervals by building will markedly improve the reliability of the analysis. Properties are billed by energy providers, so it is reasonable to ask for the monthly resolution, and it was not uncommon to see monthly data included as a tab in the program’s BOM Report. The program can still maintain a six-month interval for providing updated data; however, the resolution of the data in the spreadsheet should be at the same resolution as the source billing data. Overall, the BOM Report has value and should continue.
  - **NYSERDA Response to Recommendation:** Implemented. With the transition to the collection of utility data release forms and the regular pulls of monthly utility data as described above, projects will no longer be required to submit the compiled six-month data metrics as part of the BOM reporting process.
- **Recommendation:** Include a more expansive (and required) non-routine event log in the BOM Report. The BOM Report does include a section for reporting non-routine events; however, it was rarely used. In these dynamic properties, something is always changing, although it is not possible nor necessary to track every change in the facility. However, the BOM Report could be modified to request input by building if undergone significant changes during the reporting period, such as “No longer in the portfolio,” “Percent under major renovation,” or “Percent repurposed.”
  - **NYSERDA Response to Recommendation:** Implemented. The program is collecting information with quarterly reports to identify any changes in the building list included in the project. The program will update the data requested in the quarterly reports to encourage participants to provide a greater level of detail about major physical or operational changes occurring in the impacted buildings.
- **Recommendation:** Include a detailed description of the training curricula and its content in the project file. The training curricula provides a basis for corroborating engineering estimates of savings by identifying the types of actions staff were trained to do. The program reporting should also include regular reporting of the energy reduction actions taken by trained staff (sometimes referred to as an Opportunity Log). This record of actions forms a basis for corroborating engineering estimates, but it also can help focus and motivate trained staff to identify and implement measures.
  - **NYSERDA Response to Recommendation:** Implemented. Participants for active projects are required by their contractual scope of work to submit detailed descriptions of training content, including curricula as well as electronic versions of training materials, as a deliverable to NYSERDA, so this information will be available for future engineering analyses.
- **Recommendation:** Require program participants to continue to meet program reporting requirements for at least one year after the conclusion of training. While the benefits of training may begin to accrue from the first day of training, the full benefits may not appear until after training has been completed and put into action.

- **NYSERDA Response to Recommendation:** Implemented. With the new process to collect utility data more regularly, on a six-month interval, NYSERDA will be able to access data for at least one year after the conclusion of the training.

It appears the savings estimates are not updated when the project is complete with readily available baseline annual usage from the BOM Report. Project savings are estimated early in the customer enrollment as a function of the participant’s reported energy bills (in dollars), conversion of bills (in dollars) to energy use, and a saving fraction assumption proposed by the contractor. In the current estimates, annual usage that is factored into the estimate of the project savings understates the actual electric usage by about 40. Neither the gas nor electric actual annual usage corresponds well to the annual usage assumed by NYSERDA in the initial estimates of savings. As another issue, some of the projects did not report district steam or fuel oil impacts, even though they are included in the BOM report, and the training activity will impact these streams.

- **Recommendation:** Revise project savings prior to reporting the project as “complete” in the scorecard. Prior to closing a project and reporting the savings as complete, the energy use should be updated with the BOM Report annual baseline usage. This will remove the error associated with estimating annual energy consumption.
- **NYSERDA Response to Recommendation:** Implemented. Program will review the data available at the time of closing the project and adjust reported savings if it can be concluded that energy data submitted during the project provides a more accurate value to report.
- **Recommendation:** Report all savings streams. The program did not report all the fuels noted in the BOM Report. Utility provided district steam and fuel oil should be reported in the scorecard in the appropriate columns. Energy imported from a non-utility provider, such as steam or hot water, can be converted to equivalent natural gas.
- **NYSERDA Response to Recommendation:** Implemented. Program will review the data available at the time of closing the project and adjust reported savings if it can be concluded that energy data submitted during the course of the project provides a more accurate value to report.

## **Workforce Development Talent Pipeline Market Evaluation**

The program has positively impacted participants despite labor disruption due to the COVID-19 pandemic.

A notable proportion (approximately 50 percent) of the program-supported workforce do not end up in a clean energy job after training or on-the-job training (OJT) wage support concludes.

- **Recommendation:** The Talent Pipeline’s sponsorship of interns and OJT hires was highly valued by the participants and was successful at introducing workers into the clean energy workforce. The program could consider doubling or tripling the number of individual placements to account for natural attrition.
- **NYSERDA Response to Recommendation:** Rejected. Increasing placements directly corresponds with an increased cost in program incentive budgets. The program has been adding supplemental

non-CEF funding to support the hiring of additional interns and OJT hires to support the market; however, significant additional funding is needed to double or triple the number of placements/new hires.

- **Recommendation:** The program might also consider increasing the number of OJT hires.
  - **NYSERDA Response to Recommendation:** Rejected. Increasing placements directly corresponds with an increased cost in program incentive budgets. The program has been adding supplemental non-CEF funding to support the hiring of additional OJT hires to support the market.
- **Recommendation:** While the evidence indicates the Talent Pipeline intern and OJT hire activity is valuable to the participants and brings new workers into the clean energy workforce, it is not clear that the cost and time of onboarding is the only or best measure of program impact. Other metrics that might be more appropriate for measuring progress could be centered on increasing the permanent placement rates or on targeting specific job areas (like installers), as well as tracking whether training developed is being leveraged outside of the NYSERDA program.
  - **NYSERDA Response to Recommendation:** Pending. Staff will further evaluate this recommendation.

Respondents to the participant and non-participant market employer surveys noted that there is need for increased field training of new hires. Additionally, both employers and trainers noted that the current level of hands-on training is not adequate, and they expressed the desire to see an increase in hands-on training opportunities.

- **Recommendation:** The Talent Pipeline should continue to encourage hands-on components in trainer curricula, expanding trainee exposure to this learning modality.
  - **NYSERDA Response to Recommendation:** Implemented. As the severity of the COVID-19 pandemic has eased, training partners have been eager to return to in-person, hands-on training for new worker training and have been doing so in many cases. NYSERDA will continue to encourage hands-on training as it was a key element of training models, by design, pre-COVID-19.
- **Recommendation:** The Talent Pipeline should encourage hands-on components in partnership with technical high schools.
  - **NYSERDA Response to Recommendation:** Implemented. NYSERDA has started several new training projects with technical high schools and will continue to promote the funding opportunities to this category. Additionally, NYSERDA is coordinating its Workforce and P-12 Schools activities to integrate clean energy education and awareness in high schools located in disadvantaged communities.

## Energy Management Practices Market Evaluation (2021)

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the Energy Management Practices (EMP) Market Evaluation (2021) include:<sup>25</sup>

Approximately 95 percent of industrial and wastewater facilities fall into Tier 3, the category with the lowest energy expenditure. Not only are Tier 3 facilities the largest in terms of number of potential participants, the penetration of EMPs is notably lower in Tier 3 facilities across both sectors when compared to Tier 1 and Tier 2 facilities.

- **Recommendation:** Examine whether it would be cost-effective to target companies with several Tier 3 facilities under a common management team.
  - **NYSERDA Response to Recommendation:** Implemented. Both industrial SEM and OsEM are open to all customer sizes, including Tier 3. When Tier 3 customers are identified as a good fit for the programs, the program works with the companies to determine the best way to apply (individually or as a group if they have sister facilities in NY). However, other NYSERDA programs that have a lower cost to participate or are more focused in scope may be better suited to Tier 3 customers.

A review of participants' impact evaluation outcomes against their adoption of the 13 industrial CEE minimum elements shows that most participants do not "fully" adopt all minimum elements, per the definition and scoring rubric developed and reported in the CEI Year 3 evaluation report (appendix A). Evaluated savings suggest the Year 3 evaluation criteria for SEM adoption are too stringent and result in indirect benefits estimates that do not fully represent SEM practitioners in the general market. To address this finding, the Indirect Benefits estimation used a revised definition of SEM adoption to include nonparticipants who demonstrated some or full adoption for every one of the CEE minimum elements and sub-elements.

- **Recommendation:** Coordinate future market and impact evaluations; base the definition of adoption on cumulative evidence linking practices to verified energy savings. Continue to use the revised working definition of SEM adoption for future market evaluations and revisit the analysis of critical SEM savings drivers annually.
  - **NYSERDA Response to Recommendation:** Pending. NYSERDA will work with its evaluation contractors to revise the definition of SEM adoption. Further, the methodologies of future evaluations will be designed to annually measure the adoption of and associated savings related to SEM.

Most program participants were satisfied and felt the program was a worthwhile investment for their company. Participants offered a variety of suggestions for improvements, such as increased direct interactions between company management and program staff so that management could better understand the value of the program. Another suggestion was to assist participants in acquiring data (e.g., submetering and access to energy management software) prior to enrolling in the program.

- **Recommendation:** NYSERDA should review participants' feedback and determine which to implement.
  - **NYSERDA Response to Recommendation:** Pending. NYSERDA will review participants' feedback and determine which to implement.

## Q4 2022

### Codes and Standards for Carbon Neutral Buildings Market Evaluation

*Summary of Report Findings, Recommendations, and NYSERDA Response to Recommendations.*

Key findings and associated recommendations from the Codes and Standards for Carbon Neutral Buildings Market Evaluation include<sup>26</sup>:

**Finding #1. Estimated code compliance is increasing overall across the state since 2015.** According to Delphi Panels conducted in 2015, 2020, and 2022, code compliance has generally increased between 2015 and 2020 in both the residential and commercial building sectors and in construction activity (new construction or additions and alterations). However, code compliance increases have varied by year, building sector, and construction activity; from no increase for residential new construction between 2015 and 2020 to a 14% increase for commercial additions and alterations between 2020 and 2022.

Training survey respondents stated that they have seen an increase in code compliance and that NYSERDA played a role in this increase. However, the Delphi Panel also noted several building code components where compliance was below 80%, including commercial sector code provisions that require expert installation or other expert knowledge, such as thermal bridging, continuous air barrier installation quality, envelope insulation installation quality, and continuous air barrier, as well residential sector provisions for documentation, recessed lighting, and duct testing. Insights related to the timing of code changes and the impact on compliance for these components were not addressed in this evaluation.

- **Recommendation:** NYSERDA should review the component-level jurisdiction compliance rates to identify specific opportunities for more targeted training to increase code compliance for building components where compliance is low. In the commercial sector, these components include thermal bridging, continuous air barrier installation quality, envelope insulation installation quality, and continuous air barriers. In the residential sector, these components include documentation, recessed lighting, and duct testing.
  - **NYSERDA response to recommendation:** Implemented. NYSERDA has used Delphi Panel findings to inform the currently offered training and other programmatic efforts and will continue to do so going forward. Thermal bridging, in particular, will be an area of focus in future trainings.

**Finding #2. Jurisdictions continue to adopt stretch codes, and NYSERDA plays a key role in stretch code adoption.** Since the prior evaluation report, the number of jurisdictions adopting stretch codes has more than doubled, from 15 to 42 jurisdictions. NYSERDA has played a key role in promoting stretch code adoption, through code development and technical and financial assistance. NYSERDA's stretch code adoption technical expert support activities received mixed reviews: interviewees found the support provided by Clean Energy Community Coordinators and NYSERDA staff to be valuable, while several respondents were critical of the support provided by regional circuit rider contractors. Several jurisdictions also provided recommendations on improving how NYSERDA provides support, including making changes to the way the stretch code is presented and how training is provided.



- **Recommendation:** NYSERDA should convene jurisdictions that have adopted NYStretch in a short online debriefing session or focus group to deepen understanding of jurisdictional experience with program support—particularly with circuit riders/consultants—and identify opportunities for improvements with the greatest potential to increase program impact. These improvements can enhance NYSERDA’s future stretch code support work.
  - **NYSERDA response to recommendation:** Pending. NYSERDA plans to issue a survey to NYStretch adopters and the stakeholders NYSERDA worked with in this effort to better understand their experiences and explore areas for improvement.

**Finding #3. The Codes and Standards for Carbon Neutral Buildings Initiative continues to reach a very significant number of code officials and building professionals with trainings. Trainings resulted in a significant increase in self-reported understanding of energy codes, and more than half of training participants report that the trainings have influenced their approach to code compliance.**

Training records indicate that Code to Zero Initiative trained at least 9,220 code officials and building professionals since March 2020, filling 48,854 seats. Survey respondents reported a higher level of understanding of the ECCCNY and stretch codes following the training, that they applied what they learned in their work, and that they shared information with others. Survey results also suggest that there may be opportunities to improve the impact of specific trainings. While 91% of training participants said they intended to use what they learned, a smaller proportion (57%) of participants reported having made one or more changes the way they address code compliance issues six months after the training.

**Finding #4. While training attendees rated the courses highly overall, a few trainings received lower ratings and specific recommendations for improvement. These trainings included the “Performance-Based Compliance with ASHRAE Standard 90.1 2016” and the “2020 ECCCNY for Commercial Buildings: Overview” training.**

Specific recommendations from training participants were to improve the topic of what documentation must be submitted by code officials in the “Performance-Based Compliance with ASHRAE Standard 90.1 2016” and the inspection checklist topic in the “2020 ECCCNY for Commercial Buildings: Overview” training.

- **Recommendation:** Conduct follow-up analysis to identify the specific trainings that generated lower reported impact in terms of behavior changes and information sharing, as well as trainings with lower ratings, to identify and prioritize potential improvements. Review analysis with implementers to determine potential adjustments to the training materials.
  - **NYSERDA response to recommendation:** Pending. This recommendation will be implemented in the next planned evaluation.

**Finding #5. The initiative logic model would benefit by some minor refinements, to ensure that it and the evaluation fully capture NYSERDA's market influence.**

- **Recommendation:** Refine the initiative logic model to include the influence of the New Construction and Buildings of Excellence Initiatives, align outputs and outcomes to reflect expected near- and mid- to long-term outcomes, and complete an evaluability map.
- **NYSERDA response to recommendation:** Pending. This recommendation will be implemented as part of the next planned evaluation.

## Recommendation Tracking Updates

NYSERDA periodically reviews and tracks the status of recommendations that have been “pending” in quarterly CEF reports. As shown in Table 14, during Q3 2022, the following NYSERDA responses to recommendations were updated from “pending” since their presentation in these CEF quarterly reports, beginning with the 2021 Annual CEF Performance Report. For reference purposes, since early 2017, when NYSERDA began conducting CEF evaluations, 177 recommendations have been published. Of these, 125 have been implemented, 21 have been rejected and 31 are still pending.

From the 2021 Annual CEF Performance Report through Q3 2022, recommendation status from evaluation studies is as follows:

- No recommendations are still pending.
- Nine recommendations have since been implemented, as detailed in Table 14.
- One recommendation has since been rejected, as shown in Table 14.

**Table 2. Summary of CEF Evaluation Study Recommendations through Q3 2022**

Study Name	Published Date	Recommendation	New Status	Update
CleanTech Start Up and Manufacturing Corps Market Evaluation (2017–2020)	12/2021	Consider working with Incubators to design strategies to further motivate cleantech companies to leverage incubator services such as offering a bonus when a certain number of services are utilized.	Implemented	This guidance was leveraged in the design of the Incubator 2.0 PON that will incorporate this recommendation into future contract(s) with awardee(s).
CleanTech Start Up and Manufacturing Corps Market Evaluation (2017–2020)	12/2021	Consider updating the 2017 Characterizing New York State's Cleantech Ecosystem and the Role of NYSERDA's ICBD Program report in the months preceding the next market assessment. Include in this research a task to create a more comprehensive list of non-participant cleantech startup companies that can be leveraged in the next market assessment.	Implemented	NYSERDA hired a consultant to build out a participant and non-participant database, supporting adoption of this recommendation.

Table 14 continued

Study Name	Published Date	Recommendation	New Status	Update
Clean Energy Communities Impact Evaluation (2016–2018)	11/2021	For the majority of completed measures, the data submitted to Salesforce did not inform savings estimates. To improve documentation, consider increasing the level of detail in the post-installation documentation submitted to NYSERDA and for the key impact parameters used to claim gross annual impacts. Priority should be given to High Impact Actions (HIAs) that produce the highest future anticipated contribution of savings for the program overall.	Implemented	This recommendation has been implemented. Recommendation states that highest priority should be given to HIAs with the highest savings. Community Choice Aggregation (CCA) saves the most and provides much more robust data to the program to calculate savings. New data includes Utility Energy Registry (UER), Distributed Energy Resource (DER) [quantity by community, installed capacity, system type (solar, wind, hydro, solar)], CCA participation load, and number of participants.
Real Time Energy Management Impact Evaluation (2017–Q1 2020)	10/2021	Evaluators recommend stratifying by two dimensions to weight the sampled projects. The first dimension is facility type, and the second is facility size. This approach will allow for more accurate representation of the population along these dimensions.	Implemented	Evaluators have implemented this recommendation where sample sizes are sufficient.

**Table 14 continued**

<b>Study Name</b>	<b>Published Date</b>	<b>Recommendation</b>	<b>New Status</b>	<b>Update</b>
Energy Storage Market Evaluation	9/2021	To help reduce the uncertainty and time impacts of the permitting process, NYSERDA should continue to provide information on the benefits of energy storage, particularly to local jurisdictions, including non-technical, basic information on the benefits and rationale for adding energy storage in New York State. NYSERDA should work to expand efforts to support the permitting process through the siting team (e.g., hosting informational sessions with permitting agencies, working to increase standardization of permitting processes across jurisdictions) to provide a neutral third-party rationale and justification for energy storage projects in New York State. The siting team could further reduce permitting and siting barriers by expanding awareness and use of the New York State Battery Energy Storage System Guidebook.	Implemented	The program continues to support local jurisdictions and other stakeholder groups both technically and through reducing barriers observed in permitting and interconnection.
REV Campus Challenge Market Evaluation (2020–2021)	7/2021	Encourage campuses that do not have a strong understanding of clean energy opportunities on their campus (typically participant-level members and nonmembers) to take small steps to learn more about how their campuses use energy.	Implemented	N/A
REV Campus Challenge Market Evaluation (2020–2021)	7/2021	Provide members with guidance on best practices for communicating clean energy initiatives and opportunities to the broader campus community, including key stakeholders and students.	Implemented	N/A
REV Campus Challenge Market Evaluation (2020–2021)	7/2021	Assist campuses with translating the benefits of clean energy projects and initiatives into student- and community-facing materials, recognizing campus’s differing preferences for clean energy and sustainability communication. When designing materials, ensure that campuses take into consideration the accessibility of such materials by students who are not physically present on campus, as the COVID-19 pandemic may have resulted in some longer-term shifts in the way students interact with campuses.	Implemented	N/A

**Table 14 continued**

Study Name	Published Date	Recommendation	New Status	Update
REV Campus Challenge Market Evaluation (2020–2021)	7/2021	Support campuses with achieving broader recognition for clean energy and sustainability achievements, such as assisting with language or ideas for relevant press releases and on-campus signage, rather than just online recognition (on the NYSERDA website) for REV Campus Challenge members. Consider packaging this assistance as a toolkit that campuses can use when completing a clean energy achievement. Additionally, utilize social media accounts to help campuses promote their clean energy accomplishments.	Implemented	N/A
REV Campus Challenge Market Evaluation (2020–2021)	7/2021	Develop an understanding of the type of recognition best suited to each campus' specific situation to provide the most valuable type of recognition for each campus. For example, if a campus is in the process of retrofitting an existing building, recommend how the campus can leverage this project in its own marketing materials while simultaneously working with relevant organizations to provide recognition.	Rejected	Recommendation no longer relevant due to program changes.

## Appendix C Endnotes

- 1 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2022/2022-Commercial-Tenant-Impact-Evaluation-Report-20162021.pdf>.
- 2 In this study, a very small amount of fuel savings were eclipsed by ancillary savings due to interactive effects. Given this finding, and the conclusion that this tenant-based intervention is not in a position to meaningfully impact fuel use in central, common areas, NYSERDA did not apply the MMBtu RR in its reporting and the program will cease reporting MMBtu savings going forward.
- 3 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDAP12-Schools-Impact-Evaluation-ReportNovember-2022.pdf>.
- 4 Given these findings, NYSERDA did not apply the negative MMBtu RR to its reporting.
- 5 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No-1602180NYSERDAREV-Campus-Challenge-Impact-Evaluation-ReportOctober-2022.pdf>.
- 6 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDAEnergyManagementPracticesImpactEvaluationReportPhase1August2022.pdf>.
- 7 Bonneville Power Association - MT&R Guidelines Rev 9.0, Page 18 (<https://www.bpa.gov/EE/Policy/IManual/Documents/MTR-Reference-Guide-Rev9.pdf>)
- 8 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDA-Retrofit-Impact-CEF-Report-FinalOctober2022.pdf>.
- 9 The final study volumes can be found here: <https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Transportation>.
- 10 A quantification of the indirect energy impacts from this assessment will be reported in the CEF Q3 2022 report.
- 11 Final report can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Heat-Pump-Impact-Evaluation-Report-August-2022.pdf>.
- 12 In its reporting electric RR are applied to both electric savings and electric usage.
- 13 The Phase 2 M&V sample showed a higher share of such customers with at least one *system* that cooled a previously uncooled space.
- 14 Massachusetts and Rhode Island Electric and Gas Program Administrators. 2016. "Ductless Mini-Split Heat Pump Impact Evaluation." <<http://www.ripuc.ri.gov/eventsactions/docket/4755-TRM-DMSHP%20Evaluation%20Report%2012-30-2016.pdf>>
- 15 New York State Joint Utilities, "New York TRM Version 9," effective January 2022. [https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/\\$FILE/NYS%20TRM%20V9.pdf](https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/$FILE/NYS%20TRM%20V9.pdf)
- 16 New York State Joint Utilities, "NYS Clean Heat Statewide Heat Pump Program Manual Version 5," October 2021. <https://saveenergy.ny.gov/NYScleanheat/assets/pdf/NYS-Clean-Heat-Program-Manual.pdf>
- 17 NY TRM Version 9, active at the time of this writing and referenced below, states that "The baselines used in [the ASHP] measure are determined by the type of equipment that would have been installed without the influence of the program supporting the installation of this measure."
- 18 New York State Joint Utilities, "New York TRM Version 9," effective January 2022. [https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/\\$FILE/NYS%20TRM%20V9.pdf](https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/$FILE/NYS%20TRM%20V9.pdf)
- 19 New York State Joint Utilities, "NYS Clean Heat Statewide Heat Pump Program Manual Version 5," October 2021. <https://saveenergy.ny.gov/NYScleanheat/assets/pdf/NYS-Clean-Heat-Program-Manual.pdf>

- 20 <https://saveenergy.ny.gov/NYScleanheat/resources/>
- 21 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Residential-ccASHP-Building-Electrification-StudyAugust-2022.pdf>. A companion memo, which presents NYSERDA results in more depth can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/ccASHPMetering-Study-SummaryMemo--August-2022.pdf>.
- 22 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2023-03-Matter-No-16-02180-NYSERDA-CleanEnergyCommunities-Report.pdf>.
- 23 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2022-12-Matter-No-16-02180-NYSERDA-Energy-Efficiency-and-Electrification-Soft-Costs-2021-Report.pdf>.
- 24 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2022-12-MatterNo-16-02180-NYSERDA-WFD-Impact-and-Market-Report.pdf>.
- 25 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No-1602180NYSERDAEnergyManagementPracticesMarketEvaluationReportOctober2022.pdf>.
- 26 The final study can be found here: <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/2023-03-Matter-No-16-02180-NYSERDA-Codes-for-CN-Buildings-Y3-Evaluation-Report.pdf>.



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