Energy Management Practices Market Evaluation

2021 Final Report

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Acronym List

Acronym	Definition
CEE	Consortium for Energy Efficiency
DIPA	Direct influence participant adoption
EMP	Energy management practices
NAICS	North American Industry Classification System
NOMAD	Naturally occurring market adoption
OsEM	On-site energy manager
RTEM	Real-time energy management (formerly referred to as energy management information)
SEM	Strategic energy management

Executive Summary

The 2021 Market Evaluation is the fifth study to examine the adoption of energy management practices (EMPs) in New York State's manufacturing industries. EMPs for this report refer to strategic energy management (SEM), an on-site energy manager (OsEM), and the use of tools for monitoring and reporting energy consumption. In 2018, NYSERDA expanded its SEM offering to include wastewater treatment facilities; as such, the Team for this Market Evaluation also examined EMP adoption among wastewater facilities.

The main objectives of the Market Evaluation were to estimate rates of EMP adoption and quantify indirect benefits resulting from NYSERDA's market development efforts. To this end, the Market Evaluation Team repeated a survey from the 2019 EMP Market Evaluation with managers at nonparticipating manufacturing and wastewater treatment facilities, and conducted in-depth interviews with a subset of participants who recently completed active engagement in the SEM offering. For the industrial sector, this Market Evaluation shows comparisons of 2021 results to those from the 2019 survey.

Key Findings

The Team analyzed results by sector and consumption Tier, based on a facility's annual energy expenditure. Approximately 95% of industrial and wastewater facilities fall into Tier 3, the category with the lowest energy expenditure.

On-site Energy Manager

As shown in Table 1, in both the industrial and wastewater sectors, about half of larger facilities and less than one-quarter of smaller facilities have a dedicated energy manager. The results for the industrial sector in 2021 are consistent with those from 2019.

Table 1. Nonparticipant On-site Energy Manager Adoption in 2021

Tier – Annual Energy Expenditure	Sector	
	Industrial	Wastewater
Tier 1 - Greater than $1 million	50%	42%
Tier 2 - $500,000 to $1 million	30%	
Tier 3 - Less than $500,000	21%	8%
Population Weighted Average	**22%**	**10%**

Monitoring and Tracking

Table 2 shows the adoption of monitoring and tracking systems in 2021. Results for the industrial sector in 2021 are consistent with those from 2019, with larger facilities being more likely to have such systems. The adoption rate of monitoring and tracking systems is relatively low for large wastewater facilities and similar to the adoption among small wastewater facilities.

Table 2. Nonparticipant Monitoring and Tracking System Adoption in 2021

Tier – Annual Energy Expenditure	Sector	
	Industrial	Wastewater
Tier 1 - Greater than $1 million	45%	17%
Tier 2 - $500,000 to $1 million	33%	
Tier 3 - Less than $500,000	14%	18%
Population Weighted Average	**16%**	**18%**

Strategic Energy Management

To be considered a practitioner of SEM, an organization must demonstrate three minimum elements, as outlined by the Consortium for Energy Efficiency (CEE):

Company Commitment. A long-term, executive-level commitment to energy performance.

Planning and Implementation. An energy management plan and evidence of implementation.

System for Measuring and Reporting Energy Performance. A systematic, ongoing measuring and reporting of energy performance data.

These three minimum elements are comprised of 13 specific subelements or practices, which are described in Appendix A.

The Team found that program participants in both sectors adopted a wide range of SEM practices during active program engagement, but most participants discontinued at least one practice at the time of the follow-up interview. The reasons for this change included staff turnover, lack of available time for current staff, and inability to identify ongoing project needs.

When looking at the broader market, very few nonparticipants adopted all SEM elements per the original definition and scoring rubric from the 2019 Market Evaluation (shown in Table 3). This finding is consistent with results of the 2019 industrial nonparticipant survey. However, the 2021 Market Evaluation found that a broader definition of SEM adoption was appropriate, so adoption rates under the revised 2021 definition are also provided in the table. Revised results show higher levels of adoption in the larger tiers across both industrial and wastewater sectors. For the definitions of SEM Adoption, refer to Appendix A.

Table 3. Nonparticipant Strategic Energy Management Adoption in 2021

Tier – Annual Energy Expenditure	Industrial		Wastewater	
	2019 Definition	2021 Definition	2019 Definition	2021 Definition
Tier 1 - Greater than $1 million	2%	24%	0%	8%
Tier 2 - $500,000 to $1 million	0%	3%		
Tier 3 - Less than $500,000	0%	2%	0%	0%
Population Weighted Average	**<1%**	**2%**	**0%**	**<1%**

Indirect Benefits

Influence from NYSERDA's efforts can cause nonparticipating facilities to adopt EMPs, which can happen in two ways:

Participants who see benefits can transfer EMPs to associated facilities under the same executive management team. This type of adoption is referred to as direct influence participant adoption (DIPA).

Nonparticipants may be indirectly influenced to adopt EMPs by working with utility partners or industry consultants, or via events, training, or other program-related activities, as described in the NYSERDA EMP logic model. This type of adoption is referred to as indirect influence nonparticipant adoption.

In both sectors, the Team found DIPA of SEM at one facility among the subset of participants interviewed for this study (Table 4). Common ownership of facilities does not seem sufficient to result in DIPA; however, common management staff *may* support DIPA. Among all three cohorts of interviewed SEM participants, all respondents who had extended SEM practices to additional facilities or planned to do so in the future reported that these facilities were under common management. Three of the six respondents who had no plans to extend SEM practices to additional facilities said this was because the other facilities were under a separate management team.

The Team also found some adoption of both SEM (2021 definition of adoption) and OsEM among nonparticipants.

Table 4. Influenced Adoption Units

Type of Adoption	On-site Energy Manager		Strategic Energy Management	
	Industrial	Wastewater	Industrial	Wastewater
Direct Influence Participant Adoption	n/a		1	1
Indirect Influence Nonparticipant Adoption	39	7	5	0

The Team found that cumulative indirect benefits exceeded the amount planned by NYSERDA by approximately 10%, as shown in Table 5.

Table 5. 2018–2021 Cumulative Indirect Benefits

Indirect Benefits Type	Evaluated Years		Evaluated Cumulative Total (2018-2021) [a]	*Cumulative Planned through 2021* [b]	Percentage of Plan Achieved
	2018-2019	2020-2021			
MWh Benefits	12,656	33,762	**46,418**	*42,081*	110%
MMBtu Benefits	135,568	375,528	**511,096**	*468,288*	109%
CO_2e Benefits	14,018	38,147	**52,165**	*47,598*	110%

[a] Evaluated benefits are based on a representative survey of nonparticipant EMP adoption but only a subset of EMP direct participants; as such, indirect benefits from DIPA could not be projected to the participant population and may be understated.

[b] New York State Energy Research and Development Authority. Revised May 7, 2021. *Clean Energy Fund Investment Plan: Industrial Chapter. Portfolio: Market Development.* Matter Number 16-00681, In the Matter of the Clean Energy Fund Investment Plan. https://www.nyserda.ny.gov/-/media/Files/About/Clean-Energy-Fund/CEF-Industrial-chapter.pdf

Effects of COVID-19 Pandemic and Associated Shut-Downs

Most industrial facilities (80% or more) experienced changes in staffing or scheduling as a result of the pandemic and associated shut-downs. A large share of facilities (65%) also experienced reduced staff availability due to illness or other personal issues. More facilities indicated reduced sales (61%) than

increased sales (37%). Other reported impacts included supply chain issues, labor shortages, and costs of personal protective equipment.

Among wastewater facilities, over half experienced changes in staffing or scheduling and just over 40% had reduced staff availability due to illness or other personal issues. Some facilities (18%) experienced decreased demand while others (10%) experienced increased demand. Like the industrial sector, the wastewater sector also experienced increased costs of personal protective equipment.

Recommendations

Tier 3 Opportunities: Not only are Tier 3 facilities the largest in terms of number of potential participants, the penetration of EMPs is notably lower in Tier 3 facilities across both sectors when compared to Tier 1 and Tier 2 facilities.

Recommendation: Examine whether it would be cost-effective to target companies with several Tier 3 facilities under a common management team.

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

SEM adopter definition: A review of participants' impact evaluation outcomes against their adoption of the 13 CEE minimum elements shows that most participants do not "fully" adopt all minimum elements, per the definition and scoring rubric developed and reported in the CEI Year 3 evaluation report (Appendix A).[1] Evaluated savings suggest the Year 3 evaluation criteria for SEM adoption are too stringent and result in indirect benefits estimates that do not fully represent SEM practitioners in the general market. To address this finding, the Indirect Benefits estimation used a revised definition of SEM adoption to include nonparticipants who demonstrated some or full adoption for every one of the CEE minimum elements and subelements.

Recommendation: Coordinate future market and impact evaluations; base the definition of adoption on cumulative evidence linking practices to verified energy savings. Continue to use the revised working definition of SEM adoption for future market evaluations, and revisit the analysis of critical SEM savings drivers annually.

Response: Pending. NYSERDA Evaluation Staff will work with the Program Staff and Market and Impact evaluation contractors to revise the definition of SEM adoption. Further, the methodologies of future evaluations will be designed to annually measure the adoption of and associated savings related to SEM.

[1] "Continuous Energy Improvement Market Evaluation 2019," Cadmus. https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/CEI-Market-Evaluation-Yr-3-Report.pdf

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

Recommendation: NYSERDA should review participants' feedback and determine which to implement.

Response: Pending. NYSERDA will review participants' feedback and determine which to implement.

Introduction

The EMP Market Evaluation is a multi-year study to monitor the adoption of EMP in the industrial sector and among water and wastewater facilities in New York. The study ran concurrently with NYSERDA's EMP initiative. The Market Evaluation has three primary objectives:

Measure the rate of EMP adoption from naturally occurring adoption and EMP initiative activities

Estimate indirect benefits from EMP adoption due to NYSERDA's influence

Provide insights to inform program design and implementation

This report covers research conducted by the EMP Market Evaluation Team in 2021, Year 5 of the EMP Market Evaluation. The Team interviewed participants and surveyed nonparticipants from the industrial and wastewater sectors, using the same industry survey that was developed for the 2019 (study Year 3) Market Evaluation; as such, responses over time are reported for the first time.[2]

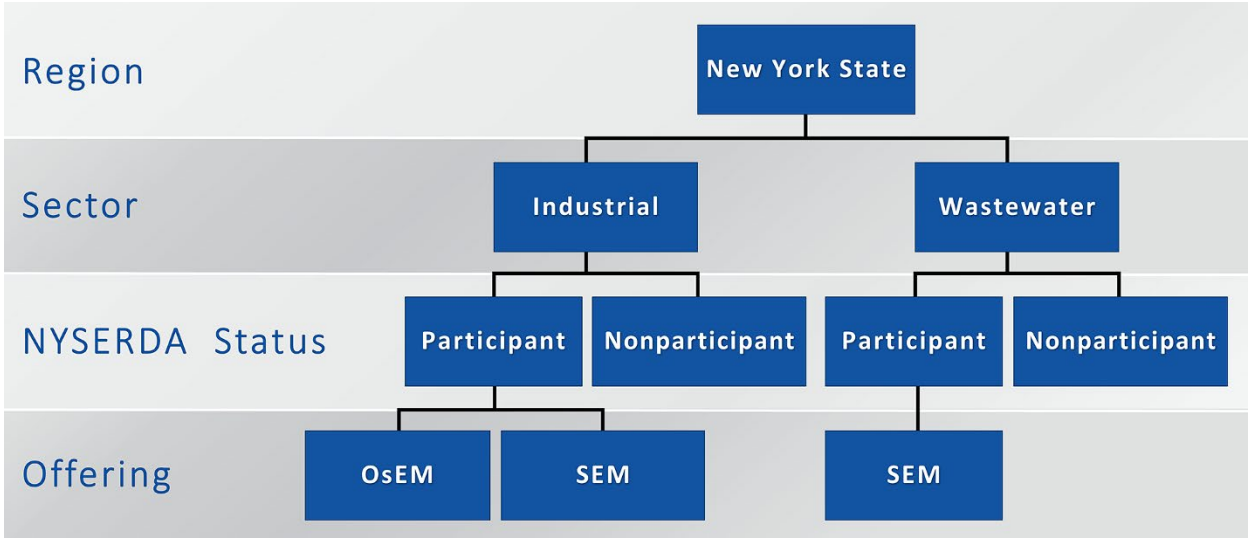
Background

The Market Evaluation Team examined SEM and OsEM in this study. SEM is a collection of practices, as defined later in the report. An OsEM is a specialized staff member or contractor whose primary function is to manage energy consumption.

For the first four years of the Market Evaluation, NYSERDA's target market was industrial facilities in New York State with relatively high energy intensity. In 2018, NYSERDA invited wastewater facilities to join the SEM initiative. As such, the Team examined both sectors for the 2021 Market Evaluation. Figure 1 shows how the research was organized. The market only includes facilities in New York State. The Team analyzed the sectors (industrial and wastewater) separately and used the participation status to determine whether a facility qualified as part of the sample frame for interviews (participants) or surveys (nonparticipants). Finally, the Team used the EMP offering to determine which specific interview questions to include for participants.

[2] The Team also conducted a survey in Year 1, but did not report comparisons with Year 3 due to substantial modifications in the questions pertaining to market adoption.

Figure 1. Study Research Organization



Industrial

For this study, the industrial sector is any facility associated with manufacturing activities. To support NYSERDA's program development plans to expand to smaller facilities, the Team segmented the research into tiers based on a facility's annual energy expenditure, defined in Table 6. The corresponding estimate of the nonparticipant population is also shown in the table, with most facilities being in Tier 3.

Table 6. Nonparticipant Industrial Market Tiers and Population

Tier	Annual Energy Expenditure	2021 Nonparticipant Industrial Population [a]	
		Total	Percentage
1	Greater than $1 million	209	3%
2	$500,000 to $1,000,000	232	3%
3	Less than $500,000	6,636	94%
All Facilities		**7,077**	**100%**

[a] The nonparticipant tier populations are based on the 2021 nonparticipant survey results. The nonparticipant population does not include participant facilities in New York that are owned by participant firms (which were analyzed separately).

Wastewater

Municipal wastewater plants are typically managed by a city or local government entity. In 2021, there were a total of 706 nonparticipating wastewater facilities in New York State (Table 7). Due to smaller population sizes in this sector, the Team aggregated results for Tiers 1 and 2. Similar to the trend in the industrial sector, 95% of wastewater facilities are in Tier 3.

Table 7. Nonparticipant Wastewater Market Tiers and Population

Tier	Annual Energy Expenditure	2021 Nonparticipant Population	
		Total	Percentage
1	Greater than $1 million	9	1%
2	$500,000 to $1,000,000	25	3%
3	Less than $500,000	672	95%
All Facilities		**706**	**100%**

Year 5 Research and Analysis

For both sectors, the Team conducted three types of research and analyses:

Nonparticipant survey. The Team gathered responses from 301 nonparticipating industrial facilities and 108 nonparticipating wastewater facilities to determine the market adoption of EMPs—both naturally occurring market adoption (NOMAD) and changes that were influenced by NYSERDA. The Team also collected responses about effects from the COVID-19 pandemic and associated shut-downs.

Participant interviews. The Team interviewed a subset of recent SEM participants (four from industrial facilities and eight from wastewater facilities), covering participants' experience in the program, their persistence of practices adopted, and diffusion of EMP to participants' associated facilities. The Team also inquired about effects from the COVID-19 pandemic and associated shut-downs.

Indirect benefits analysis. The Team estimated indirect benefits based on the nonparticipant survey and participant interviews. The Team asked participants whether EMPs were adopted at associated facilities and asked nonparticipants who adopted EMPs what influenced them to take those actions. The Team estimated indirect benefits based on unit energy benefits provided by NYSERDA and reported sources of influence that could be traced to EMP program activities.

More details on the Team's methodology for conducting each activity and analyzing the results are presented in the *Detailed Methodology* section of this report.

Industrial Sector Assessment

This section first presents the market progress indicators and summary of market adoption for the industrial sector, then provides details from the interviews and survey.

Industrial Sector - Market Progress Indicators

Table 8 shows the market progress indicators, baseline values, and evaluated values from 2019 and 2021. The right-most column also shows the 2020 and 2025 targets from the 2021 version of the *Clean Energy Fund Investment Plan Industrial Chapter*.

Table 8. *Clean Energy Fund Investment Plan Industrial Chapter* Market Progress Indicators

Indicator	Market Progress Indicators	Referenced Subpopulation	Baseline (2017)	Evaluation		Cumulative Targets	
				2019	2021	2020	2025
	On-site Energy Manager						
1	Number of energy managers hired/retained within pilot facilities	OsEM participants	0	5 of 7	3/7	20	20
2	Number of industrial facilities (beyond pilot participants) adopting OsEM role	Tier 1 and Tier 2 nonparticipant facilities (including additional facilities of participant firms)	110	218	184 [a]	30–45 (10–15 per year)	30–45 (10–15 per year)
3	Percentage of the addressable market participating in strategy; nonparticipant industrial sites hiring an OsEM	Nonparticipant facilities (excluding additional facilities of participant firms)	15%	22% (1,386)	22% (1,565)	16.5%	16.5%
	Strategic Energy Management						
4	Number of energy teams maintained beyond the cohort (indicating executive support for SEM)	SEM participants	0	7 of 15	3 of 4 [b]	27	110
5	Number of industrial facilities (beyond pilot participants) that have adopted SEM	Additional facilities owned by participant firms	0	0	1 of 4 [b]	11	30
6	Number of facilities that have adopted a system for monitoring, tracking, and making decisions based on their energy use to assist with their SEM activities as a result of this strategy	Nonparticipant facilities (excluding additional facilities of participant firms)	27% (1,886 facilities) [c]	16% (1,005 facilities)	15% (1,097 facilities)	28% (1,913)	29% (1,996)

[a] Evaluated values for indicator 2 are spot measurements, not cumulative.

[b] There were seven participants in the 2019 SEM cohort, of which the team interviewed four during the 2021 evaluation.

[c] The baseline (2017) value for indicator 6 cannot be compared to the 2021 evaluation result because of 2019 changes to the data collection approach (including an updated survey instrument and scoring and updates to the total population size).

Nonparticipant uptake, measured with market progress indicators 3 and 6, was mixed. Nonparticipant adoption of the OsEM role was 22%, above the target of 16.5%. Monitoring and tracking systems are less widespread than the original target, with only 15% (or 1,100 facilities) reporting using such a system compared to the target of 1,913 facilities by 2020. The targets for monitoring and tracking systems are out

of date, however, because they were based on a baseline value that was calculated differently than the current evaluation approach (Table 8, footnote c).

Indicators 4 and 5, which measure continued practices of SEM and expansion to additional facilities, also had mixed results. Of the four industrial participants interviewed, three had maintained an energy team beyond their program participation. However, these four respondents had a total of 10 additional facilities in New York, and only one respondent, whose company has one additional facility, said they had expanded all of the same SEM practices to that facility.

Industrial Sector - Market Adoption Overview

Table 9 summarizes the EMPs identified in the Team's research. OsEM is more prevalent among nonparticipants than other practices, such as having a system for monitoring and tracking energy. Full adoption of SEM is uncommon for program participants, and was not implemented by any nonparticipants.

Table 9. 2021 Market Adoption of Strategic Energy Management and On-site Energy Manager

Energy Management Market Indicator Practices	Participant Facilities		Additional Facilities from Participant Firms		Nonparticipant Facilities
	OsEM	SEM	OsEM	SEM	
(n)	-	4	-	10	7,077
On-site Energy Manager					
Has hired or retained OsEM (post-program)	Not measured	N/A	Not measured	N/A	22%
Strategic Energy Management					
Has active energy team	N/A	3	N/A	1	18%
Has system for monitoring and tracking	N/A	4	N/A	1	16%
Has adopted SEM	N/A	1	N/A	0	<1%[a]
					2%[b]

Source: Data on participant facilities and additional facilities of participant firms is from the participant interviews. Data on nonparticipant facilities is from the 2021 nonparticipant survey.

[a] Based on 2019 definition of SEM adoption.

[b] Based on 2021 definition of SEM adoption.

Industrial Sector - Participant Impacts

The Team interviewed four of seven participants in the 2019 industrial sector SEM cohort, discussing topics that included the persistence of SEM practices and diffusion of SEM practices to additional facilities. While there was one OsEM participant, the Team was unable to reach this participant for an interview.

Industrial Participant Experiences

The Market Evaluation Team asked participants how they learned about the program and their main motivation for participating. Three industrial participants learned about the program through outreach from NYSERDA, either in person or online, while the other reached out to NYSERDA to ask what programs they could participate in and learned about the program through that interaction. In terms of

motivation for participating, three industrial participants wanted to save money on energy expenditures, while one wanted to gain a better understanding of energy use at their facility.

One industrial respondent noted effects that COVID-19 had on their program participation, stating that once the pandemic began, more of the program activities switched to being online, including a shared calendar between program staff and participants. This change was difficult for some of the respondent's older engineers to adapt to, especially after experiencing more in-person involvement before the pandemic.

All four industrial respondents said they believed participating in the program was a worthwhile investment for their company or organization. Two participants mentioned that the collaboration and communication with other participants in their cohort was especially beneficial to brainstorming new energy-saving ideas. Two other participants noted that the treasure hunt activity and collaboration with program staff was particularly helpful.

The Team also asked participants about the information they received through the program and the amount of time that staff dedicated to participating in trainings and implementing practices. Three of the participants said the information their team received through participation was consistent with their expectations and relevant to their efforts. One of these participants noted that the modeling information they received was slightly difficult to work with due to the complexity of their facility but understood that their situation was unique and thought the set-up for the model was correct and useful. One other participant said the information was slightly below their expectations in terms of the level of technical information. This respondent said there was a lot of good general information but the content was slightly more basic than what they expected to receive. Three participants also said that the time their employees dedicated to trainings and implementing the practices was appropriate and aligned well with their expectations. One participant said it was initially more time consuming to get up to speed and understand the potential of their practices than they expected, but eventually they found that this time was very valuable once they had a team to implement the practices.

Two participants offered recommendations for program changes that would make it easier for facilities to participate and that would provide a better experience. One participant said it would be helpful to have more interactions between company management and program staff so that management could better understand the value of the program. This respondent said that it would be beneficial to have a five-minute debrief at the end of coaching sessions where company management could join and learn more about their company's involvement. The other participant noted that once the COVID-19 pandemic began, more of the program participation transitioned to online offerings, which was a difficult adaption for some of their older engineers. This respondent suggested having more in-person offerings when possible.

Persistence of Strategic Energy Management Practices

Table 10 shows the persistence of SEM practices. During program participation in 2019, three of four interviewed participants fully adopted SEM, meaning they adopted all the practices listed in the table. Two years later, only one of these participants was still implementing all listed SEM practices. Five of the listed practices persisted to 2021. The other four practices, designating an energy champion, having staff assigned to an energy team, employee training, and reporting energy performance to key stakeholders, were each discontinued by one respondent. The respondent who said their company discontinued having

an energy champion said the designated person left the company and they were still looking for a replacement. The other respondent who had discontinued certain practices said their company had continued to grow in production and they currently did not have an adequate level of staffing to keep up with production while also implementing these practices.

Table 10. Persistence of Strategic Energy Management Practices Following Program Participation

Strategic Energy Management Practices Adopted by Interview Respondents	In Place at Time of Interview in 2021 (Retained) (n=4)	Adopted During Program Participation in 2019 (n=4)
Company energy policy and energy reduction goals	4	4
Designated energy champion	3	4
Staff assigned to energy team	3	4
Assessment of existing energy management practices, assessment (map) of energy use by end-user system	3	3
Maintaining a register of energy improvement opportunities; scheduling and tracking implementation	4	4
Employee training	3	4
System for monitoring, tracking, and making decisions based on energy usage	4	4
Regular review of usage performance against goals	4	4
Reporting energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior management, and others)	3	4
Fully adopted SEM (all practices above in place)	**1**	**3**

Direct Influence Participant Adoption

Companies often have multiple facilities. Successful business practices can be spread to additional facilities through common leadership staff. Three of the four respondents have additional facilities in New York. Among these respondents, only one reported that an additional facility had adopted SEM practices independent of the program. As Table 11 shows, this additional facility adopted six of the eight actions (everything except employee training and having energy management software in place). The respondent said these two actions were not adopted because the building[3] has a low occupancy, so they were more focused on lowering the building energy usage and operating it appropriately to the level of occupancy rather than being focused on training the employees. They also did not have energy management software in place for either building.

The two respondents who did not extend practice to their additional facilities in New York indicated that those sites were under different management.

[3] This secondary building was not a manufacturing facility.

Table 11. Adoption of Strategic Energy Management Practices at Participant's Additional Facilities

Strategic Energy Management Practice	Respondent 1 (One Additional Facility)
Policy and usage goals	✓
Staff assigned to energy team or facility has an energy champion	✓
Assessments of existing EMPs; assessment (map) of energy use by end-user system	✓
Maintaining a register of energy improvement opportunities; scheduling and tracking implementation	✓
Employee training	-
Energy management software	-
Regular review of performance against goals	✓
Reporting energy performance to key stakeholders across the organization (such as facility management, operations, line engineers, accounting, and senior management)	✓

Industrial Sector - Nonparticipant Adoption

The Team conducted a statewide phone survey of manager-level contacts at industrial manufacturing facilities to collect data on the penetration of key EMPs, including the practices that NYSERDA uses to track market progress (see Table 8) and those that indicate SEM adoption. The Team analyzed differences between nonparticipant adoption in 2021 compared to 2019, as well as between energy expenditure tiers in 2021, since a facility's total energy usage is expected to be a major factor influencing adoption.[4]

To identify significant movement in the market, the Team used proportions testing with $p \leq 0.05$.[5] The Team conducted a series of significance tests to identify differences over time (2019 to 2021) and between tiers. Overall, there was not a significant market shift across any of the minimum elements over time. Additionally, though there are differences in the findings across tiers—especially between Tiers 1 and 3—these differences are expected. Tier 1 facilities are larger than Tier 2 facilities, which are larger than Tier 3 facilities. Tier 1 facilities have higher energy burdens, which presents more opportunities for energy conservation.

On-site Energy Manager Adoption

Nonparticipant adoption of OsEMs is tracked as market progress indicators 2 and 3 (Table 8). NYSERDA's OsEM program requires that the OsEM is an industrial energy expert who is stationed on the site from 20 to 40 hours per week and dedicated to championing the organizational behaviors and practices needed to continuously improve processes and optimize energy efficiency. To assess whether facilities had adopted the OsEM role, the Team asked respondents if they had assigned responsibility for energy management to an individual (either alone or as the leader of a team) and whether that individual

[4] For an explanation of differences that were identified within 2019 tiers, please refer to the Market Evaluation Year 3 Report: https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/CEI-Market-Evaluation-Yr-3-Report.pdf

[5] The *p*-value is the probability that an observed difference between groups occurs by chance. A *p*-value of 0.05 indicates a 5% probably of detecting a difference between two groups by random chance. Lower *p*-values equate to more confidence that the results are NOT due to chance.

was stationed at the site. Facilities that had assigned responsibility to an individual who was stationed at the facility are considered to have adopted OsEM.

Table 12 shows the tier-level and overall nonparticipant assignment of OsEMs in 2021 compared to 2019. Overall OsEM assignment remained consistent between 2019 and 2021 and within tiers.

Table 12. Industrial Nonparticipant On-site Energy Manager Adoption, 2021 and 2019

Tier	2021		2019	
	n	%	n	%
Tier 1	41	50%	46	54%
Tier 2	30	30%	26	31%
Tier 3	230	21%	223	20%
Overall [a]	**301**	**22%**	**295**	**22%**

[a] Overall is the weighted average of tier-level results. Weighting is based on the population size of each tier compared to the overall industrial population.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C6, C6a, C6c, and C7a and Year 3 nonparticipant survey questions C6, C6a, C6c, and C7a.

Monitoring and Tracking System Adoption

A key EMP is maintaining a system to monitor and record energy use over time and allow employees to analyze progress against reduction targets. A monitoring and tracking system records energy usage data over time, facilitates analysis of usage against goals, and helps with making decisions related to additional energy and process improvements.

A monitoring and tracking system can be as simple as an Excel-based spreadsheet, as long as it is consistently maintained. However, periodically checking energy usage as reported on utility bills or through a utility website is not considered a monitoring and tracking system because the company is not storing the data, the data are not used to assess progress against a goal, and the data are not clearly used for making decisions about energy usage. The Team assumed that any facility that took the time to monitor and record their energy data used these data to inform decisions.

Table 13 shows the rate of adopting monitoring and tracking systems, by year and tier. As the table shows, adoption did not change between 2019 and 2021, and Tier 3 facilities were the least likely to have fully adopted monitoring and tracking systems.

Table 13. Industrial Nonparticipant Monitoring and Tracking System Adoption, 2021 and 2019

Tier	2021		2019	
	n	%	n	%
Tier 1	41	45%	46	35%
Tier 2	30	33%	26	35%
Tier 3	230	14%	223	14%
Overall [a]	**301**	**16%**	**295**	**16%**

[a] Overall is the weighted average of tier-level results.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C6, C6a, C6c, and C7a.

To receive full credit for having a monitoring and tracking system, facilities had to (1) indicate that they used a tool or system to track energy use over time and (2) specifically identify the type of system. The Market Evaluation Team tracks adoption of three types of monitoring and tracking systems: real-time energy management (RTEM) systems;[6] monitoring, targeting, and reporting tools; and spreadsheet tools.

An RTEM system is a sophisticated software tool that automatically receives and records energy usage data at various levels, from specific equipment or a production line to the facility level or even across multiple facilities. These systems usually integrate energy usage data with production data and sometimes with other variables such as weather and the facility schedule. RTEM systems usually include a dashboard that provides automated analysis of key metrics and can generate more detailed reports. Some RTEM systems require a subscription to the vendor, who processes data, monitors for changing trends, and assesses progress against goals or anomalies and reports those to the client facility.

Table 14 shows the percentage of participants who track facilities' energy use and have all the features that define an RTEM system.

Table 14. Industrial Real-Time Energy Management Adoption, 2021 and 2019

Tier	2021		2019	
	n	%	n	%
Tier 1	41	26%	46	11%
Tier 2	30	7%	26	4%
Tier 3	230	3%	223	4%
Overall [a]	**301**	**4%**	**295**	**4%**

[a] Overall is the weighted average of tier-level results.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions D7, D8c, and D8i.

Strategic Energy Management Adoption

Though energy professionals recognize differing approaches to SEM, this Market Evaluation relies on the CEE definition,[7] which requires that companies implement three "minimum elements" to be considered practicing SEM:

Company Commitment. A clear, long-term, executive-level commitment to energy performance, demonstrated by the existence and communication of an energy policy, goals, and resources to meet those goals.

Planning and Implementation. An energy management plan and evidence of a continuous improvement approach to plan implementation.

System for Measuring and Reporting Energy Performance. A systematic, ongoing measuring and reporting of energy performance data.

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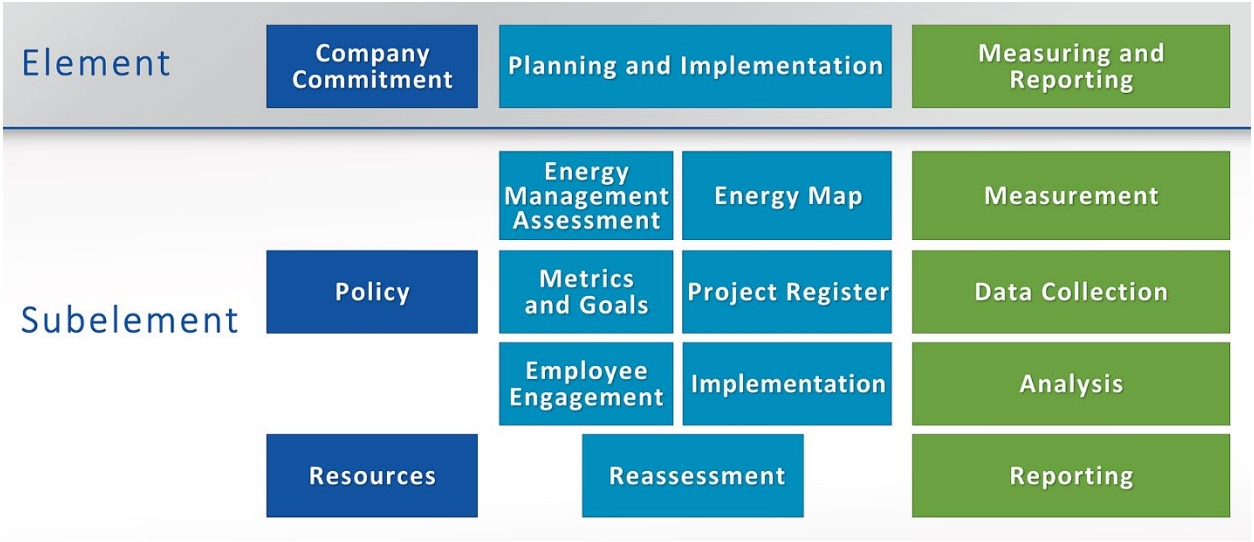
[6] RTEM systems are also referred to as energy management information systems. Previous Market Evaluation reports and the nonparticipant survey questions used the term EMIS. The Team updated that term in this report to be consistent with other NYSERDA publications and to respond to changes in industry terminology.

[7] Consortium for Energy Efficiency. Accessed July 27, 2017. *CEE Strategic Energy Management Minimum Elements, 2014.* https://library.cee1.org/content/cee-strategic-energy-management-minimum-elements/

Each element consists of two to seven subelements, summarized in Figure 2.

Figure 2. Strategic Energy Management Elements and Subelements



The Market Evaluation framework for SEM assessment, which consists of adapted definitions of each minimum element and subelement to facilitate more precise measurement over time, is included in *Appendix A*.

Table 15 shows the percentage of nonparticipant respondents adopting each minimum element. Between 2019 and 2021, the level of SEM adoption did not change significantly when measured by the 2019 Market Evaluation definition of SEM adoption, and neither did the adoption rates of the minimum elements. Using the revised 2021 definition also shows no significant differences in adoption rates between 2019 and 2021.

Table 15. Industrial Nonparticipant Strategic Energy Management Adoption, 2021 and 2019

Minimum Element	2021			2019		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
ME1. Company Commitment (2019 Definition)	17%	10%	3%	20%	8%	1%
ME2. Planning and Implementation (2019 Definition)	7%	0%	0%	9%	0%	1%
ME3. Measuring and Reporting Performance (2019 Definition)	41%	10%	4%	24%	8%	4%
SEM Adoption (2019 Definition) [a]	**2%**	**0%**	**0%**	**7%**	**0%**	**0%**
ME1. Company Commitment (2021 Definition)	76%	47%	23%	65%	42%	26%
ME2. Planning and Implementation (2021 Definition)	24%	10%	3%	17%	4%	2%
ME3. Measuring and Reporting Performance (2021 Definition)	59%	37%	14%	48%	46%	17%
SEM Adoption (2021 Definition) [a]	**24%**	**3%**	**2%**	**13%**	**4%**	**2%**

[a] This row represents the percentage of nonparticipants adopting all three minimum elements.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C3, C4, C4a, C5, C6, C6a, C8–C10, D1–D4, D4a, D4b, D6, D6a, D7, D11, and D13–D19.

The next sections discuss each element and their subelements in more detail.

Company Commitment

SEM, like other continuous improvement management practices, requires a clear, executive-level commitment to ongoing performance improvement, demonstrated by the existence and communication of a company policy and associated goals and a commitment of resources to achieve those goals.

Table 16 breaks out the Company Commitment subelement scores by year and tier.

Table 16. Strategic Energy Management Adoption, Company Commitment, 2021 and 2019

Subelement	2021			2019		
	Tier 1 (n=41)	Tier 2 (n=30)	Tier 3 (n=230)	Tier 1 (n=46)	Tier 2 (n=26)	Tier 3 (n=223)
1a. Policy and Goals (2019 Definition)	34%	20%	7%	35%	23%	9%
1b. Resources (2019 Definition)	32%	20%	7%	35%	15%	6%
1. Company Commitment [b] (2019 Definition)	**17%**	**10%**	**3%**	**20%**	**8%**	**1%**
1a. Policy and Goals (2021 Definition)	76%	47%	23%	65%	42%	26%
1b. Resources (2021 Definition)	100%	100%	100% [a]	100%	100%	99% [a]
1. Company Commitment [b] (2021 Definition)	**76%**	**47%**	**23%**	**65%**	**42%**	**26%**

[a] These cells had significant differences between year-to-year results (within same tier).

[b] This row represents the percentage of nonparticipants adopting both subelements.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C3, C4, C5, C6, C6a, and C8–C10.

For **subelement 1a. Policy and Goals**, the Team required that facilities have a written energy policy and energy performance goals and that they communicate those goals to staff. For **subelement 1b. Resources**, the Team assessed whether facilities had dedicated staff and financial resources to implement SEM. Overall and for both subelements, the Team found no significant change between 2021 and 2019.

When measured using the 2019 definition, Tiers 1 and 2 are both more likely to have policies, goals, and sufficient dedicated staff resources for energy management than Tier 3. When Tier 3 facilities do have dedicated staff resources, they tend to have a single individual while Tiers 1 and 2 facilities tend to have teams assigned to energy management.

Planning and Implementation

The Planning and Implementation element is focused on the facility's operational starting point or foundation to strategically manage energy. Planning and Implementation has seven subelements that measure whether the facility takes the actions needed to systematically identify energy savings opportunities, realize those potential savings, then continuously update its plan to achieve more savings going forward:

Subelement 2a. Energy Management Assessment evaluates current EMPs by using a performance scorecard or facilitated energy management assessment. This required the facility to have reviewed equipment and energy bills to identify savings opportunities and completed and organizational assessment for SEM.

Subelement 2b. Energy Map requires that the facility has developed an energy map to identify the key energy drivers and end uses, including the energy costs across the company.

Subelement 2c. Metrics and Goals requires that companies created specific, measurable goals and demonstrated an internal commitment to meet those goals. To assess this subelement, the Team asked if facilities had created fuel-specific energy performance goals for either electricity or natural gas (or both)

in the form of an absolute reduction or a reduction of energy usage per unit of production over time. In addition, facilities needed to have adopted facility key performance indicators for both energy and process optimization through an energy management initiative.[8]

Subelement 2d. Project Register requires that companies have a plan to achieve their energy goals, document potential energy efficiency projects, and track the progress of projects. The Team recognized a project or opportunity register, a tune-up action item list, or energy management tracking software as meeting the criteria for a project register.

Subelement 2e. Employee Engagement requires that the facility have an energy manager or energy team and that the manager or team had conducted some kind of engagement activity related to energy or conservation within the past two years.

Subelement 2f. Implementation measures whether a facility has completed an energy or process efficiency improvement project.

Subelement 2g. Reassessment assesses whether the facility takes a continuous approach to addressing energy and process efficiency by periodically updating its goals and its plan to achieve those goals. The Team gave full credit to facilities that have a plan and revisit that plan at least quarterly or when operations change. Like subelement 2d, this subelement required that the facility first have a plan to achieve its savings goals.

Table 17 provides the levels of full adoption of each Planning and Implementation subelement, by tier.

[8] The survey language described energy management initiatives as "services through ISO 50001, a strategic energy management program, continuous energy improvement, Lean, Six Sigma, Kaizen, total quality management, or another continuous improvement initiative."

Table 17. Strategic Energy Management Adoption, Planning and Implementation, 2021 and 2019

Subelement	2021			2019		
	Tier 1 (n=41)	Tier 2 (n=30)	Tier 3 (n=230)	Tier 1 (n=46)	Tier 2 (n=26)	Tier 3 (n=223)
2a. Energy Management Assessment (2019 Definition)	32%	33%	17%	33%	19%	14%
2b. Energy Map (2019 Definition)	54%	50% [a]	32%	52%	19% [a]	24%
2c. Metrics and Goals (2019 Definition)	27%	13%	3%	13%	4%	3%
2d. Project Register (2019 Definition)	37%	17%	8%	28%	8%	8%
2e. Employee Engagement (2019 Definition)	32%	10%	5%	35%	12%	8%
2f. Implementation (2019 Definition)	63%	67%	47%	70%	65%	45%
2g. Reassessment (2019 Definition)	24%	10%	4%	22%	8%	3%
2. Planning and Implementation [b] (2019 Definition)	**7%**	**0%**	**0%**	**9%**	**0%**	**1%**
2a. Energy Management Assessment (2021 Definition)	90%	83%	80% [a]	89%	81%	73% [a]
2b. Energy Map (2021 Definition)	54%	50% [a]	33%	52%	19% [a]	25%
2c. Metrics and Goals (2021 Definition)	68%	43%	28%	59%	42%	28%
2d. Project Register (2021 Definition)	71%	57% [a]	34% [a]	57%	31% [a]	19% [a]
2e. Employee Engagement (2021 Definition)	46%	27%	12%	35%	15%	10%
2f. Implementation (2021 Definition)	63%	70%	49%	70%	69%	46%
2g. Reassessment (2021 Definition)	39%	17%	8%	35%	15%	9%
2. Planning and Implementation [b] (2021 Definition)	**24%**	**10%**	**3%**	**17%**	**4%**	**2%**

[a] These cells had significant differences between year-to-year results (within same tier).

[b] This row represents the percentage of nonparticipants adopting all subelements.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C3, C4, C5, C6, C6a, and C8–C10.

Overall, the planning and implementation of SEM practices in the market did not significantly shift between 2019 and 2021. However, Tier 2 facilities were more likely to have energy maps in 2021 than in 2019. When using the 2021 definition for adoption, significant increased adoption is seen in project register and energy management assessment.

System for Measuring and Reporting Energy Performance

The System for Measuring and Reporting Energy Performance element measures the capability of a facility to effectively monitor its progress against energy and process efficiency performance goals. Several subelements require specialized expertise, which can fall outside the resources and tools companies typically require to meet a facility's core mission. To satisfy this element, a facility employee (or contracted energy manager) must collect energy use data over time using a tool or software program, regularly analyze that data to inform energy efficiency project decisions and planning, and report the findings of the collected data and analyses to company stakeholders at least once per year:

Subelement 3a. Measurement measures the facilities' use of a tool to record energy use over time so those data are available to track progress against energy goals. This subelement is equivalent to the monitoring and tracking system adoption discussed earlier.

Subelement 3b. Data Collection requires facilities to collect energy performance and review their energy consumption data at least monthly.

Subelement 3c. Analysis requires facilities to indicate that they had determined their baseline energy usage against which to analyze progress against energy performance goals.

Subelement 3d. Reporting requires facilities to share energy data with shareholders, management, or operations staff at least annually.

Table 18 shows the full adoption levels by tier for the third minimum element of SEM. When measured against the 2019 definition of adoption, the subelements were essentially the same from 2019 to 2021. Any apparent changes in values between the two years were not statistically significant at the $p \leq 0.05$ threshold.

When examining the subelements using the 2021 definition of adoption, statistically significant declines were measured for Tier 3 in data collection and reporting.

Table 18. Strategic Energy Management Adoption, Measuring and Reporting Performance, 2021 and 2019

Subelement	2021			2019		
	Tier 1 (n=41)	Tier 2 (n=30)	Tier 3 (n=230)	Tier 1 (n=46)	Tier 2 (n=26)	Tier 3 (n=223)
3a. Measurement (2019 Definition)	71%	57%	20%	52%	54%	22%
3b. Data Collection (2019 Definition)	51%	30%	8%	46%	23%	10%
3c. Analysis (2019 Definition)	71%	47%	29%	61%	58%	28%
3d. Reporting (2019 Definition)	76%	67%	50%	76%	85%	54%
3. Measuring and Reporting Performance[b] (2019 Definition)	**41%**	**10%**	**4%**	**24%**	**8%**	**4%**
3a. Measurement (2021 Definition)	71%	57%	21%	52%	54%	22%
3b. Data Collection (2021 Definition)	90%	77%	67%[a]	93%	92%	76%[a]
3c. Analysis (2021 Definition)	93%	87%	80%	91%	85%	76%
3d. Reporting (2021 Definition)	80%	70%	61%[a]	83%	85%	71%[a]
3. Measuring and Reporting Performance[b] (2021 Definition)	**59%**	**37%**	**14%**	**48%**	**46%**	**17%**

[a] These cells had significant differences between year-to-year results (within same tier).

[b] This row represents the percentage of nonparticipants adopting all subelements. Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions D1, D7, and D17–D19.

Effects of COVID-19 Pandemic and Shut-Downs

The Team asked if survey respondents experienced any effects from the COVID-19 pandemic and associated shut-downs. Table 19 shows the results among respondents by tier. Over half the respondents experienced effects such as changes in staffing or scheduling, reduced staff availability, and reduced sales or revenue. Additionally, Tier 3 respondents were less likely to have experienced a change in staffing or scheduling, reported by 78% (n=230) compared to 93% (n=41) of Tier 1 respondents. Seventy-seven respondents said there were other impacts because of the pandemic. The most prevalent were a shortage of materials or supply chain issues (n=27), a shortage of labor or difficulty hiring (n=20), and the increased cost of acquiring personal protective equipment (n=11). Other issues mentioned included budgetary constraints, changes in energy use at their facilities, and struggles adjusting to remote work.

Table 19. Effects of Pandemic and Shut-Downs on Nonparticipants

Base	Tier 1 n=41	Tier 2 n=30	Tier 3 n=230	Total n=301
Changes in staffing or scheduling	93%	90%	78%	81%
Reduced staff availability due to illness or other personal issues	71%	70%	63%	65%
Reduced sales or revenue due to decreased demand from customers	57%	60%	62%	61%
Increased sales of revenue due to increased demand from customers	48%	33%	35%	37%
Any other impacts as a result of coronavirus pandemic [SPECIFY]	33%	23%	24%	25%

Source: Year 5 (2021) participant survey question F5.

Wastewater Sector Assessment

This section first presents the market progress indicators and summary of market adoption for the wastewater sector, then provides more details from the interviews and survey. Descriptions for SEM elements and subelements are the same as those described in the *Industrial Sector Assessment* section.

Wastewater Sector - Market Adoption Overview

Table 20 presents a 2021 market-wide view of the practices identified in the wastewater sector. Similar to the industrial sector, one participant fully adopted SEM, while zero nonparticipants fully adopted SEM. The other EMPs were more prevalent: having an active energy team or energy manager and having a monitoring and tracking system.

Table 20. 2021 Market Adoption of Strategic Energy Management and On-site Energy Manager

Market Progress Indicators	Participant Facilities	Additional Facilities from Participant Jurisdictions	Nonparticipant Facilities	2021 Total Market (%)
(n)	8	18	706	732
On-site Energy Manager				
Has hired or retained OsEM (post-program)	N/A	N/A	10%	10%
Strategic Energy Management				
Has active energy team	7	1	18%	20%
Has system for monitoring and tracking	7	1	18%	19%
Has fully adopted SEM	1	1	0%[a]	0%
			<1%[b]	

[a] Based on 2019 definition of SEM adoption.

[b] Based on 2021 definition of SEM adoption.

Wastewater Sector - Participant Impacts

To date, NYSERDA has hosted two SEM cohorts for wastewater facilities in New York.[9] There were 13 participants between these two cohorts. Year 2 of the first cohort ended in September 2020 and year 1 of the second cohort ended in March 2021.

The Team interviewed eight of the 13 participants, asking how they learned about the program and their main motivation for participating. Four wastewater participants learned about the program through outreach from NYSERDA, either in person or online, while the other four learned about the program through attending a New York Water Environment Association event. Five respondents were motivated to participate to reduce energy expenditures, while two wanted to gain a better understanding of energy use at their facility and one wanted to get project assistance. Table 21 summarizes this information.

[9] Wastewater facilities are not eligible for the OsEM program.

Table 21. 2021 Wastewater Participant Decision-Making

Outreach Source and Motivation	Cohort 1 (year 2 ended in September 2020) n=4	Cohort 2 (year 1 ended in March 2021) n=4
Program Knowledge Source		
Outreach from NYSERDA	2	2
New York Water Environment Association event	2	2
Motivation for Participating		
Reduce energy expenditures	4	1
Gain understanding of facility energy use	0	2
Project assistance offered through program	0	1

Additionally, four respondents noted effects that COVID-19 had on their program participation. These respondents, whose participation partially or primarily occurred during the pandemic, noted satisfaction with the virtual offerings, including regular coaching calls and other online meetings and information sessions. Three of these respondents believed that in-person interactions with program staff and other participants would have been helpful under different circumstances.

Wastewater Participant Experiences

Seven of the eight respondents said that participating in the program was a worthwhile investment for their company or organization. The one participant who thought participation was not worthwhile said their organization had too many small improvements they should have made on their own first and they were not fully ready to participate. Despite this, however, the participant did note that the program helped point out these needs and allowed the energy champion to make progress as part of the effort.

Five wastewater sector participants rated themselves as *very satisfied* with their experience in the program overall. Two others rated themselves as *moderately satisfied* due to COVID-19 impacting program participation, which they acknowledged was not a fault of the program itself, and one other participant rated themselves as *moderately satisfied* because they did not have submetering capabilities at the time of their participation, which made it difficult. Six participants mentioned that the collaboration and communication with other participants in the program was especially beneficial to help brainstorm new energy-saving ideas.

All eight participants said the information their team received through the program was consistent with or exceeded their expectations and was relevant to their efforts. Two participants noted that they did not go into the experience with many expectations for the cohort but said they found the level of technical assistance to be beyond what they anticipated and that they were impressed with their results. Three participants said the time their employees dedicated to trainings and implementation of the practices was appropriate and aligned well with their expectations. Of the respondents who said the program did not align with their expectations, two said this was due to multiple reasons: both said certain aspects of the program were consistent with what they were anticipating, but one said they had to take additional time with program staff to discuss information from the consulting sessions related specifically to their facility. Two other respondents said implementing practices took longer than expected due to issues with the pandemic and staffing at their facilities, though they did note this was not a fault of the program. One last participant said that the entire process, but especially implementing practices was more time consuming than they expected, which made their participation somewhat difficult.

Five participants offered recommendations for changes to the program that would make it easier for facilities to participate and provide a better experience. Two participants suggested updating program requirements. One of these participants said there should be a screening for participants prior to participating to make it clear that they need to have submetering, and suggested that it would help if NYSERDA could offer assistance with establishing submetering. The other participant who suggested updates to program requirements said that NYSERDA should lower the requirement for the amount of money spent on operations to allow smaller organizations to participate. This respondent said this requirement initially prohibited them from participating but they were eventually allowed to join after communicating with program staff, which would be beneficial for other smaller organizations as well. Of the other participants who offered suggestions, one noted that it would be beneficial to be able to obtain improved energy management software through the program. This participant had an Excel-based model that worked for them, but said that specific software could have made it easier. Another participant thought the virtual offerings established during the pandemic were very helpful and should continue as an option. One last participant suggested having the cohort members be more geographically condensed. This participant said some members were a three- to five-hour drive from them, which made in-person collaboration somewhat difficult.

Persistence of Strategic Energy Management Practices

In July and August 2021, the Market Evaluation Team interviewed eight participants about the persistence of SEM practice[10] and diffusion to associated facilities. Table 22 shows the persistence of SEM practices in 2021.

Table 22. Persistence of Strategic Energy Management Practices Following Program Participation

Strategic Energy Management Practices Adopted by Interview Respondents	In Place at Time of Interview in 2021 (Retained; n=8)	Adopted during Program Participation in 2020 or 2021 (n=8)
Company energy policy and energy reduction goals	8	8
Designated energy champion	7	8
Staff assigned to energy team	7	8
Assessment of existing EMPs; assessment (map) of energy use by end-user system	7	7
Maintains a register of energy improvement opportunities; schedules and tracks implementation	6	8
Employee training	4	8
System for monitoring, tracking, and making decisions based on energy usage	7	8
Regularly reviews usage performance against goals	4	8
Reports energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior management, and others)	5	8
Fully adopted SEM (all practices above in place)	**3**	**7**

[10] While the Team examined the persistence of various practices, the persistence of savings was not within the study scope.

During program participation, four respondents fully adopted SEM, meaning they adopted all the practices listed in the table. At the time of the interview, only two participants were still implementing all SEM practices. One respondent who was no longer fully adopting SEM said this was because the designated energy champion had retired and some practices had been put on hold as a result. The other respondent said some practices had been halted due to time constraints and needs of the employees.

Implementing company energy policy and energy reduction goals, as well as completing an assessment of existing EMPs, had the highest persistence, with each of the respondents who completed these actions during their program participation saying they still had these in place at the time of the interview. Employee training and regular review of usage performance against goals had the lowest persistence among respondents. Both of these actions were implemented by all eight respondents during their participation, while only four respondents had the actions ongoing at the time of the interview. When asked to explain, three respondents said these practices had fallen off for a variety of reasons including an inability to identify ongoing project needs, staff having difficulty keeping up with practices due to being busy elsewhere, and not feeling the need to continue with trainings. Two other respondents said their practices fell off due to staff who had participated in the program leaving the company.

Direct Influence Participant Adoption

Seven of the eight respondents have additional facilities in New York. Among these respondents, only one reported that their additional facility had adopted SEM practices independent of the program (and said it had adopted all the same SEM practices as their primary facility; Table 23). Among respondents who had not extended SEM practices to additional facilities, four plan to do so, two chose not to extend the practices, and one said their additional facility is operated by a different management group.

Table 23. Adoption of Strategic Energy Management Practices at Participants' Additional Facilities

Strategic Energy Management Practice	Respondent 1 (One Facility)
Policy and usage goals	✓
Staff assigned to energy team or has as energy champion	✓
Assessments of existing EMPs; assessment (map) of energy use by end-user system	✓
Maintains a register of energy improvement opportunities; schedules and tracks implementation	✓
Employee training	✓
Energy management software	✓
Regularly reviews usage performance against goals	✓
Reports energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior management, and others)	✓

Wastewater Sector - Nonparticipant Adoption

In 2018, NYSERDA began targeting wastewater facilities to encourage them to enroll in SEM. Mirroring the industrial section 2.4 and using the same survey, the sections below detail the findings of nonparticipant OsEM, monitoring and tracking, and SEM adoption. Due to a relatively small number of responses within Tiers 1 and 2, the Team combined results from those tiers for analysis and reporting.

On-site Energy Manager Adoption

Facilities that had assigned energy conservation responsibility to an individual stationed at the facility are considered to have adopted OsEM. Table 24 shows segment-level and overall wastewater nonparticipant adoption of OsEMs in 2021. As expected, Tiers 1 and 2 facilities were more likely to have adopted an OsEM than Tier 3 facilities.

Table 24. Wastewater Nonparticipant On-site Energy Manager Adoption

Segment	2021
Tiers 1 and 2 (n=12)	42%
Tier 3 (n=96)	8%
Overall (n=108) [a]	**10%**

[a] This row represents the population weighted average.

Source: Year 5 survey questions C6, C6a, C6c, and C7a.

Monitoring and Tracking System Adoption

A key EMP is maintaining a system to monitor and record energy use over time and allow employees to analyze progress against reduction targets. Interestingly, Tier 3 wastewater facilities were as likely as Tiers 1 and 2 facilities to maintain a monitoring and tracking system (Table 25).

Table 25. Wastewater Nonparticipant Monitoring and Tracking System Adoption

Segment	2021
Tiers 1 and 2 (n=12)	17%
Tier 3 (n=96)	18%
Overall (n=108) [a]	**18%**

[a] This row represents the population weighted average.

Source: Year 5 survey questions C6, C6a, C6c, and C7a.

The Team asked about specific features that define an RTEM system: having an automated analysis or visual display of energy use over time, analyzing energy use against a baseline or energy usage target, and integrating energy usage data with production data. Table 26 shows that only a few facilities have a true RTEM system.[11]

Table 26. Wastewater Real-Time Energy Management Adoption, 2021

Tier	2021	
	n	Percentage
Tiers 1 and 2	12	8%
Tier 3	96	4%
Overall [a]	**108**	**4%**

[a] This row represents the population weighted average.

[11] NYSERDA does not require an RTEM system in order to participant in their program. These results are provided as an informational measurement of an EMP.

Strategic Energy Management Adoption

The following sections detail the wastewater adoption of minimum SEM elements as defined by the CEE: organization commitment, planning and implementation, and a system for measuring and reporting energy performance.

Table 27 shows the percentage of nonparticipant wastewater respondents meeting the full level of adoption for each minimum element. Similar to the industrial sector, no nonparticipants adopted SEM according to the original 2019 definition of an SEM adopter, and Tier 3 was less likely than Tiers 1 and 2 to have adopted any of the minimum elements. When viewed using the revised definition of an SEM adopter, the Team finds some adoption of SEM among Tier 1 and Tier 2 facilities.

Table 27. Wastewater Nonparticipant Strategic Energy Management Adoption, 2021

Minimum Element	2021	
	Tiers 1 and 2 (n=12)	Tier 3 (n=96)
ME1. Company/Organization Commitment	8%	1%
ME2. Planning and Implementation	0%	0%
ME3. Measuring and Reporting Energy Performance	8%	2%
SEM Adoption (2019 Definition) [a]	**0%**	**0%**
SEM Adoption (2021 Definition)	**8%**	**0%**

[a] This row represents the percentage of nonparticipants adopting all three minimum elements.

Source: Year 5 (2021) and Year 3 (2019) nonparticipant survey questions C3, C4, C4a, C5, C6, C6a, C8–C10, D1–D4, D4a, D4b, D6, D6a, D7, D11, and D13–D19.

Company Commitment

The Team measured adoption of the first minimum element by determining the existence and communication of a company policy and associated goals and commitment of resources to achieve those goals. For full subelement definitions, please refer to section 2.4.3 (Company Commitment). Table 28 shows that while Tier 1 and Tier 2 facilities are more likely than Tier 3 facilities to have policies, goals, and resources for energy management, most facilities do not have a commitment to energy management.

Table 28. Wastewater Nonparticipant Strategic Energy Management Adoption, Company Commitment

Subelement	Tiers 1 and 2 (n=12)	Tier 3 (n=96)
1a. Policy and Goals	25%	1%
1b. Resources	8%	5%
1. Company Commitment [a]	**8%**	**1%**

[a] This row represents the percentage of nonparticipants adopting both subelements.

Source: Year 5 (2021) nonparticipant survey questions C3, C4, C5, C6, C6a, and C8–C10.

Planning and Implementation

The Planning and Implementation element is focused on the facility's operational starting point or foundation to strategically manage energy. As shown in Table 29, of the subelements, wastewater facilities are most likely to have created an energy map to identify key energy drivers and end uses (subelement 2b. Energy Map) and to have completed an energy or process efficiency improvement project (subelement 2f. Implementation).

Table 29. Wastewater Nonparticipant Strategic Energy Management Adoption, Planning and Implementation

Subelement	Tiers 1 and 2 (n=12)	Tier 3 (n=96)
2a. Energy Management Assessment	25%	19%
2b. Energy Map	50%	27%
2c. Metrics and Goals	8%	0%
2d. Project Register	25%	0%
2e. Employee Engagement	17%	7%
2f. Implementation	67%	29%
2g. Reassessment	8%	1%
2. Planning and Implementation [a]	**0%**	**0%**

[a] This row represents the percentage of nonparticipants adopting all subelements.

Source: Year 5 (2021) nonparticipant survey questions C3, C4, C5, C6, C6a, and C8–C10.

System for Measuring and Reporting Energy Performance

The System for Measuring and Reporting Energy Performance element measures the capability of a facility to effectively monitor its progress against energy and process efficiency performance goals. Table 30 provides wastewater adoption levels by subelement. For all but the reporting subelement, Tiers 1 and 2 show higher incidences than Tier 3. The prevalence of the reporting subelement is nearly the same between the tiers.

Table 30. 2021 Full Adoption Levels by Tier for Measuring and Reporting

Subelement	Tiers 1 and 2 (n=12)	Tier 3 (n=96)
3a. Measurement	50%	28%
3b. Data Collection	33%	5%
3c. Analysis	83%	32%
3d. Reporting	42%	45%
3. Measuring and Reporting Performance [a]	**8%**	**2%**

[a] This row represents the percentage of nonparticipants adopting all subelements.

Source: Year 5 (2021) nonparticipant survey questions D1, D7, and D17–D19.

Effects of COVID-19 Pandemic and Shut-Downs

The Team asked if survey respondents experienced any effects from the COVID-19 pandemic and associated shut-downs. Table 31 shows the results among nonparticipants by tier. Over half the respondents experienced changes in staffing or scheduling. However, less than half experienced other effects such as reduced staff availability or changes in customer demand. Additionally, Tiers 1 and 2 respondents were more likely to have experienced a change in staffing or scheduling, reported by 83% (n=12) compared to 63% (n=96) of Tier 3 respondents. Twenty-five respondents said there were other impacts because of the pandemic. The most prevalent of these other impacts were the increased cost of acquiring personal protective equipment (n=6), budgetary constraints (n=5), and difficulties adjusting to remote working (n=4). Other issues mentioned included a shortage of materials and dealing with an increase in waste being produced.

Table 31. Effects of Pandemic and Shut-Downs on Nonparticipants

Base	Tiers 1 and 2 n=12	Tier 3 n=96	Total n=108
Changes in staffing or scheduling	83%	63%	65%
Reduced staff availability due to illness or other personal issues	75%	44%	47%
Reduced sales or revenue due to decreased demand from customers	8%	22%	20%
Increased sales of revenue due to increased demand from customers	33%	8%	11%
Any other impacts as a result of coronavirus pandemic [SPECIFY]	17%	24%	23%

Source: Year 5 (2021) participant survey question F5.

Indirect Benefits Estimation

The Market Evaluation Team calculated the indirect savings benefits achieved by the EMP programs since the last indirect benefit evaluation in 2019. NYSERDA's EMP programs generate energy savings and carbon reduction benefits *indirectly* due to two types of influence:

DIPA occurs when a company extends EMPs to additional facilities because of the benefits realized by its participant facility.

Influenced nonparticipant adoption occurs when a nonparticipant facility adopts an EMP practice because of information it receives originating from NYSERDA program activities or because of structural changes in the market resulting from program activity.

To be considered an indirect impact of NYSERDA's initiative, EMP adoption in either of these categories must be clearly influenced by NYSERDA. There is a clear link to NYSERDA's program influence when participants implement EMPs in other facilities. Nonparticipant adoption of an EMP may result from influence by NYSERDA's initiative partners (such as utilities or consultants) or from NOMAD, which includes all adoption that is influenced by other forces in the market not connected to NYSERDA. NOMAD does not contribute to indirect benefits as it is independent of NYSERDA's actions.

The actual benefits from indirect adoption include adopters' electric and fossil fuel energy savings and carbon emissions reductions. To evaluate indirect benefits achieved by the program, the Team applied the following algorithm, developed in Year 2:

$$\boldsymbol{Indirect\ benefits_t = [DIPA + (Nonparticipant\ Adoption - NOMAD)]_t * UEB}$$

Where:

t = Time period

DIPA = Direct influence participant adoption; the additional units of adoption by participant companies after they are no longer receiving incentives or direct support from NYSERDA

Nonparticipant Adoption = Units of adoption by nonparticipating facilities that have adopted the technology or practice

NOMAD = Units of naturally occurring market adoption; the estimated number of industrial facilities that would have adopted the technology or practice absent NYSERDA's intervention

UEB = Unit energy benefit; the energy savings (MWh or MMBtu) or carbon dioxide–equivalent reductions per industrial facility resulting from the adoption of OsEM or SEM

DIPA, nonparticipant adoption, and NOMAD are combined to determine the total number of facilities indirectly adopting the practice. The variable *t* defines the time period being assessed; in this case, 2020 and 2021. The unit energy benefit is the amount of indirect savings and carbon reduction benefits estimated for each adopting facility. The Team used Year 5 primary data to calculate each variable related to units of adoption and used planning estimates from NYSERDA for the unit energy benefits. The following sections describe this process in more detail.

Calculating Units of Indirect Influence Adoption

The total units of indirect influence adoption is equal to influenced nonparticipant adoption combined with DIPA. To estimate the influenced nonparticipant adoption, the Team first calculated the number of nonparticipants in the survey sample who adopted an OsEM or adopted/continued SEM in 2020 or 2021. Next, the Team calculated and subtracted the NOMAD from the number of adopters. Finally, the Team extrapolated the sample result to the population.

Nonparticipant OsEM and SEM Adoption

Nonparticipants were considered an OsEM adopter if they met two criteria:

Have an individual or team with formal responsibility for energy performance
If it is a team, there must be an individual in charge
The person in charge must work onsite

Nonparticipants were considered an SEM practitioner if they adopted all CEE minimum elements to some degree (either some or full adoption). This definition is informed by an analysis of impact evaluation results for SEM program participants showing that energy savings were achieved by participants who fully adopted all CEE minimum elements and by those who did not fully adopt all elements (see analysis results in *Appendix B*).

NOMAD

Table 32 summarizes the questions that were used to determine if a respondent is NOMAD.

Table 32. Analysis Approach to Identify Naturally Occurring Market Adoption

Factor	Survey Question [a]	Response Options
2020-2021 Timing	In approximately what year did your facility first [practice description]?	[Record year]
Source	Which, if any, of the following factors contributed to your company's decision to [practice description]?	Information from an industry association (specify association) Information from a consultant or provider (specify consultant) Information from utility, NYSERDA, or other entity (specify entity) Training, workshop, webinar, or other event (specify event) Information in a case study or report (specify) Another source (specify) None of the above
Importance	How important was [repeat for each source indicated] to your company's decision to [practice description]?	Very important Somewhat important Not too important Not at all important

[a] Questions about an OsEM referenced company's decision to "assign responsibility for energy performance," while questions about SEM referenced a facilities' decision to "adopt a commitment to ongoing and systematic energy management."

The nonparticipant survey asked when the company adopted a practice. Then it asked what information sources influenced the company's decision, and the importance of each source. For the EMP adoption to be considered an indirect outcome of NYSERDA's program activity, the respondent must have credited NYSERDA (or another source that was influenced by NYSERDA) as an influence on the facility's

decision, and rated that influence as *very important* or *somewhat important*.[12] Furthermore, the respondent must have adopted a practice during or after 2018, when NYSERDA's market activity began. Any facility is NOMAD that did adopt/continue EMP in 2020 or 2021 and did not credit NYSERDA information as an important resource.

Table 33 shows the number of industrial nonparticipant adopters at each step of the analysis. After subtracting NOMAD, two Tier 1 facilities and a single Tier 3 facility in the sample were found to be influenced OsEM adopters. The Team extrapolated the results to the Tiers 1 and 3 populations, which yielded 10 Tier 1 and 29 Tier 3 influenced nonparticipant adopters in the population (OsEM only). The single influenced SEM adopter in the sample did so in 2019 and indicated that NYSERDA was an important factor in their decision to adopt EMPs.

Table 33. Industrial Nonparticipant Adopter Attrition

Influence Factor	OsEM Adoption			SEM Adoption		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
Nonparticipant Adopters in 2020 and 2021 (number of survey respondents)	**21**	**9**	**48**	**15**	**0**	**0**
Naturally Occurring Determination Factor						
Adopted prior to 2018 or unknown	18	8	43	14	0	0
Not influenced by NYSERDA source	1	1	4	0	0	0
NYSERDA source not considered important influence	0	0	0	0	0	0
Total NOMAD (a + b + c)	**19**	**9**	**47**	**14**	**0**	**0**
Influenced Nonparticipant Adoption (sample); Adopters Minus NOMAD	**2**	**0**	**1**	**1**	**0**	**0**
Influenced Nonparticipant Adoption (population)	**10**	**0**	**29**	**5**	**0**	**0**

Table 34 shows the same analysis for the wastewater sector. There were no influenced SEM adopters. Only one respondent, a Tier 3 facility, was identified as an influenced OsEM adopter. The Team extrapolated the results to the Tier 3 population, which resulted in seven influenced nonparticipant adopters in the population.

[12] The Team used the outreach activity details provided by staff for the Year 4 report to identify NYSERDA-influenced resources.

Table 34. Wastewater Nonparticipant Adopter Attrition

Influence Factor	OsEM Adoption			SEM Adoption		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
Nonparticipant Adopters in 2020 and 2021 (number of survey respondents)	**3**	**2**	**8**	**0**	**0**	**0**
Naturally Occurring Determination Factor						
Adopted prior to 2018 or uknown	3	2	7	0	0	0
Not influenced by NYSERDA source	0	0	0	0	0	0
NYSERDA source not considered important influence	0	0	0	0	0	0
Total NOMAD (a + b + c)	**3**	**2**	**7**	**0**	**0**	**0**
Influenced Nonparticipant Adoption (sample); Adopters Minus NOMAD	**0**	**0**	**1**	**0**	**0**	**0**
Influenced Nonparticipant Adoption (population)	**0**	**0**	**7**	**0**	**0**	**0**

Total Units of Indirect Adoption

In addition to influenced nonparticipant adoption, the Team also examined DIPA for each sector.

Table 35 shows the total number of influenced industrial adopters. Through interviews with SEM participants, the Team identified that one had extended their SEM practices to an additional facility (shown in the DIPA row).

Table 35. Total Number of Influenced Adopters in Industrial Facilities (Population Estimates)

Type of Adoption	OsEM			SEM		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
Direct Influence Participant Adoption	Not measured			0	0	1
Influenced Nonparticipant Adoption	10	0	29	5	0	0
Total Indirect Adoption	**10**	**0**	**29**	**5**	**0**	**1**

Table 36 shows the total number of influenced wastewater adopters. Similar to the industrial sector, the Team identified one wastewater participant who extended all their SEM practices to an additional facility.

Table 36. Total Number of Influenced Adopters in Wastewater Facilities (Population Estimates)

Type of Adoption	OsEM			SEM		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
Direct Influence Participant Adoption	n/a			0	0	1
Influenced Nonparticipant Adoption	0	0	7	0	0	0
Total Indirect Adoption	**0**	**0**	**7**	**0**	**0**	**1**

Unit Energy Benefit Values and Assumptions

To calculate indirect saving impacts, the Team applied unit energy benefits developed as part of the Year 3 Market Evaluation, shown in Table 37. See the *Year 3 Market Evaluation Report*[13] for a detailed discussion of how these values were developed. OsEM benefits are for a single year and persist as long as the OsEM role is active. SEM benefits depend on the first year adopted; savings decrease over time.

Table 37. Unit Energy Benefits

Program/Metric	Tier 1	Tier 2	Tier 3
On-site Energy Manager			
Electricity (MWh)	1,200	500	165
Fossil Fuels (MMBtu)	15,000	5,000	1,650
Carbon (Metric Tons)	1,446	534	176
Strategic Energy Management			
Year 1 - Electricity (MWh)	702	211	70
Year 1 - Fossil Fuels (MMBtu)	5.424	1,627	537
Year 1 - Carbon (Metric Tons)	664	199	66
Year 2 - Electricity (MWh)	337	101	33
Year 2 - Fossil Fuels (MMBtu)	2,603	781	258
Year 2 - Carbon (Metric Tons)	319	96	32
Year 3 - Electricity (MWh)	330	99	33
Year 3 - Fossil Fuels (MMBtu)	2,551	765	252
Year 3 - Carbon (Metric Tons)	312	94	31

Summary of Indirect Benefits

The Team applied the unit energy benefits to the corresponding number of facilities adopting OsEM and SEM, by tier. Table 38 shows the industrial sector estimated indirect benefits. Most of the OsEM adopters did so in 2020 and were credited for two years of benefits. The Tier 3 SEM adopter was a result of DIPA, which the Team assumed occurred more recently, in 2021. The Tier 1 SEM adopter started practicing in 2019 (year 1), so was given credit for year 2 and year 3 savings in 2020 and 2021, respectively.

[13] Cadmus. April 2020. *Continuous Energy Improvement Market Evaluation: 2019 Final Report.* Prepared for New York State Energy Research and Development Authority. NYSERDA Contract 104542. https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/CEI-Market-Evaluation-Yr-3-Report.pdf

Table 38. Industrial Estimated Indirect Benefits by Program and Tier, 2020-2021

Indirect Benefits Type	On-site Energy Manager			Strategic Energy Management			EMP Initiative Total
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3	
2020							
Units of Indirect Adoption	5	0	29	5	0	0	**39**
MWh Benefits	6,129	0	4,760	1,721	0	0	**12,610**
MMBtu Benefits	76,608	0	47,604	13,294	0	0	**137,506**
CO_2e Benefits	7,383	0	5,089	1,627	0	0	**14,099**
2021							
Units of Indirect Adoption	10	0	29	5	0	1	**45**
MWh Benefits	12,257	0	4,760	1,685	0	70	**18,773**
MMBtu Benefits	153,215	0	47,604	13,028	0	537	**214,385**
CO_2e Benefits	14,766	0	5,089	1,594	0	66	**21,514**
2020 and 2021							
MWh Benefits	18,386	0	9,521	3,406	0	70	**31,383**
MMBtu Benefits	229,823	0	95,209	26,322	0	537	**351,891**
CO_2e Benefits	22,148	0	10,177	3,221	0	66	**35,612**

Table 39 shows the estimated wastewater sector indirect benefits. The OsEM adoption occurred in 2020, and two years of benefits were applied to the extrapolated population. SEM adopters were a result of DIPA, which the Team assumed occurred more recently, in 2021.

Table 39. Wastewater Estimated Indirect Benefits by Segment, 2020-2021

Indirect Benefits Type	On-site Energy Manager			Strategic Energy Management			EMP Initiative Total[a]
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3	
2020							
Units of Indirect Adoption	0	0	7	0	0	0	**7**
MWh Benefits	0	0	1,155	0	0	0	**1,155**
MMBtu Benefits	0	0	11,550	0	0	0	**11,500**
CO_2e Benefits	0	0	1,235	0	0	0	**1,235**
2021							
Units of Indirect Adoption	0	0	7	0	0	1	**8**
MWh Benefits	0	0	1,155	0	0	70	**1,225**
MMBtu Benefits	0	0	11,550	0	0	537	**12,087**
CO2e Benefits	0	0	1,235	0	0	66	**1,300**
2020 and 2021							
MWh Benefits	0	0	2,310	0	0	70	**2,380**
MMBtu Benefits	0	0	23,100	0	0	537	**23,637**
CO2e Benefits	0	0	2,469	0	0	66	**2,535**

[a] Values in table are rounded to nearest unit

For both sectors, most indirect benefits came from influenced nonparticipants assigning an OsEM. This is not surprising since qualifying as an SEM practitioner requires meeting several criteria, which is more difficult than meeting the criteria for OsEM.

Table 40 shows the evaluated indirect benefits from 2018 through 2021 compared to the planned indirect benefits. Estimated indirect benefits are higher than the planned cumulative benefits.

Table 40. 2018–2021 Cumulative Evaluated Indirect Benefits

Indirect Benefits Type	Evaluated Years		Evaluated Cumulative Total (2018–2021)	*Cumulative Planned through 2021* [a]	Percentage of Plan Achieved
	2018-2019	2020-2021			
Industrial	12,656	31,383	44,039	N/A	N/A
Wastewater	N/A	2,380	2,380	N/A	N/A
MWh Benefits	**12,656**	**33,762**	**46,418**	***42,081***	**110%**
Industrial	135,568	351,891	487,459	N/A	N/A
Wastewater	N/A	23,637	23,637	N/A	N/A
MMBtu Benefits	**135,568**	**375,528**	**511,096**	***468,288***	**109%**
Industrial	14,018	35,612	49,630	N/A	N/A
Wastewater	N/A	2,535	2,535	N/A	N/A
CO_2e Benefits	**14,018**	**38,147**	**52,165**	***47,598***	**110%**

[a] *Clean Energy Fund Investment Plan: Industrial Chapter*, revised May 7, 2021.

Key Findings and Recommendations

There are several key findings from the Market Evaluation study.

Industrial Market: For the industrial sector, the 2021 nonparticipant survey results were similar to those obtained in 2019, indicating that the broader market has not changed with regard to EMPs.

SEM Adoption: The adoption of SEM is still highly dependent on program support for both sectors.

OsEM Adoption: OsEM is more prevalent than SEM, with half of larger industrial facilities and 40% of larger wastewater facilities employing a dedicated energy manager. Across both sectors, less than 10% of adoption among nonparticipants was influenced by NYSERDA.

Tier 3 Opportunities: Not only are Tier 3 facilities the largest in terms of number of potential participants, the penetration of EMPs is notably lower in Tier 3 facilities across both sectors when compared to Tier 1 and Tier 2 facilities.

Recommendation: Examine whether it would be cost-effective to target companies with several Tier 3 facilities under a common management team.

Response: Implemented. Both SEM and OsEM are open to all customer sizes, including Tier 3. When Tier 3 customers are identified as a good fit for the programs, we work with the companies to determine the best way to apply (individually or as a group if they have sister facilities in NY). However other NYSERDA programs that have a lower cost to participate or are more focused in scope may be better suited to Tier 3 customers.

SEM adopter definition: A review of participants' impact evaluation outcomes against their adoption of the 13 CEE minimum elements shows that most participants do not "fully" adopt all minimum elements, per the definition and scoring rubric developed and reported in the CEI Year 3 evaluation report (Appendix A).[14] Evaluated savings suggest the Year 3 evaluation criteria for SEM adoption are too stringent and result in indirect benefits estimates that do not fully represent SEM practitioners in the general market. To address this finding, the Indirect Benefits estimation used a revised definition of SEM adoption to include nonparticipants who demonstrated some or full adoption for every one of the CEE minimum elements and subelements.

Recommendation: Coordinate future market and impact evaluations; base the definition of adoption on cumulative evidence linking practices to verified energy savings. Continue to use the revised working definition of SEM adoption for future market evaluations, and revisit the analysis of critical SEM savings drivers annually.

Response: Pending. NYSERDA Evaluation Staff will work with the Program Staff and Market and Impact evaluation contractors to revise the definition of SEM adoption. Further, the methodologies of

[14] "Continuous Energy Improvement Market Evaluation 2019," Cadmus. https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/CEI-Market-Evaluation-Yr-3-Report.pdf

future evaluations will be designed to annually measure the adoption of and associated savings related to SEM.

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

Recommendation: NYSERDA should review participants' feedback and determine which to implement.

Response: Pending. NYSERDA will review participants' feedback and determine which to implement.

Participant Staff Turnover: One of the most reported reasons for SEM participants discontinuing EMPs after program participation was staff turnover or lack of staffing (reported by two of the four interviewed industrial participants and three of the eight interviewed wastewater participants).

Direct Influence Participant Adoption: Common ownership of facilities does not necessarily lead to DIPA; however, common management staff *may* support DIPA. Among all three cohorts of interviewed SEM participants, all respondents who had already extended SEM practices to additional facilities or planned to do so in the future reported that these facilities were under common management. Three of the six respondents who had no plans to extend SEM practices to additional facilities said this was because the other facilities were under separate management.

COVID Impacts: Most industrial facilities (80% or more) experienced changes in staffing or scheduling as a result of the pandemic and associated shut-downs. A large share of facilities (65%) indicated that they also experienced reduced staff availability due to illness or other personal issues. More facilities indicated reduced sales (61%) than increased sales (37%). Other impacts reported included supply chain issues, labor shortages, and the increased cost of personal protective equipment.

Among wastewater facilities, over half experienced changes in staffing or scheduling and just over 40% had reduced staff availability due to illness or other personal issues. Some facilities (18%) experienced decreased demand while others (10%) experienced increased demand. Like the industrial sector, the wastewater sector also experienced the increased cost of personal protective equipment.

Detailed Methodology

Nonparticipant Survey

The Market Evaluation Team conducted a phone survey with management-level contacts at nonparticipant industrial and wastewater facilities in New York to measure the penetration of key EMP practices as of 2021. Both sectors (industrial and wastewater) received the same survey. Year 5 was the second survey wave, originally conducted in Year 3. In Year 3, the Team significantly modified the survey from Year 1 to better improve response rates and question clarity. Therefore, comparison between Year 1 results is not possible. The Year 5 (2021) nonparticipant survey instrument is included in *Appendix C.*

Industrial Sample

Sampling Approach

As in 2019, the Team used InfoGroup data purchased and provided by NYSERDA to develop the industrial sample frame. From the InfoGroup dataset, the Team identified all records meeting the characteristics of the target industrial population:

Facilities with a North American Industry Classification System (NAICS) code beginning in 31X going through 33X (designating a manufacturing facility)

Industrial facilities that had not previously participated in NYSERDA's EMP program

Industrial facilities with 10 or more employees

The Team stratified the population into seven groups (identified by NAICS codes) and three tiers of annual energy expenditures within each group. The groups included six high-priority industries and an additional category with all the remaining NAICS codes:

311 Food

322 Paper

325 Chemicals

326 Plastics and Rubber

327 Nonmetallic Mineral Products

332 Fabricated Metal Products

Other (NAICS codes 312–316, 321, 323, 324, 331, 333–337, and 339)

Energy expenditure data were not provided by InfoGroup, so the Team used the number of employees as a proxy to develop the sample frame. The tier definitions are provided in Table 41.

Table 41. Tier and Proxy Tier Definitions

Tier	Annual Energy Spending Tier	Number of Employees Tier (Proxy)
Tier 1	Annual Energy Spending Greater $1 million	More than 250 employees
Tier 2	Annual Energy Spending from $500,000 to $1,000,000	Between 100 and 249 employees
Tier 3	Annual Energy Spending Less than $500,000	Between 10 and 99 employees

Table 42 shows the initial estimates for the population of industrial facilities by tier and industrial sector.

Table 42. 2021 Industrial Nonparticipant Population (Pre-Survey Estimates)

NAICS	Sector	Tier 1	Tier 2	Tier 3
311	Food	22	48	757
322	Paper	5	26	158
325	Chemicals	16	21	223
326	Plastics and Rubber	6	25	167
327	Nonmetallic Mineral Products	6	22	191
332	Fabricated Metal Products	18	66	1,047
3XX	Other	150	366	3,737
Total		**223**	**574**	**6,280**

As in the 2019 EMP Market Evaluation, the Team calculated sample size targets using the Neyman optimal allocation to assign total sample sizes to tier and sector strata.[15] The Team assumed maximum variability in survey responses among customers within each stratum, used finite population corrections, and set 90% statistical confidence with ±10% precision targets for measuring EMP adoption in 2021 and changes over time within each tier. The Team also incorporated a response rate that was calculated based on the 2019 survey results to ensure there were enough samples in each sector and tier combination. This forced a census to be taken across Tiers 1 and 2, since the calculated sample size targets were greater than the estimated population sizes. The target sample sizes are provided in Table 43.

Table 43. 2021 Target Energy Management Practice Sample Sizes

NAICS	Sector	Tier 1	Tier 2	Tier 3
311	Food	22	48	461
322	Paper	5	26	244
325	Chemicals	16	21	244
326	Plastics and Rubber	6	25	217
327	Nonmetallic Mineral Products	6	22	244
332	Fabricated Metal Products	18	66	543
3XX	Other	150	366	1,031
Total		**223**	**574**	**2,985**
Approximate Response Rate Used		**32%**	**20%**	**4%**
Expected Precision at 90% Confidence		**±14.9%**	**±18.9%**	**±6.8%**

Final Sample and Post Survey Adjustments

The survey was conducted by NYSERDA's survey partner, APPRISE, from February through June 2021. Table 44 shows the 2021 population and sample sizes, with the expected confidence and precision for tier-level and sample-level results.

[15] The Neyman optimal allocation is defined as $n_h = n * \frac{(N_h * S_h)}{\sum(N_h * S_h)}$, where n_h is the sample size for stratum h, n is the total sample size, N_h is the population size for stratum h, and S_h is the standard deviation of stratum h.

Table 44. Survey Sample Plan

Tier	Estimated Nonparticipant Population	Expected Sample Size	Expected Precision within Tier
Industrial Facilities Tier 1	223	48	±14.9%
Industrial Facilities Tier 2	574	33	±18.9%
Industrial Facilities Tier 3	6,280	230	±6.8%
Industrial Facilities Total	**7,077**	**311**	**--**

The EMP Market Evaluation survey collected information on each facility's actual annual energy expenditure. The Team used these data to revise the estimated population for each tier and sector, which had initially been based on the proxy data (number of employees, as reported by InfoGroup). Where the number of employees did not align with annual energy expenditure according to Table 41, the Team reassigned respondents to the correct tiers. For this analysis, the Team adjusted the population of facilities based on the proportion of facilities reassigned in the sample. Table 45 shows the updated estimates for the nonparticipant population based on the survey results and includes the actual sample sizes for each tier.

Table 45. Post Survey Nonparticipant Population and Sample Size by Tier

Tier	Revised Nonparticipant Population	Actual Sample Size
Industrial Facilities Tier 1	209	41
Industrial Facilities Tier 2	232	30
Industrial Facilities Tier 3	6,636	230
Industrial Facilities Total	**7,077**	**301**

Wastewater Sample

Sampling Approach

The Team used OpenNY provided by NYSERDA to develop the wastewater sample frame. Table 46 shows the assigned wastewater facility sample segments and definitions. The Team designed these original segments to mirror the inherent difference in energy management needs between small and large facilities. The Team removed program participants from the sample frame.

Table 46. Tier Definitions

Segment	Definition (Number of Gallons)
Small Facilities	Facilities treating less than 5 million gallons of water per day
Large Facilities	Facilities treating more than 5 million gallons of water per day

NYSERDA attempted to survey a census of wastewater facilities within each tier. Table 47 shows the population sizes of each tier and calculated sample size targets with 90% statistical confidence and ±10% precision. It also includes the actual sample sizes achieved with the attempted census.

Table 47. Population and Sample Targets

Segment	Population	Sample Size Needed to Achieve 90/10 C/P	Actual Sample Size
Small Facilities	654	77	81
Large Facilities	77	37	27

The EMP Market Evaluation survey collected information on each facility's actual annual energy expenditure. The Team used these data to revise the estimated population for each tier and sector, which had initially been based on the proxy data (number of gallons of water used daily, as reported by OpenNY). The Team reassigned respondents to the newly defined tiers based on energy expenditure. For analysis, the Team adjusted the population of facilities based on the proportion of facilities reassigned in the sample. Table 48 shows the updated estimates for the nonparticipant population based on the survey results and includes the actual sample sizes for each tier.

Table 48. Survey Sample Results

Tier	Estimated Nonparticipant Population	Actual Sample Size
Wastewater Facilities Tier 1	9	4
Wastewater Facilities Tier 2	25	8
Wastewater Facilities Tier 3	672	96
Wastewater Facilities Total	**706**	**108**

Participant Interviews

The Team recruited representatives from facilities that had completed active participation in the NYSERDA SEM or OsEM programs. The Team used interview responses to assess participants' experience in the program, the persistence of practices adopted, and the diffusion of practices to other facilities within the same company.

Table 49 shows the number of contacts available and the number of interviews the Team conducted for industrial OsEM participants, industrial SEM participants, and wastewater SEM participants. The Team interviewed 12 respondents by telephone during August and September 2021. The Team was unable to contact the one OsEM participant available and therefore did not collect any data on OsEM in this Market Evaluation. The interview guide is available in *Appendix D*.

Table 49. Available Post-Participation Contacts and Completed Interviews

	Industrial OsEM Participants	Industrial SEM Participants	Wastewater SEM Participants
Contacts Available	1	7	13
Contacts Interviewed	0	4	8

Strategic Energy Management Definitions and Scoring

Table A-1 lists the 13 CEE minimum elements and subelements that describe the conditions a facility should have in place to be considered SEM practitioners.

Table A-1. Strategic Energy Management Definitions and Scoring Criteria

CEE Minimum Element	CEE Minimum Element Definition	Criteria Assessed for Market Evaluation
Company Commitment	**In an industrial organization, clear commitment is vital for SEM to succeed. Senior managers must undertake these activities.**	
1a. Policy and Goals	Set, frame, and communicate long-range energy performance objectives through an energy policy and energy reduction goals.	Facility has a written energy plan or policy, has set energy reduction goals, or has communicated goals to staff.
1b. Resources	Ensure that SEM initiatives are properly resourced for goal attainment, including assigning responsibility or accountability to an individual energy champion, energy team, or support of employee engagement activities.	Facility has a team with responsibility for energy performance that meets at least once per quarter and facility has at least minimal staff and funding support needed to manage energy performance.
Planning and Implementation	**Planning provides the foundation for a customer to strategically manage energy. Implementation translates planning into actions that improve efficiency. Planning and implementation consists of seven activities conducted by the energy champion or team.**	
2a. Energy Management Assessment	Assess current EMPs by using a performance scorecard or facilitated energy management assessment.	Facility has completed a review of equipment and energy bills to identify savings opportunities and has completed an organizational assessment for SEM.
2b. Energy Map	Develop a breakdown or map of energy end uses and costs across the company.	Facility has developed an energy map to identify the key energy drivers and end uses.
2c. Metrics and Goals	Establish clear, measurable goals for energy performance improvements based on analysis of baseline energy consumption and relevant variables of energy consumption.	Facility has defined energy performance goals in terms of energy consumption quantities or a percentage reduction in use and has committed to goals as part of facility key performance indicators for both equipment and process.
2d. Project Register	Describe actions to be undertaken over one or more years: these can be behavior or capital improvements.	Facility has list of potential projects and revisited the list or energy management project plan at least once.
2e. Employee Engagement	Develop and implement a plan to educate employees about their activities' energy impacts.	Facility has conducted any employee engagement activities related to energy or conservation at least annually.
2f. Implementation	Complete measures in the project register.	Facility has completed at least one process or energy efficiency project in the last two years.
2g. Reassessment	Periodically review energy performance by comparing actual consumption to expected consumption and use this information to reassess goals, metrics, and planned projects.	Facility has revisited the project register at least once.

CEE Minimum Element	CEE Minimum Element Definition	Criteria Assessed for Market Evaluation
System for Measuring and Reporting Energy Performance	**Industrial organizations should monitor and report energy performance according to their goals and should regularly analyze actual consumption against estimated consumption. A system for measuring and reporting energy performance consists of four activities that may involve multiple departments or individuals within a facility.**	
3a. Measurement	Regularly collect performance data to understand energy use; this subelement should capture all relevant energy consumption variables including production and weather.	Facility uses a tool that tracks energy use over time.
3b. Data Collection	Collect and store energy performance measurements versus goals in commonly available formats.	Facility reviews energy performance at least monthly.
3c. Analysis	Create a baseline of energy consumption and a model to predict energy consumption, then regularly update the model.	Facility has established an energy consumption baseline.
3d. Reporting	Provide internal and external stakeholders with the results of energy initiatives and achievements compared to goals.	Facility shares facility energy use details with stakeholders such as management or operations staff.

Table A-2 shows the scoring rubric used to generate SEM nonparticipant adoption scores for each subelement. Respondents were scored based on whether they had full adoption, some adoption, or no adoption of that subelement.

Table A-2. Year 5 Scoring Rubric for Strategic Energy Management Adoption

CEE Minimum Element	Subelement	Year 5 Survey Questions	Full Adoption (2 points = 100%)	Some Adoption (1 point = 50%)	No Adoption (0 points = 0%)
1. Company Commitment	1a. Policy and Goals	C3, C4, C5	AND (C3=1, C4=1, C5=1)	For each subelement, response combinations that are not full adoption or no adoption would be considered some adoption.	AND (C3>1, C4>1, C5>1)
	1b. Resources	C6, C8–C10	AND (C6=1, C6a="team," C8<5, C9<3, C10<3)		AND (C6>1, C6b="No," C8>6, C9=NR, C10=NR)
2. Planning and Implementation	2a. Energy Management Assessment	D1, D2	AND (D1<3, D2<3)		AND (D1>3, D2>3)
	2b. Energy Map	D3	D3<3		D3>3
	2c. Metrics and Goals	D4, D4a, D4b, D11, D13	AND (D4<3 OR (D4a<3, D4b<3), D11=1, D13=1)		AND (D4>2, D11>1, D13>1)
	2d. Project Register	C4a, D6, D6a	AND ((C4a=1, D6<5) OR (D6a=1, D6a=99))		AND (C4a>1, D6>4)
	2e. Employee Engagement	(C6), D15, D15a	AND (D15<3, D15a<5)		D15>2
	2f. Implementation	D14	D14<3		D14>3
	2g. Reassessment	D16	OR (D16=1, 2, 3, OR 6)		OR(D16=98 OR 99)
3. Measuring and Reporting Energy Performance	3a. Measurement	D7	D7<3		D7>3
	3b. Data Collection	C4, D17	AND (C4=1, D17<4)		AND (C4>1, D17≥8)
	3c. Analysis	D1, D18	AND (D1=1, D18<2)		AND (D1>1, D18>3)
	3d. Reporting	D19	D19<7		D19>8

SEM Participant Energy Savings and CEE Minimum Element Adoption

Figure B-1 shows evaluation results from the impact evaluation on the right along with which of the 13 CEE subelements were adopted by each SEM participant. Each row represents a different facility; SEM in the participant name indicates an industrial participant and WEC indicates a wastewater participant. The analysis shows that most participants did not fully adopt all subelements; in fact, some industrial participants did not adopt multiple minimum elements. Despite this, most participants demonstrated positive energy savings.

Figure B-1. SEM Participants' CEE Minimum Element Adoption and Energy Savings

Project Number	Policy & Goals	Resources	Energy Management Assessment	Energy Map	Metrics and Goals	Project Register	Employee Engagement	Implementation	Reassessment	Measurement	Data Collection	Analysis	Reporting	SEM % Savings (Electric)	SEM % Savings (Non-Electric)
SEM 1	P	F	F	U	U	F	P	F	P	F	P	F	P	8.0%	N/A
SEM 2	F	P	F	U	N	N	N	F	F	F	P	F	F	-0.1%	-2.8%
SEM 3	P	F	F	U	U	F	P	F	F	F	F	F	F	-0.9%	-12.8%
SEM 4	F	F	F	U	F	F	F	F	F	F	F	F	F	3.0%	N/A
SEM 5	P	N	F	U	N	F	N	F	P	P	P	F	P	7.5%	0.9%
SEM 6	P	P	F	P	N	F	N	F	F	N	P	F	F	12.6%	10.3%
SEM 7	U	F	F	F	P	N	P	F	P	F	U	F	N	1.0%	0.7%
SEM 8	N	F	F	U	N	F	N	F	F	N	N	F	F	1.2%	-7.5%
SEM 9	U	F	F	U	N	N	N	F	F	N	P	F	F	1.4%	-2.1%
SEM 10	F	F	F	F	P	F	F	F	F	P	F	F	F	1.5%	40.8%
WEC 11	F	F	F	F	U	F	P	F	P	P	P	F	P	4.9%	N/A
WEC 12	F	P	F	U	U	F	F	F	F	P	P	F	P	0.0%	N/A
WEC 13	F	F	F	P	U	F	P	F	F	F	F	F	P	2.2%	N/A
WEC 14	P	F	F	U	U	F	P	F	P	P	P	F	P	1.3%	N/A
WEC 15	P	F	F	U	U	F	P	F	P	P	P	F	P	5.1%	N/A

F	Fully Meets
P	Partially Meets
N	Not Met
U	Unknown

Nonparticipant Survey Instrument (Year 5)

Introduction

*May I speak with [CONTACT NAME]? [IF THAT PERSON IS NOT AT THIS PHONE NUMBER, ASK FOR NAME AND PHONE NUMBER AND START AGAIN]
(Yes)
(Don't know) [ASK TO SPEAK WITH SOMEONE WHO IS INVOLVED IN ENERGY DECISIONS AT THIS COMPANY AND BEGIN AGAIN]
(Refused) [THANK AND TERMINATE]

*Hello, my name is [INSERT NAME] and I am calling from APPRISE on behalf of the New York State Energy Research and Development Authority, also called NYSERDA. NYSERDA is conducting an important study about energy use with companies that have industrial and manufacturing facilities in New York State. I am calling regarding your company's [IF FACILITY =/= WASTEWATER "facility in [INSERT CITY]". IF FACILITY = WASTEWATER "[Facility Name]"]. Are you familiar with this facility?
(Yes)
(No)
(Don't know) [ASK FOR PERSON WHO IS FAMILIAR AND START AGAIN]
(Refused) [THANK AND TERMINATE]

Can you confirm that this facility is an industrial production facility?
(Yes)
(No)
(Don't know) [ASK FOR PERSON WHO IS FAMILIAR AND START AGAIN]
(Refused) [THANK AND TERMINATE]

Are you involved with decisions about your company's energy use and management practices at that facility?
(Yes)
(No, not involved with decisions) [ASK FOR PERSON WHO IS INVOLVED AND START AGAIN]
(Don't know) [ASK FOR PERSON WHO IS INVOLVED AND START AGAIN]
(Refused) [THANK AND TERMINATE]

[IF ASKED WHAT STUDY IS ABOUT: NYSERDA is assessing current energy management practices and needs for industrial companies and will use the collective input to design supporting resources for companies like yours. These resources are very important to the state's economic future.]

Is this a good time for you to answer a few questions about energy practices for your company?
(Yes) [Continue]
(No [ASK: When would it be a good time for me to call back?] [SCHEDULE CALLBACK])
(Don't know) [ASK TO SPEAK WITH SOMEONE ELSE AND START AGAIN]
(Refused)

Back-up information, not to be programmed:

[If "No – Not a convenient time," ask if Respondent would like to arrange a more convenient time for us to call them back or if you can leave a message for that person.]

[IF RESPONDENT ASKS HOW LONG, SAY: "APPROXIMATELY 15 MINUTES."]

[IF NEEDED:] This survey is for research purposes only and this is not a marketing call. This is the primary way for NYSERDA to gather information about industrial company energy use and practices. Your participation in this study is important so that NYSERDA can include your perspectives in how energy efficiency initiatives are offered in New York.

[Only if asked for a NYSERDA contact to verify the survey authenticity, offer

Carley Murray, Project Manager

NYSERDA

carley.murray@nyserda.ny.gov

READ: Great. We appreciate your time and willingness to respond to this survey. Before we get started, I'd like you to know that we will keep your responses anonymous. They will be kept confidential and aggregated with other people's responses in our report. Your responses will not be linked to you or your company, so please feel free to speak as candidly as you like.

Screeners

*What is your title? [READ LIST ONLY IF NECESSARY]
(Owner)
(President)
(Chief Executive Officer [CEO])
(Chief Operating Officer [COO])
(Chief Financial Officer [CFO])
(Facility or Property Manager)
(Finance Manager)
(Building operator)
(Building engineer)
(Other [SPECIFY:_____])[If an office manager or similar administrator type, ask whether they are involved in company management decisions. If not, ask for someone else who is involved in management decisions.]

(Don't know) [ASK FOR SOMEONE ELSE INVOLVED IN MANAGEMENT DECISIONS. IF NO ONE THEN THANK AND TERMINATE.]
(Refused) [ASK FOR SOMEONE ELSE INVOLVED IN MANAGEMENT DECISIONS. IF NO ONE THEN THANK AND TERMINATE.]

How many production facilities [buildings] does your company operate within New York state? [If needed: Production facilities are buildings where your company produces, manufactures, or processes goods.]
[Record number: ____][If none or 0, THANK AND TERMINATE]

> [If B2>1] Our questions for this survey refer to the [IF FACILITY =/= WASTEWATER "production facility in [CITY]". IF FACILITY = WASTEWATER "[Facility Name]"]. If your company has more than one New York production facility, please respond to the following questions for this facility.

What category best represents the square footage of the [IF FACILITY =/= WASTEWATER "facility at the [CITY] facility". IF FACILITY = WASTEWATER "[Facility Name]"]?
Less than 20,000 square feet
20,000 to less than 40,000 square feet
40,000 to less than 80,000 square feet
80,000 to less than 150,000 square feet
150,000 square feet or larger
(Don't know)

[IF FACILITY =/= WASTEWATER] Our records indicate your company has approximately [NO. of EMPLOYEES] employees in the facility where you are stationed. Does this sound about right?
(Yes)
(No) [What is the correct number of employees? _____]
(Don't know)
(Refused)

[IF FACILITY = WASTEWATER] How many employees does the [Facility Name] have?
ENTER NUMBER: _____
(Don't know)
(Refused)

During a typical year (i.e., disregarding the impacts of the COVID-19 pandemic), what category best represents your facility's annual spending on energy (electric and natural gas)?
Less than $100,000
Between $100,000 and $500,000
Between $500,000 and $1,000,000
More than $1,000,000
(Don't know)

Energy Management Commitment

Thank you for confirming those details. I'd like to start by understanding the role energy management has in your facility operations and priorities. If some of the terms are unfamiliar or used in many different ways, let me know and I will provide further clarification. We are most interested in what these terms and concepts mean for your facility.

Using a 1-5 scale where 1=not at all important and 5=extremely important, How important to your facility are the following for maintaining a competitive advantage: [1a.At]
Energy efficient equipment [Record 1-5 rating, DK, Unfamiliar, Refused]
Process Efficiency practices [Record 1-5 rating, DK, Unfamiliar, Refused]
Executive-level commitment to ongoing and systematic energy management [Record 1-5 rating, DK, Unfamiliar, Refused]

Has your company's top management expressed verbal support for energy management? [1a.At]
(Yes)
(No)
(Don't know)
(Refused)

Does your company or facility have a written energy policy that includes guiding principles for energy management? [IF NEEDED: This may be part of a broader sustainability plan with other goals such as recycling, waste reduction, water use, etc.] [1b.PG]
(Yes)
(No)
(Don't know)
(Refused)

Does your facility set energy performance goals? [1b.PG]
(Yes)
(No)
(Don't know)
(Refused)

C4a. [IF C4=1] Do you have a documented plan for how to achieve those goals?
(Yes)
(No)
(Don't know)
(Refused)

[If C4=1] Have your energy performance goals been communicated to operations staff? [1b.PG]
(Yes)
(No)
(Don't know)
(Refused)

C5a. [IF C5=1] In what year did your company first adopt a commitment to ongoing and systematic energy management?
[Year]
(Don't know)
(Refused)

C5b. [IF C5=1] Which of the following factors contributed to your company's decision to make a company-wide commitment to ongoing and systematic energy management? [ALLOW MULT RESPONSE]

Information from an Industry Association (specify association)_____
Information/pitch from a consultant or provider of these services (specify consultant)_____
Information from utility, NYSERDA, or other entity (specify entity)_____
Training, workshop, webinar, or other event (specify event)_____
Read a case study or report (specify) _____
Another source (specify)_____
None of the above
(Don't know)
(Refused)

C5c. [ASK IF C5b ≠ 7, 98,99] How important was [repeat for each factor from C5b] to your company's decision to make a company-wide commitment to ongoing and systematic energy management? Would you say it was…[READ OPTIONS]

Very important
Somewhat important
Not too important
Not at all important
(Don't know)
(Refused)

Does your facility have an individual or team with formal responsibility for energy performance? [1c. Res]
(Yes) [C6a. Is this a team or an individual?(team=1, individual=2, Don't Know, Refused)]
(No) [C6b. Does your company have plans to identify an energy manager? (yes=1, no=2, Don't Know, Refused)]

(Don't know)
(Refused)

C6c. [If C6a=1] Does the team have a designated leader with primary responsibility for the team's objectives?

(Yes)
(No)
(Don't know)
(Refused)

[If C6a=2 or C6c=1] Is this individual a company employee or an outside consultant or contractor? [1c. Res]
Employee [C7a. MOVED]
Consultant or Contractor [Specify firm]

(Don't Know)
(Refused)

C7b. [IF C7 = 1] Is this individual supported by an outside consultant or contractor with engineering or energy management expertise?

(Yes) [Specify firm]
(No)
(Don't know)
(Refused)

C7a. [MOVED] [If C6a=2 or C6c=1] Does this person work On-site, where primary production occurs?

(Yes)
(No)
(Don't know)
(Refused)

C8t. [ASK IF C6=1 OR C6b = 1] In approximately what year did your facility first consider assigning formal responsibility for energy performance?

[Year]
(Don't know)
(Refused)

C8u. [ASK IF C6a=2 OR C6c=1] Which, if any, of the following factors contributed to your company's decision to assign formal responsibility for energy performance to a specific individual? [READ LIST. MULTIPLE RESPONSES ALLOWED.]

Information from an Industry Association (specify association)_____
Information/pitch from a consultant or provider of these services (specify consultant)_____
Information from utility, NYSERDA, or other entity (specify entity)_____
Training, workshop, webinar, or other event (specify event)_____
Read a case study or report (specify) _____
Another source (specify)_____
None of the above
(Don't know)
(Refused)

C8v. [ASK IF C8u ≠ 7,98,99] How important was [repeat for each factor from C8u] to your company's decision to assign formal responsibility for energy performance to a specific individual? Would you say it was…[READ OPTIONS]

Very important
Somewhat important
Not too important
Not at all important
(Don't know)
(Refused)

C8w. [If C6a=2 or C6c=1] Does this individual have a specific set of targets related to energy performance that are part of their job description or performance review?

(Yes)
(No)
(Don't know)
(Refused)

C8x. [If C6a=2 or C6c=1] What percentage of this person's time is dedicated to energy performance-related tasks?

25% of their time or less
From 26% to 50% of their time
From 51% to 75% of their time
More than 75% of their time
(Don't know)
(Refused)

C8y. [If C6a=2 or C6c=1] Does the individual have any type of energy management certification?

(Yes)
(No)
(Don't know)
(Refused)

C8z. [If C8y=1] What type of certification do they have?

CEM (Certified Energy Manager, through AEE)
CP EnMS (Certified Practitioner in Energy Management Systems, through 50001)
LEED Professional
Other [Specify:_____]
(Don't know)
(Refused)

[If C6a=team] Earlier you mentioned your facility has a team responsible for energy performance. How frequently does the team meet? [1c. Res]

(Daily)
(Weekly)
(Monthly)
(Quarterly)
(Twice a year)
(Annually)
(Varies or "as needed")
(Other), Specify_____
(Does not meet)

(Don't know)
(Refused)

Which of the following best describes your facility's level of dedicated staff resources to [If C4=1 "achieve energy management goals?" OR IF C4 >1 "manage energy performance?"] [Read response options] [1c. Res]
Sufficient level of staff resources
Some, but not sufficient, staff resources
No staff resources dedicated
(Don't know)
(Refused)

Which of the following best describes your facility's level of funding [If C4=1] "dedicated to achieve energy management goals?" [OR If C4 =2,98,99] "for energy projects or initiatives?" [Read response options] [1c. Res]
Sufficient level of funding
Some, but not sufficient, funding
No funding
(Don't know)
(Refused)

Planning and Implementation

Has your facility ever conducted a review of energy-using equipment and energy bills to identify savings opportunities? [2a.EMA]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

D18. [MOVED] Have you established an energy consumption baseline for your facility, to determine changes in energy use? [If needed: This is an analysis of your facility's energy data and relevant drivers of energy consumption such as facility production output, used for measuring potential impacts from energy consumption changes.] [3c.An]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

READ: Now I'd like to talk about ways your facility may be engaged in and implementing strategic energy management. Strategic Energy Management is a company-wide commitment to ongoing and systematic energy management. You may have heard this referred to as "S.E.M" or continuous energy improvement or "C.E.I.".

D1a. First, how familiar are you with the concept of SEM or continuous energy improvement?

Very familiar
Somewhat familiar
Not too familiar
Not at all familiar?
(Refused)

Has your facility undergone an organizational assessment for *strategic* energy management activities? This is an assessment of your facility's energy management practices; it focuses on energy management structure and practices, as opposed to specific energy savings opportunities. [2a.EMA]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

Has someone at your facility developed an energy map to identify the key energy drivers and end uses? [READ IF NEEDED: This is a breakdown of processes from raw materials to final distribution, and all the energy end uses, such as lighting or hot water, required to produce the end product.] [2b.EMAP]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

[If C4=1] You mentioned earlier that your facility has defined energy performance goals. For which of the following fuels has your facility set goals? [ALLOW MULTIPLE RESPONSE]
Electricity
Natural gas
Other fuel [specify]
(Don't know)
(Refused)

D4a. [IF D4=1] Please tell me which of the following best describes how your energy performance goals are defined for electricity. (READ IF NEEDED: This is often expressed as a percent or an absolute reduction of energy use per production unit over time, for example, 5% reduction in electricity use per production unit within 3 years.) [2c.MG]

The goals are defined as a percent reduction in energy use [Specify percent and time period]

The goals are defined using specific energy consumption numbers [Specify quantity, unit (MMBTUs or megawatt hours) and period]

The goals are defined in some other way [Specify]

(Don't know)

(Refused)

D4b. [IF D4=2] Please tell me which of the following best describes how your energy performance goals are defined for natural gas. (READ IF NEEDED: This is often expressed as a percent or an absolute reduction of energy use per production unit over time, for example, 5% reduction in natural gas use per production unit within 3 years.) [2c.MG]

The goals are defined as a percent reduction in energy use [Specify percent and period]

The goals are defined using specific energy consumption numbers [Specify quantity, unit (MMBTUs or ccf) and period]

The goals are defined in some other way [Specify]

(Don't know)

(Refused)

[If C4=1] In what year did your facility first adopt energy performance goals? [If needed, this is not the year that you set the goal you just mentioned. We would like to know when you first started setting goals in general].

[RECORD YEAR]

(Don't know)

(Refused)

In which of the following ways does your facility document potential energy management projects? [2d.PR] [Read options aloud; Allow multiple responses]

Project or opportunity register or list

Tune up action item list

Energy management tracking software

Updating energy management plan

Does not document potential energy efficiency projects

Other [Specify]

(Don't know)

(Refused)

D6a. [IF D6 = 1,2] Does your facility update this register or list to track energy management project progress and completion? [2d.PR]

(Yes)
(No)
(Don't know)
(Refused)

D7a. Has your facility at [ADDRESS] undergone a readiness assessment or audit to support installation of an energy tracking system? [If necessary: An energy tracking system readiness audit typically consists of a review of existing equipment, current energy usage, energy saving opportunities, and existing monitoring and reporting systems to identify an appropriate energy tracking software package.]

Yes
No
(Don't know)
(Refused)

D7b. [ASK IF D7a=1] Approximately when was this assessment conducted?

[Year]
(Don't know)
(Refused)

D7bb. [ASK IF B2>1 AND D7a = 1] Were any of your other New York production facilities reviewed as part of the same readiness assessment?

Yes
No
(Don't know)
(Refused)

D7c. [ASK IF D7a=1] Which of the following factors contributed to your company's decision to undergo a readiness assessment or audit?

Information from an Industry Association (specify association)_____
Information/pitch from a consultant or provider of these services (specify consultant)_____
Information from utility, NYSERDA, or other entity (specify entity)_____
Training, workshop, webinar, or other event (specify event)_____
Read a case study or report (specify) _____
Another source (specify)_____
None of the above
(Don't know)
(Refused)

D7d. [ASK IF D7c ≠ 7, 98,99] How important was [repeat for each factor from D7c] your company's decision to undergo a readiness assessment or audit? Would you say it was…[READ OPTIONS]

Very important
Somewhat important
Not too important
Not at all important
(Don't know)
(Refused)

Is your facility currently using a tool or system to track energy use over time? [READ IF NEEDED: This is typically a detailed spreadsheet or software-driven system that records energy consumption across end-uses over time. Some also calculate and report energy savings.] [3a.MS]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

[ASK IF D7=1,2] What type of tool or system are you using (or do you plan to use)? [Read options; Select all that apply] [MTR]
(Monitoring, Targeting and Reporting model (MT&R))
(Energy Management Information System (EMIS))
(Microsoft Excel-based spreadsheet tool)
Other tool or system [Specify]
(Don't know)
(Refused)

D8i. [ASK IF D7=1,2] At what level does your energy system track data usage? Please indicate all of the following that apply. [Read options; Select all that apply][EMIS]

System monitors and tracks all energy usage across multiple facilities
System monitors and tracks all energy usage within a single facility
System monitors and tracks all energy usage at a production-line level, across multiple consumptions sources and equipment
System monitors and tracks all energy usage by a single system or piece of equipment
(Don't know)
(Refused)

D8j. [IF D8i=1] How many facilities does the system monitor?

[Record Response]
(Don't know)
(Refused)

D8c. [ASK IF D7=1,2] Which of the following does this tool or system perform? [Read options; Select all that apply][EMIS]

Takes periodic readings of energy usage, and stores data
Provides automated analysis and reporting of energy usage
Provides visual displays of energy use over time, such as charts or graphs
Integrates energy use with production data
Compares current energy usage to an energy usage baseline
Monitors progress toward an energy usage target
None of the above
(Don't know)
(Refused)

D8d. [ASK IF D7=1,2] In what year did your facility first consider adopting a tool or system to track energy usage?

[Year]
(Don't know)
(Refused)

D8e. [ASK IF D7=1,2] Which of the following factors contributed to your company's decision to adopt an energy tracking tool or system?

Information from an Industry Association (specify association)_____
Information/pitch from a consultant or provider of these services (specify consultant)_____
Information from utility, NYSERDA, or other entity (specify entity)_____
Training, workshop, webinar, or other event (specify event)_____
Read a case study or report (specify) _____
[If D7a = 1] The results of the readiness assessment
Another source (specify)_____
None of the above
(Don't know)
(Refused)

D8f. [ASK IF D8e ≠ 8, 98,99] How important was [repeat for each factor selected from D8e] to your company's decision to adopt an energy tracking tool or system? Would you say it was…[READ OPTIONS]

Very important
Somewhat important
Not too important
Not at all important
(Don't know)
(Refused)

[MOVED] How frequently does staff review energy performance data? [3b.DCA]
(Daily)
(Weekly)
(Monthly)
(Quarterly)
(Twice a year)
(Annually)
(Varies or "as needed")
(Other), Specify_____
(Never)
(Don't know)
(Refused)

D8g. Which of the following types of decisions, if any, do you or does your company make using analysis of energy performance data? [RANDOMIZE LIST]
Decisions about building improvements, such as new lighting or heating and cooling equipment
Decisions about when to upgrade production equipment
Decisions about production times and volume
Decisions about energy management goals or energy management plans
Decisions about staff location
Other decisions [Specify]
Company does not base any decisions on output
(Don't know)
(Refused)

D8h. Does your company receive analysis and reporting based on your energy usage data from an outside firm through a regular subscription service?
(Yes)
(No)
(Don't know)
(Refused)

Has your facility adopted any initiatives that contribute to energy efficiency equipment optimization? This could include services through ISO 50001, a strategic energy management program, continuous energy improvement, lean, six sigma, kaizen, total quality management or another continuous improvement initiative. [2c.MG]
(Yes) [Specify]
(In process)
(planning to)
(No)
(Don't know)
(Refused)

[If D10=1] Are these equipment optimization initiatives included in facility key performance indicators or KPIs? [2c.MG]
(Yes)
(No)
(Don't know)
(Refused)

Now focusing on production processes within your facility, has your facility adopted initiatives that contribute to energy process optimization? Again, this may include I-S-O 50001 or another initiative. [2c.MG]
(Yes) [Specify]
(In process)
(planning to)
(No)
(Don't know)
(Refused)

[If D12=1] Are these energy process optimization initiatives included in facility key performance indicators or KPIs? [2c.MG]
(Yes)
(No)
(Don't know)
(Refused)

Has your facility completed any energy or process efficiency projects within the past 2 years? [2f.Imp]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

[If C6=1] Has the energy manager or team conducted any specific employee engagement activities around energy management or conservation in the past 2 years? [IF NEEDED: INCLUDES ANY ACTIVITIES THAT INVOLVE STAFF OUTSIDE AN ENERGY TEAM, SUCH AS ENGAGING STAFF TO TURN OFF EQUIPMENT WHEN NOT USED, AWARENESS CAMPAIGNS, ETC.] [2e.EE]
(Yes)
(In process)
(planning to)
(No)
(Don't know)
(Refused)

D15a. [If D15=1,2] How frequently, if at all, has the energy manager or team conducted employee engagement activities specifically related to energy management? [DO NOT READ LIST] [IF NEEDED: Includes any activities that involve staff outside an energy team, such as engaging staff to turn off equipment when not used, awareness campaigns, etc.]:

(Weekly)
(Monthly)
(Quarterly)
(Annually)
(Less frequently than annually)
Not at all
Other: [specify]
(Don't know)
(Refused)

[If C4a = 1] How often do you reassess your list of planned projects to ensure that these align with business and energy performance priorities? [2g.Rmt]

(Weekly)
(Monthly)
(Quarterly)
(Annually)
(Less frequently than annually)
(When operations change)
(Have not revisited plan)
(Plan is too recently established to warrant review)
(Other [Specify])
(Don't know)
(Refused)

How often is your facility's energy use data shared with company stakeholders, such as management or operations staff? [3d.RP]

(Daily)
(Weekly)
(Monthly)
(Quarterly)
(Twice a year)
(Annually)
(Varies or "as needed")
(Other), Specify_____
(Never)
(Don't know)
(Refused)

Barriers and Interest

My next set of questions are about your facility's interest in strategic management solutions and possible challenges your facility may have experienced when considering energy management.

Are you currently participating in a strategic energy management methodology or system that includes guidance from an external consultant or another organization?
(Yes)
(No)
(Don't know)
(Refused)

[If E1=1] What is the name of the consulting firm or organization that you are working with? [RECORD RESPONSE]

[IF E1≠1] Have you considered participating in a Strategic Energy Management program at any time within the past two years?
(Yes)
(No)
(Don't know)
(Refused)

Business Decision Making and Drivers

What trade associations or similar organizations do you consider valuable sources of information about trends in your industry? [RECORD UP TO THREE]
[RECORD RESPONSE]
[RECORD RESPONSE]
[RECORD RESPONSE]
(Don't know)

[ASKED IF F7=1 ANSWERED] Is your company a member in any of the organizations you just mentioned?
[RECORD RESPONSE FOR EACH RESPONSE IN F1]

Have you attended any conferences or trade shows, in-person or virtually, in the past year?
Yes
No
(Don't know)
(Refused)

[IF F3=YES] Which events did you attend? [Record sponsor and name of event]
[Sponsor] [Event]
[Sponsor] [Event]
[Sponsor] [Event]
[Sponsor] [Event]

During 2020, did your facility experience any of the following as a result of the coronavirus pandemic and shut-downs? [RANDOMIZE; RECORD YES/NO/DON'T KNOW FOR EACH]
Changes in staffing or scheduling?
Reduced staff availability due to illness or other personal issues?
Reduced sales or revenue due to decreased demand from customers
Increased sales or revenue due to increased demand from customers
Any other impacts as a result of coronavirus pandemic? [SPECIFY]
(Don't know)
(Refused)

On Termination: Thank you for your help. We appreciate your time and opinions.

Participant Interview Guide (Year 5)

These interviews allowed the Market Evaluation Team to evaluate the level of retention of OsEM services and SEM practices among pilot participants following pilot engagement. The Team used the interviews to address the specific market progress indicators for OsEM and SEM retention shown in the table below, as well as to assess the level of retention for aspects of the OsEM role and individual components of SEM. The Team also used these interviews to gather data to quantify DIPA. DIPA is one component of the indirect impact algorithm, and results from participant implementation of SEM or OsEM, during or following the pilot, in facilities that did not receive direct assistance from NYSERDA. Finally, the Team used interviews to collect participant feedback on the pilot experience. (These interviews were not intended to evaluate direct energy savings, or the persistence of energy savings.)

The following table maps the interview guide questions to specific research topics for the Market Evaluation of continuous energy improvement adoption.

Question Mapping

Topic	Research Objective	Interview Question
Market Progress Indicators	Determine the number of industrial sites retaining OsEM Determine the number of industrial sites continuing to participate in SEM (after program has ended) Determine the number of energy teams maintained beyond the cohort (indicating executive support for SEM)	OsEM – Sec B SEM – Sec C
Indirect Impact Assessment	Quantify additional facilities, beyond the participating facility, where the participant firm has employed an OsEM or adopted SEM practices not in place prior to participation	OsEM – B10 SEM – C9
Participant Experience	Assess participant satisfaction with program Assess whether any aspects of the program are more or less difficult for participants and identify opportunities for program implementation improvements Assess whether the participants' experience in the program matched their expectations at the time they applied (to inform program marketing and participant communication) Identify any barriers to the transfer of program learnings from one facility to others within the same firm	Sec D

Data Collection Method: Phone interview
Estimated Time to Complete: 15 to 20 minutes
Population Description: Participants who ended engagement with the program approximately six months prior to the interview date

Analysis Approach

The Market Evaluation Team assessed the market progress indicators as stated in the *Clean Energy Fund Investment Plan Industrial Chapter*, and the units of DIPA, as shown in the following table. The Team also reported more granular information on adoption or enhancement of individual components of the OsEM role and SEM practices.

Approach to Quantification of Market Progress Indicators and DIPA

On-site Energy Manager	
Continued OsEM adoption	Participant facility retains OsEM role (single staff person assigned as energy champion) and/or continues to engage with energy consultant
OsEM Indirect Impacts (DIPA)	OsEM role (could be same served by individual) extended to additional facilities that did not participate in the pilot
Strategic Energy Management	
Continued SEM adoption	Facility adopted an energy team by end the pilot and continues to use energy team Facility adopted all SEM practices by end of pilot and continues to implement all SEM practices
SEM Indirect Impacts (DIPA)	Facility extended all SEM practices to additional New York facilities that did not participate in the pilot

Introduction

Thank you for joining me today. My firm is assisting NYSERDA to monitor the market adoption of continuous energy improvement practices, such as use of On-site energy managers and strategic energy management. In this interview, I would like to ask a few questions about your experience in the [PROGRAM], how your experience in the program is affecting your company practices today. NYSERDA will use the information we collect through these interviews to assess whether their program design is having a long-term impact on participant firms, and whether there are improvements that could increase the program's impact - so we encourage you to be candid. Your responses will be anonymous. This interview should take no more than 45 minutes. Do you have any questions before we begin?

First, I'll ask some basic questions about your company and how you engage with the market.

Please tell me about your role at your company, and your relationship to the facility that participated in the [PROGRAM].

What do you produce at the participating facility?

How many facilities does your firm operate in New York? What products do these facilities produce?

On-site Energy Manager Market Progress Indicator [OsEM Participants Only]

How familiar were you with energy management, or continuous energy improvement concepts, before your facility participated in the OsEM Program?

[If familiar] Prior to participating in the OsEM Program, what resources did you use to stay up to date, or learn more about energy efficiency and energy management? [Probe: annual conferences? organizations like ISO? Trade associations? Consultants?]

How did you learn about the OsEM program, and what motivated your company to participate? [Probe: What information, specifically, was convincing for your company?]

Prior to participating, did you have any staff assigned to identify energy efficiency or energy cost reduction opportunities? If yes, can you describe which staff, what their energy efficiency responsibilities were, and how much of their time was allocated to those activities?

Can you describe the OsEM role at your facility during your participation in the program? What consultant or staff filled this role, what did their job entail, and how many hours per week did they dedicate to the role?

Does your facility continue to engage the OsEM consultant, or a different consultant?

Does your facility currently have any internal staff in the role of an OsEM? If yes, what staff (title) serve this function, and how many hours per week do they dedicate to it?

[If not engaging consultant and no internal OsEM, skip to Section D]

[If retaining OsEM consultant or internal staff] How has the role of the OsEM changed, if at all, since your participation in the program ended? Does the current OsEM continue to perform all of the functions of the OsEM funded by the pilot? Does the current OsEM dedicate the same amount of time to the role? [If changes have occurred] Can you explain why the OsEM role has changed since the pilot ended?

Do you foresee any future changes to this role at your facility in the coming months or years?

[IF MULTIPLE FACILITIES IN NY] Since you first applied to participate in the NYSERDA OsEM pilot, have any of your other facilities in New York adopted an OsEM, or does your current assigned OsEM serve multiple facilities within your company, in New York? If so, which ones? [RECORD NAME/CITY and annual energy expenditure FOR EACH FACILITY THAT HAS ADOPTED, OUTSIDE PILOT PARTICIPANT]

Facility Name	City	Estimated annual expense for energy (electricity, gas, and any other fuels)			
		Less than $500,000	Between $500,000 and $1 Million	More than $1 Million	Don't know

Does the OsEM regularly spend time On-site at each of those facilities? If yes, can you describe amount of time they spend at each facility on a weekly or monthly basis? [RECORD HOURS PER WEEK OR MONTH FOR EACH FACILITY]

Facility Name/City	Hours (Weekly/Monthly)

Strategic Energy Management Market Progress Indicator [SEM Participants Only]

How familiar were you with strategic energy management, or continuous energy improvement concepts, before your facility participated in the SEM training program?

[If familiar] Prior to participating in the OsEM Program, what resources did you use to stay up to date, or learn more about energy efficiency and energy management? [Probe: annual conferences? organizations like ISO? Trade associations? Consultants?]

How did you learn about SEM, and what motivated your facility to join the SEM program? [Probe: What information, specifically, was convincing for your company? (Recommendations from trusted sources? If so, which? Awareness of peers that were participating? Internal company initiative? Case studies or other hard data?)]

Prior to participating, what energy management practices did you already employ at your facility?

How, if at all, did your approach to energy management change after you began participating in the pilot?

What SEM practices did you employ by the end of your participation? Even if you are no longer employing that practice, I'm interested in what you tried out. [USE TABLE TO RECORD. ADDRESS EACH PRACTICE.]

Which of these practices do you continue to employ? [USE TABLE TO RECORD.]

> [SEM, IF SOME PRACTICES DISCONTINUED] Why are you no longer employing the practice of [PRACTICE]?

Participant Facility			
Strategic Energy Management Practice	**Before *[Not a priority to record]***	**During/ End of Pilot**	**Present**
Ex: Company energy policy and energy reduction goals	*Policy, goals in place*	*Goals more rigorous, detailed*	*Same*
Company or facility-level energy policy and energy reduction goals			
Budget available for energy management activities			
Designated energy champion			
Staff assigned to energy team			
Assessment of existing energy management practices, assessment (map) of energy use by end-user system			
Maintaining a register of energy improvement opportunities, and scheduling and tracking implementation			
Employee training			
Energy management software in place			
Regular review of usage performance against goals			
Reporting energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior mgmt., etc.)			

[IF MULTIPLE FACILITIES IN NY] Since you first applied to participate in the SEM program, has your firm extended any of the SEM practices that you learned through the program to any of their other facilities in New York? If so, which facilities have adopted some or all of these practices? [RECORD NAME/CITY FOR EACH FACILITY THAT HAS ADOPTED, OUTSIDE PILOT PARTICIPANT]

Additional Facility #1: _____ [NAME/CITY] _____	
Strategic Energy Management Practice	**Adopted (X)**
Policy and usage goals	
Staff assigned to energy team, or as energy champion	
Assessments of existing energy management practices, assessment (map) of energy use by end-user system	
Maintaining a register of energy improvement opportunities, and scheduling and tracking implementation	
Employee training	
Energy management software	
Regular review of performance against goals	
Reporting energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior mgmt., etc.)	

Additional Facility #2: _____ [NAME/CITY] _____	
Strategic Energy Management Practice	**Adopted (X)**
Policy and usage goals	
Staff assigned to energy team, or as energy champion	
Assessments of existing energy management practices, assessment (map) of energy use by end-user system	
Maintaining a register of energy improvement opportunities, and scheduling and tracking implementation	
Employee training	
Energy management software	
Regular review of performance against goals	
Reporting energy performance to key stakeholders across the organization (facility management, operations, line engineers, accounting, senior mgmt., etc.)	

For each additional facility mentioned above, please estimate their annual energy expenses (including electricity, natural gas, and any other fuels).

Facility Name/City	Estimated annual expense for energy (electricity, gas, and any other fuels)			
	Less than $500,000	Between $500,000 and $1 Million	More than $1 Million	Don't know

Participant Experience with the Program

How satisfied are you with the experience overall? What aspects of the program did you think worked best, and why?

Can you recommend any changes to the program that would make it easier for facilities to participate, or provide a better experience?

[OsEM] How effective was the OsEM in your facility? Was the OsEM more effective at some tasks than others? Can you provide any examples?

[OsEM] Thinking back on your participation in the OsEM program, do you have any lessons learned or recommendations for other firms that participate, to make the experience more beneficial or easier?

[SEM] How did the information your team learned compare with your expectations, in terms of the technical level of the content, and the relevance for your facility?

[SEM] How did the amount of time that staff dedicated to participating in the trainings, and implementing SEM practices, compare with your expectations?

[SEM] About how much time, as a percentage of a full-time employee, do your staff currently spend on activities connected with SEM? A rough estimate is fine.

Would continued training be helpful to your firm, to retain the skills and experience gained through the pilot? [If yes] What type of training would be helpful, and for which staff? (If needed: types of training might include *online, in person, etc. for topics such as review of pilot materials, more advanced certification such as CEM, or continuing ed credits, etc.)*

Do you think participating in the program was a worthwhile investment for your firm? Why or why not?

If you had known when you signed up what you know now, do you think your firm would have made the same decision to participate in the program?

Conclusion

Those are all of the questions I had prepared. Is there anything about the program that we haven't discussed that you would like to mention, or anything you think I should keep in mind?

Thank you for talking with me today.