

# Appendix 4

## Energy Management System Market Assessment

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# **SECTION 4A**

## Customer Interview Guide

# Customer Interview Guide

This Interview Guide is a tool to guide interviews with EMS customers in New York. These interviews will help characterize installed EMS and customer behaviors and usage relevant to EMS. The guide helps to ensure the interviews include questions concerning the most important issues being investigated as part of this assessment. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. Leveraging the results of the New York Statewide Commercial Baseline Study, this guide will be used for commercial customers who are known EMS users in New York. The depth of the exploration with any particular respondent will be guided by the knowledge that individual has.

## INTRODUCTION

Thank you again for taking the time to talk with us today. We are conducting research on behalf of NYSERDA (the New York State Energy Research and Development Authority) on how commercial businesses in New York State use their energy management systems – which I will refer to as “EMS”. Do you have 30 minutes to speak with me?

Before we begin, I wanted to note that your responses will be confidential, and we will not link you or your company with anything we report to NYSERDA.

Advise interviewee that the interviews will be audio taped and transcribed. Recordings will be used to help with note taking only.

## DEFINITION OF EMS

I’m going to ask you a number of questions about your EMS and how you use it. Before we do that, I’d like to define what we mean by “EMS” in the context of this study. We consider EMS to be:

Any technology that can control systems at a building-wide level to optimize energy use and occupant comfort.

We are intentionally excluding technology that only measures, stores, analyzes, and/or displays energy use data but cannot control systems.

## BACKGROUND QUESTIONS

1. As part of this research, we already spoke with someone from your company and we understand there is an EMS present at your facility. Are you the most knowledgeable person within your company to talk about the EMS present at your facility?
  - a. If no, ask for contact information for most knowledgeable person.

2. What is your title in your company?
3. I'd like to confirm with you some characteristics of your EMS. We understand that:
  - a. Your EMS was installed in [YEAR],
  - b. Your EMS controls [PERCENTAGE] of your facility, and
  - c. Your EMS controls [LIST OF EQUIPMENT TYPE]. Is this correct?

### EMS TRAINING AND MAINTENANCE

4. Did the EMS vendor provide training/recommendations to help you maximize the value of the installed EMS?
  - a. [IF YES] Could you describe the training/recommendations that you received? (PROBE: Type of training (in-person/remote), length of training, when customer received training, etc.)
  - b. [IF YES] Who received the training/recommendations from your company?
  - c. [IF YES] Do you think the level of training was sufficient? Why or why not?
  - d. [IF NO] From your perspective, what types of training/recommendations would have been helpful?
5. Do you have a contract with a vendor for ongoing EMS maintenance or other support? (PROBE: Ongoing training, troubleshooting, diagnostics, repairs, data analysis, etc.)
  - a. [IF YES] Is the vendor the same vendor who sold you the EMS system?
    - i. [IF NO] What motivated you to switch vendors?
  - b. [IF YES] What is the length of the contract? How often do you renew the contract with the vendor?
  - c. [IF YES] What types of services are provided by the vendor?
  - d. [IF NO] Could you explain why you don't have a maintenance/support contract for your EMS?

### HOW CUSTOMERS USE EMS

My next few questions are about how you use your EMS and the control capabilities of your EMS.

6. Who operates the EMS at your facility? (PROBE: Title of operator)
  - a. How familiar is the operator with the capabilities of the EMS? Would you say that the operator is extremely familiar, very familiar, somewhat familiar, not too familiar, or not at all familiar?
7. Does your company have remote access to EMS data/monitoring/controls?
  - a. [IF YES] How does the operator typically access the EMS controls? (PROBE: Web/mobile/portable interface vs central control panel)?
  - b. Does a third-party company (e.g. engineering firm, vendor, contractor) have remote access to your EMS?
8. How frequently are your EMS settings adjusted/reprogrammed? To clarify, we are referring to changes in programmed settings and not overrides to preset schedules or setpoints.
  - a. [IF<>NEVER] Could you describe the adjustments/reprogramming? Who makes the adjustments/performs the reprogramming?
9. How often are your EMS settings overridden?
  - a. [IF<>NEVER] Could you describe the overrides and who performs them? (PROBE: Tenants vs building owners)

10. How often is your EMS commissioned? [IF NEEDED: Commissioning is the process of improving and optimizing building controls to increase energy efficiency while maintaining occupant comfort. This may involve repairing control devices (e.g., economizer dampers), replacing broken components, and reprogramming control sequences.]
  - a. [IF<>NEVER] Who performs the commissioning? (PROBE: EMS vendor, vendor with maintenance contract, engineering firm, etc.)
11. I'd like to ask you about the type of EMS control strategies you have and currently use.

Control Strategies	Have Control Strategy? (a)	Use Control Strategy?
A. Temperature setback [IF NEEDED: This strategy minimizes the difference between interior and exterior temperatures to reduce heating and cooling consumption when the building is unoccupied.]		
B. Optimal start and stop [IF NEEDED: This strategy ensures that HVAC equipment turns on and off just in time at the beginning and end, respectively, of periods of occupancy, but not significantly earlier or later.]		
C. Occupancy-based controls [IF NEEDED: This strategy uses occupancy sensors to determine if a space is occupied and adjusts energy-using equipment accordingly.]		
D. Reset controls [IF NEEDED: A variety of strategies used to adjust set points based on actual demand. Common reset controls are supply air temperature reset and static pressure reset.]		
E. Peak demand load control/demand response [IF NEEDED: This strategy monitors electric peaks at various intervals to actively shed load off core components during peak demand periods.]		
F. Scheduling [IF NEEDED: This strategy allows end-users to implement multiple scheduling scenarios with various on/off times and set points.]		
G. Demand ventilation [IF NEEDED: This strategy uses carbon dioxide sensors on the return stream of the air handler to reduce outdoor air intake during periods of low occupancy.]		
H. Others?		

<sup>a</sup>Supply air temperature reset adjusts supply temperature based on temperature of air returning from cooled spaces to meet the required demand. When applied, the temperature of the supply air is increased, effectively reducing compressor energy or reheat energy. Static pressure reset adjusts static pressure based on airflow demand in a ducted cooling system.

[ASK IF 11Ea = YES]

12. Was your EMS initially installed for demand response purposes?

[ASK FOR CONTROL STRATEGIES WHERE 11(b) = NO]

13. Why are you not using this strategy?
14. Have you replaced or upgraded your EMS?
  - a. [IF NO] Have you considered replacing or upgrading your EMS?
  - b. [IF REPLACED] How old was your prior EMS? (Confirm that age of EMS referred to current EMS.)
  - c. [IF UPGRADED] When did you make the upgrade? (Confirm that age of EMS refers to the initial installation.)
  - d. [IF YES TO 14 or 14a] What criteria do you use to decide if you should replace or upgrade your EMS?

## MARKET DRIVERS AND BARRIERS

My last few questions are about benefits of EMS and barriers to installation.

15. I'd first like to ask you about the benefits of EMS. For each of the following, please tell me:

- a. If you use your EMS to achieve this benefit (Note if the EMS does not have the capability)
- b. [ASK IF 15a=YES] If this benefit is extremely important, very important, somewhat important, not too important, or not at all important to you
- c. [ASK IF 15a=YES] If you are extremely confident, very confident, somewhat confident, not too confident, or not at all confident in achieving this benefit

EMS Benefits	Use EMS? (a)	Level of Importance (b)	Level of Confidence (c)
Gather energy usage data to better understand energy use			
Reduce your energy use			
Increase occupant comfort (e.g., by maintaining consistent temperatures and lighting levels)			
Improve functionality of equipment (e.g., by simplifying and streamlining building operations)			
Monitor building operations through remote access			
Control building operations through remote access			
Diagnose operational issues			
Other?			

16. Approximately, how much energy do you think you save by using your EMS, compared to if you did not have it? (Probe for %)
  - a. Do these savings meet your expectations?
  - b. How satisfied are you with the achieved energy savings? Would you say you are extremely satisfied, very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied?
17. Do your EMS' non-energy benefits meet your expectations?
  - a. How satisfied are you with the non-energy benefits of your EMS? Are you extremely satisfied, very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied?
18. From your perspective, what are the largest barriers to EMS installations? (PROBE: Upfront cost, lack of knowledge, lack of knowledgeable building staff, security concerns, etc.) How do you think these barriers can be overcome?

#### WRAP-UP

19. Are there other important topics or pieces of information related to your EMS that you think we should know about?

Those are all of the questions I have for you. Thank you so much for taking the time to speak with us!



# **SECTION 4B**

## Market Actor Interview Guide



# Market Actor Interview Guide

This Interview Guide is a tool to guide interviews with market actors active in New York. These interviews will help assess the current state of the market for EMS in New York. The guide helps to ensure the interviews include questions concerning the most important issues being investigated as part of this assessment. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. This guide will be used for two different categories of market actors – (1) EMS vendors (distributors and manufacturers) and (2) EMS service providers (contractors, building engineers, etc.); some market actors overlap both categories. Each type of market actor will be asked about topics about which they are likely to be knowledgeable, given their role in the EMS market. The depth of the exploration with any particular respondent will be guided by the knowledge that individual has.

## INTRODUCTION

Advise interviewee that the interviews will be audio taped and transcribed.

Thank you again for taking the time to talk with us today. We are conducting research on behalf of NYSERDA (the New York State Energy Research and Development Authority) on the market for energy management systems – which I will refer to as “EMS” – in New York State.

## DEFINITION OF EMS

I’m going to ask you a number of questions about your business, your customers, and the general market for EMS in New York State. Before we do that, I’d like to define what we mean by “EMS” in the context of this study. We consider EMS to be:

Any technology that can control systems at a building-wide level to optimize energy use and occupant comfort.

We are intentionally excluding technology that only measures, stores, analyzes, and/or displays energy use data but cannot control systems.

## BACKGROUND QUESTIONS

I first have a few general questions about your company.

1. Would you consider your company (check all that apply):
  - a vendor of EMS equipment?
  - a service provider helping customers install EMS equipment?
  - a service provider analyzing data from EMS?
  - a. If service provider: What are the primary services that your company provides?
2. In what areas of New York State does your company operate?
3. What is your title in your company?

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## EMS INSTALLATIONS

I'd like to ask some specific questions about the EMS installations your company completes.

4. Approximately...
  - a. How many new EMS does your company install in a typical year in NY State?
    - i. Approximately, what share of the NY State market do you think that represents?
    - ii. What % of new installations are in new construction v. existing buildings?
  - b. How many upgrades to existing EMS systems does your company complete in a typical year?
5. How often do you sell/install a new EMS in the following situations:
  - a. as standalone solutions (e.g., a one-time purchase of an EMS outside of a broader set of energy efficiency upgrades)? (PROBE: Are certain types of customers more likely to install standalone EMS systems? Customers of different sizes, business types, or building types?)
  - b. as a package with HVAC or other energy efficiency upgrades?

## MARKET ACTOR PRACTICES / BUSINESS MODELS

Now I'd like to ask some general questions about EMS system installations. Your answers to these questions don't need to be specific to your company.

[ASK Q.7 IF RESPONDENT INDICATED MAKING EMS UPGRADES IN 3b]

6. What types of systems are most commonly being controlled by new EMS installations? (PROBE FOR LIST, e.g., lighting, heating, cooling, ventilation, refrigeration, process equipment, building access, fire systems, security systems, water, plug load, gas systems)
7. What types of control strategies are available in new EMS installations? (PROBE FOR LIST)
8. Now thinking about existing EMS:
  - a. What percentage of installed EMS will receive upgrades over time?
  - b. What percentage of systems will be replaced by new systems?
  - c. What are customer criteria for replacing versus upgrading?
  - d. What EMS upgrades are most common? (Probe for significant upgrades, e.g., adding on systems, versus small upgrades, e.g., adding on software)
  - e. How often do customers make upgrades concurrently with other EE upgrades? What are common equipment upgrades that happen concurrently with EMS upgrades?
  - f. How common is it for a customer to build off an existing EMS system vs. switch to a different system/platform when considering an EMS upgrade? (this question is more hardware/software)
  - g. What is the typical age of systems that receive upgrades? What is the typical age of systems that are replaced by new systems?

9. How common are contracts with a customer to maintain an EMS you have sold them?
  - a. What is the typical length of contracts and how often are they renewed?
  - b. How frequently do you reprogram/commission systems for your customers? (PROBE: Does your company reprogram systems that were installed by a different company? Do other companies reprogram systems that you have installed?)
  - c. Do you typically have remote access to EMS data or controls?
10. Does your company provide recommendations and/or training to customers to help them maximize the value of installed EMS?
  - a. If not, are there companies you recommend to customers that provide this service?

## MARKET DRIVERS AND BARRIERS

My next few questions are about market drivers and barriers.

11. What are the key factors that lead to the installation of EMS by NY businesses? (PROBE: Energy savings opportunities, energy efficiency programs, desire for decreased staffing requirements, increased comfort, etc.)
  - a. What are the benefits of EMS desired by customers? How important is energy efficiency compared to other benefits from using EMS? What are typical benefits achieved? (Probe for energy savings and non-energy benefits.) Do you target a certain energy savings level for your customers when completing an EMS project?
  - b. What kind of influence do building codes and standards have on the EMS market? How about local laws and mandates? Does this differ significantly based on the location of the project in NY State?
  - c. How common is it for EMS systems to be installed for demand response purposes (e.g., specifically to manage demand at different times of the day or participate in demand response programs offered by NY utilities)?
12. What are the largest market-level barriers to EMS installation in NY State? (PROBE: High cost, small number of vendors, hard to communicate the value proposition to customers, difficult to hire skilled workers that can maintain/use EMS, etc.)
  - a. What are customer-level barriers to EMS installation?
  - b. Are customers aware of and confident in benefits of EMS? (PROBE: How do customers typically learn about EMS? How much of the customers' EMS-related knowledge was due to sales/education efforts by your company?)
  - c. What type of information (report/metrics/case studies/etc.) is the most helpful in encouraging customers to install/upgrade an EMS?
  - d. Do you expect any of these barriers to become more difficult or less difficult to deal with in the future?

## CUSTOMER BEHAVIORS

My last few questions are about how customers use their EMS. If you do not feel you have enough information to answer a question, just let me know.

13. In your opinion, do customers actively use EMS to optimize their energy consumption? Are the EMS used in conjunction with other tools or processes to optimize energy consumption?
14. Typically, how familiar are facility staff with the capabilities of their EMS? How would you rate that on a scale of 0 to 10, where 0 is not at all familiar and 10 is very familiar? Does that vary by the type of EMS or the type of business? Is facility management turnover a common issue?

## WRAP-UP

15. Overall, what are key changes that you expect in the market for EMS moving forward? (PROBE: Increased demand as a result of rising energy prices, decreased cost due to greater availability, increased demand due to government regulations, etc.)
16. Are there other important topics or pieces of information related to the current state of the EMS market in NY State that you think we should know about?

## RTEM & REMOTE AUDITING/REM

Before we wrap up, I have some questions about some specific types of energy management practices you or your customers might use.

17. First, I'd like to ask you about "real-time energy management," also referred to as "RTEM." NYSERDA defines RTEM as the on-going management of a building's energy consumption. This is done by conducting equipment-level monitoring of energy use, with granular data extraction that is pushed to the cloud for analysis, resulting in actionable energy reports that can be used to fine-tune the operation of the building's energy systems and to identify energy-saving capital projects. How familiar are you with the concepts of real-time energy management? Would you say...
  - 1 Very familiar
  - 2 Somewhat familiar
  - 3 Not very familiar
  - 4 Not at all familiar [SKIP TO REM QUESTIONS]
18. Does your company provide...
  - a. RTEM systems?
  - b. RTEM services?

[IF EMS VENDOR]

19. Do any of your EMS product offerings have RTEM capabilities?
  - a. [IF YES] If yes, how many offerings? What percentage of your offerings does that represent?
  - b. [IF YES] What percentage of your EMS installations integrate RTEM capabilities?
  - c. [IF WE HAVE TIME] What percentage of your EMS installations have/integrate ADVANCED RTEM capabilities? [IF NEEDED: Advanced RTEM capabilities include automatic, cloud based energy management controls]

[IF EMS SERVICE PROVIDER]

20. Do any of your EMS installations or upgrades have RTEM capabilities?
  - a. [IF YES] What percentage of installations? What percentage of upgrades?
21. Are you aware of standardized methods for calculating the costs and savings of RTEM projects?

(Record separately for costs and savings)

- a. [IF YES] Do you currently use those for costs? for savings?
22. My next set of questions is about "remote auditing," also referred to as "remote energy management." Remote auditing involves the use of virtual building assessment tools that can provide a baseline of whole building performance quickly and cost-effectively, detecting energy savings potential, and helping to target energy efficiency projects. How familiar are you with remote auditing? Would you say...
  - 1 Very familiar
  - 2 Somewhat familiar
  - 3 Not very familiar
  - 4 Not at all familiar [SKIP TO NEXT MODULE]

23. Does your company provide remote auditing tools or services?
- 1 Yes
  - 2 No [SKIP TO NEXT MODULE]
24. Are you familiar with standardized methods that remote audit platforms use to calculate costs and savings?
- (Record separately for costs and savings)
- a. [IF YES] Do you currently use those for costs? for savings?

Those are all of the questions I have for you. Thank you so much for taking the time to speak with us!