Clean Energy Fund Quarterly Performance Report through June 2024

Final Report | August 2024

NEW YORK STATE | 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

Document Title
Clean Energy Fund Quarterly Performance Report through June 30, 2024

Revision Date	Description of Changes	Revision on Page(s)
August 29, 2024	Original Issue	

Clean Energy Fund Quarterly Performance Report through June 30, 2024

Final Report

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About The Clean Energy Fund and This Report

The Clean Energy Fund (CEF), approved by the Public Service Commission (PSC) Order on January 21, 2016[1] and later modified on September 9, 2021,[2] was established as a commitment to clean energy and efficiency measures, recognizing that deploying programs at scale has potential to address the pressing environmental and energy challenges, while providing enormous economic opportunity for New York State. The 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 Public Service 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.[3] The Climate Leadership and Community Protection Act (Climate Act), signed July 2019 and effective January 1, 2020, adopted this energy efficiency target, which puts the State on a path to complete carbon-neutrality across all sectors of the economy, including power generation, transportation, buildings, industry, and agriculture. In April 2022, the PSC approved an expansion to the NY-Sun program to further support efforts meeting the State's clean electricity goals. 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[4]
- 6,000 MW of Solar by 2025 and 10,000 MW of Solar by 2030
- 22 million tons of carbon reduction through Energy Efficiency and Electrification
- Minimum 35 percent 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.

The CEF is comprised of four distinct portfolios (CEF Portfolio):

- Market Development (MD)
- Innovation & Research (IR)
- NY-Sun
- NY Green Bank

This report provides a collective view of progress for all four portfolios against CEF targets (Figures 1 and 2) and further details quarterly and cumulative activity for the MD and IR portfolios through March 31, 2024 (Figure 3). The September 9, 2021, PSC Order requires quarterly reporting for the MD and IR portfolios which continue to include the following:

- Progress toward cumulative and annually-prorated incremental targets and budgets.
- Progress toward the CEF's contribution to New Efficiency: New York (NE:NY) targets.
- A performance summary discussion of key CEF initiatives.
- A summary of acquired benefits and projected benefits committed, compared to investment plan projections.

To meet these reporting requirements, this report document is accompanied by a scorecard (spreadsheet) that contains all plan and progress information related to CEF activity, also filed quarterly. This New York State Energy Research and Development Authority (NYSERDA) scorecard is consolidated with each State utility scorecard to publish data on Open NY, where it is available to all stakeholders. Finally, the publishing of these data sets coincides with a similar update to the Clean Energy Dashboard (CED), an interactive and dynamic tool first published in 2019 to improve accessibility and transparency of ratepayer-funded clean energy program reporting statewide.

NY-Sun reports progress quarterly within the NYSERDA scorecard and CED and is summarized in section 3 of this report. Quarterly reporting for NY Green Bank is similarly provided within NYSERDA's quarterly scorecard and the CED, but also within a separately filed report.[5]

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1 Clean Energy Fund Performance Overview

1.0 Progress Toward Aggregate Clean Energy Fund Goals

Figures 1 and 2 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 March 31, 2024, and nets out overlap across portfolios where it is known to occur. Plans depicted throughout this report reflect the February 28, 2024 Compiled Investment Plan (CIP) filing made by NYSERDA and later approved by DPS March 28, 2024.

Figure 1 captures the status of CEF funding while Figure 2 depicts progress of the combined portfolios against the latest CEF ordered benefit targets. Figures 1 and 2 should be viewed together to properly relate investments to results. In each of these visuals, combining what has been expended/acquired with encumbered/committed results demonstrates NYSERDA's total progress toward CEF targets, while adding in the remaining expected (planned) values serves to illustrate the full potential in NYSERDA's programmed portfolios.

Figure 1. Clean Energy Fund Portfolio Expected Investment versus Targets

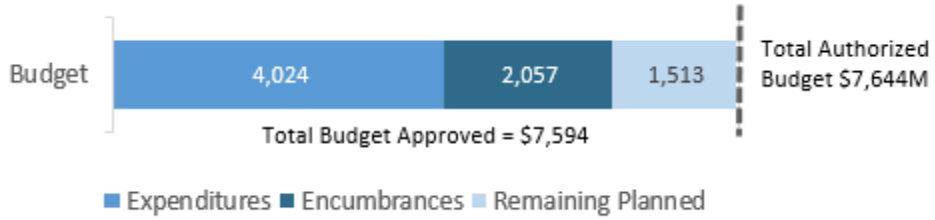


Figure 1 Supporting data		Total Authorized Budget	Budget Approved		Expended Funds		Encumbered Funds		Remaining Planned		Funding Not Yet Approved
			Current Total	% of Authorized	Current Total	% of Authorized	Current Total	% of Authorized	Total Balance	% of Authorized	
Market Development (MD)	Program Funds	$ 2,399.7 M	$ 2,327.6 M	98%	$ 1,279.5 M	54%	$ 676.3 M	28%	$ 371.8 M	16%	$ 44.4 M
	NYS Cost Recovery Fee		$ 27.7 M		$ 15.9 M		$ 0.0 M		$ 11.8 M		
Innovation & Research (IR)	Program Funds	$ 631.7 M	$ 623.0 M	100%	$ 272.8 M	44%	$ 222.0 M	35%	$ 128.2 M	21%	$ 1.6 M
	NYS Cost Recovery Fee		$ 7.1 M		$ 3.0 M		$ 0.0 M		$ 4.0 M		
MD and IR combined	Administration	$ 274.4 M	$ 270.4 M	99%	$ 203.5 M	74%	$ 0.0 M	0%	$ 66.9 M	24%	$ 4.0 M
	Evaluation	$ 124.2 M	$ 124.2 M	100%	$ 44.1 M	35%	$ 13.1 M	11%	$ 67.1 M	54%	$ 0.0 M
	MD and IR Total	**$ 3,430.0 M**	**$ 3,380.0 M**	**99%**	**$ 1,818.9 M**	**53%**	**$ 911.4 M**	**27%**	**$ 649.7 M**	**19%**	**$ 50.0 M**
NY-Sun	Program Funds	$ 3,162.8 M	$ 3,162.8 M	100%	$ 1,218.2 M	39%	$ 1,145.1 M	36%	$ 799.5 M	25%	$ 0.0 M
	NYS Cost Recovery Fee	$ 41.8 M	$ 41.8 M	100%	$ 11.4 M	27%	$ 0.0 M	0%	$ 30.4 M	73%	$ 0.0 M
	Administration	$ 58.8 M	$ 58.8 M	100%	$ 26.5 M	45%	$ 0.0 M	0%	$ 32.3 M	55%	$ 0.0 M
	Evaluation	$ 3.5 M	$ 3.5 M	100%	$ 1.5 M	43%	$ 0.5 M	15%	$ 1.5 M	42%	$ 0.0 M
	NY-Sun Total	**$ 3,266.8 M**	**$ 3,266.8 M**	100%	**$ 1,257.6 M**	**38%**	**$ 1,145.6 M**	**35%**	**$ 863.7 M**	**26%**	$ 0.0 M
NY Green Bank	**Total**	**$ 947.1 M**	**$ 947.1 M**	**100%**	**$ 947.1 M**	**100%**	**$ 0.0 M**	-	**$ 0.0 M**	**-**	**-**
CEF Total		**$ 7,643.9 M**	**$ 7,594.0 M**	**99%**	**$ 4,023.6 M**	**53%**	**$ 2,057.0 M**	**27%**	**$ 1,513.4 M**	**20%**	**$ 50.0 M**

- 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.

- NY-Sun totals shown here exclude $397 million in non-CEF NYSERDA funded solar projects (see Table 12). Reporting on this figure previously included $289 million for a non-CEF NYSERDA program historically focused on funding solar projects. Recent analysis has concluded that the project mix has expanded significantly into efficiency projects which cannot be disaggregated, and therefore this program will now be excluded from Solar PV reporting.

The summary of benefit progress reflects evaluated totals, incorporating verified gross acquired savings where evaluations have been completed, and reflects gross savings values elsewhere. Through Q2 2024, measurement and verification activities have resulted in an adjustment to gross energy savings by approximately -3.2 TBtu. Indirect benefits from market transformation are included in acquired totals where they have been quantified through evaluation, now totaling approximately 5.9 TBtu energy savings. Conservative estimates of indirect benefits are also included in the remaining plans generally reflecting 50 percent of the anticipated achievement as is consistent with other plan filings that account for uncertainty in timing and potential overlap across the portfolio that has yet to be fully evaluated.

Figure 2. Clean Energy Fund Portfolio Expected Benefits versus Targets

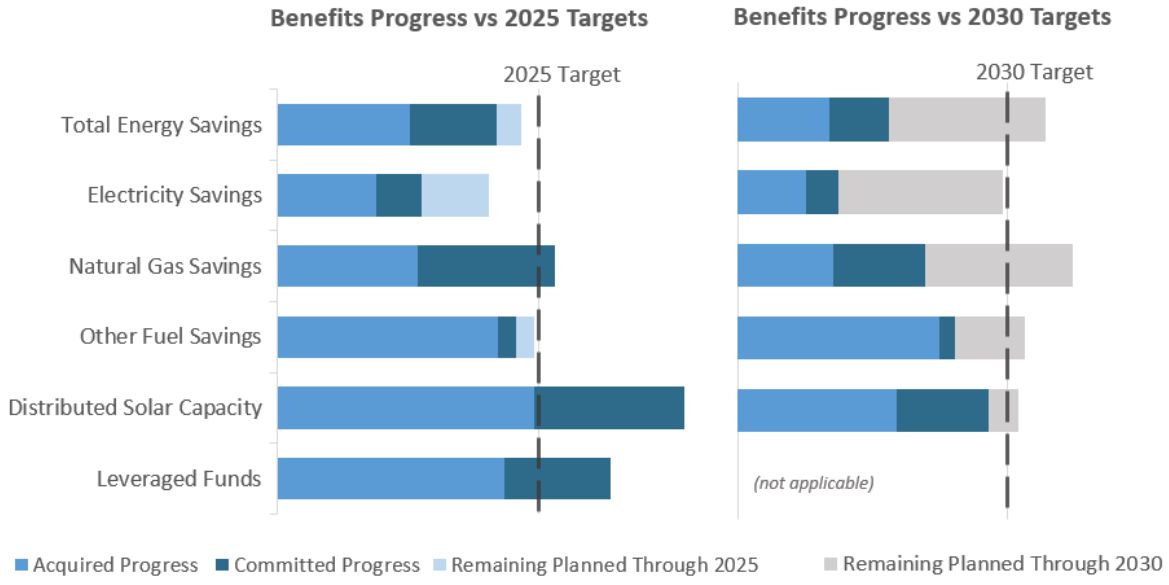


Figure 2 Supporting Data	Acquired Progress	Committed Progress	Remaining Planned Through 2025	Total Expected Through 2025	2025 Order Target	Remaining Planned Through 2030	Total Expected Through 2030	2030 Order Target
Total Energy Savings (MMBtu equivalent, millions)	26.9	17.6	5.0	49.5	53.0	45.9	90.4	79.0
Electricity Savings (MWh, millions)	2.5	1.2	1.7	5.4	6.7	6.1	9.8	10.0
Natural Gas Savings (MMBtu, millions)	13.5	13.0	-	24.4	25.0	20.7	47.2	38.0
Other Fuels Savings (MMBtu, millions)	12.7	1.0	1.1	14.8	15.0	4.5	18.1	17.0
Distributed Solar Capacity (Renewable MW)	5,889	3,429	-	9,319	6,000	1,078	10,397	10,000
Leveraged Funds ($ millions)	$17,369	$8,081	-	$25,451	$20,000	-	$25,451	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)	44.5	→	90%	84%		49%	56%
Electricity Savings (MWh, millions)	3.7		68%	55%		38%	37%
Natural Gas Savings (MMBtu, millions)	26.5		109%	106%		56%	70%
Other Fuels Savings (MMBtu, millions)	13.7		93%	91%		75%	80%
Distributed Solar Capacity (Renewable MW)	9,319		100%	155%		90%	93%
Leveraged Funds ($ millions)	$25,451		100%	127%		100%	n/a

Table notes are on the next page

- Energy savings values are annual; Total Energy Savings measures the combined Electricity and Fuel savings net of usage; therefore, values will not sum to the total of individual electric and fuel savings values.
- CEF initiatives not dedicated to building energy efficiency (Electric Vehicles - Rebate, Combined Heat and Power, and Fuel Cells) have been excluded from progress and plans toward the first four energy saving targets shown above.
- Overlap where it is known or perceived to exist between portfolios has been removed from progress reported.
- Distributed Solar Capacity includes 1,438 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.
- Leveraged Funds progress here includes non-CEF NYSERDA funded solar projects of $1,961 million acquired and $113 million committed, consistent with overall reporting toward CEF distributed solar targets which include all solar statewide.
- Leveraged Funds Total Expected benefit values do not currently include any anticipated indirect impacts.
- 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.
- Benefits metrics that have not been given 2030 Targets in the Order are shown as "not applicable."

As Figures 1 and 2 illustrate, NYSERDA has made significant progress positioning the collective portfolios to achieve the CEF Order Targets on both 2025 and 2030 timelines. An explanation of progress and the current portfolio mix is as follows:

- Just over eight years into the ten-year CEF commitment timeline (~80%), every metric with the exception of electricity savings is at or above a linear 80% measure of progress when comparing the total committed benefits through the current quarter, and this progress will only be bolstered as more evaluation studies enable reporting of indirect impacts from earlier years of the CEF.
- Near-term projections for Total Energy Savings (MMBtu equivalent) through 2025 continue to show the effects of current clean energy and broader market challenges (supply chain disruptions, skilled labor availability, increased construction costs) however NYSERDA maintains confidence in the ability of the CEF portfolio to deliver the overall impact outlined by CEF 2030 Targets.
- Projects delivering electricity savings remain behind the pace of fuel savings as illustrated by the Figure 2 visual, but the strong foundation of fuel-related projects, of which significant savings are already considered acquired in the portfolio, is boosting the near-term 2025 view and firming up the overall potential for 2030 achievement.

- Renewable energy capacity MW continues to progress well against the 2025 target as a result of the continued success of NY-Sun which is on a trajectory to achieve the target early. The portfolio is also well positioned to achieve the expanded 2030 target of 10 GW.
- Leveraged funding acquired and committed progress is outpacing other metrics due to strong NY-Sun and Innovation & Research returns.

The September 2021 CEF Order included a target regarding equity for disadvantaged communities (DACs), specifically that a minimum of 35 percent of the benefits of CEF investments would accrue to disadvantaged communities. On November 15, 2023, NYSERDA filed with the PSC its first Disadvantaged Communities Report for ratepayer funded programs, which included place-based investments and benefits across the Clean Energy Fund portfolio covering years 2020 - 2022. Another filing spanning years 2020 – 2023 was made in March 2024 and summarized in NYSERDA's CEF Annual Report. Reporting requirements outlined by DPS are aligned with a broader statewide effort, where NYSERDA is working with other State agencies and stakeholders, including the Climate Justice Working Group and the Department of Environmental Conservation, to establish a statewide benefits/ metrics framework and reporting system for the Climate Act disadvantaged community mandate. This annual statewide report would include place-based investments across all funds, not just CEF, and is expected to be compiled and released early 2025.

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

Annual Benefits Metrics ** Direct + Indirect Benefits ** Overlap Accounted	Acquired Progress	Committed Progress	Total Progress as of Current Reporting Period	2025 Order Expectation (Anticipated Benefit)	2030 Order Expectation (Anticipated Benefit)
Emissions Reductions (CO2e Metric Tons, millions)	6.3	3.6	9.9	9.0	14.0
Participant Bill Savings ($ millions)	$1,184	$747	$1,931	n/a	n/a

- 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.

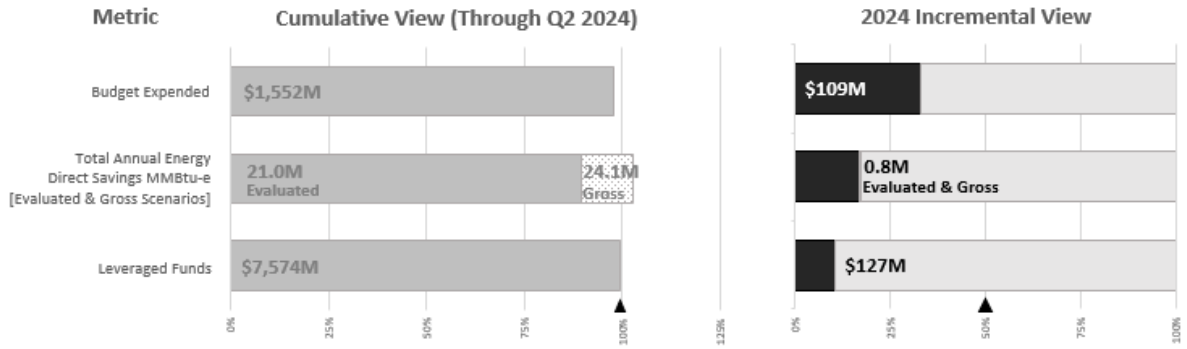
2 Market Development and Innovation & Research Performance

On May 20, 2022, NYSERDA filed a comprehensive update to all MD and IR portfolio plans in the first edition of the Compiled Investment Plans (CIP), as prescribed in the CEF Order. These plans convey expected funding and benefit progress for each initiative, which are used to gauge progress over time as outlined in these quarterly reports and elsewhere. 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 as well as to learn from the market. On November 1, 2023, NYSERDA completed the annual filing which was approved by DPS in December and took effect on January 1, 2024. In February NYSERDA filed an update to the CIP which was later approved by DPS in March. Reporting for Q2 2024 reflect the plans filed in February. More recently, NYSERDA filed an update to the CIP on July 3, 2024 which was later approved by DPS in August. These plans will be reflected in NYSERDA's Q3 2024 CEF Report and they will serve as the basis for year-end reviews. NYSERDA closely monitors progress of the portfolios towards CEF benefits targets using both cumulative and incremental measures, which can be reviewed in granular detail for the portfolio and for each program and metric within the Clean Energy Dashboard.

Figure 3 provides a high-level view of NYSERDA's MD and IR portfolio performance to plan, measuring progress toward expended funding and acquired direct benefit plans through Q2 2024. Key points to understand the data presented in Figure 3 include:

- The Cumulative View (Through Q2 2024) represents years 2016–2023, plus two quarters of 2024; 100 percent in this view represents the cumulative *planned* amounts for that timeframe, prorated to enable comparison of progress through the current quarter.
- The 2024 Incremental View represents progress reported in the current calendar year against the current calendar year plan in total, with an expectation that 100 percent of the plan should be achieved by year-end. This secondary measure helps NYSERDA monitor and assess specific trends throughout the year. Progress illustrated in this view can be influenced by how NYSERDA finishes the previous year as those plans represent an estimate; the portfolio may start the new year either ahead or behind the forecasted finish 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.
- 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 & Research Progress and Performance



Through Q2 2024, NYSERDA's cumulative progress of these three benchmark measures remains strong, though the incremental view shows slower progress toward the 2024 plan. Progress toward expenditure goals slowed in Q2 and total energy savings continued to lag which is assessed in greater detail for the Top 15 Energy Savings Impact initiatives in Table 2 that follows. Innovation & Research projects report leveraged funding progress on a lag which is helpful when assessing how cumulative progress towards goals through Q2 remain on track while incremental progress for the year suggests a shortfall. The portfolio is on track overall for this metric, and lagged reporting of these benefits will continue to give the appearance of a gap to plan in the current year.

Top Energy Impact Initiative Performance Summary

In NYSERDA's Market Development portfolio, 15 key initiatives currently account for approximately 91 percent of the expected total energy saving benefits (represented by equivalent annual MMBtu) and 51 percent of the total approved Market Development budget. These initiatives warrant special attention due to the weight they carry in terms of the overall success of the CEF in delivering expected benefits and are characterized in greater detail in Table 2 that follows.

Table 2. Performance Summary for Market Development's Top Energy Impact Initiatives

Cumulative progress to plan is measured on a prorated basis through Q2 as described in detail for Figure 3 above. Budget Percent Performance is progress against approved funding expenditure plans while Energy Percent Performance is progress against the equivalent annual MMBtu acquired plan. Benefits analysis conducted with both Gross and Verified Gross (evaluated) direct savings where applicable.

MMBtu Impact Rank	Initiative	Cumulative Progress (% Performance To Plan) Budget %	Savings Type	Energy %	Progress Narrative
1	Energy Management Technology	101%	Gross: Evaluated:	85% 37%	Progress of budget expenditures are trending favorably through Q2 2024 though energy benefits still lag plan. An evaluation of verified gross savings significantly reduced energy savings 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, which creates a delay in acquiring projects. A second evaluation concluded in 2023 showing improved realization rates and a third study is underway now with a target completion timeframe of Q1 2025. This final study will be instrumental in assessing the full impact of the program and enabling NYSERDA to establish clear expectations for program benefits reporting and forecasts. Several large projects anticipated for completion early in 2024 have experienced some delays but are still expected to be completed before the end of 2024. Another evaluation study is also commencing to update realization rates and quantify indirect benefits from this program. This combined impact and market evaluation will be undertaken on Real Time Energy Management in 2024 and future quarterly reports will detail results as studies conclude.
2	Technical Services	112%	Gross: Evaluated:	114% 115%	Progress of budget expenditures and benefits remains strong. Commercial funds were fully committed by Q2 2024 and additional funding of $9.6M was approved August 7, 2024 in a Compiled Investment Plan filing. An impact evaluation is planned to begin Q4 2024 and future reports will detail results.

Table 2 continued

MMBtu Impact Rank	Initiative	Cumulative Progress (% Performance To Plan) Budget %	Savings Type	Energy %	Progress Narrative
3	Product and Appliance Standards	91%	Gross: Evaluated:	n/a n/a	Progress of budget expenditures is trending well through Q2. Work is underway to implement standards approved in 2023 with the launch and expansion of the statewide compliance program. This initiative forecasts all impacts as indirect savings; those benefits will be reported in the future as evaluation studies conclude and the market impact over time is understood. An evaluation is underway and is expected to conclude in mid-2025. Future quarterly reports will detail findings.
4	Building Operations and Maintenance Partnerships	109%	Gross: Evaluated:	68% 83%	While acquired energy savings is tracking slightly behind plan due to some project delays and some projects completing only partial training scopes of work, the program continues to receive new applications each month through the open enrollment process and new service providers are bringing in new participants. The current pipeline of projects expected to close in 2024 will likely fall below forecasted values due to some cancellations, reduced training scopes, and extensions into 2025. An updated impact evaluation is underway and is projected to be completed later in 2024. Future reports will detail results.
5	Market Challenges	97%	Gross: Evaluated:	75% n/a	Commercial and Industrial Carbon Challenge re-opened for competitive funding in the consolidated funding application in Q2 2024. Carbon Challenge awards from previous rounds are moving forward with slight delays. The Empire Building Challenge demonstration projects are in the early stage of implementation and benefits will begin to be acquired in Q4 2024. The third round of Empire Building Challenge projects are expected to be selected in Q4 2024. An evaluation is anticipated to begin in early 2025 and future reports will detail results.
6	Electric Vehicles – Rebate	100%	Gross: Evaluated:	139% 100%	Inactive. 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, and no identified sales increase beyond incentives that could be linked to program funding, no indirect savings were estimated as part of this study. Evaluation studies will continue to assess indirect impacts going forward.

Table 2 continued

MMBtu Impact Rank	Initiative	Cumulative Progress (% Performance To Plan) Budget %	Savings Type	Energy %	Progress Narrative
7	LMI Multifamily	97%	Gross: Evaluated:	64% 59%	The program saw significant progress in new projects for Q2 2024 with $23M committed to support the next tranche of retrofit projects for New York State Homes and Community Renewal (HCR) through the Clean Energy Initiative. NYSERDA continues to allocate funds to existing New York City Housing Preservation and Development (HPD) projects through the Retrofit Electrification Pilot as well. Acquired savings are lagging but are expected to improve by year end, pending the completion of HCR's next funding round and Multifamily Performance Program projects meeting NYSERDA deadlines. Further savings are expected to be realized later in Q4 2024 from HPD projects awarded through the new Resilient and Equitable Decarbonization Initiative for Existing Buildings Program. The Multifamily Technical Services offering continues to see an uptick in demand for LMI studies through increased outreach and partnerships. NYSERDA expects to commit additional funds in Q3 and Q4 of 2024 through the launch of two new initiatives – FlexTech "Lite" which will provide 100% cost share to LMI buildings, and On-Site Energy Manager. An evaluation of MPP is underway now and future reports will detail results.
8	Industrial Transition	99%	Gross: Evaluated:	106% 98%	Inactive. Projects continue to close out and the program is performing consistently on both budget and energy benefits, noting that three projects remain open with anticipated completion by Q4 2024. Evaluation assessment has confirmed the energy performance of this program with a strong realization rate. A final assessment of performance is underway with scheduled completion by Q4 2024.
9	Energy Management Practices	105%	Gross: Evaluated:	79% 88%	Industrial On-site Energy Manager and Strategic Energy Management both saw an increase in applications in Q2 2024 resulting in positive market response; budgets and energy savings metrics are trending in a positive direction. An evaluation study focusing on the Industrial component of Energy Management Practices was complete in Q2 2024 showing strong realization rates for both programs.
10	Codes and Standards for Carbon Neutral Buildings	98%	Gross: Evaluated:	n/a n/a	Core work for code advancement and training is moving forward expeditiously and proposals for the next State code update have been released publicly by The Department of State. This initiative forecasts all impacts as indirect savings and, through ongoing evaluation studies, measured indirect benefits have exceeded plan for the period of study (260%). The latest study completed Q1 2024 shows that NYSERDA's long-standing engagement in this space is responsible for approximately 3.4 TBtu of energy savings during the period 2017-2023, of which approximately 1.7 TBtu is reflective of CEF-specific efforts. An update to this study is underway now with results anticipated Q1 2025.

Table 2 continued

MMBtu Impact Rank	Initiative	Cumulative Progress (% Performance To Plan) Budget %	Savings Type	Energy %	Progress Narrative
11	New Construction – Market Rate	110%	Gross: Evaluated:	92% 92%	The initiative continues to perform well on both budget and energy benefits, with the greatest expenditure activity this quarter coming from the Carbon Neutral Community Economic Development/Building Cleaner Communities Competition (BCCC) program and significant expenditures also coming from the New Construction-Commercial, New Construction-Housing, and Buildings of Excellence (BOE) programs as projects advance through construction stages toward completion. The next round of BCCC and BOE were launched in Q2. A single-family competition, Building Better Homes, is set to launch in Q4. An evaluation focusing on multifamily and commercial projects is underway now and future quarterly reports will detail results.
12	Clean Energy Communities	101%	Gross: Evaluated:	256% 103%	Progress of budget expenditures and energy benefits continues to trend favorably in Q2 2024 with 58% of the municipalities in the state participating in the program. A surge of program activity has taken place since the program update took effect December 2023 and communities remain engaged in the program as they actively work toward grant thresholds. NYSERDA has confirmed the shift to indirect metrics through an independent third-party review and is currently undertaking an evaluation assessment, anticipated to be complete Q2 2025, confirming the indirect benefits for the program through program year 2023.
13	Clean Green Campuses	99%	Gross: Evaluated:	46% 101%	All funding is now fully committed. As projects are completed, excess funding will be recommitted to complete a College Decarbonization Playbook underway and provide continued outreach support to the sector.
14	P-12 Schools	102%	Gross: Evaluated:	59% n/a	Acquired savings for 2024 will fall short of the target as two large projects experienced delays that should be resolved in 2025. An update to the impact evaluation is postponed until 2025 to allow more time for participants to implement measures.
15	Heat Pumps Phase 2 (2020)	93%	Gross: Evaluated:	n/a n/a	Progress of expenditures is generally strong. This initiative forecasts all impacts as indirect savings and to date, NYSERDA has measured nearly 1 TBtu of equivalent energy savings covering period 2020 - 2022, considerably higher than the forecast savings for that same time period.

2.0 Quarterly Benefits Progress Versus Plan

Table 3. Market Development and Innovation & Research Portfolio—Annual Direct Benefits

The table that follows represents all Market Development and Innovation & Research initiatives and their associated direct benefits. 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. Note measurement and verification activities have reduced gross savings by approximately 3.2 TBtu through the second quarter.

Annual Benefits Metrics	**Evaluated Totals** (verified gross where evaluated; gross where not)								
Market Development Innovation & Research ** Direct Only **	**Planned Incremental Acquired Benefits in Current Year**	**Current Year Acquired Benefits Through Current Quarter**	**Cumulative Acquired Benefits Through Current Quarter**	**Committed Benefits as of Current Quarter** (Committed but not acquired)	**Total Progress as of Current Quarter** (Total Acquired + Committed)	**Total Expected Benefits Through 2025**	**Total Progress as % of Total Expected Benefits Thru 2025**	**Total Expected Benefits Through 2030**	**Total Progress as % of Total Expected Benefits Thru 2030**
Total Energy Savings (MMBtu)	4,591,294	775,077	20,980,483	17,247,607	38,228,090	32,175,206	119%	46,900,630	82%
Electricity Savings (MWh)	627,022	77,685	2,102,934	1,315,259	3,418,193	3,438,563	99%	4,269,196	80%
Total Fuel Savings (MMBtu)	3,217,504	536,263	23,313,825	14,009,725	37,323,550	30,710,831	122%	42,833,288	87%
Natural Gas Fuel Savings (MMBtu)	2,816,674	464,840	10,332,843	13,034,862	23,367,706	16,805,389	139%	27,601,923	85%
Other Fuel Savings (MMBtu)	400,830	71,423	12,980,982	974,863	13,955,845	13,905,442	100%	15,231,365	92%
Renewable Energy Generation (MWh)	38,483	2,221	278,810	52,958	331,768	311,921	106%	313,321	106%
Renewable Energy Capacity (MW)	1	1	436	2	437	798	55%	2,593	17%
Total Leveraged Funds ($M)	$1,193	$127	$7,574	$3,734	$11,309	$9,581	118%	$13,093	86%

- Verified savings as a percent of total reported direct savings varies by metric and includes electricity (62% verified), natural gas (65%), and other fuels (13%). 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.
- 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.
- 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 4. Market Development and Innovation & Research Portfolio—Annual Indirect Benefits

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 studies which will occur gradually and grow over time, depending upon the period of each study, which varies from one initiative to another. More information on the Evaluation, Measurement, and Verification can be found in section 4 of this report. Note approximately 5.9 TBtu of indirect benefits have been quantified through evaluation. NYSERDA makes conservative estimates of indirect benefits, generally reflecting 50 percent of the remaining planned, anticipated achievement, accounting for uncertainty in timing and potential overlap across the portfolio that has yet to be fully evaluated.

Market Development ** Indirect Only **	Cumulative Indirect Benefits Evaluated Through Previous Period	Indirect Benefits Evaluated in Current Reporting Period	Total Indirect Benefits Evaluated Through Current Reporting	Total Indirect Benefits Expected Through 2025	Total Indirect Benefits Evaluated as % of Total Expected Through 2025	Total Indirect Benefits Expected Through 2030	Total Indirect Benefits Evaluated as % of Total Expected Through 2030
Total Energy Savings (MMBtu equivalent)	5,925,893	6	5,925,900	19,789,917	30%	49,590,256	12%
Electricity Savings (MWh)	658,734	2	658,736	2,360,097	28%	5,918,118	11%
Total Fuel Savings (MMBtu)	3,965,430	-	3,965,430	12,899,165	31%	31,430,770	13%
Natural Gas Fuel Savings (MMBtu)	3,156,410	-	3,156,410	7,620,755	41%	19,614,530	16%
Other Fuel Savings (MMBtu)	809,020	-	809,020	5,278,410	15%	11,816,240	7%
Renewable Energy Generation (MWh)	478,683	-	478,683	640,347	75%	1,013,935	47%
Renewable Energy Capacity (MW)	58	-	58	122	48%	270	21%

- Indirect benefits are reported for the initiatives and specific time periods for which studies have concluded; these impacts will be added over time as additional studies conclude, regularly growing these evaluated totals.
- Cumulative Indirect Benefits Evaluated Through Previous Period reflects the total reported indirect benefits as of the period, but not necessarily all indirect savings anticipated through the reporting period, since additional studies will likely conclude for past periods and add to these overall figures.
- Total Indirect Benefits Evaluated Through Current Reporting Period, Total Energy Savings updated to include Energy Usage which is not presented as its own metric on this table. Of reported Electricity Usage, 84,155 MWh is netted in the Total Energy Savings calculation.
- Indirect leveraged funding will be captured with future assessments.

2.1 Quarterly Budgets Progress Versus Plan

Table 5. Market Development Initiatives by Focus Area—Budgets and Spending

See endnote section for more information.[6,7,8]

Market Development Focus Area | Initiative	Current Year Expenditures Plan	Current Year Expenditures Through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered)	Total Expected Expenditures Through 2025	Total Progress as % of Total Expenditures Through 2025	Total Expected Expenditures Through 2030	Total Progress as % of Total Expenditures Through 2030
Clean Heat & Cooling								
Heat Pumps Phase 1 (2017)	$1,579,931	$462,618	$2,509,697	$57,401,481	$57,341,685	100%	$57,491,685	100%
Heat Pumps Phase 2 (2020)	$9,074,502	$3,991,510	$16,349,493	$49,778,085	$45,951,366	108%	$61,193,408	81%
Renewable Heat NY - Clean and Efficient Biomass Heating	$256,728	$97,501	$154,518	$13,375,763	$13,410,575	100%	$13,410,575	100%
Solar Thermal Transition	-	-	-	$287,513	$287,513	100%	$287,513	100%
Clean Heat & Cooling Total	**$10,911,161**	**$4,551,629**	**$19,013,707**	**$120,842,842**	**$116,991,139**	**103%**	**$132,383,181**	**91%**
Codes and Standards, & Other Multisector Initiatives								
Codes and Standards for Carbon Neutral Buildings	$9,650,000	$3,125,447	$10,913,961	$30,194,571	$34,613,243	87%	$52,000,000	58%
Information Products and Brokering	$350,000	(182000)	$392,888	$2,644,049	$3,216,057	82%	$5,500,000	48%
Market Characterization & Design Market Development	$3,573,106	$1,126,734	$4,299,319	$23,353,814	$24,345,245	96%	$24,758,269	94%
Product and Appliance Standards	$4,525,000	$1,658,253	$7,005,409	$12,703,994	$13,574,991	94%	$20,699,000	61%
REV Connect	$2,800,000	$882,458	$4,532,201	$11,199,666	$10,740,000	104%	$13,000,000	86%
Codes and Standards, & Other Multisector Initiatives Total	**$20,898,106**	**$6,610,892**	**$27,143,777**	**$80,096,094**	**$86,489,537**	**93%**	**$115,957,269**	**69%**
Commercial / Industrial / Agriculture								
Advancing Agricultural Energy Technologies	$500,000	-	$1,297,760	$2,104,449	$2,104,449	100%	$2,104,449	100%
Agriculture Transition	-	-	-	$3,598,821	$3,598,821	100%	$3,598,821	100%
Clean Green Campuses	$2,350,000	$701,998	$6,664,988	$21,357,861	$18,436,772	116%	$21,650,002	99%
Commercial Transition	$80,000	$362,633	$160,290	$12,359,688	$12,261,797	101%	$12,424,397	99%
Energy Management Practices	$3,474,680	$2,142,835	$5,609,997	$23,821,680	$22,777,326	105%	$26,976,778	88%
Energy Management Technology	$8,698,116	$3,014,055	$26,724,687	$85,529,534	$79,191,678	108%	$108,298,861	79%
Greenhouse Lighting and Systems Engineering	$487,486	$222,789	$2,675,513	$6,880,000	$4,917,724	140%	$5,000,000	138%
Industrial Transition	$329,867	$8,148	$478,088	$45,259,688	$46,046,872	98%	$46,046,872	98%
Market Challenges	$23,208,869	$10,241,279	$80,309,049	$110,938,408	$68,048,118	163%	$130,132,457	85%
P-12 Schools	$2,950,000	$1,925,294	$31,012,646	$42,517,006	$18,637,406	228%	$57,600,000	74%
Pay for Performance	-	$4,824	$79,417	$1,778,747	$1,709,226	104%	$1,709,226	104%
Real Estate Tenant	$282,757	$189,263	$491,181	$14,689,344	$15,003,316	98%	$15,798,390	93%
Technical Services	$9,967,990	$6,356,430	$42,417,916	$84,995,551	$55,884,390	152%	$88,252,737	96%
Commercial / Industrial / Agriculture Total	**$52,329,764**	**$25,169,548**	**$197,921,533**	**$455,830,777**	**$348,617,895**	**131%**	**$519,592,988**	**88%**
Communities								
Clean Energy Communities	$9,111,101	$3,576,455	$19,442,352	$53,724,550	$48,245,638	111%	$66,271,963	81%
Community Energy Engagement	-	-	-	$4,388,546	$4,388,546	100%	$4,388,546	100%
Communities Total	**$9,111,101**	**$3,576,455**	**$19,442,352**	**$58,113,096**	**$52,634,184**	**110%**	**$70,660,509**	**82%**

Table 5 continued

Market Development Focus Area | Initiative	Current Year Expenditures Plan	Current Year Expenditures Through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered)	Total Expected Expenditures Through 2025	Total Progress as % of Total Expenditures Through 2025	Total Expected Expenditures Through 2030	Total Progress as % of Total Expenditures Through 2030
Low-to-Moderate Income								
Healthy Homes Feasibility Study	-	-	$32,865	$212,147	$212,147	100%	$212,147	100%
Heat Pumps Phase 2 (2020)	$5,305,840	$166,468	$2,467,154	$10,499,684	$19,581,902	54%	$30,000,000	35%
LMI Multifamily	$21,793,068	$6,033,227	$78,532,106	$126,133,754	$90,265,270	140%	$179,328,622	70%
LMI Outreach & Engagement	$1,864,482	$427,880	$1,434,824	$4,719,220	$7,418,473	64%	$8,467,401	56%
LMI Pilots	$397,717	$106,583	-	$852,665	$1,648,099	52%	$2,443,533	35%
Low Rise New Construction Transition - LMI	$375,000	$104,153	$423,521	$7,899,646	$7,920,376	100%	$7,920,376	100%
Multifamily New Construction Transition - LMI	$1,540,000	$87,798	$1,043,811	$7,644,472	$7,970,981	96%	$7,970,981	96%
New Construction - LMI	$12,041,800	$8,473,728	$76,186,831	$124,779,977	$68,100,606	183%	$135,131,363	92%
NYS Healthy Homes Value Based Payment Pilot	$4,159,810	$535,157	$660,794	$3,564,561	$9,791,294	36%	$9,791,294	36%
Regional Clean Energy Hubs	$14,698,862	$2,217,748	$31,548,229	$39,342,700	$36,062,733	109%	$47,000,000	84%
RetrofitNY - LMI	$700,000	$647,844	$3,313,100	$8,718,943	$7,772,759	112%	$8,918,410	98%
REVitalize	-	-	-	$291,424	$291,424	100%	$291,424	100%
Single Family - Low Income	-	$300,656	$874,126	$248,785,463	$249,028,568	100%	$249,028,568	100%
Single Family - Moderate Income	$3,450,000	$1,977,295	$573,280	$98,679,021	$102,751,836	96%	$102,751,836	96%
Solar for All	$1,348,048	$132,986	$7,022,967	$12,697,024	$8,360,581	152%	$13,011,046	98%
Low-to-Moderate Income Total	**$67,674,627**	**$21,211,524**	**$204,113,607**	**$694,820,700**	**$617,177,049**	**113%**	**$802,267,000**	**87%**
Multifamily Residential								
Energy Management Technology	$1,627,603	$864,621	$3,126,116	$10,706,272	$11,164,276	96%	$14,099,239	76%
Market Challenges	$2,986,634	$1,235,995	$5,712,364	$9,782,393	$9,680,748	101%	$13,300,000	74%
Multifamily Low Carbon Pathways	$4,173,801	$665,428	$9,216,952	$11,382,709	$10,540,699	108%	$19,670,380	58%
Multifamily Market Rate Transition	-	-	-	$156,214	$156,214	100%	$156,214	100%
Technical Services	$4,739,021	$2,619,262	$10,956,688	$22,112,500	$17,477,400	127%	$30,717,634	72%
Multifamily Residential Total	**$13,527,058**	**$5,385,306**	**$29,012,120**	**$54,140,086**	**$49,019,336**	**110%**	**$77,943,466**	**69%**
New Construction								
Commercial New Construction Transition	$1,570,000	$446,290	$1,410,609	$11,437,276	$12,453,705	92%	$12,645,983	90%
Low Rise New Construction Transition - Market Rate	$180,000	$186,773	$32,424	$4,326,441	$4,381,285	99%	$4,381,285	99%
Multifamily New Construction Transition - Market Rate	$170,000	$11,367	$160,666	$1,592,735	$1,626,873	98%	$1,626,873	98%
New Construction - Market Rate	$7,030,929	$4,632,088	$93,773,222	$120,629,855	$46,072,335	262%	$159,150,505	76%
New Construction Total	**$8,950,929**	**$5,276,517**	**$95,376,921**	**$137,986,307**	**$64,534,198**	**214%**	**$177,804,647**	**78%**

Table 5 continued

Market Development Focus Area | Initiative	Current Year Expenditures Plan	Current Year Expenditures Through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered)	Total Expected Expenditures Through 2025	Total Progress as % of Total Expenditures Through 2025	Total Expected Expenditures Through 2030	Total Progress as % of Total Expenditures Through 2030
Renewables / Distributed Energy Resources (DER)								
Anaerobic Digesters Transition	$4,460,000	$531,041	$6,605,043	$13,414,066	$11,840,829	113%	$13,388,516	100%
Clean Energy Siting and Soft Cost Reduction	$1,399,598	$430,344	$1,670,862	$4,875,324	$5,674,035	86%	$8,795,000	55%
Combined Heat & Power Transition	$9,510,500	$478,850	$15,161,356	$54,953,459	$56,056,729	98%	$56,056,729	98%
Fuel Cells	$1,706,250	-	$500,000	$4,786,644	$7,199,144	66%	$7,199,144	66%
Offshore Wind Master Plan	-	-	-	$4,965,882	$4,965,882	100%	$4,965,882	100%
Offshore Wind Pre-Development Activities	$170,000	-	$181,646	$9,715,747	$9,789,462	99%	$9,789,462	99%
ORES Support	$2,500,000	-	$1,653,971	$4,304,117	$6,541,535	66%	$9,000,000	48%
Reducing Barriers to Distributed Deployment	$1,200,000	$204,299	$3,630,768	$13,408,736	$12,566,201	107%	$15,450,000	87%
Small Wind Transition	-	-	-	$3,323,673	$3,323,673	100%	$3,323,673	100%
Solar Plus Energy Storage	$10,424,500	-	$6,924,500	$36,820,771	$36,820,772	100%	$36,820,772	100%
Renewables / Distributed Energy Resources (DER) Total	**$31,370,848**	**$1,644,533**	**$36,328,147**	**$150,568,420**	**$154,778,263**	**97%**	**$164,789,178**	**91%**
Single Family Residential								
Consumer Awareness	-	-	-	$2,251,671	$2,251,671	100%	$2,251,671	100%
Heat Pumps Phase 2 (2020)	$5,800,000	$1,055,979	$3,863,040	$8,090,709	$16,505,089	49%	$17,537,698	46%
Pay for Performance	-	-	-	$885,489	$886,553	100%	$886,553	100%
Residential	$17,225,086	$7,689,701	$10,673,627	$41,419,481	$53,300,174	78%	$56,998,862	73%
Single Family Market Rate Transition	-	-	-	$23,528,344	$23,528,344	100%	$23,528,344	100%
Single Family Residential Total	**$23,025,086**	**$8,745,680**	**$14,536,667**	**$76,175,694**	**$96,471,831**	**79%**	**$101,203,128**	**75%**
Transportation								
Electric Vehicles - Rebate	$84,388	$16,634	$92,815	$39,498,889	$39,498,889	100%	$39,498,889	100%
EV Charging and Engagement	$2,900,000	$55,915	$461,785	$517,700	$5,325,000	10%	$7,200,000	7%
Transportation Total	**$2,984,388**	**$72,549**	**$554,600**	**$40,016,589**	**$44,823,889**	**89%**	**$46,698,889**	**86%**
Workforce Development								
Building Operations and Maintenance Partnerships	$3,367,669	$2,609,112	$9,403,360	$26,185,371	$22,568,513	116%	$33,345,000	79%
Talent Pipeline	$11,324,453	$4,560,737	$23,498,696	$61,054,696	$59,941,727	102%	$85,000,000	72%
Workforce Development Total	**$14,692,122**	**$7,169,849**	**$32,902,056**	**$87,240,066**	**$82,510,240**	**106%**	**$118,345,000**	**74%**
NYS Cost Recovery Fee Market Development	$2,896,925	$835,974	-	$15,926,203	$21,028,444	76%	$27,710,474	57%
Total Market Development	**$258,372,115**	**$90,250,456**	**$676,345,488**	**$1,971,756,874**	**$1,735,076,004**	**114%**	**$2,355,355,729**	**84%**

Table 6. Innovation & Research Initiatives by Focus Area—Budgets and Spending

See endnote section for more information.[9,10,11]

Innovation & Research Focus Area | Initiative	Current Year Expenditures Plan	Current Year Expenditures Through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered)	Total Expected Expenditures Through 2025	Total Progress as % of Total Expenditures Through 2025	Total Expected Expenditures Through 2030	Total Progress as % of Total Expenditures Through 2030
Buildings Innovation								
Climatetech Commercialization Support	$2,600,000	-	$8,329,160	$9,509,160	$7,525,000	126%	$10,000,000	95%
NextGen Buildings	$9,375,963	$1,723,865	$41,646,611	$56,822,811	$35,738,806	159%	$65,000,000	87%
Buildings Innovation Chapter Total	**$11,975,963**	**$1,723,865**	**$49,975,770**	**$66,331,970**	**$43,263,806**	**153%**	**$75,000,000**	**88%**
Clean Transportation Innovation								
Electric Vehicle Innovation	$7,100,000	$1,506,398	$13,388,115	$23,582,652	$24,804,240	95%	$31,850,000	74%
Public Transportation and Mobility	$2,900,000	$300,768	$3,456,912	$11,203,748	$15,086,837	74%	$22,500,000	50%
Clean Transportation Innovation Total	**$10,000,000**	**$1,807,165**	**$16,845,027**	**$34,786,400**	**$39,891,077**	**87%**	**$54,350,000**	**64%**
Climate Resilience Innovation								
Grid ClimateTech Ready Capital	$200,000	-	-	-	$2,400,000	0%	$12,000,000	0%
Hydrogen Innovation	$145,000	$51,268	$130,930	$344,035	$1,550,000	22%	$7,000,000	5%
Market Characterization & Design Innovation & Research	$318,287	$198,990	$179,596	$1,474,440	$1,750,653	84%	$1,750,653	84%
Climate Resilience Innovation Total	**$663,287**	**$250,258**	**$310,525**	**$1,818,476**	**$5,700,653**	**32%**	**$20,750,653**	**9%**
Energy Focused Environmental Research								
Energy-Related Environmental Research	$6,550,000	$1,978,552	$9,550,411	$41,354,362	$41,787,274	99%	$47,800,000	87%
Energy Focused Environmental Research Total	**$6,550,000**	**$1,978,552**	**$9,550,411**	**$41,354,362**	**$41,787,274**	**99%**	**$47,800,000**	**87%**
Gas Innovation								
Hydrogen Innovation	$1,920,000	$387,839	$10,971,531	$11,855,392	$6,112,891	194%	$24,800,000	48%
Long Duration Energy Storage	$3,000,000	$200,000	$13,971,765	$14,818,443	$10,140,000	146%	$17,000,000	87%
Utility Thermal Network Technical Support	$625,000	$161,759	$837,286	$1,047,802	$1,625,000	64%	$3,000,000	35%
Gas Innovation Total	**$5,545,000**	**$749,597**	**$25,780,582**	**$27,721,637**	**$17,877,891**	**155%**	**$44,800,000**	**62%**
Grid Modernization								
Future Grid Performance Challenge	$5,700,000	$3,327,208	$25,176,599	$38,167,442	$24,587,156	155%	$58,063,066	66%
Grid ClimateTech Ready Capital	$962,000	$214,007	$3,403,058	$3,732,985	$4,152,000	90%	$22,000,000	17%
High Performing Electric Grid	$5,000,000	$1,487,639	$14,504,275	$58,084,698	$52,300,156	111%	$64,800,000	90%
Power Electronics Manufacturing Consortium	-	-	-	$16,694,490	$16,694,490	100%	$16,694,490	100%
Grid Modernization Chapter Total	**$11,662,000**	**$5,028,853**	**$43,083,932**	**$116,679,615**	**$97,733,803**	**119%**	**$161,557,556**	**72%**
Negative Emissions Technologies								
CarbonTech Development	$1,608,494	-	$1,857,917	$5,000,000	$4,481,988	112%	$5,113,980	98%
Natural Carbon Solutions	$1,875,000	$513,983	$10,600,448	$11,429,967	$6,676,080	171%	$20,486,020	56%
Negative Emissions Technologies Total	**$3,483,494**	**$513,983**	**$12,458,365**	**$16,429,967**	**$11,158,068**	**147%**	**$25,600,000**	**64%**
Renewables Optimization								
Energy Storage Technology and Product Development	$4,070,000	$771,668	$24,714,580	$38,369,637	$23,655,370	162%	$39,500,000	97%
National Offshore Wind Research & Development Consortium	$2,311,000	$1,545,849	$3,903,775	$22,071,434	$21,570,000	102%	$22,500,000	98%
Renewables Optimization Total	**$6,381,000**	**$2,317,517**	**$28,618,355**	**$60,441,071**	**$45,225,370**	**134%**	**$62,000,000**	**97%**
Technology to Market								
CarbonTech Development	$2,879,005	$1,400,000	$6,223,800	$14,215,884	$10,653,010	133%	$14,362,020	99%
Catalytic Capital for Climatetech	$641,950	$218,136	$826,507	$18,527,512	$19,146,690	97%	$19,360,229	96%
Climatetech Commercialization Support	$7,601,618	$2,513,634	$14,716,417	$54,426,287	$50,017,997	109%	$54,927,913	99%
Climatetech Expertise & Talent	$521,000	$94,434	$4,500,666	$11,904,249	$9,452,523	126%	$12,049,276	99%
Manufacturing Corps	$500,000	$210,000	$3,355,996	$16,822,069	$14,810,139	114%	$17,058,959	99%
Novel Business Models and Offerings	$3,625,000	$414,636	$5,755,305	$13,384,067	$13,383,394	100%	$13,383,394	100%
Technology to Market Total	**$15,768,573**	**$4,850,840**	**$35,378,691**	**$129,280,068**	**$117,463,754**	**110%**	**$131,141,791**	**99%**
NYS Cost Recovery Fee Innovation & Research	$816,766	$230,067	-	$3,037,048	$4,873,359	62%	$7,068,792	43%
Total Innovation and Research	**$72,846,083**	**$19,450,698**	**$222,001,659**	**$497,880,615**	**$424,975,054**	**117%**	**$630,068,791**	**79%**

3 NY-Sun Performance

As represented in Figure 2 above, NYSERDA's NY-Sun Portfolio continues to show strong progress toward the CEF distributed solar capacity targets. Progress in the following tables is conveyed in both capacity (megawatts direct current) and generation (megawatt-hours). Additional detail around progress by year can be found in the NYSERDA-Supported Solar Projects dashboard. Major highlights that speak to progress through the current quarter include:

- On April 22, 2024, the US Environmental Protection Agency announced that NYSERDA was selected as a recipient for a $249.8 million Solar For All grant. NYSERDA and its subgrantees will implement the funds to support the development of additional solar serving DACs.
- On May 16, 2024, the Public Service Commission release an Order approving the Statewide Solar For All program. This initiative will reduce community solar project development and management costs by aggregating projects and distributing the associated electric bill savings to each Utility's EAP-eligible customers.
- New York's national leadership in community solar continued, with 129 MW completed Q2 2024.
- There are approximately 3,429 MW of solar in development with NYSERDA awards. These projects are at an advanced stage of development and will contribute to the 10 GW by 2030 target.

Quarterly benefit and budget progress is conveyed in the tables that follow.

3.0 Quarterly Benefits Progress

Table 7. NY-Sun—Installed Capacity and Production (NY-Sun Only)

Table 7 shows installed solar capacity (MW) and production (MWh) across major market sectors. The table includes all projects receiving NY-Sun funding, including those that are supported by the Solar Energy Equity Framework (SEEF). Projects included in SEEF benefit low- to moderate-income (LMI) households, affordable housing providers, residents of disadvantaged communities (DACs), and public schools serving DACs. As an example, a solar installation at the residence of an eligible LMI homeowner in Albany would be included in the "Upstate-Residential" category in Table 7, as well as in the "SEEF Only" Table 8. Community solar projects are categorized based on their location and size, with most of the State's total community solar capacity categorized as "Upstate-Commercial/Industrial" for the purpose of this table.

Annual Benefits		Evaluated Totals (verified gross where evaluated; gross where not)						
NY-Sun ** Includes SEEF and non-SEEF Projects **		Projects Completed (Installed) through Prior Year	Projects Completed (Installed) in Current Year	Cumulative Projects Completed (Installed Units) through Current Quarter	Projects Approved or Contracted But Not Yet Completed (Current Pipeline)	Total Progress (Installed + Pipeline) through Current Quarter	Total Expected Installed Projects through 2030	Total Progress as % of 2030 Goal
Distributed Solar Energy Capacity (MW)	Commercial/Industrial (Competitive)	117.6	-	117.6	-	117.6	117.6	100%
	Upstate - Residential	499.0	27.1	526.1	20.3	546.4	527.0	104%
	Upstate - Nonresidential	148.9	7.8	156.7	28.4	185.1	279.0	66%
	Upstate - Commercial/Industrial	2,236.6	253.8	2,490.4	3,129.2	5,619.6	6,213.0	90%
	Con Ed - Residential	341.6	30.7	372.3	21.6	393.9	441.0	89%
	Con Ed - Nonresidential	160.6	22.5	183.1	189.3	372.4	735.0	51%
	Capacity Total	**3,504.4**	**341.9**	**3,846.2**	**3,388.7**	**7,234.9**	**8,312.6**	87%
Distributed Solar Energy Production (MWh)	Commercial/Industrial (Competitive)	136,193	-	136,193	-	136,193	n/a	
	Upstate - Residential	511,343	25,936	537,279	19,771	557,051		
	Upstate - Nonresidential	165,378	8,444	173,823	31,525	205,347		
	Upstate - Commercial/Industrial	2,752,790	361,185	3,113,975	4,149,940	7,263,915		
	Con Ed - Residential	355,488	30,649	386,136	21,911	408,048		
	Con Ed - Nonresidential	183,431	28,115	211,546	228,842	440,388		
	Production Total	**4,104,624**	**454,328**	**4,558,952**	**4,451,989**	**9,010,942**		

Table 8. NY-Sun—Installed Capacity and Production (NY-Sun SEEF Only)

Table 8 is limited to projects that are supported by SEEF, which includes "adder" incentives for qualifying projects that are offered in additional to the "base" NY-Sun incentives received by all qualifying projects in the applicable market sector. The projects included in Table 8 are a subset of those in Table 7.

Annual Benefits		Evaluated Totals (verified gross where evaluated; gross where not)				
NY-Sun ** Solar Energy Equity Framework ONLY **		Projects Completed (Installed Units) Through Prior Year	Projects Completed (Installed Units) in Current Year	Cumulative Projects Completed (Installed Units) Through Current Quarter	Projects Approved or Contracted But Not Yet Completed (Current Pipeline)	Total (Installed + Pipeline) Through Current Quarter
Distributed Solar Energy Capacity (MW)	Upstate - Residential	6.4	1.1	7.5	1.0	8.5
	Upstate - Nonresidential	0.9	0.5	1.4	0.9	2.3
	Upstate - Commercial/Industrial	63.7	55.1	118.8	364.2	482.9
	Con Ed - Residential	4.1	2.5	6.6	1.7	8.3
	Con Ed - Nonresidential	19.6	5.0	24.6	15.4	40.0
	Capacity Total	**94.7**	**64.2**	**158.9**	**383.2**	**542.1**
Distributed Solar Energy Production (MWh)	Upstate - Residential	6,842	1,081	7,922	989	8,912
	Upstate - Nonresidential	866	510	1,376	955	2,331
	Upstate - Commercial/Industrial	122,806	82,235	205,041	500,405	705,446
	Con Ed - Residential	4,381	2,574	6,954	1,847	8,801
	Con Ed - Nonresidential	22,960	6,603	29,563	18,854	48,417
	Production Total	**157,854**	**93,004**	**250,858**	**523,049**	**773,906**

Table 9. All Other Solar—Installed Capacity and Production Beyond NY-Sun

Table 9 tracks all other reported progress toward the statewide solar deployment goals of 6 GW by 2025 and 10 GW by 2030. It includes projects that received non-CEF NYSERDA funding as well as projects installed independent of NYSERDA funding. NYSERDA utilizes data from utility interconnection inventories published by the Department of Public Service to determine non-NYSERDA reported installations. Since the two data sets can define project completion date differently, some overlap may exist between the two, however the totals presented here (MW, MWh) will never exceed the reported interconnected totals. As the pipeline of NYSERDA commitments are drawn down over time (projects are considered acquired in both data sources), this overlap is systematically eliminated.

Annual Benefits		Evaluated Totals (verified gross where evaluated; gross where not)				
Other Solar Installations		Projects Completed (Installed Units) Through Prior Year	Projects Completed (Installed Units) in Current Year	Cumulative Projects Completed (Installed Units) Through Current Quarter	Projects Approved or Contracted But Not Yet Completed (Current Pipeline)	Total (Installed + Pipeline) Through Current Quarter
Distributed Solar Energy Capacity (MW)	NYSERDA (non-CEF) Installations	593.4	12.0	605.4	40.7	646.1
	Non-NYSERDA Statewide Installations			1,437.9		1,437.9
	Capacity Total	**593.4**	**12.0**	**2,043.3**	**40.7**	**2,084.0**
Distributed Solar Energy Production (MWh)	NYSERDA (non-CEF) Installations	651,146	12,674	663,820	48,626	712,446
	Non-NYSERDA Statewide Installations			1,553,515		1,553,515
	Production Total	**651,146**	**12,674**	**2,217,335**	**48,626**	**2,265,961**

3.1 Quarterly Budgets Progress

Table 10. NY-Sun—Budgets and Spending

Table 10 shows encumbrances and expenditures across major market sectors and programmatic areas with the NY-Sun initiative. The "MW Block Incentives & Adders" section breaks down encumbrances and expenditures across the major market sectors, excluding funding with the Solar Energy Equity Framework. All SEEF encumbrances and expenditures, including "adder" incentives, are tracked as a line item. As an example, for a solar installation at the residence of an eligible LMI homeowner in Albany the expenditure of the "base" NY-Sun incentive would be included in the "Upstate-Residential" sub-category in the "MW Block Incentives & Adder" section, while the "adder" incentive from the SEEF budget would be included in the "Solar Energy Equity Framework (SEEF)" line item. Table 11 provides a more in-depth look at SEEF encumbrances and expenditures and tracks the total NY-Sun funding committed to SEEF-eligible projects.

NY-Sun	Expenditures through Prior Year	Current Year Expenditures through Current Quarter	Cumulative Expenditures through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered	Total Expected Expenditures	Total Progress as % of Total Expected Expenditures
MW Block Incentives & Adders							
Commercial/Industrial (Competitive)	$48,616,265	$0	$48,616,265	$299,343	$48,915,609	n/a	
Upstate - Residential	$225,312,656	$5,272,658	$230,585,314	$4,413,086	$234,998,400		
Upstate - Nonresidential	$65,855,735	$2,640,251	$68,495,986	$9,393,766	$77,889,751		
Upstate - Commercial/Industrial	$486,451,159	$116,222,373	$602,673,531	$668,797,422	$1,271,470,953		
Con Ed - Residential	$104,795,724	$5,533,927	$110,329,651	$4,351,940	$114,681,591		
Con Ed - Nonresidential	$90,147,892	$14,696,840	$104,844,732	$125,471,930	$230,316,662		
MW Block Subtotal	**$1,021,179,431**	**$144,366,049**	**$1,165,545,480**	**$812,727,486**	**$1,978,272,967**	**$2,485,201,000**	71%
Solar Energy Equity Framework (SEEF) Adder	$24,586,715	$8,420,223	$33,006,938	$242,803,761	$275,810,699	$399,764,000	69%
Funds to Assist Transition to Prevailing Wage	$0	$0	$0	$82,374,137	$82,374,137	$238,725,000	35%
Consumer Education	$1,547,475	$1,658	$1,549,133	$1,950,867	$3,500,000	$6,500,000	54%
Implementation and Quality Assurance	$16,865,769	$1,255,207	$18,120,976	$5,194,633	$23,315,609	$32,600,000	72%
Administration	$24,587,896	$1,906,196	$26,494,092	$0	$26,494,092	$58,756,000	45%
Evaluation	$1,390,534	$109,690	$1,500,224	$524,765	$2,024,989	$3,500,000	58%
NYS Cost Recovery	$10,062,389	$1,331,463	$11,393,851	$0	$11,393,851	$41,800,000	27%
NY-Sun Total	**$1,100,220,209**	**$157,390,486**	**$1,257,610,695**	**$1,145,575,650**	**$2,403,186,344**	**$3,266,846,000**	74%

Table 11. NY-Sun—Solar Energy Equity Framework (SEEF) Spending Details

This table is a subset of budget and spending data reported in Table 10 intended to provide greater detail on SEEF and Other Incentive investments relative to the broader NY-Sun budget. Other Incentives shown here reflect the base MW Block and non-SEEF incentive adders and are a subset of spending shown in Table 10 under MW Block Incentives & Adders.

Solar Energy Equity Framework (SEEF)	SEEF Adder Expenditures	Other Incentive Expenditures	SEEF Adder Encumbrances	Other Incentive Encumbrances	SEEF Adder Total Progress	Other Incentive Total Progress	SEEF Total Progress
Upstate - Residential	$2,866,583	$2,526,031	$644,443	$236,442	$3,511,026	$2,762,473	$6,273,499
Upstate - Nonresidential	$636,283	$508,623	$624,004	$298,646	$1,260,286	$807,269	$2,067,555
Upstate - Commercial/Industrial	$9,332,840	$24,263,765	$226,306,967	$80,700,220	$235,639,807	$104,963,985	$340,603,792
Con Ed - Residential	$3,698,540	$1,284,507	$1,100,471	$368,302	$4,799,011	$1,652,809	$6,451,820
Con Ed - Nonresidential	$11,319,751	$11,932,290	$11,859,644	$10,242,698	$23,179,395	$22,174,988	$45,354,383
Technical Assistance and Implementation	$5,152,942	$0	$2,268,231	$0	$7,421,173	$0	$7,421,173
Total	**$33,006,938**	**$40,515,216**	**$242,803,761**	**$91,846,307**	**$275,810,699**	**$132,361,523**	**$408,172,222**

Table 12. Non-CEF NYSERDA Solar Spending

This table quantifies NYSERDA investments in solar projects that are funded outside of the Clean Energy Fund. Project costs related to other non-NYSERDA installed solar (statewide interconnections) is not available and therefore not included.

Other Solar Installations	Expenditures through Prior Year	Current Year Expenditures through Current Quarter	Cumulative Expenditures through Current Quarter	Encumbrances as of Current Quarter	Total Progress as of Current Quarter (Expended + Encumbered
NYSERDA (non-CEF) Installations	$395,334,094	$2,614,680	$397,948,774	$62,600,093	$460,548,866

- As noted in Figure 2, non-CEF solar spending previously included $289 million for a NYSERDA program which previously funded solar projects but is now funding a mix of solar and energy efficiency projects that cannot be disaggregated in reporting, therefore it has been excluded here to ensure solar reporting is not incorrectly inflated.

4 Evaluation, Measurement, and Verification Summary

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

For the Q2 2024 reporting period, six studies were finalized as presented in Table 13. For more information on the schedule of studies as they pertain to NYSERDA's Market Development and Innovation & Research initiatives, please reference the Compiled Investment Plan or view reporting for historical periods to see past summaries both found on NYSERDA's website.

Table 13. Evaluations Completed Q2 2024

Evaluated Program	Evaluation type	Evaluated program year(s)
Energy Storage	Impact	2016-2022
Solar Photovoltaic (PV)	Impact	2018-2021
Energy Management Practices – Industrial	Impact	2018-2022
Agriculture	Impact	2017-2020
Residential Audit & Ratings MAR Study	Market & Impact	2019-2021
Industrial Facility Stock Study	Market	2022-2023

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

Note that NYSERDA began providing these summaries with the 2021 Annual CEF Performance Report.

Energy Storage Impact Evaluation (2016-2022)

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

Key findings and associated recommendations from the Energy Storage Impact Evaluation include:[12]

Finding 1: Market signals. For the majority of systems in this study, market opportunities and their economic incentives drive operational strategy. The review of the system performance data suggests two general trends: 1) site operators try to minimize the cycling of the battery to minimize degradation and preserve its lifecycle, and 2) dispatch only when there is a significant incentive to do so, which appears to be mostly in summer, particularly for Value of Distributed Energy Resources (VDER) sites. Given sufficient market signals, many sites could be cycling their batteries more often and at a higher rate of discharge—further bolstering the case for batteries as a flexible grid resource. For example, VDER sites, which make up 29 of the 42 sites, cycled only 50 times per year on average.

Recommendation 1: As most of the battery usage is focused on the summer months, NYSERDA can evaluate opportunities for winter-targeting programs that have defined hours of needs (e.g., winter DR programs), to which the batteries can contribute.

NYSERDA response to recommendation: Implemented. NYSERDA routinely monitors system performance and tailors the program according to situational needs.

Finding 2: Underutilization. The Evaluation Team finds that it is common for sites to have extended periods of no discharge activity. In some cases, this may be a metering issue, but to the extent it reflects real idle time, it signals that these grid assets are sometimes underutilized. For example, 7 of 42 sites cycled fewer than 20 times per year.

Recommendation 2: NYSERDA should continue routine engagement with site operators, with additional focus on gathering data points throughout the life of the system on how it is being used and why. NYSERDA might consider enhanced outreach to sites identified in this report as having extended period of inactivity.

NYSERDA response to recommendation: Rejected based on individual site economic tolerances and site desire to optimize VDER incentives as described in Finding 1.

Finding 3: VDER revenue is driving the market currently. Estimated VDER revenues are meaningfully greater than those from other revenue streams, with an average of $345k per VDER-participating site in 2022. They also represent the revenue stream that most systems are targeting. Survey responses recognized that all six components of the VDER Value Stack provide value to projects: energy value (LBMP), capacity value (ICAP,

Option 1, 2, or 3), environmental value (E) – only storage with solar, demand reduction value, locational system relief value, and community credit.

Recommendation 3a: NYSERDA should consider alternative outreach methods with stakeholders (e.g., target workshops, focus groups, etc.) to drive continued adoption of these systems.

NYSERDA response to recommendation: Pending. NYSERDA will consider alternative and/or additional outreach methods as opportunities arise with key stakeholders, and with guidance by evaluators.

Recommendation 3b: If opportunities exist to refine the VDER modeling tool, one option would be to allow vendors to look at how much they earned from VDER in order to more easily calibrate projected and actual VDER performance, further bolstering their confidence in their projected earnings.

NYSERDA response to recommendation: Implemented. NYSERDA maintains a value stack calculator to help contractors better estimate compensation for projects.

Finding 4: Normal degradation. Per this study's operational and time-based modeling of battery degradation, all of the 40 Battery Energy Storage System (BESS) projects evaluated for battery degradation are expected to have remaining useful life after 20 years of operation, where end of life is defined as when the BESS has 60% or less of capacity retention remaining. However, this finding relies on modeling and lacks important inputs, like state of charge and operating temperature. State of charge information is only collected for 9 of 42 sites and operating temperature is not tracked. Both measurements are important in accurately estimating battery degradation.

Recommendation 4: In the upcoming year, the state of charge data from the nine sites for which this data is available can be used to generate battery-level model outputs if this is of interest to NYSERDA. Ideally, however, state of charge and operating temperature would be available for all sites. Since these metrics are typically collected by the system vendors as part of the routine operational data collection, NYSERDA should consider adding this as a data collection requirement for program participants.

NYSERDA response to recommendation: Pending. This will be considered as part of upcoming retail energy storage program manual updates.

Finding 5: Consistency in interval data. Electric inputs and outputs from the battery, solar system, and grid must each be captured separately and at high rigor to enable analysis and modeling of hybrid DERs. Varying levels of data feed consistency from metering and control systems introduces uncertainty into the results that the program should address moving forward. Currently, it is difficult to parse what is real activity and what is an issue with the data feed, which complicates the effort to understand how these sites are operating and how they respond to the market incentives.

Recommendation 5: Moving forward, the program should put into place regular validations of control system data streams (charge and discharge) against on-site revenue-grade metering (net facility load). Such validations can alert both site operators and program staff to issues in data collection. In addition to the validations, the program could consider making addressing data collection issues' a requirement for continued participation in the program.

NYSERDA response to recommendation: Implemented. A component of program participation includes a requirement to install a revenue grade meter to directly record the net energy charged and discharged from the energy storage system. NYSERDA routinely performs validation of energy storage system performance.

Finding 6: Program information. Contextual information collected as part of the program—specifically in utility rate classes and VDER configurations applicable for each site—is key to accurately calculating site benefits (both VDER and otherwise). When this data is unavailable, assumptions must be made that can lead to inaccurate estimates of site benefits.

Recommendation 6: Require the provision and consistently collect site-level characteristics, like engineering specifications, facility characteristics, and utility rates. All contextual information about the site aids in understanding system performance.

NYSERDA response to recommendation: Implemented. Collection of this contextual information is now a standard component of program participation.

Solar Photovoltaic (PV) Impact Evaluation (2018-2021)

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

Key findings and associated recommendations from the Solar PV Impact Evaluation include:[13]

Finding 1: Overall program realization rate (RR) and capacity factor are 96.5% and 12.7%, respectively. Table 14 provides more details by region, system size and purchase type.

Table 14. Results by Customer Sector

Customer Sector		Sample Complete	Capacity Factor	Capacity Factor Relative Precision	Realization Rate	Realization Rate Relative Precision
	Residential	32	12.8%	6.3%	109.3%	4.6%

Below 200 kW	Non-Residential	2	12.7%	1.8%	89.7%	2.7%
≥ 200 to <750 kW	Non-Residential	4	12.5%	8.6%	93.1%	8.6%
≥ 750 kW		93	12.7%	1.0%	94.2%	1.2%
Overall		131	12.7%	1.7%	96.5%	1.7%

Finding 2: System capacity factors increased compared to the prior evaluation period, with the residential sector seeing the most improvement. Factors contributing to the increase may include technology improvements, improved system maintenance practices, and system design. Additionally, trends in project location and solar irradiance may impact overall performance over time.

Recommendation 2: Continue to study potential drivers for improvements in performance and normalize performance with solar irradiance.

NYSERDA response to recommendation: Implemented. Quantifying improvements in performance attributed to solar irradiance and technology features continue to be a focus, as systems are completed.

Finding 3: Recently completed PV projects show an increase in the number of bifacial panels being installed. Bifacial panels outperformed monofacial panels for the evaluated projects. Systems with bifacial panels had a capacity factor of 13.6%, or about 7% higher than systems installed with monofacial panels. Bifacial panels have more surface area and better collect diffused solar radiation. This technology may become more prevalent and drive an increase in NY-Sun's overall performance.

Recommendation 3: Continue to study bifacial panel technology for performance and cost effectiveness. If the improvement in performance is cost-effective, the program could encourage this technology's implementation.

NYSERDA response to recommendation: Implemented. Performance of systems utilizing bifacial panel technology is a focus of ongoing research as these systems are completed.

Finding 4: This evaluation period saw a dramatic decrease in the percentage of projects flagged for review due to low production. For the few projects that were flagged, the low performance appears to be due to persistent excessive shading or system design (tilt and orientation). This finding diverges from the prior evaluation which found low performance projects had extended periods with low production anomalies.

Recommendation 4: Future evaluations and persistence studies should assess if this trend continues. If it does continue, the potential factors should be studied, including maintenance practices, system design, technology, and program influence.

NYSERDA response to recommendation: Implemented. A persistence study that includes these features is underway and anticipated to be complete in Q2 2025.

Energy Management Practices Impact Evaluation (2018-2020)

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

NYSERDA's Energy Management Practices (EMP) Initiative contains two programs: 1) Strategic Energy Management (SEM), including a wastewater-specific segment called Wastewater Energy Coaching (WEC), and 2) On-site Energy Manager (OsEM). This evaluation focused on the Industrial components of SEM, WEC and OsEM) of Energy Management Practices.

Key findings and associated recommendations from this Impact Evaluation include: [14]

The Impact Evaluation Team found the verified gross electric savings realization rate of 100% and verified percent savings relative to baseline of 4.0% for the combined industrial EMP programs in the second phase of the evaluation.

The programs achieved somewhat higher realization rates for the natural gas savings for the combined Industrial EMP programs, with the VGS RR of 121% and verified savings relative to baseline as 1.9%.

The Impact Evaluation Team also calculated unit energy benefits (UEB) to assist in the calculation of indirect benefits from the EMP initiative. Unit energy benefits for the combined EMP program are 2,541,868 kWh and 20,948 MMBtu, respectively.

Finding 1: While the Impact Evaluation Team found the SEM program's verified gross savings realization rate to be high for electric savings (104% for WEC projects and 185% for non-WEC projects), there was significant variance in the overall project level realization rates.

Recommendation 1: Continue to refine and improve modeling best practices and procedures and use them consistently.

NYSERDA response to recommendation: Pending. NYSERDA will consider implementation of analysis improvements as new sites are added and for selected existing sites.

Finding 2: In some cases, SEM models used steam consumption or chilled water consumption as an energy driver. However, the steam or chilled water is not the primary driver. Instead, the steam or chilled water consumption is driven by another variable, such as production, weather, or occupancy.

Recommendation 2: SEM models can be improved through correct consideration of primary energy drivers.

NYSERDA response to recommendation: Implemented: Sites with steam or chilled water consumption will incorporate additional variables, as needed.

Finding 3: Three of the Phase 2 SEM participants had existing fossil-fuel on-site generation at their facility. One of these SEM participant sites was removed from the analysis since there was insufficient information to accurately assess direct program benefits.

Recommendation 3: Consider collecting and documenting more information (e.g., measure-specific fuel usage, savings and operational parameters both technical and economical) about sites with fossil-fuel on-site generation. This will help the program better understand the impacts of fossil-fuel on-site generation operation in New York State.

NYSERDA response to recommendation: Implemented: Sites with on-site generation or other fuel switching measures will be subject to additional consumption data collection and related fuel usage reporting**.**

Finding 4: The Impact Evaluation Team found insufficient documentation or missing savings calculations for some limited measures in OsEM projects.

Recommendation 4: Although it will add some additional burden on the program participants, the Impact Evaluation Team recommends that NYSERDA encourage on-site energy managers to provide complete project documentation and savings calculations. When possible, documentation such as photographs, spot metering or short-term meter logging electronically saved would increase confidence in the reported savings.

NYSERDA response to recommendation: Pending. NYSERDA will consider implementation of these improvements as new sites are added and for selected existing sites.

Finding 5: The Impact Evaluation Team found inconsistent use of affinity laws for pumps and fans. Some projects did not use them at all, while other used a range of values from 2.5 to 3.

Recommendation 5: OsEM report review should continue to review the affinity exponent for the calculation of energy savings from pumps and fans. When applied to variable speed drives that cause substantial speed reductions on large motors, the difference in savings when using an affinity exponent of 2.5 or 3 can be significant.

NYSERDA response to recommendation: Implemented. Sites with pump or fan measures will receive review for proper affinity exponent application.

Agriculture Impact Evaluation (2017-2020)

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

Key findings and associated recommendations from the Agriculture Impact Evaluation include:[15]

Finding 1: Measure Adoption Rates (MAR).
The five-year measure adoption rate (MAR) for the Agriculture Energy Audit Program - defined as the ratio of kWh/year installed to kWh/year recommended - was estimated to be 33% using data self-reported by audit participants, but the evaluation team expects to report a stronger, verified estimate of the MAR for this program in the next report from of this evaluation in 2025 after reviewing and potentially modifying the approach.

The evaluation found the realization rate (RR) to be strong: 121% for electricity. As with the MAR, the methodology for assessing the realization rate will be reviewed and potentially modified in the next evaluation.

Lighting upgrades are the most prevalent, with 66% of sites installing the recommended measure. While the lost cost of most LED lighting makes this energy-efficient measure an enticing option for agricultural sites, the cost for liner LEDs present with indoor growing operations is still cost-prohibitive for farms.

The infrequent recommendation of PV solar in audit reports is attributed to its unfavorable cost-to-benefit ratio and lengthy ROI periods. For example, one AEAP recommendation involves a 9 kW PV system with an upfront cost of over $31,000 (including all incentives and tax credits) and a payback period of 23 years is not feasible for a small farming operation with profit margins estimated at less than 10%.

For motors, the absence of installations is linked to generic advice provided in audits. In contrast, specific suggestions, such as installing a Variable Frequency Drive (VFD) on milk transfer pumps, have increased implementation rates. The electrical noise generated by VFDs are believed to negatively impact dairy cows, prompting producers to forgo installing these drives near the animals to protect their well-being and maintain productivity.

Recommendation 1: As part of the next round of evaluation, NYSERDA should review and potentially modify its approach to assess the audit program's measure adoption rates, as well as realization rates. In the meantime, NYSERDA should apply the new MAR and RRs from this evaluation.

NYSERDA Response to Recommendation: Rejected. While NYSERDA will work with the evaluator to reassess and potentially modify its MAR and realization rate approach for the next round of evaluation, MAR and realization rate findings estimated through this study will be applied to reporting to reflect the current analysis conducted.

Finding 2: Audit Recommendations.
Feedback from participants indicates that agricultural audits are most effective at driving the adoption of energy efficiency measures if they provide recommendations that meet the specialized needs of agricultural operations.

Recommendation 2a: NYSERDA should consider advertising solutions to common concerns raised by agricultural sites in the audit program evaluations (for example, cattle disliking the sound of electrical motors) in its Energy-Related Agricultural Best Practices guides.

NYSERDA Response to Recommendation: Pending. This recommendation is under consideration for implementation.

Recommendation 2b: Impact evaluators should ask participants' reasoning as to why recommended equipment is not installed.

NYSERDA Response to Recommendation: Pending. NYSERDA will consider adding this data question to future scopes of work

Finding 3: Impact Evaluation Timeline

Self-reported measures in the 2023 market evaluation of the Agriculture Energy Audit Program participant survey under-represented the actual installation of equipment. This could be due to recall issues in data collection. In particular, participants are more likely to forget about installing an energy-efficient measure than to falsely claim installation.

Recommendation 3: To strengthen evaluation results, NYSERDA should attempt outreach to conduct impact evaluation as soon as possible following the performance period after audit completion, to ensure respondents have recent memory of the measures installed and other details following their audits.

NYSERDA Response to Recommendation: Implemented. The impact evaluation team will conduct outreach to collect primary data as an input for this evaluation one year after audit completion where possible, instead of following the previous plan of waiting a full 2 years after audit completion to follow up.

Finding 4: Savings Calculations.

The variety of conditions of agricultural sites pose challenges to conducting billing analysis to evaluate energy impacts, whereas key parameter measurement using data obtained from phone interviews and on-site visits has been found to be more effective in many cases. Bottom-up calculations, following the guidelines of IPMVP Option A – Retrofit Isolation: Key Parameter Measurement, determine savings through engineering calculations of data points collected via email, phone interviews, or site visits. These calculations do not require participants to provide authorization for the use of utility energy consumption data. Additionally, energy savings deemed from engineering calculations are not influenced by external factors such as the use of on-site fossil fuels, changes in production levels, and energy use due to behavior changes, new construction, or other unpredictable events.

Recommendation 4: NYSERDA evaluation staff should prioritize bottom-up calculations over regression analyses. Bottom-up calculations require additional data collection from program participants, but this effort is worth the benefit of increased precision of energy savings attributable to the program. Regression analyses' reliance on utility data authorization and the profound impact of non-routine events and external variables on statistical models make this approach imprecise. It is not a viable option for evaluating savings from the agricultural sector.

NYSERDA Response to Recommendation: Implemented. The next phase of this evaluation will employ Key Parameter Measurement as central to the study's methodology.

Finding 5: Survey Fatigue.

Survey fatigue from multiple touchpoints with evaluators and the absence of an incentive for responding to outreach inhibit response rates. Responses could be increased through stronger coordination between the market and impact evaluation teams and through use of incentives for respondents.

Recommendation 5: NYSERDA should facilitate closer coordination between the market and impact evaluation teams evaluating the audit program to streamline and expedite outreach and should implement incentives for interview and on-site visit participation in the next updated to this evaluation.

NYSERDA Response to Recommendation: Implemented. The impact evaluation team will coordinate more closely with the related market evaluation of the NYSERDA Agriculture programs. NYSERDA will also consider providing incentives to respondents in the next update of this evaluation.

Residential Energy Audit and Ratings Market and Impact (2019-2021) Evaluation

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

This study estimated average savings per household using a Measure Adoption Rate (MAR) approach for both the Residential Energy Assessment Program and the Home Energy Ratings pilots. An additional objective of this evaluation was an attitudinal assessment of participants, including process-related research.

Key findings and associated recommendations from the MAR and Attitudinal Assessment include:[16]

Finding 1: Overall customers reported being very satisfied with their experience with these programs reporting overall satisfaction levels between 4.0 and 4.3 out of 5 for each of the three programs. The areas that received the lowest scores were the quality and value of recommendations and the thoroughness of the report.

Recommendation 1: Evaluators recommend that the program provide additional tools and training that could help contractors develop consistent and thorough recommendations. This training could cover the most common, or important from a program perspective, types of energy efficiency measures, what information the auditors should be collecting in the homes, and what information should be included in the report to the customers. Many of the contractors have expertise and focus on one area; however, training could give them more education on all of the different measures that the program wants to have recommended. It could also help contractors focus on certain areas that may be of interest to the program in the future, such as electrification.

NYSERDA Response to Recommendation: Implemented. NYSERDA introduced a new energy auditing tool and program platform in July 2023. One of the benefits of the new auditing platform is ensuring consistency among all audit reports and notations if key components were missing from recommendations. Training on the tool was completed for all participating contractors and ongoing training opportunities are available. NYSERDA will continue to monitor the uptake of the new auditing platform and look for areas of continuous training and support.

Finding 2: About 20% of the contractors identified that they participate in several NYSERDA programs that offer energy audits in addition to the Residential Energy Assessments program, and that while all programs require collection of the same or similar customer and building data, each program has its own required data collection forms and processes. These contractors identified this as an inefficiency that increases the paperwork and administrative burden on contractors to manage multiple processes.

Recommendation 2: Collaborate across audit and rating programs to standardize data collection and administrative processes. Consider adopting a common data collection form and/or process for core customer and/or building information with opportunities to supplement with program-specific data needs.

NYSERDA Response to Recommendation: Implemented. With the implementation of the new program management platform and audit tool in July 2023, NYSERDA standardized the data collection and report for the Residential Energy Assessment and EmPower+ programs. The Comfort Home pilot will be brought into that platform in 2024 and work is underway to standardize the processes when it can be done.

Finding 3: The evaluated MAR for the REA fossil measures is 38%, statistically significantly lower than the program assumption of 46%. However, the MAR from this study may be somewhat understated since many of the survey respondents had received the audit less than two years prior to the survey. The evaluated MAR for the REA electric measures is not statistically significantly different from the program assumption.

For the pilots, the evaluated MAR for audits delivered by contractors was slightly higher than the program assumption of 45%, but the result for inspectors was well below the program assumption of 30%. However, the MAR from this group of homeowners may be somewhat understated since many of the survey respondents had received the audit less than two years prior to the survey and were in the process of buying the home at the time of the audit.

Recommendation 3: Retain the current MAR assumptions for the Residential Energy Assessment program, and re-evaluate the MAR in the next round of this study, with more participants who have longer elapsed time since the audit.

For future pilots that rely on inspectors, consider assuming a lower MAR than was assumed for the Home Energy Score and Pearl pilots.

NYSERDA Response to Recommendation: Rejected. To be conservative in its reporting, NYSERDA will incorporate the 38% MAR rate into its forecasting of impacts from the Residential Energy Assessment Program in 2024, instead of retaining the current MAR assumptions for the program.

Finding 4: Natural gas realization rates for total savings were 77%, 92%, and 119%, respectively for the REA program, the HES pilot, and the Pearl pilot. For REA, the realization rate lower than 1 reflects the lower than assumed MAR. However, natural gas realization rates will not be applied to reported savings until the completion of Phase 2 of the evaluation, to ensure sufficient confidence and precision in the results of the analysis. Note this evaluation uses an incremental sampling approach which aggregates results over the course of successive phases to reach desired confidence and precision levels over time. For all three initiatives, Evaluation estimates of average recommended savings per home are in line with the program assumptions.

Recommendation 4: No change is recommended to the savings estimates for recommended measures based on this study given prior program adoption of savings calculation changes associated with the move to a common platform (NYHEP).

NYSERDA Response to Recommendation: Implemented. With the adoption of the new platform in July 2023, the methodology for savings calculations changes was already changed for some measures, to be consistent with the NYS Technical Resource Manual (TRM). No modifications were made to the TRM-based calculations in NYHEP as a result of the evaluation.

Finding 5: Electric realization rates from this study were not found to be meaningful.

Recommendation 5: For the next evaluation round for this program, consider further steps to exclude effects of fuel switching on both electric and natural gas savings. Also consider steps to include a larger number of homes in the billing analysis to improve the reliability of these savings estimates.

NYSERDA Response to Recommendation: Rejected. For the next evaluation period, NYSERDA will seek to better understand the effects of fuel switching, rather than excluding fuel switching from the analysis.

Statewide Industrial Facility Stock Study (2022-2023)

This report provides results from the second phase of a two-phase study. The Phase One Report, completed Q1 2023 established an initial understanding of industrial manufacturing facilities and indoor greenhouses in New York by synthesizing existing secondary data and research on New York State (NYS) industries.[17] The Phase Two Report is based on primary data collection, including web surveys and physical and virtual site visits. This report updates estimates from the Phase One Report and provides additional facility characteristics of interest.[18]

Summary of Report Findings, Key Observations and Opportunities

Manufacturing sector characteristics

Table 15 shows selected manufacturing sector characteristics by subsector in order of annual energy consumption. All manufacturing sector estimates in this study are limited to facilities with confirmed manufacturing activity at the site. As a result, total facility counts and employment are smaller than in other data

sources, including Phase One of this study, that used sources based on NAICS code without explicit screening for manufacturing activity. The table shows that Paper and Chemicals are the three-digit NAICS groups with the highest total energy consumption, energy expenditures, and energy-use emissions in the state, followed by Primary Metals, Food, Fabricated Metals, and Transportation Equipment.

Petroleum and Coal Products is comparatively small in terms of all the characteristics shown. While this subsector appears to be large based on reported employment in NAICS group 324, the screening conducted for this study determined that a large fraction of the facilities, particularly the large ones, were non-manufacturing. Hence, manufacturing energy use, expenditures, and emissions are small for this subsector.

Table 15. Manufacturing Characteristics by Subsector

NAICS and Subsector Manufacturing Type	Number of Facilities	Total Employees	Annual Energy Consumption (MMBtu)	Annual Energy Expenditures ($1,000s)	Annual Emissions from Energy Use (1,000s MTCO2e)[19]
322 - Paper	90	9,132	30,193,506	309,313	2,742
325 - Chemicals	142	~18,520	25,360,873	268,539	2,288
331 - Primary Metals	74	5,196	~15,542,029	~235,872	~1,258
311 – Food	357	16,075	14,382,126	152,192	1,304
332 - Fabricated Metal Products	1,570	85,473	14,205,015	213,438	1,183
336 - Transportation Equipment	89	16,445	~11,964,122	119,080	~1,084
327 - Nonmetallic Mineral Products	155	7,058	7,513,926	84,800	677
334 - Computer and Electronic Products	196	30,950	~7,186,419	~113,073	~560
324 - Petroleum and Coal Products	21	364	500,542	6,938	45
Non-key	5,083	138,408	21,884,521	285,390	1,849
Total	7,777	327,622	148,733,079	1,788,634	12,990

Note:
'~' indicates that one response made up 50% or more of a single result, or that the Relative Standard Error was between 50% and 100%.

NYSERDA uses a tier system for categorizing industrial facilities. Tier 1 is defined as having greater than $1 million in annual energy expenditures, Tier 2 is $500k to $1 million in annual energy expenditures, and Tier 3 is less than $500k in annual energy expenditures. Table 16 shows the same results provided in Table 15 by Tier.

While Tier 1 and Tier 2 have similar numbers of manufacturing facilities, Tier 1 has a much greater number of employees than Tier 2, and accounts for roughly three-fourths of the consumption, expenditures, and emissions in New York State. Tier 3 has the large majority of facilities and employees, but accounts for only about 20% of New York State manufacturing consumption, expenditures, and emissions.

Table 16. Manufacturing Characteristics by Tier

NAICS and Subsector Manufacturing Type	Number of Facilities	Total Employees	Annual Energy Consumption (MMBtu)	Annual Energy Expenditures ($1,000s)	Annual Emissions from Energy Use (1,000s MTCO2e)
Tier 1	172	72,517	111,697,147	1,302,872	9,788
Tier 2	142	23,358	8,384,380	99,287	739
Tier 3	7,643	231,747	28,651,551	386,475	2,462
Total	7,777	327,622	148,733,079	1,788,634	12,990

Manufacturing Sector End Uses

Table 17 shows manufacturing electric and non-electric energy consumption by high-level use.[20] Since a boiler may have joint use for both facility HVAC and industrial processes, boilers are listed as a separate use category. The table shows that three-quarters of electricity is used for production processes, while around half of non-electric fuels are used for boilers and 30% is used for production. In terms of non-electric fuels used for heating processes, 80% of boiler use and 60% of non-boiler heating are for low and medium temperature heating (under 570°F). For both electric and non-electric energy sources, basic facility operations account for about 15% of total energy use. Table 18 shows this information by tier.

Table 17. Manufacturing Energy Consumption by High-Level Use

Fuel	Basic Facility Operations	Boilers or Generators	Manufacturing or Industrial Production Process	Don't Know/ Unknown	Total
Electricity	15.6%	4.4%	74.8%	5.2%	100.0%
Non-Electric Fuels	17.6%	47.9%	29.6%	4.8%	100.0%

Table 18. Manufacturing Energy Consumption by Tier

Fuel	Tier	Basic Facility Operations	Boilers or Generators	Manufacturing or Industrial Production Process	Don't Know/ Unknown	Total
Electricity	1	14.1%	4.8%	79.3%	1.8%	100.0%
	2	15.3%	5.9%	64.1%	14.7%	100.0%
	3	20.3%	3.0%	63.4%	13.3%	100.0%
	Total	15.6%	4.4%	74.8%	5.2%	100.0%
Non-Electric Fuels	1	12.2%	54.3%	30.8%	~2.7%	100.0%
	2	22.7%	32.3%	19.4%	25.6%	100.0%
	3	40.7%	23.0%	26.9%	9.5%	100.0%
	Total	17.6%	47.9%	29.6%	4.8%	100.0%
Note: '~' indicates that one response made up 50% or more of a single result, or that the Relative Standard Error was between 50% and 100%.						

Manufacturing Sector Energy and Climate Practices and Policies

Fewer than 9% of facilities report they have completed energy consumption baselines; and 16% are currently completing one or plan to within the next three years.

Twenty-three percent (23%) of facilities have completed process upgrades within the last three years, and 16% are currently completing them or plan to which the next three years.

Around 42% of facilities have used state and/or utility incentives to finance process upgrades and another 48% would consider using them.

Greenhouse Characteristics

Table 19 shows key greenhouse characteristics. After screening, there are fewer greenhouses than originally estimated in Phase One. The screening restricted the study to structures with fixed walls and cultivation under glass, which excluded facilities that had only hoop houses (arched ground covers constructed of hoop-shaped tubular ribs covered with a plastic film).

Table 19. Greenhouse Characteristics

Number of Facilities	Total Employees	Annual Energy Consumption (MMBtu)	Annual Energy Expenditures ($1,000s)	Annual Emissions from Energy Use (MTCO2e)
344	6,427	3,740,279	57,751	338,520

Greenhouse Sector End Uses

Table 20 shows manufacturing electric and non-electric energy consumption by high-level use. The table shows that 56% of electricity is used for greenhouse lighting and another 19% for other greenhouse processes (e.g., packaging). In terms of non-electric fuels, 61% are used for boilers or generators and another 26% for other greenhouse processes (e.g., drying and curing).

Table 20. Manufacturing Energy Consumption by High-Level Use

Fuel	Basic Facility Operations	Boilers or Generators	Greenhouse Lighting	Other Process	Other	Don't Know/ Unknown	Total
Electricity	~6.5%	~6.2%	~56.3%	~19.1%	~1.7%	~10.2%	100.0%
Non-Electric Fuels	2.3%	61.3%	0.0%	25.8%	5.3%	~5.3%	100.0%

Fewer than 5% of greenhouse facilities report they have a written energy policy and zero reported having a climate action plan.

Around 15% of facilities have completed process upgrades within the last three years, and 7% are currently completing them or plan to within the next three years.

Around 32% of facilities have used state and/or utility incentives to finance process upgrades, and 58% were aware of them and would consider using them.

Key Observations and Opportunities

The NY Statewide Industrial Facilities Stock Study suggests opportunities within manufacturing facilities for GHG emission reductions through efficiency, electrification, and other interventions. The diverse nature of the subsectors examined, and the unique characteristics observed in them, allow tailored offerings to achieve GHG emission reductions across this important customer base. Some key observations that could be used for targeting specific subsectors, or for GHG gas emissions reductions across the subsectors, include:

The top two manufacturing subsectors in terms of overall energy consumption and emissions in New York are paper and chemicals, together accounting for close to 40% of the manufacturing sector consumption and emissions. Primary metals, food, fabricated metal products, and transportation equipment each account for about 10% of consumption and of emissions. Thus, these six industries together account for the majority of industrial energy use and emissions. Effective decarbonization strategies targeted to these industries could have high impact for New York State's clean energy initiatives.

Several key subsectors were observed to have large portions of non-electric boiler and non-boiler fossil fuel use dedicated to low and medium temperature heating (under 570°F). These low- and medium-temperature heating processes are potential candidates for electrification.

Energy management practices, including tracking energy consumption or energy performance, maintaining a written energy policy, mapping key consumption drivers, and completing a greenhouse gas inventory, all had relatively low incidence across the industrial subsectors (ranging from under 2% to under 40% across practices and subsectors). This finding suggests opportunities within the state for continued shaping of energy management practices, policies, and awareness of energy use within facilities.

Overall, it is clear that selective and systematic interventions with manufacturing facilities can create meaningful GHG reductions that will benefit both industrial customers and New York State residents.

Endnotes

[1] Order Authorizing the Clean Energy Fund Framework, issued and effective January 21, 2016. [LINK]

[2] Order Approving Clean Energy Fund Modifications, issued and effective September 9, 2021. [LINK]

[3] http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=18-M-0084 [NYS Department of Public Service Commission Files]

[4] Governor Hochul announces new framework to achieve nation-leading energy storage target (6GW by 2030), which can be referenced in the PSC filing of the Energy Storage Roadmap https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7D4753BA-916B-483E-9E35-6749B20384A6}

[5] https://greenbank.ny.gov/Resources/Public-Filings [NY Green Bank Public Filings]

[6] If solicitations with upcoming due dates were factored into the total NYSERDA commitments in the Market Development Budgets and Spending table, an additional $105,508,677 or 89% of the total approved budget to date, would be included with total NYSERDA commitments.

[7] The Market Characterization and Design initiative includes funds to support overarching, non-initiative-specific evaluation studies.

[8] Initiative commitments that are in excess of their total budgets are in anticipation of program attrition. No initiative will have total expenditures in excess of that initiative's total budget at the close of the program.

[9] If solicitations with upcoming due dates were factored into the total NYSERDA commitments in the Innovation and Research Budget and Spending table, an additional $30,326,681 or 84% of the total approved budget to date, would be included with total NYSERDA commitments. NYSERDA anticipates attrition over time.

[10] The Market Characterization and Design initiative includes funds to support overarching, non-initiative-specific evaluation studies.

[11] A modification on September 9, 2022 to the Renewables Optimization Investment Plan expanded the activities and budget of the Energy Storage Technology and Product Development initiative to focus on solutions providing 10 to 100+ hours of storage for various grid applications to enable the transition away from natural gas infrastructure. In a subsequent filing on November 1, 2022 this new portion of the initiative was renamed to Long Duration Energy Storage as its own initiative the Gas Innovation focus area.

[12] The final study will be posted to NYSERDA's website Q3 2024.

[13] The final study will be posted to NYSERDA's website Q3 2024.

[14] The final study will be posted to NYSERDA's website Q3 2024.

[15] The final study will be posted to NYSERDA's website Q3 2024.

[16] The final study will be posted to NYSERDA's website Q3 2024.

[17] The Phase 1 study can be found here: https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/Matter-No-1602180NYSERDAIndustrial-Facilities-Stock-Study-Phase-One-Report-March-2023.pdf.

[18] The Phase 2 study will be posted to NYSERDA's website Q3 2024.

[19] Includes Scope 1 (emissions from sources that facility owns or controls directly) and Scope 2 (direct GHG emissions associated with the purchase of electricity, steam, heat, or cooling) emissions. Scope 3, which encompasses emissions not produced by a facility itself but that the facility indirectly affects in its value chain are not included.

[20] Includes natural gas, propane, fuel oil, kerosene, distillate, diesel, motor gasoline, hydrogen, purchased hot water, or steam.

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

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