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# **SEM Markets Expansion Study: Assessing Potential New Markets for the Expansion of California 's Strategic Energy Management Program**

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# Executive Summary

In March 2023, with Southern California Gas Company as lead, the California Investor-Owned Utilities (IOUs)<sup>1</sup> and Community Choice Aggregator MCE Clean Energy (MCE) engaged Jay Luboff Consulting, LLC and associated study partners (the “Study Team”) to conduct an eight-month study (“Study”) to identify possible “Best-Fit” non-industrial segments in California, with savings potential and other favorable factors, for expansion of SEM to new markets. This report presents the results of the research conducted by the Study Team.

## Study Objectives

The main purpose of this Study is to identify non-industrial market sectors best suited for SEM programs in California. The overall study’s objective is to provide California stakeholders with cogent, actionable insights and recommendations regarding expansion of SEM to new non-industrial market segments, with a focus on supporting the Commission’s expansion policy and the Program Administrators’ SEM implementation goals.

## Study Approach

The Study Team focused on data gathering from SEM SMEs and on developing an approach to identify, evaluate, and rank “Best-Fit” CA markets for SEM expansion.

## Data Sources

The Study team relied on both primary and secondary sources of information, including:

**Primary Data Sources.** Knowledge base of National and California SEM Collaborators, National SEM Subject Matter Experts (SMEs), and national non-industrial SEM Program Administrators.

**Secondary Data Sources.** Information from California’s SEM Design Guide and M&V Guide, Technical Potential Assessments, Successful Non-Industrial SEM Programs. (See Appendix A for several examples of robust non-industrial SEM programs operating outside of California).

## Research Focus Areas – Success Factors

The Study Team focused its research and analysis on three broad non-industrial segment characteristics or SEM “**Success Factors**” that the team determined, based on the insights gathered from SEM SMEs, could best be used to identify, assess, and rank “Best-Fit” market segments with potential for success as new market entrants into California’s non-industrial SEM program environment. These three Success Factors are:

**Success Factor 1: Segment’s Organizational and Operational Alignment with SEM Implementation Needs and Principles.** The level of capabilities (of typical organizations within a segment) to engage and successfully partner in a SEM effort.

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<sup>1</sup> Southern California Gas Company (SCE) leads this jointly funded study with Pacific Gas & Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E), and CCA MCE Clean Energy (MCE)

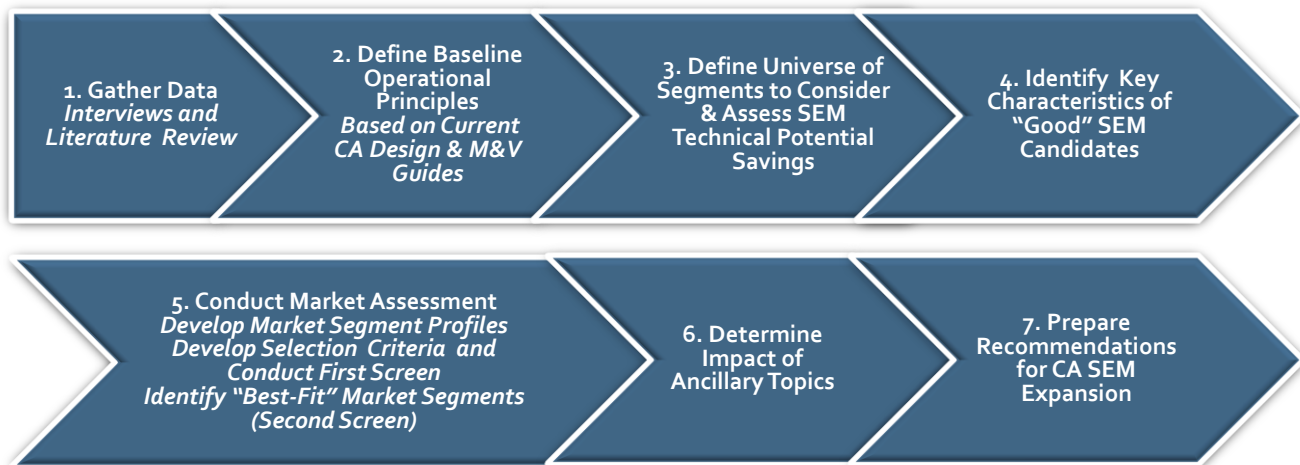
**Success Factor 2: Segment’s Availability of SEM Savings.** The level of energy savings that could be achieved in the market segment.

**Success Factor 3: Segment’s Availability of “Good” SEM Candidates.** The typical level of motivation, engaged business culture, and available resources in organizations in a particular market segment.

## Research Process

Figure ES-1 provides a high-level graphic description of the Study’s Research Process. Each of these steps are described in detail in Chapters 2 through 8. Below we focus only on the Market Assessment and Recommendations steps.

**Figure ES-1. Process Flow for SEM Market Expansion Study Approach**



## Market Assessment

To conduct the assessment, the Study Team evaluated each of the non-industrial segments from the perspective of the three SEM Success Factors described above. The Study Team followed a sequence of steps to conduct the assessment:

- Step 1: Develop Non-Industrial Market Segment Profiles for each of the 13 segments.
- Step 2: Develop screening criteria to evaluate each of the 13 segments in terms of each of the three Success Factors. Develop criteria weights and values to use in the evaluation process and a scoring tool to conduct the evaluation.
- Step 3: Assemble a Delphi Panel of expert non-industrial SEM Implementers and PAs to score each of the segments.
- Step 4: Analyze scores provided by the Delphi Panel participants in terms of average scores and rank segments (First Screen).
- Step 5: Identify “Best-Fit” Segments based on comments from Delphi Panel participants and other SEM SMEs. (Second Screen).

### First Screen

The Study Team developed screening criteria for each Success Factor with the corresponding weights and values. We relied on input from Implementers and other SEM SMEs to develop the weights and values presented in Table ES-1.

**Table ES-1. Screening Criteria Weights and Values**

| Criteria                                                                                                                                                                                                      | Weight (%) | Value          |                   |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|-------------------|-----------------|
|                                                                                                                                                                                                               |            | 1 (Low)        | 2 (Medium)        | 3 (High)        |
| Success Factor 1: Availability of Organizational & Operational Alignment with SEM Implementations Needs and Principles                                                                                        |            |                |                   |                 |
| 1- Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion                                                        | 10         | Very Few       | Some              | Many            |
| 2- Organizations that have the appropriate structure to implement activities needed to comply with CA Design and M&V Guides                                                                                   | 5          | Very Few       | Some              | Many            |
| 3- Organizations with available data to stablish energy use baselines and develop models (usage data, and data on parameters that drive energy use)                                                           | 10         | Very Few       | Some              | Many            |
| Success Factor 2: Availability of SEM Savings                                                                                                                                                                 |            |                |                   |                 |
| 4- Annual Technical Potential Savings                                                                                                                                                                         | 15         | <2% kWh/Therms | 2% - 4% KW/Therms | > 4% kWh/Therms |
| 5- Organizations with high energy use                                                                                                                                                                         | 15         | Very Few       | Some              | Many            |
| Success Factor 3: Availability of "Good" SEM Candidates                                                                                                                                                       |            |                |                   |                 |
| 6- Organizations for whom Information is publicly and readily available (business plans, mission and goals statements)                                                                                        | 5          | Very Few       | Some              | Many            |
| 7- Organizations that have a broad / long-term business and organization perspective; a sustainability, business, ESG, or long-term capital expenditures plan; and/or a methodical approach to their business | 15         | Very Few       | Some              | Many            |
| 8- Organizations with motivation to join and participate in SEM activities                                                                                                                                    | 20         | Very Few       | Some              | Many            |
| 9- Organizations that are able to commit time, financial, and staff resources to implement the changes needed as part of the SEM program                                                                      | 5          | Very Few       | Some              | Many            |

Table ES-2 shows the segments ranked based on the Total average scores, Success Factor 1 average scores, Success Factor 2 average scores, and Success Factor 3 average scores.

**Table ES-2. Non-Industrial Segments Ranked Based on Average Scores**

| Rank Based on Total Average Score |                     | Rank Based on SF 1 Average Score |                    | Rank Based on SF 2 Average Score |                    | Rank Based on SF 3 Average Score |                    |
|-----------------------------------|---------------------|----------------------------------|--------------------|----------------------------------|--------------------|----------------------------------|--------------------|
| Non-Industrial Segment            | Total Average Score | Non-Industrial Segment           | SF 1 Average Score | Non-Industrial Segment           | SF 2 Average Score | Non-Industrial Segment           | SF 3 Average Score |
| 1. Higher Education               | 2.9                 | 1. Higher Education              | 0.7                | 1. Higher Education              | 0.9                | 1. Higher Education              | 1.3                |
| 2. k-12 Schools                   | 2.6                 | 2. Government                    | 0.6                | 2. Hospital                      | 0.8                | 2. k-12 Schools                  | 1.2                |
| 3. Government                     | 2.5                 | 3. k-12 Schools                  | 0.6                | 3. k-12 Schools                  | 0.8                | 3. Government                    | 1.2                |
| 4. Hospital                       | 2.5                 | 4. Hospital                      | 0.6                | 4. Government                    | 0.7                | 4. Hospital                      | 1.0                |
| 5. Lodging                        | 2.0                 | 5. Other Health                  | 0.6                | 5. Grocery                       | 0.6                | 5. Lodging                       | 1.0                |
| 6. Office                         | 1.9                 | 6. Warehouse                     | 0.5                | 5. Office                        | 0.6                | 6. Office                        | 0.8                |
| 7. Grocery                        | 1.9                 | 7. Office                        | 0.5                | 7. Residential Multifamily       | 0.6                | 7. Grocery                       | 0.8                |
| 8. Residential Multifamily        | 1.9                 | 8. Lodging                       | 0.5                | 7. Warehouse                     | 0.6                | 8. Residential Multifamily       | 0.8                |
| 9. Warehouse                      | 1.8                 | 9. Retail                        | 0.5                | 9. Other Commercial              | 0.6                | 9. Other Commercial              | 0.7                |
| 10. Other Health                  | 1.8                 | 10. Grocery                      | 0.5                | 10. Other Health                 | 0.6                | 10. Other Health                 | 0.7                |
| 11. Other Commercial              | 1.8                 | 10. Residential Multifamily      | 0.5                | 10. Lodging                      | 0.6                | 11. Retail                       | 0.7                |
| 12. Retail                        | 1.7                 | 12. Other Commercial             | 0.5                | 12. Retail                       | 0.5                | 12. Warehouse                    | 0.7                |
| 13. Restaurant                    | 1.4                 | 13. Restaurant                   | 0.4                | 13. Restaurant                   | 0.4                | 13. Restaurant                   | 0.5                |

As can be seen in the table, there is a lot of overlap between the ranking in terms of Total score and the ranking in terms of Success Factor scores. From the scores and ranking we can identify four groups of segments:

**Top Segments:** Higher Education, k-12 Schools, Government, and Hospital

**Second Tier Segments:** Lodging, Office, Grocery, and Residential Multifamily

**Third Tier Segments:** Warehouse, Other Health, Other Commercial, and Retail

**Bottom Tier Segments:** Restaurant

### **Second Screen**

To select those segments that are best suited for SEM expansion in California, the Study Team took into account the results of the First Screen, the specific comments provided by the Delphi Panel members, as well as the information gathered in the interviews with SEM SMEs. From the results of the First Screen and the comments presented in the tables, the Study Team identified three categories of segments to consider for SEM expansion in California:

**Best-Fit Segments:** Higher Education, K-12 Schools, Government, and Hospital.

**Good-Fit Segments:** Lodging, Office, Grocery, Residential Multifamily, Warehouse, and Other Health.

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Other Segments: Other Commercial, Retail, and Restaurant.

Chapter 6 includes a detailed review of each of these categories.

## Recommendations

We strongly recommend that California's SEM program is expanded to include non-industrial segments. The Study research shows that California's SEM Industrial Program is ripe for expansion into non-industrial segments. Several factors that contribute to this recommendation include:

- The enthusiasm of many Program Administrators and Implementers to expand SEM,
- The flexibility that the California SEM Design and M&V Guides provide for making changes that may be needed to accommodate the needs of other customer segments,
- The Study findings of potentially significant energy savings resulting from the expansion,
- The historical success of non-industrial SEM programs in the Northwest and growing application and success of similar efforts in other states, and
- The fact that in California, MCE is currently implementing non-industrial SEM Programs and other IOUs have issued or are getting ready to issue RFPs for their implementation with the Commission's approval.

Specific recommendations are summarized below and described in detail in Chapter 8.

### ***Some Segments as a Whole are More Suitable for Expansion***

As shown above, the Study Team identified three groups of non-industrial segments in terms of their suitability to be included in SEM programs. The segments and groups are presented in Table ES-4.

***Table ES-4. Non-Industrial Segments – Suitability for Market Expansion***

| Best-Fit Segments | Good-Fit Segments       | Other Segments   |
|-------------------|-------------------------|------------------|
| Higher Education  | Lodging                 | Other Commercial |
| k-12 Schools      | Office                  | Retail           |
| Government        | Grocery                 | Restaurant       |
| Hospital          | Residential Multifamily |                  |
|                   | Warehouse               |                  |
|                   | Other Health            |                  |

### ***There are no "Bad" Segments – Candidate Characteristics are Key***

Although, as indicated above, there are some segments that as a whole seem to be best suited for expansion, information gathered throughout the Study indicates that there is not a "bad" segment from the perspective of SEM participation. The most important factor for SEM success seems to be the characteristics of the potential candidates associated with each of the Success Factors described above. Candidates from all segments can have these characteristics and as such are viable candidates for SEM expansion. Most successful non-industrial programs are open to a variety of non-industrial segments.

### ***Motivation is the Most Important Characteristic***

Not all Success Factors are equally important in determining which candidates may be more successful in a SEM program. Most of the SMEs interviewed mentioned that while the other two Success Factors are

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important and necessary key components of the overall SEM success equation, *Success Factor 3* is the one that best predicts the desire to “partner” in and long-term commitment to a SEM program.

### ***Capability to Implement SEM Activities is an Important Consideration***

Having organizational and operational alignment with SEM implementation needs and principles (*Success Factor 1*) provides the candidates with the capability to implement the activities required by a SEM effort. In particular, having an engaged and dedicated Executive Sponsor and an engaged, proactive, hands-on Energy Champion to help drive the SEM effort is very important for a successful participation in a SEM program.

### ***Availability of SEM Savings is an Important Consideration***

Having enough available savings (*Success Factor 2*) is an important characteristic for potential SEM candidates. Some Implementers mentioned that they target organizations with high and diverse energy uses, including multiple buildings, activities, and equipment, that offer more opportunities for savings. However, other Implementers have found that candidates with low energy use, but otherwise suitable characteristics related to motivation and engagement, can be successful SEM participants and thus, they use energy use as a guide only.

### ***California’s SEM Design Guide Applies Well to Non-Industrial SEM***

Most non-industrial SEM PAs and Implementers that have implemented programs in California or in areas where California’s Guide has been used to support local guidance, have found that overall, the Design Guide’s principles and requirements apply well to non-industrial SEM programs. These programs deviate from the Guide, in only minor and practical ways, to better address the needs of the specific customer bases and ensure cost-effective delivery. We describe some of these changes in Chapter 8.

### ***California’s SEM M&V Guide Applies Well to Non-Industrial SEM***

While the M&V approaches described in California’s SEM M&V Guide were written for Industrial SEM programs in the State, the principles and requirements to determine claimable savings seem to apply to most non-industrial SEM program participants. BPA’s M&V guide -- which content is used by several utilities across the country -- addresses both Commercial and Industrial SEM programs and explicitly states that the methods are applicable to both sectors. On October 1, 2023 BPA’s “Multiyear SEM” offering was launched with an 8-year measure life for industrial and non-industrial SEM programs<sup>2</sup>

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<sup>2</sup> Communication between BPA and the Study Team on October 3, 2023. BPA has updated its SEM Calculator v.8.3 to use the 8-year EUL and is currently updating their entire BPA M&V Protocols library (available at <https://www.bpa.gov/energy-and-services/efficiency/measurement-and-verification>), which will include new energy savings reporting content for the 8-year EUL within the BPA C&I SEM M&V Reference Guide.

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## CHAPTER | 1

## Introduction

California's industrial SEM effort, launched in 2018 with the adoption by the California Public Utilities Commission ("Commission"; "CPUC") of Decision 16-08-019<sup>3</sup>, has proven to be a valuable addition to California's energy efficiency (EE) portfolio of programs and has created a strong interest in SEM programs. The issuance of the *2018-2019 Industrial Strategic Energy Management (SEM) Impact Evaluation*<sup>4</sup>, showing positive benefits and savings from the initial years of California's industrial SEM program, has further intensified stakeholder interest in expanding SEM to other sectors that might prove viable for SEM.

In March 2023, with Southern California Gas Company as lead, the California Investor-Owned Utilities (IOUs)<sup>5</sup> and Community Choice Aggregator MCE Clean Energy (MCE) engaged Jay Luboff Consulting, LLC and Associated Study Partners (the "Study Team") to conduct an eight-month study ("Study") to identify possible "Best-Fit" non-industrial segments in California, with savings potential and other favorable factors, for expansion of SEM to new markets. This document presents the results of the research conducted by the Jay Luboff Consulting Study Team.

## Background

Commission's Decision 16-08-019 directed the IOUs to implement SEM programs in California's Industrial sector. The Decision defines SEM as a customer-centric, holistic, whole-facility approach that uses normalized metered energy consumption (NMEC) and a dynamic baseline model to determine savings from all program activities at a participating customer facility, including behavioral, retrocommissioning, and operational (BRO) activities and capital projects. Operationally, SEM empowers an organization to follow a systematic approach in achieving continual improvements of energy performance, including higher energy efficiency (EE) and reduced overall energy use.

At its base, SEM is an organizational change approach aimed at creating a "handshake" between a participating organization's leadership and staff, sponsoring SEM Administrators, and their SEM Implementers to *save energy in customer facilities* by equipping and enabling plant management and staff to identify opportunities to reduce energy consumption through behavioral and operational changes that are expected to continue after the end of the formal SEM engagement period.

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<sup>3</sup> D.16-08-019.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M166/K232/166232537.PDF>

<sup>4</sup> SBW Consulting, Inc., 2018-2019 Industrial Strategic Energy Management (SEM) Impact Evaluation conducted by and Partners, December 17, 2021. [https://www.calmac.org/publications/GroupD-D11.03-SEM\\_2018-19\\_Impact\\_Evaluation\\_v2\\_CPU0340.01.pdf](https://www.calmac.org/publications/GroupD-D11.03-SEM_2018-19_Impact_Evaluation_v2_CPU0340.01.pdf)

<sup>5</sup> Southern California Gas Company (SCE) leads this jointly funded study with Pacific Gas & Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E), and CCA MCE Clean Energy (MCE)

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California's Statewide SEM Design Guide<sup>6</sup> and the Measurement and Verification (M&V) Guide<sup>7</sup>, acknowledged in Decision 16-08-019 and in subsequent Decision 23-02-002, provide a consistent framework and direction for each Program Administrator (PA) to design and implement six-year, three-cycle SEM programs<sup>8</sup>. Each cycle involves a two-year engagement, with M&V periods at the end of each year. While there are subtle differences between PA's programs, all programs generally follow the statewide design and M&V guides.

## Stakeholder Interest in Expanding SEM to New Markets

Due to the success of CA's Industrial SEM program as referenced in the *Statewide Industrial SEM Impact Evaluation*<sup>9</sup>, stakeholder interest began focusing on the potential for expanding SEM to non-industrial market segments including commercial, public buildings, agriculture, multifamily residential, and other non-industrial segments. This interest resulted in several PAs requesting the Commission to expand the application of SEM programs beyond the Industrial sector.

- In January 2023 the Commission explicitly approved MCE Clean Energy's (MCE) Multifamily SEM program (MCE AL 54-E) as a SEM program that was designed to comply with CA's SEM Design and M&V Guides. The program design was publicly proposed, presented, approved, and recognized by the Energy Division as a SEM program. MCE's initial non-industrial effort began in 2019<sup>10</sup> and was affirmed in 2021 with Commission's approval of MCE's AL 45-E<sup>11</sup>, which authorized SEM programs in the Industrial, Agricultural, and Commercial segments in MCE's budget request for that year.
- In Southern California Edison's 2021 opening comments to the proposed decision on summer reliability (which became D.21-12-011), requested clarification from the Commission on whether the SEM program could be expanded to non-industrial sectors. While the Commission's D.21-12-011 made no change to the rules at that time, it did encourage SCE to propose this expanded approach in its portfolio application for a full vetting and discussion.
- In February 2022 and April 2022, SCE followed its interest in expanding its industrial SEM effort to new markets with two Advice Letters (ALs): The February AL focused on expanding SEM to SCE's *Statewide Higher Education Energy Performance (HEEP) Program*, and the April AL requested Commission authorization to implement SEM in SCE's *Local Public Sector Programs*<sup>12</sup>.
- In February 2023, the Commission explicitly authorized EE program administrators to expand SEM programs beyond the industrial sector and concluded, "The SEM approach can be generally applicable beyond the industrial sector."<sup>13</sup>

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<sup>6</sup> Sergio Dias Consulting. "California SEM Design Guide For: Cycle 1, 2, and 3." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. <https://pda.energydataweb.com/#!/documents/2647/view>

<sup>7</sup> Sergio Dias Consulting. "California SEM M&V Guide." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. Version 3.02, July 6, 2022. <https://pda.energydataweb.com/#!/documents/2648/view>

<sup>8</sup> While the CA Industrial SEM Design and M&V Guides provide for a six-year cycle, participation is flexible and expected to be in accord with the nature of future non-industrial SEM efforts in the State.

<sup>9</sup> Ibid

<sup>10</sup> MCE's 2018-2025 Business Plan programs were approved in D. 18-05-041.

<sup>11</sup> MCE Advice Letter 54-E (approved in CPUC Jan 3, 2022 Disposition Letter); MCE Budget AL 45-E approved in 2021.

<sup>12</sup> To the project team's knowledge, the Commission did not respond formally to the SCE SEM ALs, but did incorporate essential elements of the SCE ALs requests in its February 2023 D-23-02-00, which is discussed in further detail below.

<sup>13</sup> D.23-02-002 (Findings of Fact 14; Conclusions of Law 20).

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## Acknowledging NTGR Influence and EUL Persistence for SEM Programs

Stakeholder interest in expanding the program was also encouraged by the Statewide SEM Impact evaluation's acknowledgement of the Commission's initial specification of a net-to-gross ratio (NTGR)<sup>14</sup> of 1.0 for the SEM Industrial Program, representing the overall influence of PAs and Implementers efforts on SEM participating organizations' savings outcomes, and by the Commission's specified Effective Useful Life (EUL) of 5-years for program savings persistence. Both of these metrics provide supporting documentation for the long-term impact of SEM customer engagement approaches on participating industrial organizations and their facilities.

These evaluation factors, initially stated in D-16-08-019, allowed for a net-to-gross ratio (NTGR) of 1.0 to be applied to all projects resulting from statewide industrial SEM programs that adhere to a very specific program design that ensures customer participation and education, and tracking of program / project performance. In addition, while there is no specific guidance from the Commission on what effective useful life (EUL) to use for SEM, an EUL of 5 years has historically been used based on the Commission-issued Potential and Goals study from 2018<sup>15</sup> and related CPUC support tables (DEER 2020) in eTRM.

## CPUC Decision 23-02-002 on SEM Expansion

In February 2023 in Decision 23-02-002, Ordering Paragraph #14, the Commission specifically allowed for any of the energy efficiency portfolio administrators to begin "offering strategic energy management style programs beyond the industrial sector, based on modified versions of the existing guidebooks, that must be posted on the Commission's Public Documents Area<sup>16</sup>." In addition, in the Decision, the Commission ordered the Energy Division to undertake a study within a year of D.23-02-002 to assess the applicability of the NTGR and EUL evaluation factors to non-industrial markets where SEM programs would likely be offered for implementation:

*Furthermore, within one year of the adoption of D23-02-002, Commission staff will manage and implement a study of NTGR (=1.0) and the current EUL assumptions, including recommendations for successful non-industrial SEM programs, based on lessons learned from this study. The results of this study should be used to develop appropriate SEM guidebooks for non-industrial sectors that have the characteristics conducive to successful SEM participation. (Decision page 43)*

It is broadly accepted by SEM stakeholder that the current SEM industrial guidelines, developed with broad California stakeholder input, are built on characteristics universally recognized as ideal for SEM participation and are imbued with enough flexibility to accommodate the CPUC's SEM expansion focused mandate to other market sectors per Decision 23-02-002.

## Study Objectives

The main purpose of this Study is to identify non-industrial market sectors best suited for SEM expansion in California. The overall study's objective is to provide California stakeholders with cogent, actionable insights and recommendations regarding expansion of SEM to new non-industrial market segments, with a focus on supporting the Commission's expansion policy and the PAs' SEM implementation goals.

Specific objectives of this study include:

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<sup>14</sup> Net-to-Gross (NTG) is a ratio or percentage of net program impacts divided by gross or total impacts. NTG ratios are used to estimate and describe the "free ridership" that may be occurring within energy efficiency programs. (EE Policy Manual, Version 6, April 2020, p.27), from SCE AL 4772-E for Approval of Statewide Higher Education Energy Efficiency Program (p8, footnote 24).

<sup>15</sup> Navigant 2018 Energy Efficiency Potential & Goals Study for 2018 and Beyond. [Microsoft Word - R1311005 Fitch Kao Appendix 1 8-24-17 \(ca.gov\)](#)

<sup>16</sup> D.23-02-002. <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M501/K931/501931085.PDF>

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- Assess potential market segments for SEM expansion into non-industrial markets and identify “Best-Fit” segments based on parameters similar to those used to create California’s Industrial SEM program.
  - Recommend “Best-Fit” non-industrial market segments for SEM expansion in California.
  - Identify and assess key issues / challenges associated with the implementation of SEM programs in “Best-Fit” market segments and recommend potential approaches for addressing those issues, as relevant.
  - Identify (as possible) other market segments that may have potential for SEM expansion considering variations from the parameters used to create California’s Industrial SEM program.

## Study Research Questions

The Study Research Plan<sup>17</sup> contains a series of research questions that were designed to focus initial study investigations on a broad range of issues. These initial research questions provided the framework for developing a set of comprehensive assessment criteria and ranking approaches (see Chapter 6) that the Study Team used to identify “Best-Fit” non-industrial markets for potential SEM expansion in California.

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<sup>17</sup> SEM Expansion Study: Assessing Potential New Markets for the Expansion of California’s Strategic Energy Management Program – Research Plan. <https://pda.energydataweb.com/#!/documents/2804/view>  
Jay Luboff Consulting, LLC

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Table 1 lists the key initial Study Research Questions.

**Table 1. SEM Market Expansion Study Research Questions**

| Key Research Questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Based on existing industrial sector characteristics universally recognized as being ideal for SEM program participation, what are the justifications for expanding SEM to non-industrial segments in California?<br>a. What are the reasons an intense customer participation approach such as SEM will work in other segments?<br>b. What characteristics do other segments have that lend themselves to a SEM approach? e.g.:<br>Do they have existing energy managers or staff resources available to be trained as energy managers?<br>Do they have buildings \ facilities ideal for a SEM approach, including sufficient BRO opportunities?<br>Do they have resources to provide funding opportunities or are there significant funding barriers?<br>c. What are the best-case examples to understand these important issues?<br>d. Which universally recognized characteristics do other segments NOT have that prevent them from being identified as Best-Fit” for SEM expansion? |
| 2. What specific criteria / factors should be used to assess non-industrial market segments for “Best-Fit”?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3. Which non-industrial market segments possess characteristics with the best potential for expansion?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4. Is the current Industrial SEM program model suitable for other non-industrial segments with different characteristics?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5. Initial research with California’s stakeholders have identified several “most attractive” potential market segments for SEM expansion in California: Agriculture, Large Commercial, Public Buildings, Higher-Education, Large Multifamily <sup>18</sup> .<br>a. Does the Study research support this assessment?<br>b. Which other, if any, non-industrial segments should be considered?<br>c. Should programs that include mixed market segments be considered for “SEM aggregation” (where participant’s operating characteristics and combined savings potential may have SEM relevance)?                                                                                                                                                                                                                                                                                                                                                                                            |
| 6. How do other states’ SEM programs, that operate in similar market segments as those identified in this Study as having expansion potential, address key program design, evaluation, and related economic assumptions?<br>a. What are the similarities and differences among States’ approaches, including California’s SEM Industrial program approach?<br>b. Which case studies can reflect these similarities and differences?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. Are there potential issues identified from the literature review and from interviews in California and elsewhere that California’s stakeholders should be aware of? (e.g., related to Third-Party program efforts, NMEC usage, and SEM delivery across sectors)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Interested Stakeholders

Numerous stakeholders have interest in and / or collaborate in California’s extensive network of EE strategy, policy, administration, implementation, and evaluation professionals. Key stakeholders expected to benefit from the information provided in the Study include:

**The California Public Utilities Commission.** The Study supports Commission’s Decision 23-02-002 by providing information on potential savings impacts of SEM in various market segments as well as an understanding of key new SEM market success factors.

**California IOUs, MCE, and other California Program Administrators (PAs).** The Study provides PAs with information needed to support program portfolio design and management of SEM expansion to non-industrial SEM markets. Segment insights and profiles -- based on Commission Potential and Goals Study for non-industrial market segments<sup>19</sup> -- can help portfolio managers integrate new market SEM offerings into existing commercial sector EE program portfolios, including design of RFPs for non-industrial SEM programs.

<sup>18</sup> These market sectors examples are drawn from the Advice Letters and Budget filings of MCE and SCE, and from informal discussion with SEM implementers and Program Administrators primarily working in and from California

<sup>19</sup> Non-industrial market segments in this Study include Commercial segments and Residential Multifamily.

**SEM Implementers.** The Study acknowledges the key success factors that implementers have developed and incorporated into their SEM offerings to grow the SEM industry since its inception. The Study affirms these factors and provides implementers with key market segment information and insights to support non-industrial SEM program offerings in California.

**Other Stakeholders.** This Study's comprehensive assessment and ranking of the key potential non-industrial SEM markets for SEM Expansion in California benefit SEM program advocates, ratepayer advocates, and other important stakeholders by facilitating an understanding of policy and related analysis of this important program's expansion potential.

## Study Report Structure

Table 2 lists the Study Chapters and summarizes their content.

**Table 2. SEM Market Expansion Study Report Content**

| Chapters / Appendices                                                                 | Content                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Introduction                                                                       | Study goals, objectives, research questions.                                                                                                                                              |
| 2. Study Approach                                                                     | Data sources, research focus areas, research process.                                                                                                                                     |
| 3. Baseline Operational Principles – Overview of California's SEM Design & M&V Guides | Foundational SEM program operating principles, CA SEM Design Guide's operational principles and requirements, CA SEM M&V Guide's principles and requirements.                             |
| 4. SEM Technical Potential Savings for Non-Industrial Segments in California          | Universe of segments to consider, potential SEM savings analysis for each market segment.                                                                                                 |
| 5. Characteristics of "Good" SEM Candidates                                           | Characteristics of SEM candidates that make them very likely to succeed when participating in a SEM program.                                                                              |
| 6. Market Assessment                                                                  | Market segment profiles; selection criteria, weights, and values for first screen of market segments; first screen results; identification of "Best-Fit" market segments (second screen). |
| 7. Ancillary Topics: Issues and Opportunities                                         | Analysis of ancillary issues – NMEC (implementing SEM across segments), alternative SEM SMB / DAC program approach (definition and possibilities), Workforce support.                     |
| 8. Conclusions and Recommendations                                                    | Overall recommendations for expansion of Industrial SEM program in California, lessons learned from SEM SMEs.                                                                             |
| A. Literature Review                                                                  | Successful non-industrial SEM programs, SEM Guides. Data sources for Workforce support.                                                                                                   |
| B. Interviews with Program Administrators, Program Implementers, and SEM SMEs.        | PAs, implementers, and SMEs interviewed, Interview guides, takeaways from interviews.                                                                                                     |
| C. California's SEM Design and M&V Guides                                             | CA SEM Design Guide's operational principles and requirements, CA SEM M&V Guide's principles and requirements.                                                                            |
| D. Detailed Technical Potential Input Assumptions and Data Sources                    | Input assumptions and data sources used in the technical potential analysis.                                                                                                              |
| E. Market Assessment                                                                  | First screen results for each Success Factor, Comments from Delphi Panel participants on each on the non-industrial segments considered.                                                  |

## Study Approach

The Study Team gathered insights and conducted analyses targeted at an efficacious integration of non-industrial SEM market segments into the complex EE ecology. The Study Team focused on data gathering from SEM Subject Matter Experts (SMEs) and on developing an approach to identify, evaluate, and rank “Best-Fit” CA markets for SEM expansion. The Study Team worked closely with the California Co-Sponsoring Utility Advisory Group to develop the Study approach to ensure key issues and concerns were addressed in the data gathering and assessment of potential non-industrial SEM markets.

### Data Sources

In conducting this Study, the Study team relied on both primary and secondary sources of information to guide its research on the expansion of California’s existing non-industrial SEM efforts to non-industrial sectors. These data sources include:

#### Primary Data Sources

##### ***National and California SEM Collaborators***

The Study Team relied as much as possible on the knowledge base of California’s SEM collaborators, including the SEM Market Expansion Advisory Group, SEM collaborators outside California, such as the North American SEM Collaborative, and national non-industrial SEM Program Administrators to develop the Study approach and to conduct the analysis to identify potential “Best-Fit” non-industrial markets for expansion of SEM efforts in California.

##### ***National SEM Subject Matter Experts (SMEs)***

The Study Team conducted extensive outreach to SEM SMEs, including national and State-based SEM organizations and Program Implementers with significant experience in helping design, administer, and implement successful industrial and non-industrial SEM programs around the country. The objective of the outreach was to glean key informational insights -- through interviews and related face-to-face partner events<sup>20</sup> -- from industry pioneers and current leaders who possess the historical knowledge-base to help the Study team understand the qualitative “success factors” that have made SEM offerings successful over the years since its inception. Discussions with SEM SMEs on “success factors” included identifying those important characteristics of potential “good candidates” for SEM programs, that they believed typically lead to high probability of implementation success. In addition, the Study Team worked with SEM SMEs to help assess and rank potential “Best-Fit” SEM California expansion markets through an anonymous Delphi Panel<sup>21</sup> process.

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<sup>20</sup>See Appendix B for a listing of the SEM SMEs who shared their expertise with the Study Team

<sup>21</sup> Delphi Panels are typically empaneled to provide expert input into a decision frame where the professional experience of panel members provide their expert assessment of the subject at hand. Delphi panels typically can be organized in group meeting with anonymous voting procedures in place. Alternatively, Delphi panels may be anonymous with member input to a decision process without a group meeting.

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## Secondary Data Sources

### ***California's SEM Design Guide and M&V Guide***

The Study Team relied on California's existing Industrial program guidelines, built on what are generally considered universally accepted SEM principles, to provide the operational "baseline" from which to assess non-industrial market segments in terms of their capability to align with key SEM implementation principles and needs that guarantee the success of SEM efforts.

### ***Technical Potential Assessments***

The Study Team used the best available technical potential assessments developed for non-industrial market segments to identify the thirteen market segments to consider in the analysis and determine the availability of SEM savings in each segment. The Team focused on gathering as much secondary data as possible from various energy savings projections of SEM efforts in California and around the country – including CSEM implementer-provided data -- to support the high-level SEM technical potential analysis.

### ***Successful Non-Industrial SEM Programs***

The Study Team conducted a Literature Review of key successful non-industrial SEM programs that have been implemented in other States to gather information on best practices from around the country and key program aspects that have contributed to the programs' success.

## Study Research Focus Areas

The Study team focused its data gathering and analysis approach on key research areas deemed best able to help support and meet the Study's objectives, answering its fundamental research questions. In particular, the Team focused its research and analysis on three broad non-industrial segment characteristics or *SEM "Success Factors"* that the team determined, based on the insights gathered from SEM SMEs, could best be used to identify, assess, and rank "Best-Fit" market segments with potential for success as new market entrants into California's non-industrial SEM program environment. These three Success Factors are:

### ***Success Factor 1: Segment's Organizational and Operational Alignment with SEM Implementation Needs and Principles***

The level of capabilities (of typical organizations within a segment) to engage and successfully partner in a SEM effort – e.g., with operational characteristics, executive and staff support requirements, and internal operations "cultural" capabilities to successfully engage in and implement a longer-term SEM engagement.

### ***Success Factor 2: Segment's Availability of SEM Savings***

The level of energy savings that could be achieved in the market segment, if all savings features could be installed and successful provide expected savings.

### ***Success Factor 3: Segment's Availability of "Good SEM Candidates***

The typical level of motivation, engaged business culture, and available resources in organizations in a particular market segment, e.g., motivation of an organization's leadership to successfully participate in and support a longer-term SEM effort, including its organization-change environment, availability of

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needed data, and related key success factors associated with a strong commitment to SEM as a process and organizational desire for energy savings and internal efficiency improvements<sup>22</sup>.

Figure 1 graphically depicts the three interconnected Study Focus areas that represent the three SEM Success Factors.

**Figure 1. Study Research Focus Areas – Success Factors**



Each of the three Success Factors will be discussed in detail in Chapters 3, 4, and 5.

## Study Research Process

The research approach based on the research focus areas and data sources described above supports the Study's research implementation plan and is designed to:

- Assess both the qualitative organizational-change and quantitative technical savings aspects of SEM, including addressing key implementation issues and challenges.
- Partner as much as possible with experienced SEM SMEs, with deep, non-industrial sector SEM program design, administration, implementation, and evaluation experience, to gather primary Study data
- Solicit support and input from national organizations with strong links to SEM programmatic thought-leadership and related issues, challenges, successes, and lessons learned, including the Consortium for Energy Efficiency (CEE) and the North American Strategic Energy Management Collaborative (NASEMC), and other relevant organizations and entities.
- Use the CPUC's Potential and Goals Studies to identify non-industrial market segments of interest and also use approaches, typically used in California's PG Study analysis, where possible, to develop a high-level analysis of potential SEM savings for California's non-industrial segments.

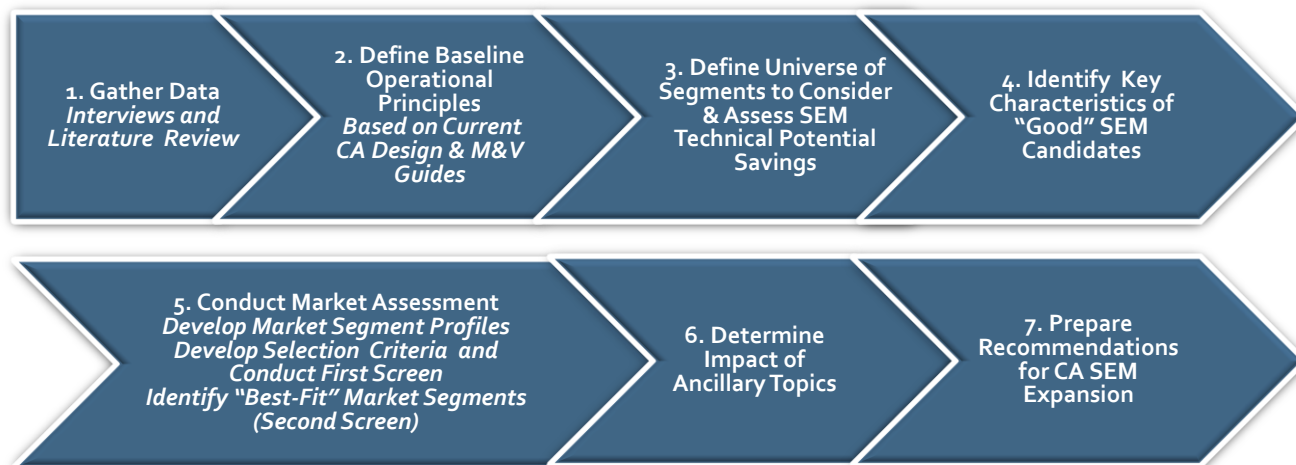
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<sup>22</sup> In relationship to the importance of this SEM success factor, one SEM pioneer noted: "SEM is an organizational-change program first and foremost (along with energy savings and other positive SEM organizational change values). Motivated early innovators are typically unique 'snowflakes' able to support the effort and lead the way in promoting SEM in their own organizations, markets, and industries and in related implementation cohort approaches of working together on SEM."

- Use additional secondary non-industrial SEM savings data from SEM efforts around the country to support the technical SEM savings analysis<sup>23</sup>.

Figure 2 provides a high-level graphic description of the Study's Research Process. A brief description of each step in the process is presented after the figure.

**Figure 2. Process Flow for SEM Market Expansion Study Approach**



### **Step 1: Gather Data**

As described above, the Study Team conducted extensive interviews with SEM SMEs both from California and from around the country. These interviews provided insight on characteristics of successful non-industrial SEM programs, participants' requirements, and implementation issues. They also provided guidance for the literature review, which relied on available literature on successful non-industrial SEM programs implemented outside California. The insights gathered from the interviews and the literature review were incorporated in all the steps of the analysis. These data gathering efforts are described in detail in Appendices A, B and C.

### **Step 2: Define Baseline Operational Principles**

The Study Team used California's SEM Design and M&V Guides (with the flexibility for modification allowed in CPUC's February 2023 D-23-02-00) as foundational documents for identifying key SEM operational needs and principles. Details on the Baseline Operational Principles are presented in Chapter 3.

### **Step 3: Assess SEM Technical Potential Savings and Define Universe of Segments to Consider**

The Study Team used data on Technical Potential savings for non-industrial segments in California from the Potential And Goals (PG) Study as well as other relevant data to identify a universe on 13 non-industrial segments (12 Commercial and one Residential) to consider in the assessment and estimated available SEM savings for each segment. Details on the technical potential savings for the 13 segments are presented in Chapter 4. Details on the data used in the analysis are presented in Appendix D.

<sup>23</sup> It should be noted that several Study Team members have had past experience with developing CPUC Potentials and Goals studies as former members of Navigant/Guidehouse PG Study teams, enabling them to conduct an analysis similar to the one used in the PG Study.

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***Step 4: Identify Key Characteristics of "Good" SEM Candidates***

The Study Team relied on the insights gathered through the interviews with SEM SMEs to identify key characteristics that drive the success of potential SEM program participants. Details on the key characteristics are presented in Chapter 5.

***Step 5: Conduct Market Assessment***

The Study Team developed profiles for the 13 market segments, describing the key segments' characteristics. The Study Team also developed selection criteria with the corresponding weights and values to evaluate, score, and rank the 13 market segments with respect to each of the three Success Factors. This corresponds to the First Screen. We relied on input from non-industrial SEM Program Implementers through the Delphi Panel to conduct the scoring.

The Study Team reviewed the higher-ranking market segments, taking into account information gathered during interviews with SEM SMEs and the input provided by implementers when conducting the scoring, to identify "best-fit" market segments. This corresponds to the Second Screen.

Details on the Market Assessment are presented in Chapter 6.

***Step 6: Determine Impact of Ancillary Topics***

The Study Team reviewed several ancillary questions raised by stakeholders related to introduction of SEM into already robust non-industrial EE markets. These ancillary topics include the relationship of SEM withing California's Commercial sector and existing NMEC programs and the potential for SEM servicing harder-to-reach market sectors, such as small and medium business (SMB) and perhaps other sectors where cost-effectiveness is an issue (smaller commercial, DAC areas, other) and where an "SEM SMB / DAC" approach may be possible. Details on the impact of ancillary topics is presented in Chapter 7.

***Step 7: Prepare Recommendations for California SEM Expansion and Characterize "Best-Fit" Market Segments***

The Study Team developed overall recommendations for expanding SEM program efforts to non-industrial segments in California as well as specific recommendations on program success factors and approaches. Details of the recommendations are presented in Chapter 8.

## Baseline Operational Principles – Overview of California’s Design & M&V Guides

This Chapter presents an overview of SEM’s foundational operating principles and needs that the Study Team used when identifying appropriate non-industrial market segments for expansion of California’s SEM program, as described in Chapter 6 (Market Assessment).

Two reference manuals provide guidance and insight into the way SEM programs currently operate in California:

- California SEM Design Guide<sup>24</sup> (Design Guide)
- California SEM M&V Guide<sup>25</sup> (M&V Guide)

These Guides served as the basis for evaluating non-industrial segments in terms of the first SEM Success Factor defined in Chapter 2: *Organizational and Operational Alignment with SEM Implementation Needs and Principles: Level of capability to engage and successfully partner in a SEM program* (see Figure 1).

### Foundational SEM Program Operating Principles

California’s Design and M&V Guides reflect the regulatory parameters and landscape specific to the state. From its inception, California’s SEM program has been designed to engage customers over a defined six-year period divided into three 2-year cycles. This long-term approach gives the program the ability to continually develop the customers’ understanding, skills, and energy related capabilities while consistently delivering energy savings. The six-year duration also allows the program to elevate activities generally provided by SEM programs (e.g., treasure hunts, energy maps, employee awareness) into well established and defined business practices that can be continued by the customer without program support once their SEM engagement has ended.

The primary objectives of the SEM program, looked through the six-year lens, are:

- To cost-effectively acquire measurable energy efficiency savings **by**
- Helping customers develop a systematic approach to managing energy **while**
- Ensuring the customer can manage the system they have developed after program completion.

Secondary objectives of the SEM program include educating participants on how to use energy management business practices to manage broader energy-related objectives and providing options for activities that support participants in integrating those objectives into their energy management business practices to strategically implement a wide-variety of demand-side opportunities.

SEM in California is currently approved for industrial customers and some of the specifics in these Guides reflect this, though they are not intentionally exclusive. In fact, the M&V Guide explicitly states that it is applicable to all segments, including commercial and institutional customers. Furthermore, Decision 23-02-002 (February 2023), Ordering Paragraph #14 specifically allows for any energy efficiency portfolio

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<sup>24</sup> Sergio Dias Consulting. “California SEM Design Guide For: Cycle 1, 2, and 3.”

<sup>25</sup> Sergio Dias Consulting. “California SEM M&V Guide.”

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administrators to begin “offering strategic energy management style programs beyond the industrial sector, based on modified versions of the existing guidebooks”.

As the SEM Design and M&V Guidebooks are considered living documents they have been revised (July 2022) to allow for more flexibility in order to expand their applicability, even if they may not consider specific non-industrial sector characteristics. Both Guides incorporate input from CPUC’s staff and evaluators, California’s SEM Program Administrators and implementers, and experience from SEM programs operated in other jurisdictions across North America, in particular in the Pacific Northwest.

Furthermore, within one year of the adoption of D.23-02-002, The Decision requires Commission staff to manage and implement a study of NTGR and the current EUL assumptions, including recommendations for successful non-industrial SEM programs, based on lessons learned from this study. The Decision also notes that “the results of this study will be used to develop appropriate SEM guidebooks for non-industrial sectors that have the characteristics conducive to successful SEM participation”<sup>26</sup>.

The operating principles and requirements for SEM programs are included in these two Guides are described in more detail below.

## California SEM Design Guide – Operational Principles and Requirements

The Design Guide is intended to be used by both SEM Program Administrators and SEM program implementation contractors and has requirements and recommendations for both. It is assumed that both the Program Administrator and the implementation contractor have experience with, and understanding of, SEM programs. The Guide provides detailed guidance on the operational components of the program in each of the two years in each of the 3 cycles. The operational principles and requirements included in the Guide are summarized below and described in detail in Appendix C.

**Parties and their Responsibilities.** The Guide clearly identifies the three parties that need to be involved in the operation of the program and their respective responsibilities:

- **The Program Administrator** – *Utility Account Executive*
- The Implementation Contractor – *SEM Coach*
- The Participating Customer – *Energy Team*
  - Data Owner
  - Energy Champion
  - Executive Sponsor

**Program Cycles:** SEM in California is intended as a six-year customer engagement, with a series of activities to be completed in 3-cycles, each two years long. Each of the cycles builds upon the knowledge and experience gained in the previous cycle, with the end goal of the third cycle being a customer that can manage and save energy with limited or no program support.

**Educational Modules and Site-specific Activities.** The SEM program is delivered through a progression of Educational Modules and Site-specific Activities that build upon each other within and between the cycles. The Guide describes the modules and specific activities to be conducted each year. It also provides a very detailed roadmap, defining the order and timing of them. Processes and responsibilities are clearly identified. This includes specification of the requirements, objectives, and deliverables, in each year.

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<sup>26</sup> California Public Utilities Commission D.23-02-002, p. 43

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## California SEM M&V Guide – Principles and Requirements

The M&V Guide defines the principles and requirements for a systematic M&V process to determine claimable energy savings from SEM programs, as specified by the CPUC in Decision 16-08-019 and Decision 23-02-002. The M&V Guide outlines a prescriptive process of (a) planning for the collection of data, (b) collecting and analyzing the data collected, and (c) measuring, verifying, and reporting energy performance or energy performance improvement for a defined boundary. The M&V Guide is based upon the common concept of determining energy savings based on a site-wide, existing baseline and utility metered-based approach. The M&V Guide also indicates where PAs have latitude in allowing deviations from the recommended process and also refers to CPUC's data and reporting requirements and its role in requesting information. The principles and requirements included in the Guide are summarized below and described in detail in Appendix C.

**Participants in the M&V Process.** The Guide clearly identifies the three primary stakeholders that need to be engaged in conducting the M&V process and their respective responsibilities.

**Data Collection Activities.** Energy consumption data and other relevant variable data needs to be collected during the SEM Program Cycle regardless of the energy savings determination approach used. Preparing for the collection of data involves the creation and update of an Energy Data Collection Plan, Energy Data and Performance Tracking Tool, and Opportunity Register.

**Baseline and Models.** The Guide describes the baseline requirements and the types of models (Energy consumption Adjustment Model – Top-Down Approach and Forecast Method – Bottom-Up Approach) that need to be used to determine energy savings. The M&V Guide explicitly allows for tracking and modeling savings for both BRO and capital measures implemented within the SEM program and removal of savings from non-SEM measures.

**Summaries and Reporting Requirements.** As the companion to the design guide, the M&V Guide outlines specific Summaries and Reporting requirements for both the Educational Modules and Site-specific Activities.

## SEM Technical Potential Savings for Non-Industrial Segments in California

This Chapter presents estimates of technical potential savings for each non-industrial segment. A key element of this Study is to develop an understanding of the size and opportunity for SEM savings within each non-industrial segment for both electricity and natural gas. The Study Team used these estimates when identifying appropriate non-industrial market segments for expansion of California's SEM program, as described in Chapter 6 (Market Assessment).

The savings estimates presented here served as the basis for evaluating non-industrial segments in terms of the second SEM Success Factor mentioned in Chapter 2: *Availability of SEM Savings: Level of savings that could be achieved in the market segment* (see Figure 1).

### Universe of Commercial Segments Considered

The Study Team defined a universe of 12 commercial segments and one residential segment to consider for this study. To identify these thirteen segments, the team started with the segments considered in the 2023 CA Potentials and Goals study<sup>27</sup> and then consolidated and/or expanded them based on intelligence from the Study Team and input provided by implementors and others interviewed throughout the Study. The universe of segments to consider in this Study is shown in Table 3.

The segments considered in the 2023 Potentials and Goals study are listed in the left column of, and the segments that were considered in this Study are shown in the right column of the table. Rationale and methodologies for splitting segments are described after the Table. Detailed descriptions of the characteristics of each of these segments are included in Chapter 6 (Market Assessment).

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<sup>27</sup> 2023 California Potentials and Goals Study, Guidehouse

<https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/energy-efficiency-potential-and-goals-studies/2023-potential-and-goals-study>

**Table 3. Non-Industrial Segments Considered in the Study.**

| 2023 CA Potentials and Goals Study<br>Non-Industrial Segments | Non-Industrial Segments Considered<br>in this Study            |
|---------------------------------------------------------------|----------------------------------------------------------------|
| Higher Education                                              | Higher Education                                               |
| Grocery                                                       | Grocery                                                        |
| Health                                                        | Hospital                                                       |
|                                                               | Other Health                                                   |
| Lodging                                                       | Lodging                                                        |
| Office (Large & Small)                                        | Office                                                         |
|                                                               | Government                                                     |
| Other Commercial                                              | Other Commercial                                               |
| Restaurant                                                    | Restaurant                                                     |
| Retail                                                        | Retail                                                         |
| School                                                        | k-12 Schools                                                   |
| Refrigerated Warehouse                                        | Warehouse                                                      |
| Warehouse                                                     |                                                                |
| Residential Multifamily                                       | Residential Multifamily<br>(Large only – more than five units) |

For the purposes of this Study, the Study Team made the following changes to the CA Potential and Goals Study's non-industrial segments:

- Health was split into Hospital and Other Health segments. Hospitals and other healthcare facilities were identified by industry experts to have different characteristics that can have an impact on the success of a SEM program and thus should be considered separately.
- Office Large and Office Small were combined into one Office segment and then a portion of that Office segment was split into a Government segment. Government office buildings were considered an important delineation in this Study because of their specific characteristics that can have an impact on the success of a SEM program.
- Refrigerated Warehouse and Warehouse were combined into one overall Warehouse segment. Characteristics critical to SEM success were not considered to be significantly different between these two segments.

The Study Team broke out Health and Office from the Potentials and Goals study into multiple segments using EIA's 2018 CBECS<sup>28</sup>, sharing out floorspace, electricity consumption and gas consumption using the CBECS data. Figures D-1 and D-2 in Appendix D show the share of total office space and consumption that is considered government office space vs standard office space from the CBECS analysis and the

<sup>28</sup> U.S. Energy Information Agency (EIA), 2018 Commercial Buildings Energy Consumption Survey (CBECS)  
<https://www.eia.gov/consumption/commercial/data/2018/> Tables B15, B16, C22, and C32

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share of healthcare floorspace and consumption categorized as hospital vs other healthcare from CBECs, respectively.

## Technical Potential Definition

Technical potential is defined as the total available energy savings potential for a given measure (an SEM measure in this case) within a service territory if no market barriers existed and all measures could be implemented at once. Essentially all energy efficiency potential studies and conservation potential assessments use this definition of technical potential but may utilize different factors and methods to calculate actual technical potential. The two most common methods used to calculate technical potential are:

- **Top-down Approach.** This method starts with the total energy consumption of a market segment or sector. Then a percentage savings associated with a measure is applied to that segment or sector's total energy consumption to estimate savings. Assumptions for baseline saturations and applicability of that market are also applied. The Study Team used this method to estimate technical potential for the purposes of this Study.
- **Bottom-up Approach.** This is a more nuanced approach that requires an extensive amount of data to model an average home or building. Per unit savings based on the average home / building are then scaled to the service territory level based on the number of customers served. This approach is more suitable for widget-based measures, and not holistic or broad reaching measures like SEM measures, and therefore we did not use it in this analysis.

The top-down technical potential formula used in this analysis is outlined below. The approach and sourcing for these data points are detailed in subsequent sections of this Chapter.

### **Technical Potential**

$$= \text{Segment Consumption (GWh or MMTherms)} * \text{Percent Market Applicability} * \text{Percent Savings}$$

Where:

**Segment Consumption** is the total consumption (for both electricity and natural gas) of a non-industrial market segment served by a Program Administrator (PA). As noted above, the Study Team considered 13 non-industrial market segments in this Study.

**Percent Market Applicability** is the percent of the market segment that SEM can be applied to and does not already have an energy management or SEM-like program in place. There can be many reasons that a segment may not be ideal for SEM, including, but not limited to ownership type, industry type, or size of the business. In this study, the percent market applicability combines 'availability' and 'applicability' factors from each technical potential researched since not every study has the same factors included, but ultimately each of the factors are designed to achieve the same goal. The factors from studies included are detailed within the sourcing section below and include *applicability, suitability, feasibility, and baseline saturation*.

**Percent Savings** is the SEM savings percent compared to baseline consumption. Wherever possible, the Study Team used segment-specific percent savings from the potentials and other studies that were reviewed, but in many cases, an overall average commercial percent savings was applied to all segments within the commercial sector.

## Analysis Approach

The Study Team took the following steps to estimate SEM technical potential in non-industrial market segments, and described in detail below:

- 
- Step 1: Compile Segment-Level Consumption and Building Stock Data (Global Data).
  - Step 2: Research Commercial SEM Saving and Market Applicability Data.
  - Step 3: Calculate Average Savings and Market Applicability Factors for each Segment.
  - Step 4: Calculate Technical Potential for each segment.

## Segment-Level Consumption and Building Stock Data

Segment-level consumption, for both electricity and natural gas, is a critical component of a top-down approach to estimate technical potential. The Study Team utilized consumption data from the 2023 California Potentials and Goals<sup>29</sup> study as a starting point for this analysis. These data include consumption and stock data for their defined commercial segments. As mentioned earlier in this chapter, some of the Potentials and Goals study segments were broken out further for this Study, such as offices into government and office and healthcare into hospitals and other health. This was done using EIA's 2018 CBECS<sup>30</sup>, which showed about 15% of total office space were government buildings and 56% of total healthcare floorspace were hospitals.

The Potentials and Goals study also provides consumption for the Residential Multifamily segment but does not distinguish between large and small multifamily buildings. For this Study, large multifamily is defined as buildings with more than five units. Since this split was not provided in the CA Potentials and Goals study, the Study Team used data from the 2019 California Residential Appliance Saturation Survey (RASS)<sup>31</sup>, which identifies the total number of large vs. small multifamily units by IOU. The percentage of units considered in the Residential Multifamily (Large) segment ranged from 64% to 74% depending on the IOU.

## Commercial SEM Saving and Market Applicability Data

The Study Team reviewed more than 15 different potential studies published since 2020 across the nation and found usable SEM data in five of those studies. Most of the studies did not even consider non-industrial SEM or did not provide publicly available detailed measure information necessary for this analysis. In many cases, the same percent savings were applied to all commercial market segments, but market applicability factors did vary by segment in most studies. Three of the five studies provided data for both electricity and natural gas. The Data Sources section at the end of this chapter contains details of the studies and the data used from each study.

In addition, the Study Team received actual program data with percent savings by market segment from two SEM implementors and received guidance on potential market applicability factors for each segment based on their on-the-ground experience. Most of the savings' data provided were in the range 2-5% savings, with a few segments achieving higher than 5% savings from some sources. Appendix D provides detailed tables showing the different percent savings and market applicability factors by source and segment.

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<sup>29</sup> 2023 California Potentials and Goals Study, Guidehouse

<https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/energy-efficiency-potential-and-goals-studies/2023-potential-and-goals-study>

<sup>30</sup> U.S. Energy Information Agency (EIA), 2018 Commercial Buildings Energy Consumption Survey (CBECS)

<https://www.eia.gov/consumption/commercial/data/2018/>

<sup>31</sup> 2019 California Residential Appliance Saturation Study, DNV-GL [RASS \(dnv.com\)](https://www.dnv.com/rass) – utilized downloadable Volume 2 subset tables by IOU

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## Average Savings and Market Applicability Factors for each Segment

With all the data compiled, the Study Team estimated average percent savings and market applicability factors, for both electricity and natural gas, for each segment. These averages were used in the final technical potential analysis. Natural gas averages are based on two fewer sources than the electricity counterparts as two sources were electricity-only potential studies. Figure 3 below show average percent savings for electricity for each segment (estimated from seven different sources) which average from a low of 2.9% for Restaurant to a high 5.0% for Higher Education.

**Figure 3. Average SEM Percent Savings by Segment – Electricity**

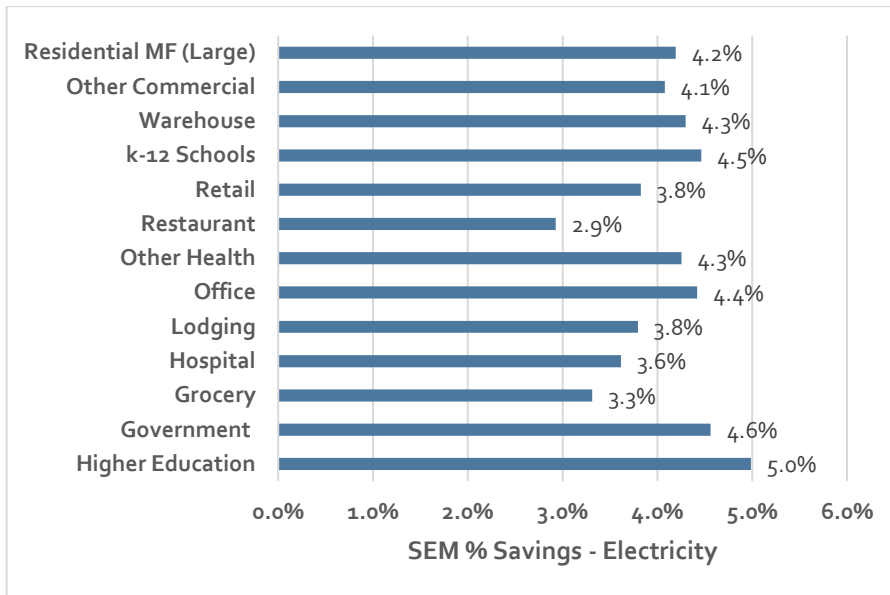
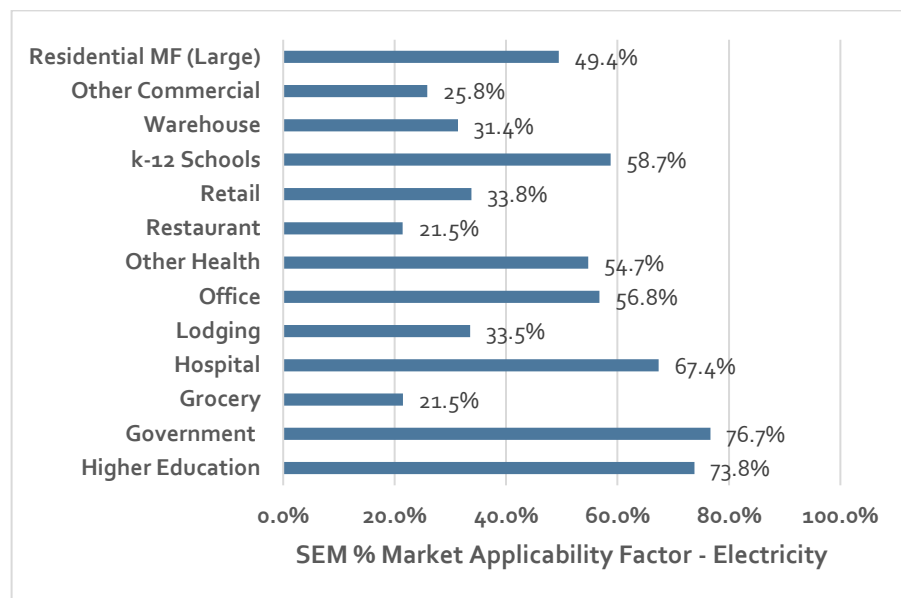


Figure 4 shows average market applicability factors for electricity for each segment (estimated from six different studies) which range from a low of 21.5% for Restaurant and Grocery to a high of 76.7% for Government. As defined earlier, the market applicability factor is meant to represent the percentage of the market where SEM can be implemented or does not already have a SEM-like program implemented. It is the remaining percentage of the market consumption that the savings percentages identified above are suitable to be applied to for technical potential calculations. A higher percentage means that the market segment is a more suitable option for SEM.

**Figure 4. Average SEM Percent Market Applicability Factor by Segment – Electricity**



Natural Gas averages are shown in the two figures below. Figure 5 show average natural gas percent savings for each segment (from five different sources) which range from a low of 2.4% for Grocery and Restaurant to a high of 4.8% for Government.

**Figure 5. Average SEM Percent Savings by Segment – Natural Gas**

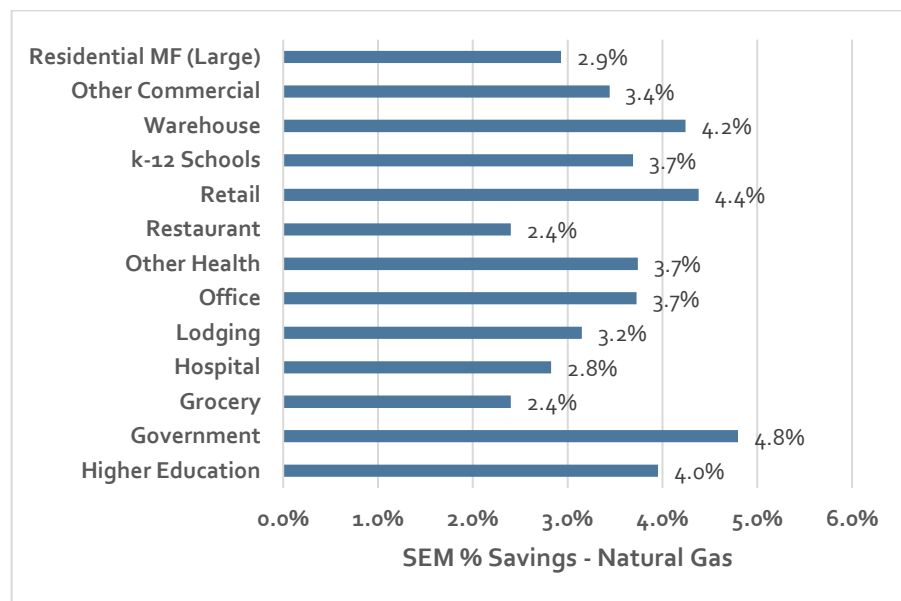
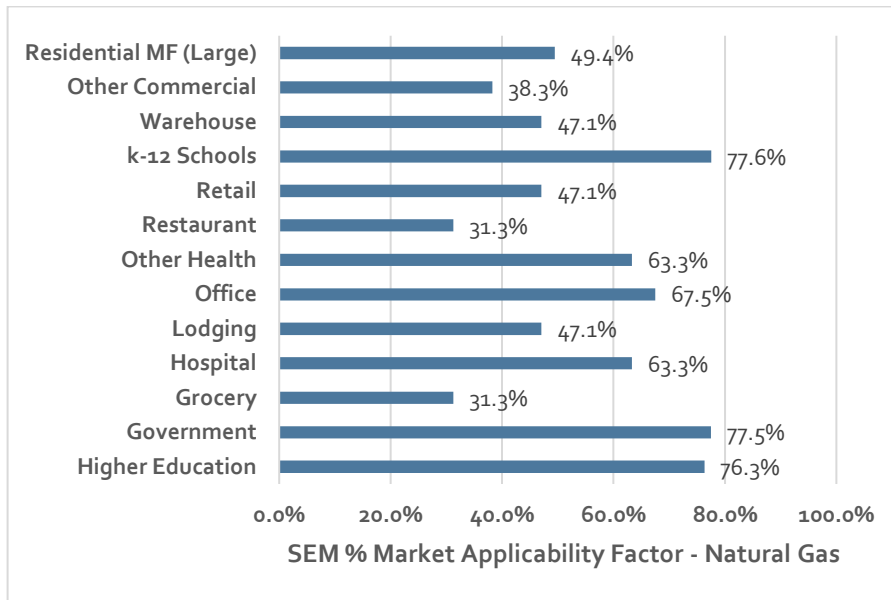


Figure 6 shows average market applicability factors for natural gas (from four different sources) which range from a low of 31.3% for Restaurant and Grocery to a high of 77.5% for Government and 77.6% for k-12 Schools.

**Figure 6. Average SEM Percent Market Applicability Factor by Segment – Natural Gas**



## Technical Potential Results

The final step in the analysis was to calculate technical potential using the savings and market applicability factors derived from the research and overall segment level consumptions from the 2023 CA Potential and Goals Study.

### Technical Potential – Electricity

Figure 7 shows the total SEM electric technical potential for each of the 13 Non-Industrial market segments in California. The three largest segments, Large MF, Office, and Hospital, make up nearly 60% of the total technical potential. Other segments that have high savings percentages, such as k-12 Schools and Higher Education, have relatively small overall statewide consumption, resulting in less overall technical potential. By contrast, the Grocery segment has a relatively high total statewide consumption due to high refrigeration loads, but based on the low market applicability factor from the data research, results in a low technical potential number relative to the total consumption of that segment. Total statewide consumption (GWh), applied savings and market applicability factors, and overall estimated technical potential are detailed in Table 4.

**Figure 7. SEM Electric Technical Potential for Non-Industrial Segments in California (GWh)**

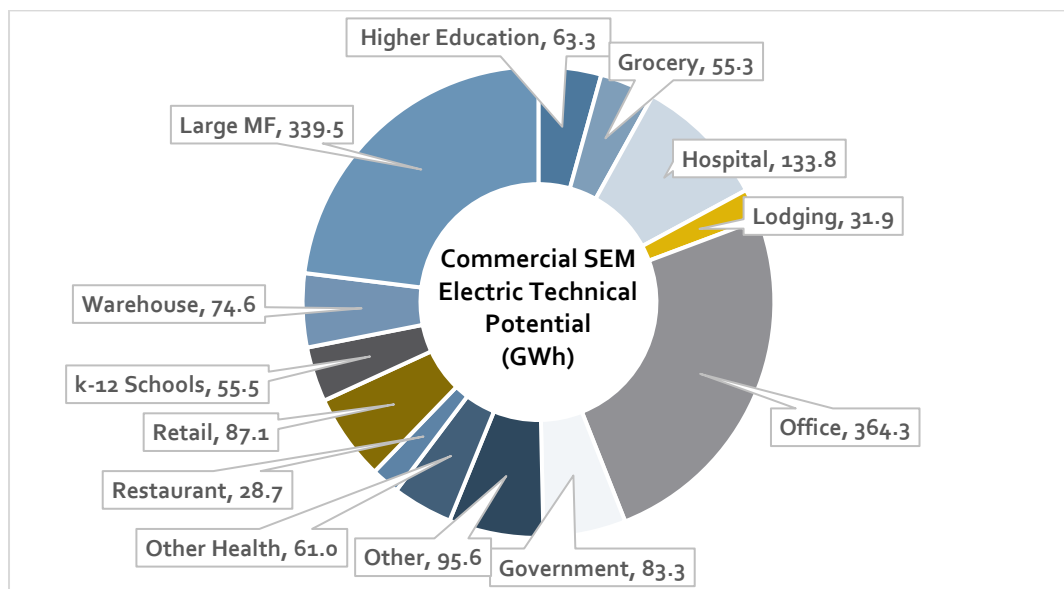


**Table 4. Non-Industrial SEM Technical Potential Inputs and Results – Electricity**

| Segment                          | Statewide Electric Consumption (GWh) | Average Savings % | Market Applicability Factor | Technical Potential (GWh) | Technical Potential (MMBtu) |
|----------------------------------|--------------------------------------|-------------------|-----------------------------|---------------------------|-----------------------------|
| Higher Education                 | 1,719.9                              | 5.0%              | 74%                         | 63.3                      | 216,036                     |
| Government                       | 2,383.4                              | 4.6%              | 77%                         | 83.3                      | 284,390                     |
| Grocery                          | 7,783.6                              | 3.3%              | 21%                         | 55.3                      | 188,849                     |
| Hospital                         | 5,490.4                              | 3.6%              | 67%                         | 133.8                     | 456,405                     |
| Lodging                          | 2,505.5                              | 3.8%              | 34%                         | 31.9                      | 108,762                     |
| Office                           | 14,524.0                             | 4.4%              | 57%                         | 364.3                     | 1,243,101                   |
| Other Health                     | 2,618.5                              | 4.3%              | 55%                         | 61.0                      | 208,028                     |
| Restaurant                       | 4,569.2                              | 2.9%              | 21%                         | 28.7                      | 97,899                      |
| Retail                           | 6,738.8                              | 3.8%              | 34%                         | 87.1                      | 297,322                     |
| k-12 Schools                     | 2,115.8                              | 4.5%              | 59%                         | 55.5                      | 189,269                     |
| Warehouse                        | 5,530.9                              | 4.3%              | 31%                         | 74.6                      | 254,534                     |
| Other Commercial                 | 9,073.0                              | 4.1%              | 26%                         | 95.6                      | 326,231                     |
| Residential Multifamily (Large)  | 16,379.5                             | 4.2%              | 49%                         | 339.5                     | 1,158,338                   |
| <b>Total Savings / Average %</b> | <b>81,432.7</b>                      | <b>4.1%</b>       | <b>47%</b>                  | <b>1,473.9</b>            | <b>5,029,165</b>            |

## Natural Gas Technical Potential

Figure 8 below shows the overall total SEM Natural Gas technical potential for each of the 13 non-industrial market segments in California. The three largest segments, Large MF, Office, and Other

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Commercial<sup>32</sup>, make up nearly 60% of the total natural gas technical potential. Large MF and Office have high market applicability factors while Other Commercial has a low market applicability factor but results in a high potential due to the significant natural gas consumption within that segment. Total statewide consumption (MMTherms), applied savings and market applicability factors, and overall estimated technical potential are detailed in

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<sup>32</sup> The “Other Commercial” segment includes a variety of different commercial buildings that do not fit within the other commercial segments including, but not limited to: Museums, Libraries, Police Stations, Fire Stations, Prisons, Gas Stations, Churches, Theaters, and Recreational Facilities. *Source 2006 CEC CEUS, Appendix J.*

[https://www.calmac.org/publications/CEC\\_CEUS\\_Appendices\\_C\\_to\\_J\\_03012006.pdf](https://www.calmac.org/publications/CEC_CEUS_Appendices_C_to_J_03012006.pdf)

Table 5.

**Figure 8. SEM Natural Gas Technical Potential for Non-Industrial Segments in California (MMTherms)**

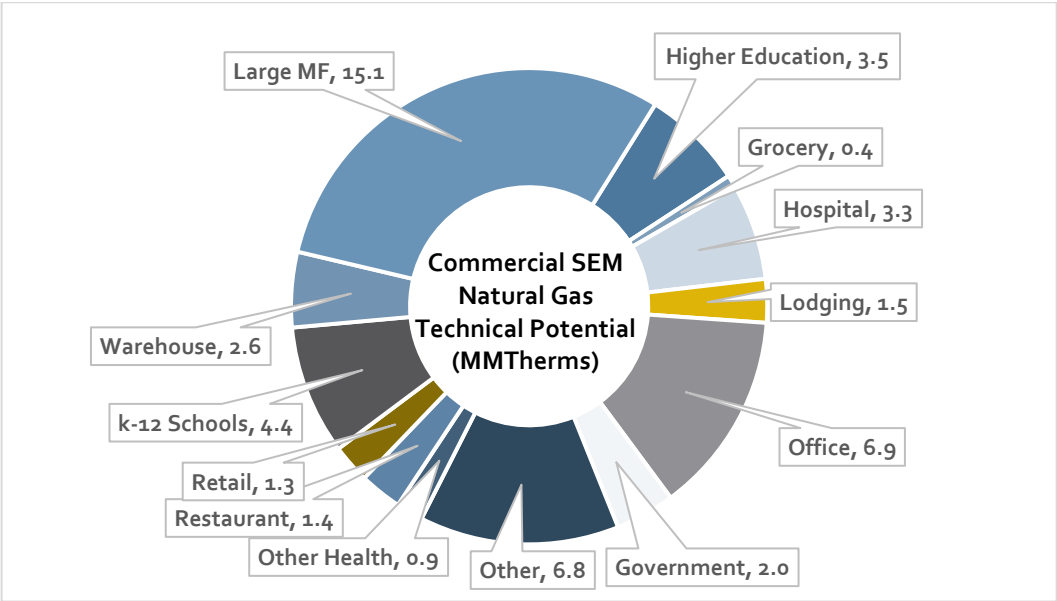


**Table 5. Non-Industrial SEM Technical Potential Inputs and Results – Natural Gas**

| Segment                           | Statewide Natural Gas Consumption (MMTherms) | Average Savings % | Market Applicability Factor | Technical Potential (MMTherms) | Technical Potential (MMBtu) |
|-----------------------------------|----------------------------------------------|-------------------|-----------------------------|--------------------------------|-----------------------------|
| Higher Education                  | 114.6                                        | 4.0%              | 76%                         | 3.5                            | 345,775                     |
| Government                        | 54.5                                         | 4.8%              | 78%                         | 2.0                            | 202,659                     |
| Grocery                           | 58.7                                         | 2.4%              | 31%                         | 0.4                            | 44,013                      |
| Hospital                          | 181.7                                        | 2.8%              | 63%                         | 3.3                            | 325,201                     |
| Lodging                           | 99.9                                         | 3.2%              | 47%                         | 1.5                            | 148,115                     |
| Office                            | 273.9                                        | 3.7%              | 68%                         | 6.9                            | 689,047                     |
| Other Health                      | 38.8                                         | 3.7%              | 63%                         | 0.9                            | 91,849                      |
| Restaurant                        | 192.3                                        | 2.4%              | 31%                         | 1.4                            | 144,255                     |
| Retail                            | 63.5                                         | 4.4%              | 47%                         | 1.3                            | 130,913                     |
| k-12 Schools                      | 153.7                                        | 3.7%              | 78%                         | 4.4                            | 440,161                     |
| Warehouse                         | 128.2                                        | 4.2%              | 47%                         | 2.6                            | 256,170                     |
| Other Commercial                  | 515.4                                        | 3.4%              | 38%                         | 6.8                            | 679,172                     |
| Residential Multifamily (Large)   | 1044.2                                       | 2.9%              | 49%                         | 15.1                           | 1,513,568                   |
| <b>Total Savings / Average %s</b> | <b>2,919.2</b>                               | <b>3.5%</b>       | <b>55%</b>                  | <b>50.1</b>                    | <b>5,010,897</b>            |

## Comments and Caveats on Technical Potential Estimates

This technical potential analysis is intended to be a high level, directional analysis only and should not be used for goal or target setting. The Study Team has intentionally not included achievable market potential for this reason. Given budget and timeline constraints, only publicly available energy efficiency potential studies and conservation potential assessments were used to augment data provided directly to the team from implementors.

The team also acknowledges differences in methodologies for all the studies sourced in this analysis and has taken care to align the proper technical potential inputs from each study as best as possible. However, misinterpretation or misapplication of inputs may still be present and is a limitation of this analysis. In addition, many studies included commercial SEM when it was in its infancy as a program offer, and the Study Team cannot address the strength of the data inputs found in these analyses.

Given the uncertainty of some technical potential inputs, specifically related to the market availability / applicability factors, this technical potential analysis is simply meant to show an estimate of overall size and possible amount of SEM energy savings potential in the non-industrial market segments considered. Further detailed analyses of overall market potential should be completed through future CPUC's Potentials and Goals studies.

## Data Sources

Appendix D includes a list of the data sources used in developing estimates of technical potential savings for the 13 non-industrial segments considered in the analysis.

## Characteristics of “Good” SEM Candidates

Chapter 5 presents information on characteristics of SEM candidates that make them very likely to succeed when participating in a SEM program. This information was gathered through interviews with SEM Subject Matter Experts (SMEs), from information on successful non-industrial SEM programs compiled in the Literature Review (Appendix A), and from input gathered from North American SEM Collaborative (NASMEC) members at several quarterly and leadership meetings.

These characteristics served as the basis for evaluating non-industrial segments in terms of the third SEM Success Factor defined in Chapter 2: *Availability of “Good” SEM Candidates: Level of motivation, engaged business culture, and available resources to make a long-term commitment to SEM* (see Figure 1).

The information gathered by the Study Team points to what a large number of SEM SMEs noted as the most important customer characteristics in predicting a successful participation in SEM programs. These characteristics relate to four key areas of focus in an organization:

- Motivation to participate in a SEM program,
- An Engaged business culture aligned with SEM activities,
- Available resources to implement the SEM program, and
- Publicly available information on the organization’s key characteristics

The presence of each of these characteristics points to “Good” SEM candidates for potential recruitment. While each characteristic is important individually, when combined they provide indication about organizations with potentially high propensity towards successful SEM implementation within a market segment and/or SEM cohort. We describe these characteristics in more detail below.

### Motivation to Participate

The Study Team found that organizational motivation and will to participate in SEM is paramount to a successful SEM engagement. A highly motivated organization typically is able to drive behavior and cultural changes that highly impact overall SEM success. Motivational factors to participate in a SEM program can vary significantly according to individual organizations concerns and/or general sector and economic condition concerns.

Among the key drivers that may motivate non-industrial SEM candidates to participate<sup>33</sup> include concerns about costs control, environmental and sustainability goals, competitive advantage, and concerns unique to specific segments, such as health concerns for healthcare facilities<sup>34</sup>. Many times, multiple concerns overlap in determining interest in SEM participation, but typically there is one or two major drivers.

We briefly discuss these drivers below. We have combined the cost controls concerns with sustainability and environmental issues into a single discussion topic area -- based on the often-interrelated relationship between these motivational drivers to participation in SEM program efforts.

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<sup>33</sup> Not necessarily in the order of concern.

<sup>34</sup> While these areas of concern were identified as an important part of Study findings, other important areas not listed may also be important drivers for motivating SEM participation.

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**Costs control and Environmental / Sustainability Concerns.** The issue of cost volatility is often a key driver for participation in a SEM effort. Organizations often look for ways to reduce energy costs and can turn to SEM as a comprehensive approach to better understand and control these costs. One example is Hospitals that have very high energy usage and associated costs.

Some commercial organizations, such as Government facilities, have directives to increase energy efficiency in buildings and reduce environmental impacts of greenhouse gas (GHG) emissions at the same time. Higher Education institutions may have energy savings and/or sustainability commitments both at the state level and with internal and external stakeholders (e.g., students, faculty, and parents). SEM aligns well with those directives and commitments and can become a vehicle for their attainment.

K-12 Schools' EE programs have a long history of involving students in energy efficiency savings efforts in California. With Commercial SEM as a "new vehicle" for student and teacher's interest, enthusiasm, and participation, school's SEM programs may have potential for significant additional sustainability focus and energy saving efforts. (See Appendix A for a discussion of TVA's innovative EnergyRight® School Uplift program).

**Competitive Advantage.** Beyond savings and GHG reductions, in some cases, commercial building markets have historically been motivated by property owner and property management efforts to differentiate their "product" through participation in "green" SEM type programs. SEM program benefits support occupant demand for sustainable / environmentally-sound office space and help to increase or sustain occupancy rates by attracting new tenants interested in office space with "green credentials".

**Unique Concerns – Health Concerns for Health Care Facilities.** As a final example, the Health Care sector, and Hospitals in particular, present a clear example of a commercial segment with multiple motivational factors for participation in a SEM effort. Among the motivations for Hospitals' participation in SEM efforts include concerns about healthy building HVAC systems (e.g., ventilation rate and humidity control) and related areas of health concern; a focus on reducing pathogen loads and increasing thermal comfort; and lighting concerns such as illuminance requirements for precision tasks, lighting spectrum issues for night-shift workers, and daylighting to enhance patient recovery and to reduce stress and improve sleep of healthcare patients and providers.

Finally, it is important to note that many SEM SMEs pointed to a possible best practice in recruiting SEM candidates: to regard organizational motivation to participate as a key characteristic of future organizational success as a SEM participant<sup>35</sup>. More than one SME interviewed noted that candidates with low usage and corresponding savings and organizational alignment that may not quite meet current program thresholds but with otherwise suitable characteristics, such as motivation and enthusiasm and an engaged business culture, can be successful SEM participants. Some SEM Implementers are devising creative strategies to integrate these smaller potential participants (both individually and in groups), into larger organization SEM cohorts with similar end-uses and training needs. A potential advantage of this approach was pointed out by one SEM SME who noted that the recruitment of small commercial organizations into larger commercial organizational cohorts has the benefit of both adding more energy savings potential to the program, and leveling out program periods where larger organization savings are in a slow to neutral cycle with amalgamated smaller participant savings.

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<sup>35</sup> See Chapter 6. In the Market Assessment Chapter, each of the three Success Factors are weighted for importance as part of the Delphi Panel scoring process. Success Factor 3's focus on motivation, engaged business culture, and resources received the highest weighting of the three Success Factors with a 45% weight.

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## An Engaged Business Culture

Aside from the above motivation drivers, another important element in an organization's characteristics needed to support a SEM effort is having a business culture that allows SEM activities to easily merge with the other business activities.

While many organizations have an interest in SEM, not all have a business culture that aligns with long-term SEM program success. Some organizations already have business cultures and correspondent operating structures that facilitate long-term SEM participation success; while some organizations' visions are focused on creating more effective internal business operating structures and culture and believe SEM, beyond other motivational benefits (noted above), can help facilitate such a vision; and further, others do not yet have a clear vision of an effective internal organizational structure but believe that SEM program activities and support may help their organization towards meeting their company's business success goals.

Whichever the organizational motivation, some key business culture characteristics that contribute to the success of a SEM engagement include:

**Long-term Business Perspective.** Organizations that have a broad, long-term business and organizational perspectives are likely able to move forward quickly with a SEM effort. Organizations of this type typically are able to provide readily available information, often including baseline raw usage data and other key information, that quickly enable these organizations to move forward into early (and later) SEM implementation steps.

**Engaged Workforce and Organizational Structures.** Organizations that have a business culture that effectively engages with their workforce can leverage this culture and/or "piggyback" on it to drive SEM success. These kinds of organizations tend to thrive as the rigor and collective knowledge brought to bear in a SEM implementation effort match already existing internal organizational structures.

**Methodical Approach to Business.** Organizations that have a methodical approach to their business can more easily allow methodical SEM activities to merge with the business culture. As can be seen from the discussion of Success Factor 1 (Chapter 3), SEM with its base in California's SEM Design and M&V Guides is grounded in ISO 50001 type activities and IPMVP<sup>36</sup> related evaluation practices. These elements of SEM incorporate significant methodical "steps" to complete over the course of a SEM initiative (whether Industrial or non-Industrial). Organizations with methodical business cultures enable this approach and typically do well and some thrive in SEM efforts.

**Engaged Workforce.** Organizations with motivated, available, and engaged personnel can more easily and successfully implement SEM activities. This includes:

- A dedicated and engaged *Executive Sponsor* to provide executive support, leadership, and ensure organization "buy-in".
- A dedicated, hands-on, on-the-ground *Energy Champion* to lead day-to-day SEM activities.
- A team of engaged and dedicated employees (*Energy Team*) in critical roles to support the company's Energy Champion in implementing SEM activities.

SMEs interviewed noted that while not all organizations have all three elements, having executive support and an energy champion to help drive the SEM effort are most important.

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<sup>36</sup> Efficiency Valuation Organization (EVO®) – International Performance Measurement, & Verification Protocol: The IPMVP is a consensus approach to measuring and verifying efficiency investments <https://evo-world.org/en/products-services-mainmenu-en/protocols/ipmvp>.

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## Available Resources

As noted above, successful participation in industrial or non-industrial SEM efforts typically requires a solid organizational commitment from participants. While the benefits to SEM participants are many, the cost of participation is not insignificant and can involve three types of resources:

- Time commitment from executive leadership and other planning team members.
- Financial resources associated with implementing energy upgrades and organizational changes identified through the SEM program.
- Staff resources in terms of Energy Champion and other staff needed to successfully undertake SEM program activities.

Although this particular factor is an important indicator of organizational capability to successfully engage in a SEM effort, from the perspective of those interviewed during this study it is only one of the many key indicators and not one that would keep an otherwise “Good” SEM candidate from participating.

## Publicly Available Information

Potential candidates for whom information about their organizations is publicly available provide SEM Implementers and/or Program Administrators with key SEM data points about the organizations’ potential SEM readiness. This information can assist in SEM recruitment, lowering recruitment costs and increasing the likelihood of early identification of “Good” SEM candidates. Examples of such publicly available information that can be most helpful in identifying “Good” SEM candidates include:

**Sustainability Focus.** A mission statement or other organizational documents that point to an organization’s focus on sustainability provides a clear indication of potential interest in SEM and can identify whether a candidate organization would be a good fit for recruitment to a SEM program.

**Business Plans.** Business plans can often give an indication of the direction in which a firm is heading, provide access to an organization’s mission statement, describe internal operating approaches, and perhaps provide indication of internal organizational culture, internal and external market focus, and related information. Such information provides indications on whether the organization has the required organizational and business culture and available resources.

**Environmental, Social, and Governance (ESG) Plans and Initiatives.** Companies adopting stated ESG objectives typically provide SEM program recruiters with key information needed to reach out to propose a SEM program partnership. While adoption of ESG objectives does not automatically translate into SEM program participation, ESG, in combination with other key motivation factors discussed in this section, can help better understand key factors and issues that may encourage participation in SEM efforts.

**Long-Term Capital Expenditures Plans.** These plans can help identify organizational interest in, for instance, projected future expenditures on energy efficiency and related performance areas of focus, that can provide insight into the candidate organization’s pattern of capital spending that may align with the needs of a long-term SEM effort.

This information allows for the development of a high-level profile, in the form of a SEM Readiness Assessment, of an organization’s interests, capabilities, and resources for participating in a SEM effort. Having this profile information can make the difference between a direct approach to a potential SEM candidate and spending weeks or months to research an organization for which such information is not available. This profile information can also be valuable to understand key participant data factors during the SEM program period.

## Market Assessment

This Chapter presents the results of the market assessment conducted to identify non-industrial segments for expansion of California’s SEM program. To conduct the assessment, the Study Team evaluated each of the non-industrial segments from the perspective of the three SEM Success Factors identified in Chapter 2 and explained in detail in Chapters 3, 4, and 5:

**Success Factor 1: Organizational and Operational Alignment with SEM Implementation Needs and Principles:** *Level of capability to engage and successfully partner in a SEM program.*

**Success Factor 2: Availability of SEM Savings:** Level of savings that could be achieved in the market segment.

**Success Factor 3: Availability of “Good SEM Candidates:** Level of motivation, engaged business culture, and available resources of organizations in the market segment.

### Approach

To conduct the market assessment, the Study Team followed a sequence of steps illustrated in Figure 9 and explained in detail below and in subsequent sections.

**Figure 9. Process Flow for Market Assessment**



Step 1: Develop Non-Industrial Market Segment Profiles for each of the 13 segments.

Step 2: Develop screening criteria, and corresponding weights and values, to evaluate each of the 13 segments in terms of each of the three Success Factors. Develop a scoring tool to conduct the evaluation.

Step 3: Assemble a Delphi Panel of expert non-industrial SEM Implementers and PAs to score each of the segments.

Step 4: Analyze scores provided by the Delphi Panel participants in terms of average scores and rank segments (First Screen).

Step 5: Identify “Best-Fit” Segments based on comments from Delphi Panel members and other SEM SMEs (Second Screen).

### Market Segment Profiles

As described in Chapter 4, the Study Team identified a universe of 13 segments to consider in the Study: 12 commercial segments (*Higher Education, Government, Grocery, Hospital, Lodging, Office, Other Health, Restaurant, Retail, k-12 Schools, Warehouse, and Other Commercial*) and one residential segment (*Residential Multifamily – Large*). The Study Team developed high-level profiles for each of these segments in California. These profiles, presented in Table 6, describe for each segment the types of

buildings typically found, the main end uses of energy, and the electric and gas consumption at the State level.

**Table 6. High-Level Profiles of Non-Industrial Segments in California**

| Segment                                | Profile <sup>37</sup>                                                                                                                                                                                                                                                                                                                 | Statewide Electric Consumption <sup>38</sup> (GWh) | Statewide Natural Gas Consumption <sup>39</sup> (MMTherms) |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|
| <b>Higher Education</b>                | Buildings used for academic or technical classroom instruction. Ventilation and cooling accounts for 42% of energy use and lighting accounts for 35%.                                                                                                                                                                                 | 1,719.9                                            | 114.6                                                      |
| <b>Government</b>                      | Government buildings use 28% of its energy use for cooling & ventilation; lighting & office equipment consume 20% each.                                                                                                                                                                                                               | 2,383.4                                            | 54.5                                                       |
| <b>Grocery</b>                         | Buildings used for retail or wholesale of food. High dependence on refrigeration (roughly 40-60% of energy use).                                                                                                                                                                                                                      | 7,783.6                                            | 58.7                                                       |
| <b>Hospital</b>                        | Buildings used as diagnostics and treatment facilities for inpatient care. Lighting account for 42% of energy use; ventilation/cooling accounts for 30%.                                                                                                                                                                              | 5,490.4                                            | 181.7                                                      |
| <b>Lodging</b>                         | Buildings used to offer multiple accommodations. Lighting and cooling/ventilation account for the highest energy use.                                                                                                                                                                                                                 | 2,505.5                                            | 99.9                                                       |
| <b>Office</b>                          | Buildings used for general office space, professional offices, or administrative offices. For an average office, cooling/ventilation comprise 7%; lighting 28%                                                                                                                                                                        | 14,524.0                                           | 273.9                                                      |
| <b>Other Health</b>                    | Buildings include medical offices/clinics for outpatient care. Cooling/ventilation accounts for 37% of energy use, lighting for 27%, and equipment/computers for 22%.                                                                                                                                                                 | 2,618.5                                            | 38.8                                                       |
| <b>Restaurant</b>                      | Buildings used for selling prepared foods and beverages. Cooking (food preparation) consumes approximately 35% of the energy a restaurant uses, HVAC approximately 28%.                                                                                                                                                               | 4,569.2                                            | 192.3                                                      |
| <b>Retail</b>                          | Buildings used for the sale/display of goods, including malls. In a typical retail building, lighting, cooling, and heating represent about 60% of total use.                                                                                                                                                                         | 6,738.8                                            | 63.5                                                       |
| <b>k-12 Schools</b>                    | Buildings used for academic or technical classroom instruction. Cooling/ventilation accounts for 35% of energy use and lighting accounts for 27%.                                                                                                                                                                                     | 2,115.8                                            | 153.7                                                      |
| <b>Warehouse</b>                       | Buildings used to store manufactured products, merchandise, or personal belongings. Lighting accounts for 30% of energy use. While in refrigerated buildings, refrigeration accounts for 13% of commercial electricity consumption.                                                                                                   | 5,530.9                                            | 128.2                                                      |
| <b>Other Commercial</b>                | Includes a variety of different commercial buildings that do not fit within the other commercial segments, including, but not limited to: Museums, Libraries, Police Stations, Fire Stations, Prisons, Gas Stations, Churches, Theaters, and Recreational Facilities. Space heating accounts for 25% of energy use and computing 22%. | 9,073.0                                            | 515.4                                                      |
| <b>Residential Multifamily (Large)</b> | Buildings with five or more apartments or condominiums. Space heating is the biggest energy use in multifamily buildings.                                                                                                                                                                                                             | 16,379.5                                           | 1,044.2                                                    |

<sup>37</sup> U.S. Energy Information Administration. <https://www.eia.gov/consumption/commercial/data/2018/>

Source 2006 CEC CEUS, Appendix J: [https://www.calmac.org/publications/CEC\\_CEUS\\_Appendices\\_C\\_to\\_J\\_03012006.pdf](https://www.calmac.org/publications/CEC_CEUS_Appendices_C_to_J_03012006.pdf)

<sup>38</sup> 2023 California Potentials and Goals Study, Guidehouse.

<sup>39</sup> 2023 California Potentials and Goals Study, Guidehouse.

## Screening Criteria for First Screen

To develop criteria to evaluate each non-industrial segment from the perspective of each of the three Success Factors, the Study Team first developed a series of questions to assess the suitability of each segment according to each Success Factor. From these questions, the Team developed corresponding screening criteria. Table 7 presents the questions and corresponding criteria for each Success Factor.

**Table 7. Questions and Screening Criteria for each Success Factor**

| Questions to be Addressed                                                                                                                                                                             | Screening Criteria                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Success Factor 1: Availability of Organizational &amp; Operational Alignment with SEM Implementation Needs and Principles</b><br><i>Level of operational capability to implement a SEM program</i> |                                                                                                                                                                                                                |
| <i>Do organizations in this market segment have the ability to?</i>                                                                                                                                   |                                                                                                                                                                                                                |
| Q1: Create a team (could be one person) in charge of energy management that can participate in SEM activities?                                                                                        | 1- Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion.                                                        |
| Q2: Appoint an Executive Sponsor (who can commit staff and financial resources to the SEM engagement)?                                                                                                |                                                                                                                                                                                                                |
| Q3: Appoint a dedicated Energy Champion?                                                                                                                                                              |                                                                                                                                                                                                                |
| Q4: Implement activities needed to comply with the CA SEM Design & M&V Guides? (Either as designed or with minor modifications)?                                                                      | 2- Organizations that have the appropriate structure to implement activities needed to comply with CA Design and M&V Guides.                                                                                   |
| Q5: Have availability of needed data to establish an energy use baseline and create a top-down or bottom-up energy use model (usage data and data on parameters that drive energy use)?               | 3- Organizations with available data to establish energy use baselines and develop models (usage data, and data on parameters that drive energy use).                                                          |
| <b>Success Factor 2: Availability of SEM Savings</b><br><i>Level of savings that could be achieved in the market segment</i>                                                                          |                                                                                                                                                                                                                |
| Q1: Does the market segment have "reasonable" technical potential savings?                                                                                                                            | 4- Annual Technical Potential Savings.                                                                                                                                                                         |
| Q2: Does the segment have organizations with high energy use?                                                                                                                                         | 5- Organizations with high energy use.                                                                                                                                                                         |
| <b>Success Factor 3: Availability of "Good" SEM Candidates</b><br><i>Level of motivation, engaged business culture, and available resources to make a long-term commitment to SEM</i>                 |                                                                                                                                                                                                                |
| <i>Do the organizations in this market segment have?</i>                                                                                                                                              |                                                                                                                                                                                                                |
| Q1: Publicly available information? (e.g., business plans, mission and goals statements)                                                                                                              | 6- Organizations for whom Information is publicly and readily available (business plans, mission and goals statements).                                                                                        |
| Q2: A long-term business and organizational perspective?                                                                                                                                              | 7- Organizations that have a broad / long-term business and organization perspective; a sustainability, business, ESG, or long-term capital expenditures plan; and/or a methodical approach to their business. |
| Q3: The ability to participate in a longer-term SEM initiative?                                                                                                                                       |                                                                                                                                                                                                                |
| Q4: A sustainability, business, ESG, or long-term capital expenditures plan?                                                                                                                          |                                                                                                                                                                                                                |
| Q5: A methodical approach to their business that will enable SEM activities to merge with the business culture?                                                                                       | 8- Organizations with motivation to join and participate in SEM activities.                                                                                                                                    |
| Q6: Interest and enthusiasm to participate in a SEM program?                                                                                                                                          |                                                                                                                                                                                                                |
| Q7: Motivation to join and sustain interest in SEM activities? (e.g., sustainability, health of patients, economic needs to control costs, other)                                                     |                                                                                                                                                                                                                |
| Q8: Financial resources to participate actively in SEM energy saving activities?                                                                                                                      | 9- Organizations that are able to commit time, financial, and staff resources to implement the changes needed as part of the SEM program.                                                                      |

Once the criteria had been developed, the Study Team developed corresponding weights and values for each criterion. The Team relied on input from Implementers and other SEM SMEs to develop the weights and values presented in Table 8.

**Table 8. Screening Criteria Weights and Values**

| Criterion                                                                                                                                                                                                     | Weight (%) | Value          |                   |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|-------------------|-----------------|
|                                                                                                                                                                                                               |            | 1 (Low)        | 2 (Medium)        | 3 (High)        |
| Success Factor 1: Availability of Organizational & Operational Alignment with SEM Implementations Needs and Principles                                                                                        |            |                |                   |                 |
| 1- Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion                                                        | 10         | Very Few       | Some              | Many            |
| 2- Organizations that have the appropriate structure to implement activities needed to comply with CA Design and M&V Guides                                                                                   | 5          | Very Few       | Some              | Many            |
| 3- Organizations with available data to stablish energy use baselines and develop models (usage data, and data on parameters that drive energy use)                                                           | 10         | Very Few       | Some              | Many            |
| Success Factor 2: Availability of SEM Savings                                                                                                                                                                 |            |                |                   |                 |
| 4- Annual Technical Potential Savings                                                                                                                                                                         | 15         | <2% kWh/Therms | 2% - 4% KW/Therms | > 4% kWh/Therms |
| 5- Organizations with high energy use                                                                                                                                                                         | 15         | Very Few       | Some              | Many            |
| Success Factor 3: Availability of "Good" SEM Candidates                                                                                                                                                       |            |                |                   |                 |
| 6- Organizations for whom Information is publicly and readily available (business plans, mission and goals statements)                                                                                        | 5          | Very Few       | Some              | Many            |
| 7- Organizations that have a broad / long-term business and organization perspective; a sustainability, business, ESG, or long-term capital expenditures plan; and/or a methodical approach to their business | 15         | Very Few       | Some              | Many            |
| 8- Organizations with motivation to join and participate in SEM activities                                                                                                                                    | 20         | Very Few       | Some              | Many            |
| 9- Organizations that are able to commit time, financial, and staff resources to implement the changes needed as part of the SEM program                                                                      | 5          | Very Few       | Some              | Many            |

The weights assigned to each criterion reflect the relative importance that Implementers and other SMEs give to each of the Success Factors as shown in Table 9.

**Table 9. Relative Importance of each Success Factor**

| "Success Factor"                                                                                                       | Weight (%) |
|------------------------------------------------------------------------------------------------------------------------|------------|
| Success Factor 1: Availability of Organizational & Operational Alignment with SEM Implementations Needs and Principles | 25         |
| Success Factor 2: Availability of SEM Savings                                                                          | 30         |
| Success Factor 3: Availability of "Good" SEM Candidates                                                                | 45         |

As discussed in Chapter 5, the availability of “Good” SEM Candidates is the most important factor for the success of a SEM program. Having potential for energy savings and organizational and operational alignment with SEM implementation needs contribute almost equally to the success of a SEM program.

## First Screen Results

The Study Team created a Delphi Panel of Implementers with experience implementing successful non-industrial SEM programs in California and other states to help assess and rank the non-industrial segments considered in the Study. The Team developed a scoring tool and asked the six Delphi Panel Participants to score each of the segments using the criteria and corresponding values and weights defined above.

Table 10 and 11 present the average scores for each criterion, each Success Factor, and the total score, as calculated in the scoring tool. Each Panel participant could assign three possible values to each criterion (1=Low, 2=Medium, and 3=High) as described in Table 8 above.

**Table 10. Scoring Results – Average Scores for Higher Education, Government, Grocery, Hospital, Lodging, Office, and Other Health**

| Criterion                                                                                                                                                                                                     | Weight (%)  | Higher Education | Government | Grocery    | Hospital   | Lodging    | Office     | Other Health |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|------------|------------|------------|------------|------------|--------------|
| <b>Success Factor 1 - Availability of Organizational &amp; Operational Alignment with SEM Implementation Needs and Principles</b>                                                                             | <b>25%</b>  | <b>0.7</b>       | <b>0.6</b> | <b>0.5</b> | <b>0.6</b> | <b>0.5</b> | <b>0.5</b> | <b>0.6</b>   |
| 1 Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion.                                                        | 10%         | 3.0              | 2.5        | 1.7        | 2.7        | 1.8        | 2.2        | 2.3          |
| 2 Organizations that have the structure to implement activities needed to comply with CA Design and M&V Guides.                                                                                               | 5%          | 2.8              | 2.5        | 1.8        | 2.3        | 2.0        | 1.8        | 2.0          |
| 3 Organizations with available data to establish energy use baselines and develop models (usage data, and data on parameters that drive energy use).                                                          | 10%         | 2.5              | 2.5        | 2.2        | 2.3        | 2.2        | 2.0        | 2.2          |
| <b>Success Factor 2: Availability of SEM Savings</b>                                                                                                                                                          | <b>30%</b>  | <b>0.9</b>       | <b>0.7</b> | <b>0.6</b> | <b>0.8</b> | <b>0.6</b> | <b>0.6</b> | <b>0.6</b>   |
| 4 Annual technical potential savings                                                                                                                                                                          | 15%         | 2.8              | 2.5        | 2.0        | 2.5        | 1.7        | 2.3        | 2.2          |
| 5 Organizations with large energy use                                                                                                                                                                         | 15%         | 2.8              | 2.3        | 2.2        | 2.8        | 2.0        | 1.8        | 1.5          |
| <b>Success Factor 3: Availability of "Good" SEM Candidates</b>                                                                                                                                                | <b>45%</b>  | <b>1.3</b>       | <b>1.2</b> | <b>0.8</b> | <b>1.0</b> | <b>0.9</b> | <b>0.8</b> | <b>0.7</b>   |
| 6 Organizations for whom Information is publicly and readily available (e.g., business plans, mission and goals).                                                                                             | 5%          | 3.0              | 2.7        | 1.7        | 2.5        | 1.8        | 1.5        | 1.5          |
| 7 Organizations that have a broad / long-term business and organization perspective; a sustainability, business, ESG, or long-term capital expenditures plan; and/or a methodical approach to their business. | 15%         | 2.8              | 2.5        | 1.8        | 2.2        | 2.2        | 1.8        | 1.7          |
| 8 Organizations with motivation to join and participate in SEM activities.                                                                                                                                    | 20%         | 3.0              | 2.7        | 1.7        | 2.3        | 2.2        | 1.8        | 1.5          |
| 9 Organizations that are able to commit time, economic, and staff resources to implement the changes needed as part of the SEM program.                                                                       | 5%          | 2.7              | 2.3        | 1.8        | 2.3        | 1.8        | 1.8        | 1.8          |
| <b>Total Score</b>                                                                                                                                                                                            | <b>100%</b> | <b>2.9</b>       | <b>2.5</b> | <b>1.9</b> | <b>2.5</b> | <b>2.0</b> | <b>1.9</b> | <b>1.8</b>   |

**Table 11. Scoring Results – Average Scores for Restaurant, Retail, k-12 Schools, Warehouse, Other Commercial, and Residential Multifamily.**

| Criterion                                                                                                                                                                                                     | Weight (%)  | Restaurant | Retail     | k-12 Schools | Warehouse  | Other Commercial | Residential Multifamily |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|------------|--------------|------------|------------------|-------------------------|
| <b>Success Factor 1 - Availability of Organizational &amp; Operational Alignment with SEM Implementation Needs and Principles</b>                                                                             | <b>25%</b>  | <b>0.4</b> | <b>0.5</b> | <b>0.6</b>   | <b>0.5</b> | <b>0.5</b>       | <b>0.5</b>              |
| 1 Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion.                                                        | 10%         | 1.5        | 1.8        | 2.5          | 2.2        | 1.8              | 2.2                     |
| 2 Organizations that have the structure to implement activities needed to comply with CA Design and M&V Guides.                                                                                               | 5%          | 1.7        | 1.8        | 2.3          | 2.2        | 1.7              | 1.7                     |
| 3 Organizations with available data to establish energy use baselines and develop models (usage data, and data on parameters that drive energy use).                                                          | 10%         | 2.0        | 2.2        | 2.5          | 2.2        | 1.8              | 1.8                     |
| <b>Success Factor 2: Availability of SEM Savings</b>                                                                                                                                                          | <b>30%</b>  | <b>0.4</b> | <b>0.5</b> | <b>0.8</b>   | <b>0.6</b> | <b>0.6</b>       | <b>0.6</b>              |
| 4 Annual technical potential savings                                                                                                                                                                          | 15%         | 1.5        | 2.2        | 2.8          | 2.2        | 2.2              | 2.3                     |
| 5 Organizations with large energy use                                                                                                                                                                         | 15%         | 1.2        | 1.3        | 2.3          | 1.8        | 1.7              | 1.7                     |
| <b>Success Factor 3: Availability of "Good" SEM Candidates</b>                                                                                                                                                | <b>45%</b>  | <b>0.5</b> | <b>0.7</b> | <b>1.2</b>   | <b>0.7</b> | <b>0.7</b>       | <b>0.8</b>              |
| 6 Organizations for whom Information is publicly and readily available (e.g., business plans, mission and goals).                                                                                             | 5%          | 1.0        | 1.7        | 2.7          | 1.2        | 1.5              | 1.7                     |
| 7 Organizations that have a broad / long-term business and organization perspective; a sustainability, business, ESG, or long-term capital expenditures plan; and/or a methodical approach to their business. | 15%         | 1.2        | 1.7        | 2.5          | 1.7        | 1.7              | 1.7                     |
| 8 Organizations with motivation to join and participate in SEM activities.                                                                                                                                    | 20%         | 1.2        | 1.5        | 3.0          | 1.5        | 1.7              | 1.8                     |
| 9 Organizations that are able to commit time, economic, and staff resources to implement the changes needed as part of the SEM program.                                                                       | 5%          | 1.3        | 1.3        | 2.5          | 1.7        | 1.7              | 1.7                     |
| <b>Total Score</b>                                                                                                                                                                                            | <b>100%</b> | <b>1.4</b> | <b>1.7</b> | <b>2.6</b>   | <b>1.8</b> | <b>1.8</b>       | <b>1.9</b>              |

## Total Score Results

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Table 12 shows the Total score calculated for each Delphi Panel member as well as the average score for each segment. The segments are presented in ranking order from the segment with the highest average score to that with the lowest.

**Table 12. Total Score Results – Segments Ranked Based on Total Average Score  
(Total Scores: 1-Low, 2-Medium, 3-High)**

| Non-Industrial Segment | Total Score |         |         |         |         |         | Average Score |
|------------------------|-------------|---------|---------|---------|---------|---------|---------------|
|                        | Score 1     | Score 2 | Score 3 | Score 4 | Score 5 | Score 6 |               |
| 1. Higher Education    | 2.9         | 2.9     | 2.7     | 3.0     | 2.9     | 2.8     | 2.9           |
| 2. k-12 Schools        | 2.3         | 2.7     | 2.9     | 3.0     | 2.7     | 2.3     | 2.6           |
| 3. Government          | 2.1         | 2.9     | 2.4     | 3.0     | 2.8     | 2.0     | 2.5           |
| 4. Hospital            | 2.1         | 2.6     | 2.3     | 2.6     | 2.6     | 2.7     | 2.5           |
| 5. Lodging             | 1.6         | 1.9     | 2.5     | 1.9     | 1.8     | 2.5     | 2.0           |
| 6. Office              | 1.8         | 1.8     | 2.2     | 2.0     | 2       | 2.0     | 1.9           |
| 7. Grocery             | 1.3         | 2.2     | 2.2     | 1.3     | 2.3     | 2.2     | 1.9           |
| 8. Res. Multifamily    | 1.4         | 1.6     | 2.5     | 2.3     | 1.6     | 1.9     | 1.9           |
| 9. Warehouse           | 1.5         | 1.8     | 2.3     | 2.0     | 1.6     | 2.0     | 1.8           |
| 10. Other Health       | 1.3         | 1.8     | 2.1     | 2.0     | 2.2     | 1.6     | 1.8           |
| 11. Other Commercial   | 1.7         | 1.0     | 2.3     | 2.0     | 2.3     | 1.5     | 1.8           |
| 12. Retail             | 1.0         | 1.6     | 2.1     | 1.1     | 2.4     | 2.3     | 1.7           |
| 13. Restaurant         | 1.0         | 1.2     | 1.4     | 1.4     | 1.9     | 1.3     | 1.4           |

As can be seen in the table, there is good agreement in the scores assigned by the Delphi Panel members for some of the segments, with almost complete agreement for Higher Education, very good agreement for k-12 Schools, Hospital, and Office, and relatively good agreement for Government, Lodging, Warehouse, and Other Health. However, there is less agreement for the remaining segments, especially for Restaurant, Other Commercial, and Retail.

All segments, except Restaurant, received a score of 2 or more (corresponding to Medium and above) from at least three of the six Panel members and many from four or more Panel members:

- Higher Education, k-12 Schools, Government, and Hospital received scores of 2.1 or higher from all six Panel members and had average scores of 2.5 or higher.
- Lodging, Office, and Grocery received scores of very close to 2 or higher from four of the six Panel members.
- Residential Multifamily, Warehouse, Other Health, Retail, and Other Commercial received scores of very close to 2 or higher from three of the six Panel members.
- Restaurant did not receive any scores of 2 or higher.

Thus, all segments, except Restaurant, were considered by three or more Panel members to have the overall characteristics required to be suitable for a successful SEM program. Higher Education, k-12 Schools, Government, and Hospital were considered to be very suitable for a successful SEM program.

The scores assigned to each segment by each Panel member most likely correlate with their level of success with SEM participants from that segment, and some Panel members probably have more experience with specific segments than others.

## Results for Each Success Factor

Scores calculated for each Delphi Panel member for each of the three Success Factors as well as the average scores for each segment are presented in Appendix E. A comparison of the scores assigned by the Panel members to the Annual Technical Potential Savings criterion with the Annual Technical Potential Savings estimated in Chapter 4 is also presented in the Appendix.

## Ranking Summary

Table 13 shows the segments ranked based on the Total average scores and the average scores for each Success Factor.

**Table 13. Non-Industrial Segments Ranked Based on Average Scores**

| Rank Based on Total Average Score |                     | Rank Based on SF 1 Average Score |                    | Rank Based on SF 2 Average Score |                    | Rank Based on SF 3 Average Score |                    |
|-----------------------------------|---------------------|----------------------------------|--------------------|----------------------------------|--------------------|----------------------------------|--------------------|
| Non-Industrial Segment            | Total Average Score | Non-Industrial Segment           | SF 1 Average Score | Non-Industrial Segment           | SF 2 Average Score | Non-Industrial Segment           | SF 3 Average Score |
| 1. Higher Education               | 2.9                 | 1. Higher Education              | 0.7                | 1. Higher Education              | 0.9                | 1. Higher Education              | 1.3                |
| 2. k-12 Schools                   | 2.6                 | 2. Government                    | 0.6                | 2. Hospital                      | 0.8                | 2. k-12 Schools                  | 1.2                |
| 3. Government                     | 2.5                 | 3. k-12 Schools                  | 0.6                | 3. k-12 Schools                  | 0.8                | 3. Government                    | 1.2                |
| 4. Hospital                       | 2.5                 | 4. Hospital                      | 0.6                | 4. Government                    | 0.7                | 4. Hospital                      | 1.0                |
| 5. Lodging                        | 2.0                 | 5. Other Health                  | 0.6                | 5. Grocery                       | 0.6                | 5. Lodging                       | 1.0                |
| 6. Office                         | 1.9                 | 6. Warehouse                     | 0.5                | 5. Office                        | 0.6                | 6. Office                        | 0.8                |
| 7. Grocery                        | 1.9                 | 7. Office                        | 0.5                | 7. Residential Multifamily       | 0.6                | 7. Grocery                       | 0.8                |
| 8. Residential Multifamily        | 1.9                 | 8. Lodging                       | 0.5                | 7. Warehouse                     | 0.6                | 8. Residential Multifamily       | 0.8                |
| 9. Warehouse                      | 1.8                 | 9. Retail                        | 0.5                | 9. Other Commercial              | 0.6                | 9. Other Commercial              | 0.7                |
| 10. Other Health                  | 1.8                 | 10. Grocery                      | 0.5                | 10. Other Health                 | 0.6                | 10. Other Health                 | 0.7                |
| 11. Other Commercial              | 1.8                 | 10. Residential Multifamily      | 0.5                | 10. Lodging                      | 0.6                | 11. Retail                       | 0.7                |
| 12. Retail                        | 1.7                 | 12. Other Commercial             | 0.5                | 12. Retail                       | 0.5                | 12. Warehouse                    | 0.7                |
| 13. Restaurant                    | 1.4                 | 13. Restaurant                   | 0.4                | 13. Restaurant                   | 0.4                | 13. Restaurant                   | 0.5                |

As can be seen in the table, there is a lot of agreement between the ranking in terms of Total score and the ranking in terms of Success Factor scores.

### **Top Segments: Higher Education, k-12 Schools, Government, and Hospital**

There is complete agreement in the top four segments: Higher Education, k-12 Schools, Government, and Hospital are the top four segments based on Total score as well as on each of the three Success

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Factors' scores. These four segments have the highest overall scores as well as the highest scores in each of the three SEM Success Factors.

### ***Second Tier Segments: Lodging, Office, Grocery, and Residential Multifamily***

There is also a good level of agreement in the next four segments: Lodging, Office, Grocery, and Residential Multifamily. In general, these segments have the second highest overall scores as well as the second highest scores in each of the three SEM Success Factors.

### ***Third Tier Segments: Warehouse, Other Health, Other Commercial, and Retail***

Similarly, there is good agreement in the next four segments: Warehouse, Other Health, Other Commercial, and Retail. These segments have slightly lower scores than the previous group.

### ***Bottom Tier Segments: Restaurant***

Finally, there is complete agreement in the last segment: Restaurant. This segment has the lowest overall score as well as the lowest scores in each of the three SEM Success Factors.

## **Best-Fit Market Segments – Second Screen**

To select those segments that are best suited for SEM expansion in California, the Study Team accounted for the results of the First Screen, the specific comments provided by the Delphi Panel members, as well as the information gathered in the interviews with SEM SMEs.

A summary of the comments provided by the Delphi Panel members and other SEM SMEs on each segment are presented in Appendix E.

From the results of the First Screen and the comments presented in Appendix E, the Study Team identified three categories of segments to consider for SEM expansion in California.

### **Best-Fit Segments: Higher Education, k-12 Schools, Government, and Hospital**

These four segments appear to present the best opportunities for expansion of the SEM program in California. In terms of the scoring results, these segments have the highest Total average scores and the highest average scores for each of the three Success Factors. All six panel members gave these segments the highest scores. These four segments have:

- The best alignment, organizationally and operationally, with SEM implementations needs and principles and as such potential SEM program participants have the greatest operational capabilities to implement a successful SEM program.
- The highest potential levels of SEM savings.
- Many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to make a long-term commitment to SEM.

#### ***Higher Education***

- This segment has the best alignment, organizationally and operationally, with SEM implementations needs and principles. They are organizationally prepared to take on the business practice development needs of SEM. They generally have a dedicated facility team with the potential to deliver SEM opportunities. They commonly have data and staff with technical expertise who can implement projects and determine savings. However, lack of submetering, sometimes even at the building level, needs to be addressed.
- This segment can potentially achieve a very high level of SEM savings. It has average technical potential savings of 5% for electricity and 4% for natural gas and overall technical potential of

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216,036 MMBtu for electricity and 345,775 MMBtu for natural gas (see Chapter 4). College campuses have many facilities of different types with a diverse load of end uses and equipment; this diversity creates savings opportunities with O&M. Community College buildings in aggregate can also add up; individual buildings, however, do not have that much usage.

- This segment has many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program. Higher Education institutions typically have a more forward thinking set of occupants (students and faculty) with sustainability and environmental goals, and sometimes an interest in being a showcase for sustainability technology (for their students and faculty). Many colleges are public institutions with accompanying level of transparency. They are also often well-capitalized and have a strong interest in the public relations aspect of reducing energy consumption. In addition, they appear to staff their facilities' teams better than other public / nonprofits.
- Higher Education institutions are active participants in BPA's CSEM programs, PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, and MCE's Commercial program.

### **K-12 Schools**

- This segment has very good alignment, organizationally and operationally, with SEM implementations needs and principles. Schools generally have a dedicated facility team with the potential to deliver SEM opportunities. Metering is generally at the building level which is appropriate for this building sector.
- This segment can potentially achieve a very high level of SEM savings. It has average technical potential savings of 4.5% for electricity and 4% for natural gas and overall technical potential of 189,269 MMBtu for electricity and 440,161 MMBtu for natural gas (see Chapter 4). K-12 Schools' energy consumption is concentrated into school districts for whom energy costs represent a large percentage of their operating costs. Large districts can have a lot of usage and a lot opportunity associated with them; however, each school is generally small with low energy savings that need to be aggregated at the district level. The seasonal nature of the building operations also serves to increase SEM potential.
- This segment has many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program. Schools are great for SEM on multiple levels. Most schools are public institutions with accompanying level of transparency. They often have a strong interest in the public relations aspect of reducing energy consumption or may be driven by local mandates to reduce consumption. Their portfolio can also be large and complex which supports the need for SEM. Schools often struggle significantly with resources; even with prop 39 improvements, schools are under-funded and under-managed. This makes this segment a prime candidate for SEM and it is very important to support it. However, state needs to fund the resources needed to support the maintenance. K-12 Schools are very close to Higher Education institutions, with different building "classes" (smaller elementaries, mid-sized middle schools, and large high schools and admin buildings) that may have different engagement (and M&V and technical) approaches. SEM can tie really well into k-12 education and workforce development.
- K-12 Schools are active participants in BPA's CSEM programs, PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, MCE's Commercial program, and TVA's EnergyRight School program.

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## **Government**

- This segment has very good alignment, organizationally and operationally, with SEM implementations needs and principles. Many government-owned facilities have a dedicated facility team with the potential to deliver SEM opportunities. Depending on the agency and its management, government facilities can be very adept at developing business practices, but sometimes they can be mired in their own processes and unable to adapt them to incorporate energy management practices. Facilities may not have the data collection systems ideally suited to SEM.
- This segment can potentially achieve a very high level of SEM savings. It has technical potential savings of 4.6% for electricity and 5% for natural gas and overall technical potential of 284,390 MMBtu for electricity and 202,659 MMBtu for natural gas (see Chapter 4). Government facilities typically have numerous decent-sized buildings with good savings opportunities. However, sometimes there are limited funds to implement projects.
- This segment has many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program. Government facilities typically have more forward-thinking set of building operators who are supporting the city's sustainability goals (among other goals); however, sometimes they don't have the right staff. Many local governments have climate goals and action plans and SEM is a conduit to achieve those goals. Larger government buildings can be great for SEM, including jails, community centers, etc.
- Municipalities and other Government are active participants in PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, MCE's Commercial program, as well as the BPA CSEM program implemented by Tacoma Power, Clark Public Utilities, and Snohomish PUD.

## **Hospital**

- This segment has very good alignment, organizationally and operationally, with SEM implementations needs and principles. Hospitals generally have sophisticated in-house facility teams and good data systems to engage with SEM.
- This segment can potentially achieve a moderate level of SEM savings. It has technical potential savings of 3.6% for electricity and 3% for natural gas and overall technical potential of 456,405 MMBtu for electricity and 325,201 MMBtu for natural gas (see Chapter 4). Hospitals are often large buildings or campuses with a diverse load of end uses and equipment and great savings opportunities. However, sometimes there are constraints that make it hard to realize a large percentage of those savings.
- This segment has many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program. Hospitals are often committed to making the world easier to live in for humans and SEM falls in line with this commitment; in addition, ownership does not changeover frequently and smooth running of the buildings is essential. Most hospitals are publicly traded or non-profits with reporting requirements and are generally well-capitalized and interested in reducing costs. However, Hospitals are sometimes limited in the changes they can make, in the time they have, and they are risk adverse. Health and safety are north stars that may cause more conservative decisions around changing equipment operation. Hospital administrators often encounter difficulties getting buy-in for changes from onsite medical staff.
- Hospitals are active participants in PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, as well as the BPA CSEM program implemented by Tacoma Power, Clark Public Utilities, and Snohomish PUD.

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## Good-Fit Segments: Lodging, Office, Grocery, Residential Multifamily, Warehouse, and Other Health

These six segments can also be viable markets for expansion to California's SEM program with some caveats.

In terms of scoring, these segments have average Total scores very close to 2 or higher (which correspond to Medium and above) and at least three of the six Delphi Panel members (and for many of the segments four or more members) gave them Total scores of 2 or higher. Similarly, they received Medium or above scores from at least three Panel members (and for many of the segments from four or more members) in each of the three Success Factors.

These segments have adequate organizational and operational alignment with SEM implementation needs and principles, have a good level of available savings, and have an adequate amount of "Good" SEM candidates. For these segments, individual facilities are not typically good candidates for a SEM program; multi-site engagements are far more impactful, with participants more able to scale their participation.

### *Lodging*

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Large chains have an advantage in terms of facility staffing able to take on Energy Champion and Executive Sponsor roles, while most independents or franchisees will struggle. Staff are often focused almost solely on operating their hotel; however, if the hotel is part of a larger organization and there is a regional / national person that is sustainability / energy lead, gains can be made. Hotels often have good data availability and people who can access said data.
- This segment can potentially achieve a moderate level of SEM savings. It has technical potential savings of 3.8% for electricity and 3% for natural gas and overall technical potential of 108,762 MMBtu for electricity and 148,115 MMBtu for natural gas (see Chapter 4). Consumption is spread across a large number of organizations / buildings. These organizations focus primarily on occupancy comfort and HVAC is often managed by transient tenants. An average hotel has decent savings and consumption; however, bottom lines and stakeholders are focused on numbers not savings. Focus on tenant comfort may restrict willingness to pursue some operational updates.
- This segment has some "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program. At the corporate and individual site level, lodgings have motivation and public relationship interests that make them good SEM candidates. SEM can integrate previous "green" and "water saving" campaigns and business practices; a lot of lodging has done well with "green" campaigns. Larger chains will be more likely to want to participate than small chains or independents, who will have less access to capital and a shorter investment timeframe.
- Large Hospitality facilities are active participants in Energy Trust's Commercial and Institutional SEM program, as well as the BPA CSEM program implemented by Tacoma Power, Clark Public Utilities, and Snohomish PUD.

### *Office*

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. There is a wide disparity in the ability of office staff to engage with SEM activities, hindered by owner / occupant issues. Data are available if local site staff are in charge of systems; a dedicated operator is not always in place.

- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 4.4% for electricity and 4% for natural gas and overall technical potential of 1,243,101 MMBtu for electricity and 689,047 MMBtu for natural gas (see Chapter 4). Large office buildings may have sufficient owner-controlled load to participate in SEM and some large tenants may likewise have enough load, but many sites will struggle with the split incentive issue.
- This segment has some "Good" SEM Candidates. This segment has a mix of large and small organizations. Split incentive is a hurdle as the vast majority of sites are leased and lease terms often put energy cost on the plate of the tenant rather than the building owner. Most office spaces are managed by property management companies that have specific bottom lines to hit and stakeholders to answer to. Commercial Real Estate (i.e., rented space, vis-à-vis property management companies) are more difficult to gain buy-in than owner-occupied office buildings.
- Property managers are active participants in PSE's CSEM program.

### ***Grocery***

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Grocery is a fairly consolidated industry where large and even regional chains generally have dedicated facilities staff. However, sales come first and depending on corporate or site engagement, availability of staff to participate in SEM may be limited. The key exception is if there is a national / regional lead for sustainability / energy. A one-off site may not have the people and data to be successful, a corporate team can provide much of the organizational needs with individual sites supplying local expertise and data.
- This segment can potentially achieve a moderate level of SEM savings. It has technical potential savings of 3.3% for electricity and 2% for natural gas and overall technical potential of 188,849 MMBtu for electricity and 44,013 MMBtu for natural gas (see Chapter 4). On its own, each site does not have that much usage; however, working with a chain of multiple stores can increase usage and savings.
- This segment has some "Good" SEM Candidates. Most large grocery chains are publicly traded and are motivated by competitive advantage from lower energy spend, which represents a higher portion of costs than for most other commercial enterprises. Most organizations are also interested in the Public Relations aspect of energy savings.
- Large Grocery stores are active participants in Energy Trust's Commercial and Institutional SEM program, as well as the BPA CSEM program implemented by Tacoma Power, Clark Public Utilities, and Snohomish PUD.

### ***Residential Multifamily***

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Often housing organizations don't have the right leadership or tools to participate well in a SEM program. Often the facility operations are outsourced. Large multifamily will have data and onsite staff with knowledge to support SEM.
- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 4.2% for electricity and 3% for natural gas and overall technical potential of 1,158,338 MMBtu for electricity and 1,513,568 MMBtu for natural gas (see Chapter 4). Potential savings can be found in common areas as well as in units; however, capital funding can be a challenge.
- This segment has some "Good" SEM Candidates. Private ownership is the norm in Residential Multifamily buildings with associated limited information. Split incentives decrease interest and ability to pursue energy savings. Publicly-owned housing typically has a public mission and

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commitment to meeting sustainability standards. Multifamily facilities are often part of progressive organizations, making them open to solutions that make them more sustainable and/or that support their occupant engagement.

- PSE's Multifamily SEM program is open to all multifamily; however, the program has found that Senior Residencies are not a good fit for SEM. Energy Trust's Commercial and Institutional SEM program includes a focus on affordable housing facilities.

### ***Warehouse***

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Warehouse has a mix of large and small organizations with varied facility staffing. Site staff are knowledgeable and data available, but staff might not be available to support a SEM program. Engaging warehouses that are part of large chains / companies where their leadership can be leveraged can have good results.
- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 4.3% for electricity and 4% for natural gas and overall technical potential of 254,534 MMBtu for electricity and 256,170 MMBtu for natural gas (see Chapter 4). For refrigerated warehouse there can be major savings. Even for non-refrigerated (but still air conditioned) warehouses there can be great opportunities.
- This segment has some "Good" SEM Candidates. Private ownership is the norm with associated limited information. With the exception of refrigerated warehouses, energy costs are not a significant motivator for business. With that, these organizations may have limited commitment to organizational business planning for energy.

### ***Other Health***

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Other Health is fairly consolidated and organizations have facility staffing capacity. Small healthcare facilities may not have knowledgeable staff available or the needed data to engage with SEM. But if there is a national / regional sustainability person that can be leveraged, good results can be obtained.
- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 4.3% for electricity and 4% for natural gas and overall technical potential of 208,028 MMBtu for electricity and 91,849 MMBtu for natural gas (see Chapter 4). Small facilities have moderate savings opportunities, but if aggregated the savings opportunities can be large.
- This segment may have some "Good" SEM Candidates. Medical Office Buildings (MOBs) are somewhat of a cross between Hospital and Retail; they are often tenant occupied, making engagement and investments challenging.
- Medical buildings are active participants in Energy Trust's Commercial and Institutional SEM program.

### **Other Segments: Other Commercial, Retail, and Restaurant**

These three segments are not as attractive candidates for expansion of California's SEM program. Although, these segments (with the exception of Restaurant) have similar scores to those of the Good-Fit segments, there is extensive disagreement in most of the scores among the Delphi Panel members. In addition, the Panel members specifically commented that these segments present challenges for SEM.

These segments have a sufficient level of available savings, but low organizational and operational alignment with SEM implementation needs and principles and a low amount of "Good" SEM candidates.

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For these segments, as well, multi-site engagements are far more impactful than single-site facilities, with participants more able to scale their participation. Although these segments may not be as attractive as some other segments, individual organizations with multiple sites within these segments can be very good candidates for a SEM program.

### ***Other Commercial***

- Many of the participants in the Delphi Panel did not provide comments on the Other Commercial segment and felt unsure about how to score it.
- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 4.1% for electricity and 3% for natural gas and overall technical potential of 326,231 MMBtu for electricity and 679,172 MMBtu for natural gas (see Chapter 4).
- This segment may have some "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to successfully participate in a long-term SEM program.

### ***Retail***

- This segment has moderate alignment, organizationally and operationally, with SEM implementations needs and principles. Retail has a mix of large and small organizations with varied facility staffing. However, sales come first and depending on corporate or site engagement, availability of staff to participate in SEM may be limited. The key exception is if there is a national / regional sustainability / energy lead.
- This segment can potentially achieve a high level of SEM savings. It has technical potential savings of 3.8% for electricity and 4% for natural gas and overall technical potential of 297,322 MMBtu for electricity and 130,913 MMBtu for natural gas (see Chapter 4). On its own, each site does not have that much usage, however, working with a retail chain of multiple stores can increase usage and savings.
- This segment may have some "Good" SEM Candidates. Split incentives are a hurdle as the vast majority of sites are leased and lease terms often put energy cost on the plate of the tenant rather than the building owner. Box stores and retail often have commitments to sustainability. However, these organizations can be difficult to engage.

### ***Restaurant***

- This segment has inadequate alignment, organizationally and operationally, with SEM implementations needs and principles. These buildings are normally very small and have high turnover. They do not focus on strategic management of their facilities. Sales come first and depending on corporate or site engagement, availability of staff to participate in SEM may be limited.
- This segment can potentially achieve a relatively low level of SEM savings. It has technical potential savings of 2.9% for electricity and 2% for natural gas and overall technical potential of 97,899 MMBtu for electricity and 144,255 MMBtu for natural gas (see Chapter 4). Unless it is a really large restaurant or you look at them in aggregate, this segment has limited savings potential and a small consumption baseline. Based on participation rates in other EE programs, energy savings does not seem to be a priority for most restaurants.
- This segment has very few "Good" SEM Candidates. Restaurant is a low-margin business sector. Low margin businesses are typically tough for SEM, due to their challenges to strategically manage different priorities.

## Ancillary Topics: Issues and Opportunities

This Chapter presents a high-level assessment of what are identified in the Study Research Plan as “ancillary” or “other” topics related to SEM Expansion in California to non-industrial segments. Three topic areas are reviewed in this Chapter:

- Workforce Support
- Implementing SEM in Coordination with Traditional Energy Efficiency (EE) Programs
- SEM SMB / DAC Program Approaches and Possibilities

### Workforce Support

Deployment of a SEM program by a Program Administrator or Program Implementer and achieving active customer participation both require a substantial commitment of human resources to make the program successful. SEM experts repeatedly told us that the level of engagement and pro-activeness of the customer’s Energy Champion and the administrator / implementer’s SEM Coach are the most important determinants of a program’s success. For commercial customers in all market segments, lack of staff available to initiate and shepherd SEM-related actions is often the biggest obstacle to enrollment or performance.

In our research, we learned about several initiatives designed to help energy industry newcomers become SEM specialists, who then help Program Administrators / implementers with program deployment and/or embed with SEM customers to help them participate more effectively. We summarize three of these to illustrate the different approaches these initiatives can take: a service that finds and hires fellows for SEM Program Administrators and participants, a jointly operated utility-implementer SEM internship program, and a SEM participant in-house training position.

### Climate Corps Fellowships

Climate Corps is a non-profit fellowship program at Strategic Energy Innovations (SEI) that provides professional development opportunities for emerging leaders helping them gain real-world expertise in all facets of climate resilience, including energy management and sustainability project implementation. Climate Corps currently places about 150 fellows across the country for each 10-month fellowship cycle. To date, a few of these have specifically been engaged to assist Commercial SEM program participants and program implementation staff.

- SEI tailors fellowship positions to each Partner’s (host organization) needs and then recruits candidates for Partners to interview. SEI serves as the employer for the fellows.
- SEI hosts training for all fellows that helps develop early-career competencies. Fellowships are ordinarily full-time positions lasting about 10 months. Most fellows concurrently pursue professional development and are mentored by the SEI Climate Corps team.
- Program Administrator Partners ordinarily engage fellows for placement at customer sites, expanding the customers’ staff resources, though they may also use fellows to extend their own staff. Partners provide funding to cover the fellows’ stipends. This cost may be shared between the utility and the customer who hosts the fellow on site.

- Fellows may lead sustainability projects, assist with energy management data development, and facilitate SEM projects within Partner organizations.
- SEI mentioned that 85% of fellows are ultimately hired by either the utility or the customer Partner in some energy management capacity.

The fellowship program has evolved through experience. SEI noted that challenges are in identifying the right training pathways and intervention points for each fellow and in finding Energy Centers for training. Keys to successful placement of fellows include:

- Availability and engagement of the site (customer) mentor
- Completeness of training provided by SEI and utility partner

Climate Corps fellowship arrangements vary from host to host. For instance, Climate Corps provides fellows to Puget Sound Energy (PSE) to support PSE's Commercial SEM (CSEM) program. Fellows have been adding staff capacity to help PSE's Commercial customers in municipal, education, healthcare, and banking sectors who seek to participate more fully in PSE's CSEM program. In an arrangement that seems unique, PSE requires that the customer become a CSEM participant to be eligible for a fellow. The fellow may also assist the customer in non-SEM energy management projects or EE programs, such as preparing rebate applications or interfacing between PSE and the customer to scope an incentive project. PSE typically commits to engaging a fellow at a participating customer's site for three years, though this is not a requirement. Over the course of the fellowship, the customer takes on a greater share of funding for the fellow's salary.

## ComEd SEM Internship Program

In 2023, ComEd in Illinois partnered with the company's SEM implementer CLEAResult to provide paid, part-time, summer internship opportunities to college and graduating high school students. The program aims to increase awareness of energy efficiency and teach students how to monitor energy consumption patterns in Commercial, Industrial, and Public Sector facilities

Interns apparently work with CLEAResult's program delivery team to assist in the deployment of ComEd's SEM offering. According to the job posting<sup>40</sup>, interns:

- Complete training that includes learning how to use utility energy usage monitoring tools and how to analyze and interpret energy consumption patterns.
- Assist in monitoring participant's electricity consumption data twice weekly to identify abnormal energy use patterns and events.
- Attend meetings with the SEM coach and SEM program participants.
- Learn how to use, and provide inputs on, tracking and management systems.
- Assist in analysis and projects that help the ComEd SEM program to innovate.
- Have access to learning opportunities to understand the energy efficiency utility programs and SEM.

This type of hands-on internship program both immediately aids SEM participants with their energy tracking and develops future workforce resources, ones with ready skills to become facility energy managers and help utilities and implementers expand SEM delivery to more customers.

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<sup>40</sup> "ComEd Strategic Energy Management (SEM) Internship Opportunity Available," March 22, 2023.

<https://www.bolingbrook.com/index.asp?SEC=28490EF8-B3C9-4503-A4C1-B67E0C2B4B0C&DE=A644ABAE-AF46-45CE-86CA-523AC324D6CD>

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## Portland Community College SEM Associate Position

Portland Community College (PCC) is a participant in Energy Trust of Oregon (Energy Trust)'s Commercial SEM program. The college took it upon themselves to hire and train their own SEM associate. It is possible that Energy Trust partially funds this position since that program does offer participants a financial incentive for an on-site intern. In their April 2022 job posting<sup>41</sup>, PCC offered a position providing the following professional development opportunities, as a part-time job with a one-year commitment:

- Attend monthly SEM operations and organizational calls with the PCC Energy Coaches and the Energy Team.
- Attend Energy Trust's SEM workshops covering continuous improvement best practices and engagement strategies.
- Learn about energy monitoring tracking systems and variables affecting energy use in the commercial sector.
- Become familiar with statistical regression modeling.
- Present accomplishments and findings at the end of the year to the SEM Energy Team and Energy Coach.
- Network with industry professionals and develop a support base for additional learning and career opportunities.
- Have the opportunity to work with Atrius Building Insights and Energy Star Portfolio Manager.
- Participate in implementing aspects of the PCC 2021 Climate Action Plan.
- Participate in professional conferences related to sustainability and energy use.

In addition to providing this training and professional development, PCC cited a number of benefits to the associate, positioning them to become a resource for other energy-or SEM-related jobs, especially in the SEM needs and opportunities in the College market segment. This type of professional development could certainly add to workforce resources for SEM Program Administrators and implementers, as well as customer participants.

## Data Sources

Appendix A includes a list of the data sources used to research Workforce Support efforts.

## Implementing SEM in Coordination with Traditional EE Programs

The *SEM Expansion Study Research Plan*<sup>42</sup> identified an area of Study research related to assessing possible impacts or conflicts, if any, associated with the introduction of SEM efforts into multiple non-industrial market segments where traditional EE programs<sup>43</sup> are being implemented -- each effort with a similar focus on saving energy but with differing programmatic approaches to acquiring the savings.

One example of one such possible impact might be called the "overlap of program impacts," in which the risk of double-counting savings due to dual participation in both an EE program and a SEM program might exist. For example, Program Administrators must take care to prevent situations where an EE

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<sup>41</sup> Portland Community College, "We're Hiring A Strategic Energy Management (SEM) Associate!" job posting April 5, 2022. <https://www.pcc.edu/sustainability/2022/04/05/were-hiring-a-strategic-energy-management-sem-associate/>

<sup>42</sup> SEM Expansion Study Research Plan, p.12.

<sup>43</sup> Traditional EE programs refer to Deemed / Custom and/or NMEC approaches.

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project, using NMEC to measure savings, includes behavior-based measures that are then subsequently included as part of a SEM engagement. Additional concerns expressed by Program Implementers relate to the extent to which current traditional EE programs might play a role in influencing a potential SEM participant. For example, there might be a situation where specific commercial audit recommendations are ultimately included as part of a SEM engagement.

While other options may exist for coordination of SEM program introduction into the Commercial sector and Residential Multifamily segment with its thriving EE program environment, the Study Team developed, based on discussions with key stakeholders, *five potential use cases*<sup>44</sup> to illustrate how SEM can be implemented in coordination with existing EE programs. While not exhaustive, these five use cases, presented in Table 14, represent the range of possible variations of SEM participation and may prove valuable to the SEM stakeholders as they develop rules and guidelines for SEM participation in Commercial segments and in the Residential Multifamily segment.

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<sup>44</sup> These are presented here as “hypothetical cases” in hopes that presentation of these use-cases may help frame future stakeholder considerations of these issues.

**Table 14. Potential Use Cases – Issues and Possibilities**

| Use Cases – Issues and Possibilities<br>Commercial and MF SEM Integration into CA Commercial and MF EE Environments |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Use Case                                                                                                            | Description and Study Team Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1                                                                                                                   | <p><b><i>SEM engagement independent of previous EE project interventions</i></b></p> <p>This is likely to be the most common SEM participation situation. In these cases, there is no risk of participation overlap nor attribution since the end-user hasn't recently participated in EE programs and whatever energy savings that are measured are purely the result of the SEM engagement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2                                                                                                                   | <p><b><i>SEM engagement following EE project intervention</i></b></p> <p>This is a situation where an end-user has completed one or more EE projects using deemed, custom or NMEC M&amp;V methods and would like to proceed with a SEM engagement. This can be done without risk of double-counting and/or attribution resulting from the prior EE intervention if a newly defined baseline - that reflects the inclusion of the savings resulting from the previous EE interventions - is used.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3                                                                                                                   | <p><b><i>SEM engagement in lieu of or prior to EE project intervention</i></b></p> <p>This is a situation where the end-user has been made aware of all their options for energy savings, including both SEM and traditional EE projects but decides to start with the SEM activities. In our discussions with SEM implementation experts, the incorporation of EE capital projects within SEM is a viable alternative. This is in spite of the fact that EE projects happening in California currently incorporate more attractive incentives than the same capital projects within an SEM engagement. However, given the current incentive structure, opportunities for separate EE capital projects would potentially be more attractive. For instance, with SEM BROs-related improvements already in place or in process, customers deciding to pursue an EE capital project at a later date will likely see reduced potential savings due to a reduced baseline built into the EE capital project analysis. Alternatively, in California and elsewhere some customers choose EE project incorporation into SEM as an efficacious "one-stop" approach to integrating EE capital projects at their facilities rather than as separate project offerings. This use case presents opportunity to test customer uptake responses in both cases: i.e., regarding views on incorporating capital projects into SEM and on EE capital projects undertaken separately. We recommend further research be done in this area.</p> |
| 4                                                                                                                   | <p><b><i>SEM engagement simultaneous to EE project intervention</i></b></p> <p>This is a situation where the end-user might have multiple facilities (and thus separate meters) and their EE activities would be separate and distinct from their SEM activities. While this situation is currently permitted if there are separate meters that would independently measure energy consumption, experts noted that such situations are quite rare given the M&amp;V challenges related to the potential for attribution and baseline impacts that would spillover from one meter to another. Future research may be valuable in this arena to determine possible methodologies of mutual SEM and EE project coordination, for instance, in multiple building campus applications. Given these challenges, we believe that this use case, although possible, would not be attractive for end-users.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5                                                                                                                   | <p><b><i>SEM engagement simultaneous to meter-based EE project intervention</i></b></p> <p>This is a situation where SEM and meter-based EE projects would be undertaken simultaneously using the same meter for M&amp;V. Such situations are clearly not feasible given the high likelihood for attribution / influence and ambiguous baseline definitions. While it might be possible to use submetering techniques to fulfill the M&amp;V requirements for the SEM and meter-based EE activities, such situations would likely heighten the risk of attribution and baseline impacts between these two activities. Given these challenges, we do not recommend that such situations be permitted.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## SEM Approaches and Possibilities for SMB and DAC Customers

With Commercial sector customers now eligible for SEM programs, stakeholders have raised long-held concerns about obstacles to EE program participation for small and medium-sized commercial

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businesses (SMB),<sup>45</sup> particularly those located in disadvantaged communities (DAC) throughout California. SMB commercial businesses often are unable to participate in many EE programs due to, among other things, extensive and costly M&V requirements that make it difficult, if not impossible, for these customers to cost-effectively participate. Indeed, many SMB and DAC customers must be focused on ensuring the success of their businesses and don't have the time or resources needed to effectively participate in such programs under the current regulatory rules and guidelines.

In addition, EE Program Implementers find it difficult to work with many small customers because a significant amount of hands-on engagement is needed to comply with the myriad of participation and verification requirements, which ultimately imperil the cost-effectiveness of projects. As a result, many small commercial customers find few opportunities for participating in EE programs and as such are typically left on the sidelines and underserved. This is a particularly acute issue for DAC customers. The Study Team addressed this issue during the discussions with SEM implementers. The greatest concern that SEM implementers expressed was that if the current SEM program M&V requirements were imposed on small commercial customers there would be very little uptake given the high cost to comply. When SEM programs were initially introduced in California (and elsewhere around the country), they were designed to accommodate large customers whose compliance with SEM M&V requirements was not an issue.

**Potential Options:** One possible solution to this dilemma that has been widely discussed by SEM stakeholders since the CPUC's SEM Decision in late 2022, is to accommodate an alternative approach for SEM M&V requirements that would be available exclusively to SMB and DAC customers. This approach is herein referred to as the SEM SMB / DAC program.

The purpose of this section is to address key issues regarding current M&V requirements and propose viable pathways to consider as the state develops rules and guidelines for future commercial sector SEM participants.

## Key Issues

To collect relevant data for this section, the Study Team conducted a series of interviews with key SMEs who have experience implementing, evaluating, administering, and regulating commercial sector EE programs as well as SEM program efforts in California and elsewhere. During interviews, several issues were identified by the SEM experts related to a potential SEM / DAC approach for small Commercial customers. This section spotlights these issues and offers perspectives and potential solutions.

### ***Issue #1 – Cost of SEM M&V is too High for Small Businesses***

If current SEM M&V rules are mandated for all participants, regardless of their size, SEM opportunity might be rendered cost-ineffective from the outset for small participants. This is due to the high cost and specialized expertise required to measure impacts and report results from the SEM actions that are taken.

**Discussion:** Based on the Study Team's discussions with SEM experts, future research needs to focus on allowance for less costly M&V approaches for these customers.

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<sup>45</sup> SMB is often used to refer to organizations that are smaller in size and revenue than large corporations, but larger than microbusinesses or those run by an individual proprietor. <https://www.techtarget.com/whatis/definition/SMB-small-and-medium-sized-business-or-small-and-midsized-business>

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### ***Issue #2 – Erosion of SEM Program Compliance***

Any potential loosening of SEM M&V requirements might lead to an erosion of the core principles of SEM.

**Discussion:** When the Study Team posed this question to the SEM experts, their response was that as long as SEM design principles are maintained in a SEM SMB / DAC program there should be no erosion of SEM program compliance.

### ***Issue #3 – Challenge to Enable SMB and DAC Customer SEM Participation***

Even with the allowance of less costly approaches to M&V to support both implementer and customer cost-effectiveness, motivated customers in these areas have other challenges related to time for executive sponsor and/or energy champion participation and the like.

**Discussion:** In this regard, other solutions such as the provision by PAs of on-site Workforce support to assist customer participation can be considered. Workforce support options and ideas are discussed earlier in this Chapter.

### **Potential Criteria for SEM SMB / DAC Participation**

Several criteria might be considered by the CPUC and SEM stakeholders as they develop an alternative SEM approach for small commercial customers. While this list should not be considered exhaustive, it illustrates a comprehensive range of criteria based on what the Study Team heard from SEM experts when asked about the possibility of an alternative SEM SMB / DAC program.

#### ***Maintain SEM Program Principles and Parameters***

To ensure the success of SEM programs for small commercial participants, it is imperative that any alternative SEM SMB / DAC program maintain the design principles and parameters – as presented in the existing California SEM Design Guide with potential modifications based on the SEM business type.

It is also important, to whatever extent it is practical, that current SEM-based parameters such as NTG and EUL be maintained for a SEM SMB / DAC program. However, if necessary, it might be appropriate to adopt minor adjustments to the stipulated NTG and EUL values for SEM SMB / DAC participants. Such adjustments could be developed and agreed to through stakeholder workshops.

#### ***Develop a Size Threshold for Small Commercial Customers***

It will be important to explicitly spell out what defines small commercial customers. The consensus among the sample of SMEs who provided input on this issue was to use maximum customer electrical demand with a 50kW size threshold, although 50 kW does not align with the definition of "small business customer" adopted by CPUC for use in IOU tariffs, which is 20 kW, as noted in E-4939.

#### ***Use Other Savings Measurement Techniques***

SEM experts have identified several potential measurement tools and techniques that are relatively straight forward and could be used to cost-effectively measure savings associated with a SEM SMB / DAC program. The USEPA's ENERGY STAR Portfolio Manager is a widely accessible interactive energy management tool that allows a user to track and assess energy consumption changes for specific buildings and across an entire building portfolio. Portfolio Manager is being successfully employed as the primary tool to provide energy performance feedback at TVA's Schools SEM pilot and by CSEM-based programs run by utilities in Washington state, such as Puget Sound Energy (PSE), Snohomish PUD, and Seattle City Light.

Another measurement technique that has been identified by stakeholders is to draw upon California's existing framework known as population-based NMEC. This is an energy savings calculation approach in

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which results are based on pre- and post- intervention energy usage data observed at the meter and calculated across a group of sites, rather than a modeled engineering forecast or deemed value (or a site - level metered savings calculation). The current rules for population-based NMEC are set up for traditional EE measures. However, there is no reason why this technique can't be adapted for SEM engagements.

These are just two examples for SEM stakeholders to consider. Indeed, there may be other tools already in use elsewhere that can be adapted for a potential SEM SMB / DAC program.

In conclusion, the Study Team recommends that the CPUC convene a working group to address the basic elements needed to address the M&V issues for a SEM SMB / DAC program approach.

## Conclusions and Recommendations

This Chapter presents recommendations and lessons learned resulting from the research and analysis conducted by the Study Team and based on the information gathered in the Literature Review (Appendix A); interviews with SEM Subject Matter Experts (SMEs) and meetings with the North American SEM Collaborative (Appendix B); the market assessment (Chapter 6); and the research on ancillary topics (Chapter 7).

### Overall Recommendations for SEM Expansion in California

We strongly recommend that California's SEM program is expanded to include non-industrial segments. The Study research shows that California's SEM Industrial Program is ripe for expansion into non-industrial segments. Several factors that contribute to this recommendation include:

- The enthusiasm of many Program Administrators and Implementers to expand SEM,
- The flexibility that the California SEM Design and M&V Guides provide for making the few changes needed to accommodate the needs of other customer segments,
- The Study findings of potentially significant energy savings resulting from the expansion,
- The historical success of non-industrial SEM programs in the Northwest and growing application and success of similar efforts in other states, and
- The fact that in California, MCE is currently implementing non-industrial SEM Programs and other IOUs have issued or are getting ready to issue RFPs for their implementation with the Commission's approval.

More detailed recommendations are presented in the next sub-sections.

### Some Segments as a Whole are More Suitable for Expansion

In the Market Assessment (see Chapter 6), the Study Team identified three groups of non-industrial segments in terms of their suitability to be included in SEM programs. The segments included in each group are presented in Table 15.

**Table 15. Non-Industrial Segments – Suitability for Market Expansion**

| Best-Fit Segments | Good-Fit Segments       | Other Segments   |
|-------------------|-------------------------|------------------|
| Higher Education  | Lodging                 | Other Commercial |
| k-12 Schools      | Office                  | Retail           |
| Government        | Grocery                 | Restaurant       |
| Hospital          | Residential Multifamily |                  |
|                   | Warehouse               |                  |
|                   | Other Health            |                  |

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### ***Best-Fit Segments***

The four Best-Fit Segments appear to present the best opportunities for expansion of the SEM program in California.

- These four segments have the best alignment, organizationally and operationally, with SEM implementations needs and principles and as such potential SEM program participants have the greatest operational capabilities to implement a successful SEM program.
- They can potentially achieve the highest levels of SEM savings.
- They have many "Good" SEM Candidates that can have the motivation, engaged business culture, and available resources to make a long-term commitment to SEM.

### ***Good-Fit Segments***

These six segments can also be viable markets for expansion of California's SEM program with some caveats. These segments have adequate organizational and operational alignment with SEM implementation needs and principles, have a good level of available savings, and have an adequate amount of "Good" SEM candidates.

For these segments, individual facilities are not typically the best candidates for a SEM program; multi-site engagements are far more impactful, with participants more able to scale their participation, than single-site facilities.

### ***Other Segments***

The three segments in the Other Segments group are not as good candidates for expansion of California's SEM program. These segments have a satisfactory level of available savings but low organizational and operational alignment with SEM implementation needs and principles and a low amount of "Good" SEM candidates.

For these segments as well, individual facilities are not typically the best candidates for a SEM program; multi-site engagements are far more impactful, with participants more able to scale their participation, than single-site facilities. Although, as segments, they are not as attractive as some other segments, individual organizations with multiple sites within these segments can be very good candidates for a SEM program.

## **There are no "Bad" Segments – Candidate Characteristics are Key**

Although, the main purpose of this Study was to identify non-industrial market segments best suited for SEM expansion in California, and as indicated above there are some segments that as a whole seem to be best suited for expansion, information gathered throughout the Study indicates that there is not a "bad" segment from the perspective of SEM participation.

As indicated before, the most important factor for SEM success seems to be the characteristics of the potential candidates associated with each of the Success Factors identified in Chapter2 (see Figure 1):

**Success Factor 1:** Organizational and Operational Alignment with SEM Implementation Needs and Principles – *Level of capability to engage and successfully partner in a SEM program.*

**Success Factor 2:** Availability of SEM Savings – Level of savings that could be achieved in the market segment.

**Success Factor 3:** Availability of "Good" SEM Candidates – Level of motivation, engaged business culture, and available resources to make a long-term commitment to SEM.

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Candidates from all segments can have these characteristics and as such are viable candidates for SEM expansion. Most successful non-industrial programs are open to a variety of non-industrial segments.

### **Motivation is the Most Important Characteristic**

Not all Success Factors are equally important in determining which candidates may be more successful in a SEM program. Most of the SMEs interviewed mentioned that while the other two Success Factors are important and necessary key components of the overall SEM success equation, *Success Factor 3* is the one that best predicts the desire to “partner” in and long-term commitment to a SEM program. Many SMEs noted that candidates with low energy usage and corresponding savings and with organizational alignment that may not quite meet current program thresholds but with otherwise suitable characteristics, such as motivation and enthusiasm and an engaged business culture, can be successful SEM participants.

Having motivation to participate, an engaged business culture, available resources, and publicly available information are a very important set of key drivers to SEM engagement success, with having the motivation and interest to participate in the program being the most important characteristic of all. These characteristics provide guidance on SEM recruitment efforts.

### **Capability to Implement SEM Activities is an Important Consideration**

Having organizational and operational alignment with SEM implementation needs and principles (*Success Factor 1*) provides the candidates with the capability to implement the activities required by a SEM effort. In particular, having an engaged and dedicated Executive Sponsor and an engaged, proactive, hands-on Energy Champion to help drive the SEM effort is very important for a successful participation in a SEM program.

However, not all candidates, with motivation and interest to participate in a SEM program, have the availability of staff to appoint an Executive Sponsor and/or an Energy Champion. For commercial customers in all market segments, lack of staff available to initiate and shepherd SEM-related actions is often the biggest obstacle to enrollment or performance.

As described in Chapter 7, SEM administrators in several areas of the country provide Workforce support for SEM either in the form of annual grants to participating SEM organizations (e.g., Energy Trust of Oregon), or through provision of interns / energy fellows to provide the needed start-up staffing for SEM efforts (e.g., Puget Sound Energy, ComEd). These initiatives and others need to be considered to facilitate participation in SEM programs of candidates with strong motivation to participate but lacking the needed staff availability.

### **Availability of SEM Savings is an Important Consideration**

Having enough available savings (*Success Factor 2*) is an important characteristic for potential SEM candidates. SEM savings tend to be a relatively small part of total energy usage. Nonetheless, the technical potential savings estimated by the Study Team (see Chapter 4) and by the Delphi-Panel members indicate that the overall energy savings vary between 2% and 5% among the non-industrial segments considered in this Study (see Table E-3 in Appendix E Table E-316).

Both availability of electricity savings and natural gas savings need to be considered and both are needed for SEM program success. SEM deals with “strategic” energy management and as such, all types of energy used need to be considered and managed. As organizations begin to electrify gas loads it will be more and more important to ensure efficient use of electricity-based equipment and processes.

Some SEM Implementers mentioned that they target organizations with high and diverse energy uses, including multiple buildings, activities, and equipment, that offer more opportunities for savings. However, other Implementers have found that candidates with low energy use, but otherwise suitable

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characteristics related to motivation and engagement, can be successful SEM participants and thus, they use energy use only as a general guideline.

Some SEM Administrators are devising creative strategies to integrate these typically smaller potential participants (both individually and in groups), into larger organization Commercial SEM cohorts with similar end-uses and training needs. A potential advantage of this approach was pointed out by one SEM SME who noted that the recruitment of smaller commercial organizations into larger commercial cohorts has the benefit of both adding more energy savings potential to the program, and leveling out program periods where larger organization savings are in a slow to neutral cycle with amalgamated smaller participant savings. This approach appears to be a fruitful way to enlist smaller organizations while still increasing energy savings.

## California's SEM Design Guide Applies Well to Non-Industrial SEM

Overall, most non-industrial SEM PAs and Implementers that have implemented programs in California or in areas where California's Guide has been used to support local guidance, have found that the Design Guide's principles and requirements apply well to non-industrial SEM programs. These programs deviate from the Guide, in only minor and practical ways, to better address the needs of the specific customer bases (compared with the industrial base addressed in the Guide) and ensure cost-effective delivery. Some of the changes include:

**Incorporate flexibility in the Customer Engagement Period.** Industrial SEM in California is intended as a six-year customer engagement, with a series of activities to be completed in 3-cycles, each two years long. Participation commitment for non-industrial SEM programs outside California varies across programs, with most having a one-to-two-year enrollment with option to renew. None of these programs use the 6-year, 3-cycle model used in California. Some flexibility may be needed when implementing non-industrial SEM programs in California.

**Incorporate flexibility in the development of cohorts.** Single-segment and mixed-segment cohorts each have merit. The make-up of cohorts varies across programs according to the geographic and customer make-up of the service territory.

Small and medium businesses (SMBs) can be looped into cohorts with larger commercial users. This has multiple benefits:

- By mixing larger and small organizations together, cost-effectiveness can be maintained over a longer time period.
- The life of the program can be extended.
- The program provides a high touch, strong customer service approach to smaller customers that may not normally get this type of opportunity.
- The cohort is mixing customers that may be able to move more quickly to implement SEM measures with others that may take longer but see higher savings. This has dual benefits: It helps ensure savings and it helps motivate those that may take longer to move.

**Allow for a hybrid-cohort / 1-1 model for delivery of SEM services.** The Design Guide has the flexibility built in to allow for use of both cohort and 1-1 approaches for delivery of SEM services. Some PAs and Implementers have found that utilizing elements of both approaches increases successful retention of Commercial participants. For example, a participant may be part of a cohort but they may need modification of some of the site-specific activities or their timing, something that the cohort activities (e.g., workshops) does not provide. Using a 1-1 approach to deliver these activities addresses the participant's needs.

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**Incorporate flexibility in the amount and timeline for required SEM activities.** The Design Guide outlines specific number of activities and a specific order and timeline of activities for the Program Implementer and participant to follow (e.g., intro workshop, Treasure Hunt, Energy Plan, Energy Management system development) (see Chapter 3) but also allows flexibility in the implementation of these SEM activities. While these guidelines have proven helpful for industrial SEM, non-industrial organizations often have more variability, even within the same market segment, than Industrial ones. A successful approach has been to work with each candidate to understand their organization and facilities' operations to design and schedule the Guide activities in a way that best suits that organization. Examples include:

- Modifying the order of Treasure Hunts and general workshop of newly enrolled customers so that they become more attuned to their own energy usage before exposure to the full SEM framework.
- Adjusting the scheduling of projects to match “down time” in facility with season operations such as schools and wineries.
- Deliver a workshop as a pair of workshops with each focusing on relevant energy efficiency topic(s) at the request of the varied audience. The intent is to cover at least one topic that is relevant to all participants, regardless of their industry.
- Include more workshops than the Guide specifies, to offer them separately to different stakeholders, such as property owners / managers, maintenance staff, and tenants.
- Incorporate some of the Energy Mapping-related activities into the Opportunities Register activities because energy maps are less relevant to non-industrial facilities.
- Build-in flexibility in the milestone due dates to encourage participation in the program.

## California's SEM M&V Guide Applies Well to Non-Industrial SEM

While the M&V approaches described in California's SEM M&V Guide were written for Industrial SEM programs in the State, the principles and requirements to determine claimable savings seem to apply to most non-industrial SEM program participants.

In fact, BPA's M&V guide addresses both Commercial and Industrial SEM programs and explicitly states that the methods are applicable to both sectors<sup>46</sup> (p. 2). This guide's content is used by a number of other utilities across the country that operate SEM programs. On October 1, 2023 BPA's “Multiyear SEM” offering was launched with an 8-year measure life for industrial and non-industrial SEM programs.<sup>47</sup>

It is beyond the scope of the Study to address issues related to NTG and EUL for SEM programs. However, the Study Team recommends that in light of BPA's change the Commission SEM expansion study currently under way reviews these parameters as part of their effort.

Evaluation reports of Commercial SEM programs in and outside of California all recommend using the same top-down, regression-based modeling approach outlined in California's M&V guide, similarly allowing for use of and end-use or measure-specific bottom-up approach with justification. However, there are some situations where alternatives to the approaches described in California's M&V Guide or

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<sup>46</sup> “Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide—version 1.0,” prepared for BPA by Facility Energy Solutions, Energy 350, Stillwater Energy, March 31, 2022. <https://www.bpa.gov/-/media/Aep/energy-efficiency/evaluation-projects-studies/bpa-sem-persistence-study-report.pdf>

<sup>47</sup> Communication between BPA and the Study Team on October 3, 2023. BPA has updated its SEM Calculator v.8.3 to use the 8-year EUL and is currently updating their entire BPA M&V Protocols library (available at <https://www.bpa.gov/energy-and-services/efficiency/measurement-and-verification>), which will include new energy savings reporting content for the 8-year EUL within the BPA C&I SEM M&V Reference Guide.

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modifications to those approaches may be needed to facilitate participation in non-industrial SEM programs. Some of these alternatives or modifications include:

**Consider flexible approaches for NMEC and/or Custom program participants.** Flexibility is needed in cases where NMEC and/or Custom program participants may wish to participate in SEM program offerings without the risk of double-counting of savings. In Chapter 7, we describe a series of Use Cases with their associated issues and possibilities to address these situations (see Table 14)

**Develop Alternative M&V approaches for SMBs and Disadvantaged Communities (DACs).** When SEM programs were initially introduced in California (and elsewhere around the country), they were designed to accommodate large customers whose compliance with SEM M&V requirements was not an issue. During our interviews with SEM Implementers many of them expressed the concern that if the current SEM program M&V requirements were imposed on small commercial customers there would be very little uptake given the high cost to comply.

One possible solution to this dilemma that has been widely discussed by SEM stakeholders, since the CPUC's SEM Decision in late 2022, is to accommodate an alternative approach for SEM M&V requirements that would be available exclusively to SMB and DAC customers. This SEM SMB / DAC program approach would comply with all current SEM program design requirements and principles but would allow for M&V approaches that are perhaps technically less rigorous than the current industrial SEM M&V requirements. SEM experts have identified a number of potential measurement tools and techniques that are relatively straight forward and could be used to cost-effectively measure savings associated with a SEM SMB / DAC program:

- The USEPA's ENERGY STAR Portfolio Manager is a widely accessible interactive energy management tool that allows a user to track and assess energy consumption changes for specific buildings and across an entire building portfolio. Portfolio Manager is being successfully employed as the primary tool to provide energy performance feedback resulting from SEM programs at a TVA Schools SEM pilot as well as CSEM-based programs run by utilities in Washington state, such as Puget Sound Energy (PSE), Snohomish PUD, and Seattle City Light.
- Another measurement technique that has been identified by stakeholders is to draw upon California's existing framework known as population based NMEC. This is an energy savings calculation approach in which results are based on pre- and post- intervention energy usage data observed at the meter and calculated across a group of sites, rather than a modeled engineering forecast or deemed value (or a site-level metered savings calculation). The current rules for population-based NMEC are set up for traditional EE measures. However, there is no reason why this technique can't be adapted for SEM activities.

We recommend that the CPUC convene a working group to address the M&V issues associated with a SEM SMB / DAC program approach.

## Lessons Learned and Insights

Since the overall objective of this Study was to provide California stakeholders with cogent, actionable insights and recommendations regarding expansion of SEM to new non-industrial market segments, we have compiled a series of lessons learned and insights gathered throughout the course of the Study.

### Insights for Program Administrators

**SEM Focus on Organizational Change.** Utilities and other PAs have extensive experience and success implementing EE programs focused on installation of more efficient "widgets" or one-time fixes to energy using processes. The organizational change focus of SEM Programs provides a significantly different framework for acquiring long-term savings and requires that PAs engage SEM participants more

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deeply and continuously to enroll them and sustain their participation in the program and to guarantee the program success. New program sales approaches may be needed to re-train / re-frame potential SEM candidates' mindsets on how SEM works and its value-add.

As with Industrial SEM programs, PAs approach to SEM participants must be to "Teach Them to Fish".

**SEM "Touchpoint" Value-Add.** A key feature of SEM, beyond its value as a cost-effective energy savings vehicle, is that it provides an additional long-term "touchpoint" with the utility's customers, which in turn increases the opportunity for customer engagement and co-marketing capital expenditures and related EE program offerings, including potential inclusion of IDER and GHG offerings. In addition, many non-industrial PAs and SEM Implementers have found that non-industrial SEM is a gateway to other energy-savings actions, enhancing the performance of other EE programs.

**Program Design Flexibility:** A key point raised in the past by California SEM stakeholders and echoed in this Study's findings, is the need for program design flexibility to fit implementation needs of a variety of customer segments. As one SME noted "Program design needs to be different to meet the entirely different organizational structure and strategic interests of building operators versus manufacturing operators."<sup>48</sup>.

**Riding Customers' "Waves-of-Change".** Long-term SEM efforts require flexibility from PAs to be able to stay with the customers through customers' "waves" of organizational changes or business disruption periods. By providing this "staying power" focus, PAs can help customers that have left the program or have been inactive for some time to return to the program when they are ready. This holds true for "waves" back and forth between, for instance, a customer's focus on capital projects and a focus on low / no cost SEM projects.

## Insights for Program Implementers

**"Meet Them Where They are At."** SEM Implementers need to have the flexibility and skills to be able to meet the customers where they are, overcome challenges, and successfully engage in building a SEM "partnership-for-change" program effort. This is a critical skill set that can make the difference between a long-term customer SEM partner and one that participates in a shorter engagement only.

**Multiple Skills are Required.** SEM Implementers need to possess "hard," technical skills (related to M&V and EE project identification and characterization) and "soft" skills (related to teaching, coaching / facilitating, motivating, and "hand-holding") to help SEM participants find and engage in EE savings opportunities over the life of the SEM effort and beyond. This points to the critical importance of the SEM firm in the success of the overall SEM program process.

As noted above, the multi-variant expertise involved in the successful operation of a SEM engagement requires significant ability to impact behavior and other implementation requirements. We use the term "hand-hold" above, and this captures a little of the flavor of the skill-set needed to bring a SEM effort to successful completion over the long-term period of program implementation.

Often in new and even ongoing SEM efforts, SEM Implementers are required to connect with the site and the customer's team taking into consideration skepticism and capacity constraints. This requires experienced teams with the appropriate skill sets to meet these and other "human" issues related to SEM.

**"Rapid Rewards and Quick-Wins (for Skeptics) Culture."** Because SEM is expected to be implemented in recently opened California commercial and multifamily markets segments, SEM Implementers need to

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<sup>48</sup> CPUC Decision 23-02-002 (February 2023) takes this concern for program design flexibility into account in recognizing the need and directs Commission staff to focus on this issue as part of its future research efforts.

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have the ability to show quick wins to address skepticism on the part of candidates for SEM participation. In addition, SEM Implementers need to have unique skills in overcoming potential customer staff resistance and skepticism to ensure SEM success. These skills may be needed even more in non-industrial market segments where customer education for “new” SEM program efforts will be needed.

## Literature Review

The Study Team conducted a survey of non-industrial programs already in operation across the country and a review of design and M&V guidebooks that have guided the development and delivery of Industrial SEM programs in California and, more recently, non-industrial programs.

SEM programs have been implemented in non-industrial market segments in several utility jurisdictions across the US and Canada. We examined many of them and have included in this review a summary of those programs that illustrate both the different SEM designs and markets served. While some of these programs are already relatively mature, we deliberately also looked at their nascence as this could be instructive to the California Program Administrators aiming to initiate new programs for non-industrial customers. In contrast, the guidebooks we reviewed are the most current ones, providing the most relevant guidance about operating SEM in general and in California specifically.

The Study Team also researched workforce support efforts in California and other States. The findings have been included in Chapter 7 along with other ancillary topics and this Appendix includes a list of the sources of data used to conduct the research.

### Non-Industrial SEM Programs

This review of non-industrial SEM programs includes the following programs:

- Bonneville Power Administration (BPA)'s Commercial Strategic Energy Management Pilot and Utility Programs currently run by Tacoma Power, Snohomish PUD, and Clark Public Utilities.
- Puget Sound Energy (PSE)'s Commercial and Multifamily Strategic Energy Management Program.
- Energy Trust of Oregon's Commercial & Multifamily Strategic Energy Management Programs
- MCE's Non-Residential and Multifamily SEM Programs.
- TVA's EnergyRight® School Uplift Program.

In addition to examining written documents—program plans, evaluation reports, and web pages—pertaining to programs offered by various utilities and agencies, we also consulted with program staff, their implementers, and other SEM experts who have helped shape the evolution of both Industrial and non-industrial SEM programs. We conducted more than a dozen interviews with 30 professionals followed by additional emails to obtain the most up-to-date and detailed information possible.

### BPA's Commercial Strategic Energy Management Pilot and Utility Programs

BPA is among the pioneers who initiated SEM in the Pacific Northwest and has operated an industrial program for well over a decade. The commercial offering (CSEM) is well underway. Starting in 2019, BPA has funded CSEM pilot engagements at two utilities that have followed a model similar to BPA's Industrial SEM program. Building on the pilots' success and experience gained, BPA has modified and expanded CSEM as a full-scale offering, effective April 1, 2022. Unlike the industrial program, the CSEM offering is designed and administered by individual BPA-served utilities. If the utilities want to implement a CSEM program, they need to fund their SEM program's infrastructure and provide their own staff and implementer to operate the program; BPA funds the incentives paid to participating customers. As such,

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the commercial SEM program is considered a measure within BPA's Commercial program, rather than a program of its own.

### ***Target Markets***

BPA's CSEM measure does not limit or target any particular commercial customers. The specific BPA-served utilities determine which customers qualify for participation in their CSEM program.

### ***Program Design and Delivery***

BPA's CSEM is a multi-year engagement, requiring a 2-year minimum customer participation. The intent is for participants to renew and continue ongoing engagement to achieve additional savings. During the pilot phase, BPA informally tested out offering standard and "lite" versions of CSEM, to see if it would attract a broader range of customers and aid retention but found this was not warranted.

The guidelines and requirements for CSEM align with BPA's Industrial SEM program but the support infrastructure is different. Industrial SEM, is administered through BPA's Energy Smart Industrial program in partnership with staff from each participating utility. In CSEM, each utility manages their own recruitment and enrollment and develops their own approach to designing and delivering their SEM program. BPA provides guidance to utilities and offers a profile of conditions that make for successful customer participation. These conditions are stated for utilities and customers (or anyone) to see in BPA's on-line SEM FAQ sheet<sup>49</sup>. In general, according to the stated conditions, successful organizations are those that have clear support from executive leadership, designate an energy champion to lead the implementation, and are willing to consider new methods and procedures to improve energy performance and reduce costs. Among the desirable organizational characteristics that make successful SEM candidates, include:

- Sufficient energy savings potential to warrant the required investment of program resources.
- Previous implementation of a custom project, lighting project or UES measure(s).
- Supportive management with the ability to form and articulate a connection between energy and a strategic business objective (e.g., sustainability, cost reduction, employee development).
- Recent success implementing continuous improvement in another aspect of the business (e.g., safety, quality, cost, lead-time).
- No major changes (organizational, process or structural) within the past or next 12 months (e.g., mergers/bankruptcy, new process loads, additions to the facility).
- A collaborative organizational culture, with recent examples of cross-functional initiatives involving operations-level personnel.
- Continuous learning and professional development are highly valued.

Each BPA-served utility determines their own CSEM eligibility criteria, measures, and participant requirements. For example,

- **Tacoma Public Utilities**, which serves a largely urban population, generally targets businesses with facilities that use more than 1 million kWh per year and encourages participants to share learning experiences with other participants in their cohort. CSEM-eligible savings are focused on non-capital measures. While program eligibility is not restricted to any particular market segment, most recently,

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<sup>49</sup> <https://www.bpa.gov/-/media/Aep/energy-efficiency/industrial/Industrial-files/ci-sem-faq.pdf>

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recruitment has focused on university and hospital segments and market-specific cohorts have been created. The utility handles most of its own M&V activities, reporting results to BPA.

- **Clark Public Utilities**, which serves a combination of suburban and rural populations, recruits participants based more on a specific customer's suitability criteria than any specific market segment. Accommodating customers of varied sizes and characteristics, cohorts tend to be comprised of different types of customers often in a similar stage of CSEM participation. The program design accommodates varying degrees of activity that encourages continuing participation and collaboration across cohorts. CSEM-eligible savings are targeted to non-capital measures. Cohorts may be mixed-segment or segment-specific. The utility works in partnership with BPA on most M&V activities.
- **Snohomish Public Utility District**, which serves a primarily suburban population, is launching CSEM in mid-2023. All market segments will be eligible, none specifically targeted. The expectation is that mixed-segment cohorts will be formed and M&V will be done in partnership with BPA. Attention will be paid to incorporating DEI into the recruiting process.

### ***Program Incentives***

As CSEM is transitioning from a BPA-funded pilot to utility "owned" programs, BPA is changing the incentives offered to participants and expected useful life values.

- During the fully BPA-funded pilot period, BPA has provided the same incentives for CSEM as those provided by BPA's Industrial SEM program: \$.025 per kWh of annual SEM verified savings. Modeling has used an EUL = 1 year.
- Starting in October 2023, with CSEM as a BPA measure and utilities funding all their own CSEM infrastructure, BPA will pay: \$.08 per kWh of annual SEM verified savings. Modeling will use an EUL = 8 years.

### ***Comparison with CA's SEM Design and M&V Guides***

BPA designed the CSEM pilots to be similar to their Industrial SEM program, using mainly a cohort-based delivery with a two-year customer commitment, renewable by mutual agreement between the customer and BPA/utility. In this post-pilot era, the expectation is that the BPA-served utilities who establish CSEM programs will continue to design them in a similarly manner since the BPA model has proven successful. The BPA design is akin to, though perhaps not as strict as California's 3-cycle design.

Since BPA will continue to fund the SEM energy savings incentives, all the BPA-served utility programs will be required to set up systems and calculate energy savings using an M&V option in BPA's "Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide"<sup>50</sup>. This guide is based on industry best practices and outlines recommended methodologies to establish baseline energy models at a whole-facility or subsystem level, quantify and track energy savings associated with the implementation of multiple energy efficiency measures over a defined reporting period, and report energy savings from SEM projects to BPA (See the guides section of this appendix for description of this guide and comparison with the CA M&V Guide.)

**Multiyear SEM offerings will use an 8-year measure life.** On October 1, 2023 BPA's "Multiyear SEM" offering was launched with an 8-year measure life for industrial and non-industrial SEM programs<sup>51</sup>.

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<sup>50</sup> <https://www.bpa.gov/-/media/Aep/energy-efficiency/evaluation-projects-studies/bpa-sem-persistence-study-report.pdf>

<sup>51</sup> Communication between BPA and the Study Team on October 3, 2023. BPA has updated its SEM Calculator v.8.3 to use the 8-year EUL and is currently updating their entire BPA M&V Protocols library (available at <https://www.bpa.gov/energy-and->

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## ***Program Performance***

The CSEM programs designed and operated by the BPA-served utilities, are just getting started. As such, no formal evaluations of them have been published. However, as noted, three utilities are operating CSEM programs and are monitoring their program's progress. They have marked early successes. In each program, the utility has developed several cohorts and across them dozens of customers are in various stages of participation. The participants come from many commercial segments, most notably:

- Schools
- Universities
- Hospitals
- Groceries
- Other Retail
- Hospitality
- Municipalities
- The utilities themselves

One program, with 13 participants, achieved savings exceeding 2.6 million kWh in the first year.

## ***Lessons Learned and Improvements Made***

The utilities that were partners in BPA's CSEM pilots and now operate CSEM programs on their own have adjusted recruitment and participation activities to match their respective customer bases. Here are examples of modifications they have found has helped with participant recruitment, activity, and retention:

- Use candidate customer size as a guideline, not a firm requirement for eligibility. Customers with smaller usage but otherwise suitable characteristics can be successful participants.
- Be flexible with the development of cohorts and even the level of activity among participants in each cohort. Both single-segment and mixed-segment cohorts have merit.
- Operating a single CSEM within a utility, without explicitly offering a standard and "lite" version, works well for participant recruitment, engagement, and retention.

Assessment of the CSEM pilots showed that participants additionally undertake and complete more energy-saving projects in other programs than do other similar customers who do not participate in CSEM. That is, it appears that CSEM is a gateway to other energy-saving actions, enhancing the performance of other energy efficiency programs.

## ***Data Sources***

1. BPA Energy Efficiency Implementation Manual 2024-2025. <https://www.bpa.gov/-/media/Aep/energy-efficiency/document-library/24-25-RP-IM.pdf>
2. BPA SEM Calculator in the Document Library <https://www.bpa.gov/energy-and-services/efficiency/document-library> (Commercial Sector and Industrial Sector – Strategic Energy Management Calculator V8.3 (excel spreadsheet – BEETS Inputs section / SEM Verified Site Savings formula))

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[services/efficiency/measurement-and-verification](https://www.bpa.gov/energy-and-services/efficiency/measurement-and-verification) ), which will include new energy savings reporting content for the 8-year EUL within the BPA C&I SEM M&V Reference Guide.

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3. Website information on current program (dated May 2022):  
<https://www.bpa.gov/energy-and-services/efficiency/commercial/commercial-strategic-energy-management>
  4. (BPA) "Commercial & Industrial Strategic Energy Management FAQ"  
<https://www.bpa.gov/-/media/Aep/energy-efficiency/industrial/Industrial-files/ci-sem-faq.pdf>
  5. (Tacoma Public Utilities) "Commercial & Industrial Strategic Energy Management"  
<https://www.mytpu.org/ways-to-save/business-rebates/commercial-strategic-energy-management/>
  6. "[Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide](#)—version 1.0" prepared for BPA by Facility Energy Solutions, Energy 350, Stillwater Energy, March 31, 2022.
  7. Interviews with A. Joiner, Stillwater (BPA pilot and utility Program Implementer), June 6, 2023; Eric Mullendore, BPA (Commercial and Industrial programs lead), June 20, 2023.
  8. Historical: "Bonneville Power Administration Strategic Energy Management Persistence Evaluation—Final Report" submitted by Evergreen Economics in partnership with SBW Consulting, November 2022.  
<https://www.bpa.gov/-/media/Aep/energy-efficiency/evaluation-projects-studies/bpa-sem-persistence-study-report.pdf>  
Note: this is the Industrial persistence report used for establishing EUL, not a commercial study.
  9. "Evaluability Assessment For The BPA Commercial SEM Pilot Program" prepared by SBW, August 11, 2017.  
<https://www.bpa.gov/-/media/Aep/energy-efficiency/evaluation-projects-studies/bpa-commercial-sem-final.pdf>  
Note: this report was written before the pilot was launched; Appendix B has a list of selection criteria.

## PSE's Commercial and Multifamily Strategic Energy Management Programs

PSE offers some of the longest-running SEM programs in the country, engaging public sector, commercial, industrial, and, most recently, multifamily customers.

**Commercial SEM:** The Commercial SEM program (CSEM) helps eligible customers make low- and no-cost changes that reduce electric and natural gas usage and bills, mainly through changes to operations, maintenance, and behavioral practices. The program requires customers to participate for at least three years, with an option to renew the participation agreement. Participants are allowed to participate in other PSE programs concurrently and can choose to implement EE opportunities identified through SEM activities in one of those other programs. In 2023, the program has about 65 participants enrolled.

**Multifamily SEM:** In 2017, PSE launched a pilot SEM program for the multifamily market. The current, full-scale program began in January 2023. The program helps participants benchmark and track their multifamily buildings' energy use as they make operational and maintenance changes. Participants are also allowed and encouraged to pursue capital projects that qualify for rebates under other PSE programs. Savings from these capital projects are removed from the savings reported by PSE under their SEM participation. Customers enroll for a 12-month period at a time.

### **Target Markets**

**Commercial SEM:** The program is open to all of PSE's commercial business, school district, and public-sector government agency customers, including electric and gas customers. PSE targets larger customers with multiple facilities. The requirements to participate in the program include:

- Building(s) must collectively use greater than 1 million kWh or 135,000 Therms (or a combination of both) annually.
- Customer must hire, contract or designate an existing staff member as an Energy Champion or Energy Manager to act as liaison between the customer and PSE. The Energy Champion or Energy Manager is responsible for completing program deliverables and tasks, communicating energy-saving initiatives to the company's staff, and managing the site's energy bills. This position must be filled for a minimum of 3 years.

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PSE does not target any particular customer group and promotes CSEM to customers in all commercial market segments. Current participants include:

- K-12 school districts—strongly recruited by PSE as they are a great fit for this CSEM, especially since the districts need the resources that the program provides
- Higher education campuses
- Local banks
- General commercial
- Municipalities
- Hospitals
- Federal customers
- Property managers

**Multifamily SEM:** The program is open to all multifamily facilities served by PSE. Participants are the property owners and their delegated site staff. Resident engagement varies per site but is usually motivated by community messages and posts by site staff. The program team has found that senior residences are not a good fit for SEM.

### ***Program Design and Delivery***

**Commercial SEM:** PSE operates the program using their own staff, including account executives who recruit candidate customers for participation. Program staff and energy management engineers direct measure installations, tracking and reporting of site performance, training, and meetings.

Unlike many SEM programs, PSE's CSEM works with customers individually, providing a "menu" of services that can be tailored to meet each customer's specific needs, including:

- The program helps participants identify energy-savings opportunities during on-site walk-throughs with a PSE engineer for as many as 3 sites per customer.
- Provides software to track energy usage and cost savings.
- Offers core and advanced, specialized courses at on-site and virtual meetings to help customers learn more about their buildings' energy usage and tools to track performance.
- Provides participation and performance incentives.
- Allows concurrent participation in other PSE programs. PSE engineers facilitate that participation and those savings are removed from SEM claims to avoid double-counting.
- Reinforces awareness through targeted messaging delivered directly to the business through email and other digital efforts.
- Conveys the value of SEM to participants through ongoing communications, public relations, and Energy Manager training.

Per PSE's annual report<sup>52</sup>, the CSEM agreement is valid for three years. Over this time, PSE anticipates a 10-12% reduction in overall energy use at the participating customer's facilities. Savings are calculated using industry standard practices and energy accounting methodologies. Reported annual savings are a

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<sup>52</sup> "2021 Annual Report of Energy Conservation Achievements" prepared by PSE.

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variance from a fixed baseline. PSE may elect to renew a customer's CSEM agreement in three-year increments to provide continued support and additional performance incentives.

**Multifamily SEM:** Similar to CSEM, PSE operates this program using in-house staff. Customers enroll for a 12-month period but since SEM is intended as a long-term engagement, it is anticipated that participants will be able to renew their enrollment annually.

### ***Program Incentives***

**Commercial SEM:** Participating customers are eligible for several types of financial incentives. These are calculated based on both the costs incurred by the customer and the size of the customer's baseline energy usage; the latter a feature that seems unique among SEM programs:

- Start-up incentive: Up to \$10,000—paid if all first-year task requirements are completed within the year.
- Training and software reimbursement—up to \$2,000 annually.
- Performance incentives—tiered to reward higher energy savings: \$.02/kWh and \$0.15/Therm saved, up to PSE-defined annual performance target (typically 3% of baseline use); for savings above the target, incentive increases to \$.035/kWh and \$0.25/therm.
- Target incentive—up to \$10,000 annually, paid if combined energy savings exceed the performance target.

**Multifamily SEM:** The program offers participants free engineering assistance along with a milestone incentive and savings-based incentives, all paid to site owners. Each owner may decide how the incentives are allocated at their participating facility(ies); e.g., offset staff time, set aside for staff pizza party. The incentives include:

- Up to \$5,000 for participating in the program.
- Performance incentives of up to \$0.35 per kilowatt-hour and \$0.25 per therm.

### ***Comparison with CA's SEM Design and M&V Guides***

PSE's CSEM design is different from Industrial SEM in California in that it seems fully customized for one-on-one deployment rather than using a cohort approach. Also, the program enrolls each customer for a 3-year engagement, renewable at PSE's discretion and customer interest, compared to California's 3-two-year cycle that uses a uniformly-designed curriculum and reassessment for continued participation at the end of each cycle. But it is not inconsistent in principle with the California design or M&V guides. The focus is on BRO measures, with capital measures handled similarly to California and other SEM programs across the country.

Savings are calculated per guidelines used in the Pacific Northwest, likely as described in BPA's M&V guide<sup>53</sup>. Notably, the requirement for commercial customers to provide data necessary to build the energy model and assess top-down savings estimates is emphasized to SEM candidates from the beginning.

### ***Program Performance***

**Commercial SEM:** CSEM has high expectations for customer savings—10-12% of baseline energy usage. And apparently, in years prior to Covid-19, those levels of savings had been achieved. Covid-19 affected

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<sup>53</sup> "Commercial & Industrial SEM M&V Reference Guide" prepared for BPA by Facility Energy Solutions, Energy 350, Stillwater Energy. March 2022.

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customers' operations and their ability to conduct projects and site energy analyses. Energy savings since Covid have been greatly affected by adjustments in building operations, in particular increased ventilation rates, and higher Energy Manager turnover. Recent savings are looking more like typical SEM savings of 3-5% across the portfolio.

**Multifamily SEM:** The program is in its first year of at-scale operation. Program staff will document upward or downward trends with respect to energy consumption throughout the engagement.

### ***Lessons Learned and Improvements Made***

**Commercial SEM:** The impacts of the COVID-19 pandemic on facility operations and site energy analyses were significant and program staff sought out methods to quantify and adapt to them. In 2021, the program addressed these challenges in several ways:

- The staff developed a non-routine event detection tool.
- The program focused on pivoting several components of the program from in-person to virtual to ensure continued customer engagement.
- PSE started to provide participants with access to energy accounting software that facilitates greenhouse gas accounting and other climate change and sustainability initiatives.
- PSE continues to explore ways to make CSEM cost-effective for smaller customers.

### ***Data Sources***

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<https://www.pse.com/en/business-incentives/energy-management-programs/commercial-strategic-energy-management>
2. "Commercial Strategic Energy Management--Frequently Asked Questions"  
[https://www.pse.com/-/media/PDFs/REBATES/SEM/7829\\_CSEM\\_FAQ.pdf?sc\\_lang=en&modified=20221223210338&hash=AE9CBE404EC280D01533300AF6CCD3DE](https://www.pse.com/-/media/PDFs/REBATES/SEM/7829_CSEM_FAQ.pdf?sc_lang=en&modified=20221223210338&hash=AE9CBE404EC280D01533300AF6CCD3DE)
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4. "Exhibit 3 2021 Program Details". Prepared October 19, 2020 (apparently by PSE)  
[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewiR2ubqyZn\\_AhUNIUIHXNfBYIQFnoECCKQAO&url=https%3A%2F%2Fwww.pse.com%2F-%2Fmedia%2FProject%2FPSE%2FPortal%2FRate-documents%2FEEES%2Fees\\_2020\\_2021\\_biennial\\_conservation\\_plan\\_exh\\_3\\_update\\_10\\_2020.pdf&usg=AOvVaw2oaYc\\_1nmnf2hug\\_RKcX4Oc](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewiR2ubqyZn_AhUNIUIHXNfBYIQFnoECCKQAO&url=https%3A%2F%2Fwww.pse.com%2F-%2Fmedia%2FProject%2FPSE%2FPortal%2FRate-documents%2FEEES%2Fees_2020_2021_biennial_conservation_plan_exh_3_update_10_2020.pdf&usg=AOvVaw2oaYc_1nmnf2hug_RKcX4Oc)
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<https://www.pse.com/rebates/Multifamily-Strategic-Energy-Management>
6. Email from Max Rennie, PSE Commercial Strategic Energy Management Program Manager, 6-14-23
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## Energy Trust of Oregon's Commercial & Multifamily Strategic Energy Management Programs

Energy Trust of Oregon (Energy Trust) operates non-industrial SEM programs in two markets: 1) Commercial and Institutional facilities, started as a pilot program in 2011 and transitioned to a full-scale program in 2014 and 2) Multifamily housing initiated in 2022. Both programs provide participants with tools and training to help them save energy through changes in energy-using behavior and emphasize the value of participants' sharing experiences and best practices with their peers in other organizations.

Because of its long-term success and evolution, the Commercial program actively uses ongoing participants to help promote the benefits of SEM to other commercial organizations. In this section we show and compare the program in its early stages and now.

### ***Target Markets***

**Commercial SEM:** The Commercial pilot program directed early efforts to enrolling large commercial and institutional customers. In 2012-2013 they enrolled 6 cohort track and 2 individual (1-1) track participants in these market segments<sup>54</sup>:

- College campus—already had a sustainability council
- Convention center—building already had LEED certification and commitment to reduce environmental footprint
- City government facilities building
- Retail company's corporate offices—had sustainability plan but needed to establish performance metrics
- Restaurant chain with about fifty 4,000 square-foot locations (1-1 track)

By 2023, the list had evolved and had participants in these commercial segments<sup>55</sup>:

- K-12 schools, mostly public—12 enrolled
- Community college & university campuses
- Healthcare, including medical buildings and hospital campuses
- Large retail & groceries (includes hospitality)
- State & municipal agency offices
- Hotels
- Parking structures

**Multifamily SEM:** The Multifamily SEM program is designed for the affordable housing market. The program's aim is to reduce operations costs for the property owners and utility costs for residents. The program participants are the multifamily property managers. Energy Trust targets building with at least 200 units but has enrolled ones with fewer. As with Commercial SEM, size seems less important than enthusiasm and commitment of resources to SEM activities.

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<sup>54</sup> PWP, Inc. and Michaels Energy, Inc. "Energy Trust Commercial Strategic Energy Management Pilot: Evaluation Report 2." September 2014.

<sup>55</sup> Conversation with Kathleen Belkayat on 5-5-2023.

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### ***Program Design and Delivery***

**Commercial SEM:** The program was designed to deliver comprehensive energy services focused on behavioral and operational changes, with recommendations for capital projects that would be eligible for incentives from other Energy Trust programs. The program initially offered both cohort and 1-1 tracks for delivery of services. Savings were (and continue to be) estimated using a top-down regression-based baseline/participation period approach. While currently largely cohort-based, Energy Trust maintains flexibility using the “meet customers where they are” strategy to keep them engaged at some level rather than losing their participation. According to the 2019 evaluation, the measures most often recommended included: thermostat adjustments, boiler adjustments, and return fan programming.

**Multifamily SEM:** The program operates similar to the Commercial program, albeit using only the cohort approach, with training, assistance, and peer sharing among the property managers. While the direct participants are property managers, the program also provides residents with services such as workshops and energy efficiency kits. The first multifamily cohort is in its second year and some workshops are conducted together with organizations in the Commercial program.

### ***Program Incentives***

**Commercial SEM:** The program provides several types of incentives to encourage and reward ongoing engagement and action:

- Energy savings—Cash incentives for electric savings in Portland General Electric and Pacific Power territories and natural gas savings in NW Natural, Cascade Natural Gas and Avista territories achieved through SEM improvements.
- Milestones—A \$1,000 incentive for each SEM milestone reached.
- Interns—Up to \$10,000 to help cover the cost of hiring an intern to work on SEM-related activities for a minimum of 80 hours during the 12-15 months of the SEM enrollment period.
- Education—Incentives for completing certifications and access to additional resources and training.

**Multifamily SEM:** Because most of the energy savings come from actions taken by the residents, the program provides no energy saving incentives to the property managers but it provides milestone, intern, and education incentives.

### ***Comparison with CA’s SEM Design and M&V Guides***

The Commercial SEM program seems to align with all of the CA guidelines. Notably:

- Has used both cohort and 1-1 delivery approaches, as approved in the California guides.
- Uses top-down savings estimation approach, noting the same data challenges mentioned in the CA M&V guide.
- Is focused largely on Behavioral, Retrocommissioning, and Operational (BRO) projects and refers most capital ones to other energy efficiency programs in Energy Trust’s portfolio.
- Emphasizes development of an Energy Management Plan and engaging the participant Energy Champion/Manager/Team and Sponsor to advance understanding of energy usage, efficiency opportunities, and data tracking.
- Since 2016, Energy Trust has used an EUL of 5 years, similar to what the CPUC has proposed for California.

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## ***Program Performance***

**Commercial SEM:** The program has been both liked by customers and successful in delivering energy savings and other benefits to participants. In 2015, participants reportedly saved 10.3 million kWh<sup>56</sup>. The program has also enhanced the performance of capital improvement programs in Energy Trust's commercial program portfolio.

## ***Lessons Learned and Improvements Made***

We had the benefit of having access to process evaluations from both the earliest days of the Commercial SEM program (2011-2013)<sup>57</sup> and more recent years (2017-2018)<sup>58</sup>. As such, we were able to review evaluations conducted at different times in the program's operation. We report the evaluators' recommendations from both the early pilot period and a more recent full-scale program period to show the difference in focus as well specifics at different stages of the program.

The following recommendations were made after the program had been running as a pilot for almost three years and were adopted into the standard-offering program starting in 2014:

- Focus on recruiting multi-site customers. Avoid recruiting firms with extensive capital projects or energy services contracts underway shortly before participation or already planned during the participation period.
- Maintain use of cohort approach only. To enhance value of information exchange among energy managers at different companies, devote time during each workshop to allow participants to share their successes and failures.
- Rather than setting negative savings for buildings to zero, pool them with the facility's other buildings with positive savings, for more accurate total facility savings reporting. Also identify factors that could account for negative savings (e.g., change in building occupancy between baseline and participation period).
- Best to estimate regression-based savings from a baseline period that immediately precedes the participation period, with full information on changes made during the participation period (i.e., maintain variance logs).
- Make reports easier for participants to understand, e.g., providing contexts for the information included, so that they can instruct participants on how to improve energy performance and better integrate the SEM concepts into their facility management and business practices.

Evaluation recommendations following the 2018 program year reflect the maturity, expansion, and refinement of the Commercial SEM program. They said:

- Promote capital upgrades to SEM program track participants beyond the first two years of involvement.
- Continue utilizing participant success stories for SEM marketing.
- Set expectations with SEM participants about savings they expect to achieve.
- Expand SEM program track participants' exposure to similar participants, even across cohorts.

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<sup>56</sup> Email from Kathleen Belkhatat.

<sup>57</sup> PWP, Inc. and Michaels Energy, Inc. "Energy Trust Commercial Strategic Energy Management Pilot: Evaluation Report 2." September 2014.

<sup>58</sup> Evergreen Economics and PWP, Inc. "2018 Existing Buildings Process Evaluation." February 7, 2019.

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A few findings from the 2014 evaluation of the Commercial SEM pilot program about what did and did not work well might prove instructive as California utilities design programs for non-industrial customers:

- Cohort track proved better than 1-1 track in the pilot. Cohort deployment was found to be both more cost-effective and valued by customers. Participating in a cohort helped customers improve their energy management efficiency and they found the exchange of ideas between facility managers from different organizations especially helpful. This approach has been used in the program ever since.
- The pilot program evaluation found challenges in calculating savings, with either misleading savings results or insufficient data to support accurate saving estimates. In particular, it was difficult to estimate savings for customers who already had plans for projects prior to participation in the program or conducted projects involving numerous equipment retrofits. This is a problem commonly faced in similar circumstances and pointed to the need for more attention, which has been given since.

The 2019 evaluation reported that Commercial SEM participants showed both significantly more participation in and greater energy savings in the Existing Buildings Program's capital improvement projects than what was obtained from commercial customers who were not SEM participants. It may be that participation in SEM enhances the performance of other energy efficiency programs.

The one sub-segment that has proven difficult to engage and retain in the Commercial SEM program is Offices operated by property managers. The combination of often national-level management companies and multiple, unrelated tenants seems to make it too challenging for candidates to create the financial commitment and on-site energy team that are the hallmark of SEM success. Government buildings, in contrast, have proven to be very successful, long-term participants.

Notably, while the Commercial program initially targeted larger, multi-site customers as potentially achieving the greatest savings, they have found that customers in all commercial segments can be highly successful participants. Recruitment now focuses more on "meeting customers where they are." In particular:

- Organizational structure matters most. SEM suitability varies more across customers within a market segment than between segments. Customers willing and able to "sell" SEM internally have the greatest chance of success and are most cost-effective for the program to engage.
- Enroll each customer at the company level they can support (e.g., a department, a building, a whole school district).
- Smaller customers are successful participants if they have the funds and personnel for an effective Energy Team and enthusiasm.
- Having each customer renew participation annually (rather than multi-year commitment) better suits non-industrial customers; this allows hiatus and encouragement/avenue to return when they are ready.
- Enroll multiple customers at the same time into a cohort; mix of market segments not important, especially in first year when curriculum is mainly learning about SEM.
- Use a graduated curriculum of trainings and activities for customers to engage in as they are ready.

**Multifamily SEM.** No assessment of the program's performance has been conducted yet as the program is quite new. There are plans for an evaluation in the 2024-2025 timeframe.

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2. DNV GL. "Impact Evaluation of Commercial Strategic Energy Management Final Report." October 2016.  
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<https://www.ase.org/category/buildings/energy-trusts-commercial-strategic-energy-management-program>
6. Additional info on Commercial SEM from Kathleen Belkayat 5-15-23 and follow-up correspondence.
7. Energy Trust of Oregon 2022 Multifamily SEM guide  
[https://www.energytrust.org/wp-content/uploads/2022/11/Multifamily-SEM-Guide\\_GDE\\_01\\_2022.pdf](https://www.energytrust.org/wp-content/uploads/2022/11/Multifamily-SEM-Guide_GDE_01_2022.pdf)

## MCE's Non-Residential and Multifamily SEM Programs

MCE launched the first cohort of SEM participants in November 2019. It included and still does include a mix of industrial, agricultural, and commercial customers. They added a stand-alone Multifamily SEM program in 2022. The programs are designed similarly and administered consistently with the California SEM Design Guide and CA SEM M&V Guide v3.02 that governs the CPUC-approved Industrial SEM programs, modified to better fit MCE's customer base. The programs use a multi-year, 3-cycle structure with specific and detailed training and on-site activities in each cycle, both delivered through an implementation contractor.

### Target Markets

**Non-Residential SEM.** The program is open to all agricultural, industrial, and commercial customers and is targeted to those with electricity usage greater than 1 GWh per year. Current participants, aside from industrial customers, are mainly wineries, municipal buildings, community and private college campuses, and K-12 schools.

**Multifamily SEM.** The program is open to all multifamily residential buildings with five or more units. Customers are targeted by size. The first tier is buildings with more than 500,000 square feet; second is buildings of at least 250,000 square feet.

### Program Design and Delivery

Both programs use the same implementer and program deployment is similar, with modifications to best accommodate the customer base in each.

**Non-Residential SEM.** Uses a cohort format for training workshops and a mix of individual and cohort site activities.

- Cohorts are formed by customers' enrollment date rather than business type so they all go through the learning process together. Some activities, such as technical workshops for specific end uses are done with "like" participants and these participants may come from different cohorts.
- The order and timing of workshops are adjusted to better suit participants' operational schedules, such as an academic year.

**Multifamily SEM.** MCE takes a phased approach with this SEM offering, allowing property managers to plan larger projects that take advantage of maximum incentive levels but are implemented over time, as

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tenants turn over. Measures include low cost/no cost, behavioral, O&M, and capital opportunities throughout the property. The program offers a range of participation options to best meet the current needs and abilities of properties' owners, managers, and tenants.

- Program activities are mainly targeted to building owners, property managers, and building staff. Tenants, however, are also offered several resident-focused workshops to engage them in energy efficiency. The program team most commonly works directly with property managers to conduct program activities.
- The program addresses and provides incentives for common area, property, and in-unit projects.
- Eligible energy-savings measures include, but are not limited to: BRO, low-cost building envelope improvements, HVAC maintenance, and lighting improvements.
- Multifamily SEM is a multifaceted efficiency program that also promotes other conservation initiatives and benefits such as water savings or cleaner air.

### ***Program Incentives***

**Non-Residential SEM.** The program offers both milestone and performance incentives to participants. Participants receive energy savings performance incentives for BRO measures. They also may receive incentives for capital measures through any one of the incentive pathways: deemed, custom, or SEM. Factors that usually influence the decision of which incentive pathway to use are the level of effort, documentation, timelines, and the incentive rates.

- Workshop attendance and data development activities—up to \$6,000 per cycle
- Performance incentives vary by type of measure and verified savings:
  - BRO measure savings—\$0.03/kWh, \$0.25/therm.
  - Custom targeted measure savings—\$0.20/kWh, \$1.50/therm.
  - Custom standard measure savings—\$0.15/kWh, \$1.50/therm.

**Multifamily SEM.** The program offers both milestone and performance incentives to participants, typically paid to property managers.

- Workshop attendance and data development activities—up to \$6,000 per cycle
- Performance incentives are paid for BRO measures only—0.03/kWh, \$0.25/Therm

Incentives for capital measures are available to income-qualified multifamily property owners and renters outside of the SEM program.

### ***Comparison with CA's SEM Design and M&V Guides***

Both the Non-Residential SEM and Multifamily SEM programs were designed to comply with the CA SEM Design and M&V Guides used statewide. Program designs for the Multifamily program were publicly proposed, presented, approved, and recognized by the Energy Division as CA SEM programs (MCE AL 54-E approved in CPUC Jan 3, 2022 Disposition Letter). Compliance with the SEM program design allowed for SEM-specific benefits as prescribed by CPUC, such as the use of a 5-year measure life and existing baseline condition (CPUC Decision 16-08-019). Both programs use the same structure with the same roles and responsibilities for participants, also consistent with the statewide guides. These roles and responsibilities are clearly articulated in the implementation plans, identically for both programs, and summarized on the MCE website:

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## SEM Team Roles and Responsibilities

### Executive Sponsor

- Communicates program
- Creates a sense of purpose
- Sets clear expectations
- Provides direction
- Provides necessary resources
- Engages supervisors
- Communicates success
- Recognizes, rewards

### Energy Champion

- Assists team communications
- Drives activities
- Owns the projects
- Creates a sense of urgency
- Creates enthusiasm
- Engages others - spreading responsibility
- Prepares and conducts effective meetings
- Engages executives

### Team Member

- Interfaces with their departments
- Identifies energy saving opportunities
- Offers subject matter expert advice
- Prioritizes energy saving opportunities
- Quantifies cost and savings
- Implements projects

Aside from Industrial, MCE finds that the CA SEM Design Guide applies very well to Agricultural, Commercial, and Multifamily sectors. Each program deviates from the guide, in only minor and practical ways, to better address the needs of these customer bases (compared with the industrial base addressed in the current industrial IOU-administered SEM programs) and ensure cost-effective delivery. For instance, the energy modeling explicitly calls for examining a variety of key drivers such as weather, day of the week, and/or number of students or tenants rather than just a production metric commonly used in the Industrial SEM models. Instructive examples from each of MCE's SEM programs follow:

#### Non-Residential SEM:

- The Energy Efficiency 101 workshop may be delivered as a pair of energy efficiency workshops. Each workshop can focus on relevant energy efficiency topic(s) at the request of the varied audience. The intent is to cover at least one topic that is relevant to all participants, regardless of their industry. The workshops utilize breakout groups to encourage participants in similar sectors to discuss barriers and strategies.
- Site activities such as Treasure Hunts and Energy Management Systems Assessments may be implemented on a schedule tailored to each participant's needs.

#### Multifamily SEM: The program:

- Includes more workshops than the CA guide specifies, in part because workshops are conducted separately for property owners/managers, maintenance staff, and tenants.
- Incorporates some of the Energy Mapping-related activities into the Opportunities Register activities because energy maps are less relevant to non-industrial facilities.
- Builds in flexibility in the milestone due dates to encourage participation in the program.

### ***Program Performance***

**Non-Residential SEM.** While only a few years in operation, MCE has created 3 cohorts that include 13 commercial customers and 2 agricultural customers. Most recent energy savings reported from the commercial cohorts are: 1-11% electric savings (6 customers) and 2-12% Gas savings (2 customers).

The program size in terms of savings falls between the smaller Commercial Deemed program and larger Commercial Custom program. Table A-1 puts these anticipated costs and savings in perspective.

**Table A-1. Commercial Programs Budget and Net Impacts (anticipated PY 2023)<sup>59</sup>**

| Program | Budget      | Net kWh   | Net Therms |
|---------|-------------|-----------|------------|
| Deemed  | \$215,671   | 194,070   | 2,071      |
| Custom  | \$1,009,905 | 1,763,760 | 18,075     |
| SEM     | \$471,621   | 800,400   | 32,043     |

**Multifamily SEM.** The program is only in its second year of operation. As designed, in 2023 the program is expected to yield a TRC cost-effectiveness of 1.30.

**Table A-2. Multifamily SEM Proposed Budget and Goals (anticipated PY 2023)<sup>60</sup>**

| Program         | Budget    | Net kWh   | Net Therms |
|-----------------|-----------|-----------|------------|
| Multifamily SEM | \$759,576 | 1,381,598 | 30,304     |

### ***Lessons Learned and Improvements Made***

MCE has not discerned any pattern of SEM applicability by market segment. They have instead found that having a flexible “meet customers where they are” program and several customer characteristics are key to the enrolling successful participants. These include:

- Customers with effective Energy Champions show most success. This may be the most important factor for success.
- The implementer’s Energy Coaches are a big selling point for candidates. They help the participants’ Energy Champions to implement the program; they walk them through the opportunity registers and help them prioritize. If the Energy Champion is not engaged, the Energy Coach may suggest that they hand the function over to another champion or for the customer to take a break from the program as a last resort, discouraging the customer from withdrawing from the program altogether.
- Inform customers at the beginning that there is possible six-year participation. They enroll for the first two-year cycle to set the foundation for the energy management program and, if they are successful, they enroll for the next two-year cycle.
- Important assessments during recruitment:
  - Ask customer if interested in SEM.
  - Ask if customer has a staff dedicated to energy management, like an operational manager or a sustainability manager, who could become the Energy Champion.
  - Customer that already has sustainability goals that SEM can leverage is a plus but not a requirement.
  - Customer with data management in place is a plus since this makes it easier to employ the preferred top-down, whole building modeling approach.

<sup>59</sup> “Commercial Energy Efficiency Program—Implementation Plan (MCE02a, MCE02b, MCE02c), PY2022-2023.” Version 7.2. July 20, 2022.

<sup>60</sup> “Multifamily Strategic Energy Management Program—Implementation Plan (MCE01c), PY2022-2023.” Version 1.2. July 20, 2022.

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As both the Commercial and Multifamily SEM programs evolve, MCE has also learned what circumstances likely lead to a participant's failure to succeed. They generously shared these insights about factors of special concern:

- How involved the customer Energy Champion is with MCE or implementer and with the customer's Energy Team members matters a lot.
- Turnover of the Energy Champion can slow or stop momentum; some champions are more pro-active than others in transitioning their role onto the next champion.
- Inability to obtain sufficient energy use or driver data from the customer causes anomalies in the usage baseline and a challenge to top-down M&V modeling.

MCE is considering expanding SEM to small and medium businesses and is planning a study to help address their concerns. Questions specifically for this study, and relevant for expanding SEM to any new market, are:

- Will there be large enough claimable savings to make it cost effective?
- Identify the data challenges. It may be harder to develop a reliable baseline for customers with smaller energy usage.
- What needs to be modified in the current Commercial SEM program to make it work for these customers?

### **Data Sources**

1. "Commercial Energy Efficiency Program—Implementation Plan (MCEo2a, MCEo2b, MCEo2c), PY2022-2023." Version 7.2. July 20, 2022. <https://cedars.sound-data.com/documents/download/2658/main/>
2. "Multifamily Strategic Energy Management Program—Implementation Plan (MCEo1c), PY2022-2023." Version 1.2. July 20, 2022. <https://cedars.sound-data.com/documents/download/2655/main/>
3. Interview with Diana Chou, Joey Lande on 4-28-2023; emails from Diana dated 6/23/23, 7/6/23
4. Website information on current program:  
Commercial, municipal, industrial, agricultural customers: <https://www.mcecleanenergy.org/energy-management/>  
Multifamily: <https://www.mcecleanenergy.org/strategic-energy-management/>

### **TVA's EnergyRight® School Uplift Program**

TVA's School Uplift Program has two goals for each participant: 1) to help reduce the energy cost of operating the school and 2) to improve the learning environment for teachers and students. The program has been enrolling participants since 2020. Each individual school is a participant; there may be several participants from the same school district:

- Year 1 cohort=11 schools
- Year 2=43 schools
- Year 3=64 schools
- Year 4=126 schools

Formal participation lasts for one year. However, the company hopes that participants will maintain a relationship with TVA and their local power company to continue improvement, since SEM is intended to engender long-term energy-saving actions. TVA is already considering re-inviting the Year 1 participants to enroll again.

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## ***Target Markets***

All public K-12 schools, including charter schools, are eligible and invited to participate. The program encourages the participation of schools, especially in under-served areas of TVA's territory, by including needs-based grants as one type of incentive in the program design. In reality, most school districts, all across the country, have need for greater funding, so this type of incentive can and does appeal to a variety of school districts in TVA-served utility districts.

## ***Program Design and Delivery***

TVA fully funds the program and implements it with TRC and assistance from the local energy providers that serve the schools. TVA and TRC each provide the Energy Coaches who recruit, educate, and assist participants. Each coach is assigned to 25-30 schools annually. Energy Coaches reach out to teachers directly to inform and invite them to participate, often at conferences and camps where teachers also meet others already enrolled in the program, which increases potential participants' interest. After enrolling in the program and implementing energy-saving measures, the participant may apply for reimbursement incentives in the form of grants. The program staff also identify the schools with the greatest unmet need to support their application for federal grants like Renew America's Schools.

The program's curriculum is specifically designed to engage and encourage participation by teachers, students, and facility staff. In addition to workshops, Energy Coach meetings, and on-site assessments to identify energy-saving opportunities that are hallmarks of SEM programs, the program also provides some services particularly well-suited to schools, including: engagement activities themed for each month of the school year, as well as posters, energy tool kits with items such a KW meter, and a manual that outlines what SEM is and how to implement it, along with technical information for equipment types typically found in schools. Schools can also pop in on a Zoom room at their convenience to get help or even interact with other schools.

The program's webpage<sup>61</sup> contains a considerable amount of publicly available information for schools, including a downloadable SEM Manual (with application form) and files of informational binders, in-school and at-home activities for elementary, middle school, and high schools; energy-savings checklists for staff and students; and award certificates.

## ***Program Incentives***

As noted, the program's goals include and go beyond simply reducing energy use at schools; they aim to improve the quality of school life. The incentive structure reflects this and seems unique among SEM programs. TVA offers financial incentives to participants in the form of two types of grants, both competitively awarded.

- Building Energy Upgrade Grants (\$200K-\$400K each)—these are community impact grants for capital improvements made to a school. The school may begin applying once their project is designed and costs and savings estimated. Both the needs of the school and the impact of the project are used in determining which participants receive these large grants, which are reimbursable up to the cost of the project and program cap. Six BEUG grants are awarded annually.
- Learning Environment Grants (\$10K or \$25K each)—Participants take energy-saving actions, usually low/no-cost measures. The awards process is gamified based on the participating school's economic status; participation in the program; engagement with Energy Coaches, students, and staff; and updating their Portfolio Manager account on time. The top 10 performing schools by those criteria

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<sup>61</sup> "TVA School Uplift Resources" <https://energyright.com/business-industry/school-uplift/resources/>

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receive \$25k; all other participants who complete all program activities by the end of their cohort participation year receive 10K.

### ***Comparison with CA's SEM Design and M&V Guides***

The School Uplift program design, from recruitment (direct TVA/TRC outreach) and participation period (1 year) to activities (classroom activities, high-school-to-elementary student mentoring, school-specific O&M) to incentives (via needs-based and performance grants awards) are tuned to what works best for schools, rather than industrial or even other commercial businesses. While training sessions and interactive meetings with cohort members are systematic, they are specifically geared to encourage and enable actions by each of several groups within a school—teachers, students, and facility staff—and to the timing of the school schedule. All of this makes the program similar in spirit but not in the specifics outlined in the California SEM design guide.

The program sets up EPA's Portfolio Manager tool for participants' data management and benchmarking. Participants enter their energy use and other school characteristic data. The program staff use data from the tool in the estimation of energy savings, which is done with a pre/post regression model. This is similar to, but not exactly the same, as what is described in the California M&V guide. TVA does use a 5-year EUL for savings persistence, similar to California's Industrial SEM. In light of BPA's recent adoption of an 8-year savings persistence, TVA said they may re-evaluate their own.

### ***Program Performance***

The program is relatively new and no formal, independent evaluation has yet been completed. The table below excerpts a snapshot of the participants' estimated performance from a paper written by the program team in 2022<sup>62</sup>. TVA added program performance data from their most recent cohort 3. The numbers in Table A-3 indicate that participants saved 7-13% in their first year.

***Table A-3. School Uplift Program—First-Year Savings by Cohort***

| Cohort                  | # of Participating Schools | Time (1 year)    | Total Est. SEM Savings (\$)<br>(All schools) <sup>[1]</sup> | Total Est. SEM Savings (kBtu)<br>(All schools) | Total Baseline (kBtu)<br>(All Schools) |
|-------------------------|----------------------------|------------------|-------------------------------------------------------------|------------------------------------------------|----------------------------------------|
| Cohort 1 <sup>[2]</sup> | 11                         | 2/1/20–4/1/2021  | \$122,527                                                   | 4,181,857                                      | 31,791,235                             |
| Cohort 2 <sup>[3]</sup> | 43                         | 5/1/21–4/30/2022 | \$294,298                                                   | 11,872,145                                     | 137,492,744                            |
| Cohort 3                | 64                         | 5/1/22–4/30/2023 | \$1,071,271                                                 | 16,808,193                                     | 243,678,107                            |

<sup>[1]</sup> Cohort 1 costs are based off an average utility rate of \$0.10/kWh. Cohort 2-3 costs are averaged from collected billing data for each fuel source.

<sup>[2]</sup> Negative savings and gas savings are omitted from totals.

<sup>[3]</sup> Cohorts 2 and 3 include gas savings. Four schools were omitted from Cohort 2 totals due to poor data quality.

The School Uplift program has steadily added enrollment each year, now exceeding 120 schools annually. The grant money awarded to participants has been used to improve the learning environment for teachers and students on such projects as playground equipment, STEAM labs, community gardens, greenhouses, stress relief rooms, and outdoor classrooms. Additionally, the program seems to have inspired more SEM for businesses. After School Uplift became successful, TVA chose to bring back the Industrial SEM program, which had been operating since 2017 but suspended during Covid. They made it available to a broader set of large customers, any that use at least 3.5MW annually. The uplifting part of this renewed SEM program is that participants get the choice to donate the dollar value of 50% of their

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<sup>62</sup> Hoover, Clay, and Jason Snyder, Cindy Herron, Brittany Alvarado, Rachel Leins, Alec Phillips. "School Uplift: An Inspiring Program to Save Energy in Schools of Disadvantaged Communities." ACEEE 2022 Summer Study on Energy Efficiency in Buildings. August 2022.

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verified savings from their bills (up to \$100K) to a local school in need. Both previous and current large - customer cohorts operate in a 2-year program.

### ***Lessons Learned and Improvements Made***

The program team has modified the program to enhance enrollment and successful participation. They identified these lessons learned and improvements:

- While the program has high success, some schools end their enrollment early. Common reasons are a change in key school staff, lack of time to catch up or complete activities, or decision to reapply for the next year's cohort. To improve participant retention, the program team started targeting recruitment to STEM teachers interested in energy efficiency and requiring an Energy Champion to be identified at the time of enrollment.
- Recruiting teachers rather than administrators yields more and more-engaged participants.
- Hire teachers as Energy Coaches because they relate to participants best.
- Expand the grant opportunities. Early on, only a limited number of participants could receive Learning Environment Grants, but by cohort year 3, this was increased so that all schools can receive at least a \$10K grant.
- Student engagement is key. It takes pressure off the already busy teachers, and students love the competition. Students also enjoy having responsibilities; it makes them feel important but also teaches them more skills.
- Creating an Energy Team is important. It spreads the load among the staff and helps them come together as a team to take action. What makes a school unsuccessful is trying to participate as a one-person team. In reviewing the program manual, we noticed that applicants are asked to identify as many as 6 Energy Team members by name, along with the proposed Energy Champion.

### ***Data Sources***

1. School Uplift on-line references:
  - "TVA School Uplift Resources" <https://energyright.com/business-industry/school-uplift/resources/>
  - "School Uplift: Power Center Academy" <https://youtu.be/hFyC5ADiVTc>
  - "School Uplift: L.E. Willson Elementary" <https://youtu.be/AkFguooUloo>
  - "School Uplift: Alvin York Institute" <https://youtu.be/LMuOtPpK5Gs>
  - "School Uplift: Bledsoe County" <https://youtu.be/WrV13EDVEg4>
2. Hoover, Clay, and Jason Snyder, Cindy Herron, Brittany Alvarado, Rachel Leins, Alec Phillips. "School Uplift: An Inspiring Program to Save Energy in Schools of Disadvantaged Communities." ACEEE 2022 Summer Study on Energy Efficiency in Buildings. August 2022.  
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3. Interview with Clay Hoover (TVA) and Brittany Alvarado (TRC), 7-18-23 and follow-up correspondence.

## **SEM Design and M&V Guides**

The Study Team examined several publicly available guidebooks and, in this section, we provide information from three guidebooks likely to be most instructive to California's Program Administrators and implementers in the development of SEM programs for commercial and/or multifamily market segments:

- The California SEM design and M&V guides for Industrial SEM,
- MCE's application of those guides to their own Commercial and Multifamily SEM programs, and

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- BPA's Commercial and Industrial SEM M&V guide.

All three guides are very current, having been drafted in 2022.

## California SEM Design and M&V Guides

Two reference manuals provide guidance and insight into the way SEM programs currently operate in California: California SEM Design Guide<sup>63</sup> and California SEM M&V Guide<sup>64</sup>. They reflect the regulatory parameters and landscape specific to the state. Most notably, SEM in California is intended as a six-year customer engagement, with a series of activities to be completed in 3-cycles, each two years long. Currently, SEM in California is approved for industrial customers (and for all non-residential customer segments in MCE's service area) and some of the specifics in these guides reflect this, though they are not intentionally exclusive. In fact, the M&V guide explicitly states that it is applicable to all segments, including commercial and institutional customers.

These guides, updated in 2022, incorporate input from the CPUC staff and evaluators, California's SEM Program Administrators and implementers, and experience from SEM programs operated in other jurisdictions across North America, in particular in the Pacific Northwest.

### *California SEM Design Guide*

This design guide provides detailed guidance on the operational components of the program in each of the two years of each of the 3 cycles: 1) Educational Modules and 2) Site-specific Activities. In this design, the SEM program is delivered to customers through a progression of modules and activities that build upon each other within and between the cycles. The guide clearly identifies the three parties involved in the operation of the program, namely: the Program Administrator (including Account Execs), the Implementation Contractor (including the SEM Coach), and the Customer Participants (including the Executive Sponsor, Energy Champion, Data Owner, and other staff comprising an Energy Team).

The guide provides a very detailed roadmap, specifying not only the specific activities but the order and timing of them. Processes and responsibilities are clearly identified. This includes specification of the requirements, objectives and deliverables, in each year. Examples that illustrate this attention to detail include:

- A site-specific activity, the Energy Management System Assessment (EMA), in Year 1 shall be held during or after the Kick-off Meeting and prior to any other educational or site-specific activities and shall include at least the SEM Coach and the Energy Champion.
- In Education Module #8, the SEM Coach must work with each Energy Champion ahead of time to prepare a brief presentation to program participants, explaining the story and outcomes through their engagement with the SEM program. This should be a similar presentation as that given to their Executive Sponsor. Customers should receive a certificate of accomplishment.

In addition, and possibly unique among SEM guides, the California design guide outlines specific training and support the program may offer to SEM participants on tracking GHG emissions data and IDSM opportunities, for those customers who want it. It also provides support in the development of the

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<sup>63</sup> Sergio Dias Consulting. "California SEM Design Guide For: Cycle 1, 2, and 3." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. Version 1.01, July 5, 2022.  
<https://pda.energydataweb.com/#!/documents/2647/view>

<sup>64</sup> Sergio Dias Consulting. "California SEM M&V Guide." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. Version 3.02, July 6, 2022.  
<https://pda.energydataweb.com/#!/documents/2648/view>

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participant's Energy Management System for tracking energy usage. This reflects the CPUC's and Program Administrators' prioritization of IDSM and the state's GHG emissions reduction goals.

### ***California SEM M&V Guide***

This guide defines the principles, guidelines, and requirements for a systematic M&V process to determine claimable SEM energy savings. As the companion to the design guide, it outlines specific Summaries and Reporting requirements for both the Educational Modules and Site-specific Activities.

The guide explicitly allows for tracking and modeling savings for both BRO and capital measures taken within the SEM program and removal of savings from non-SEM measures. And it both allows and describes the use of the "top-down" approach (using energy consumption adjustment models developed for each type of energy consumed within the M&V boundaries) or "bottom-up" approach (aggregating energy savings calculated for individual measures implemented during the reporting period) for calculating SEM program savings, while still advocating the top-down approach.

The guide also indicates where Program Administrators have latitude in allowing deviations from the recommended process and also refers to CPUC data and reporting requirements and the Commission's role in requesting information.

### ***Future Guidance***

The current guides are intended for application to California's Industrial SEM programs. It is also noted, however, that much would be applicable to non-industrial SEM. As the CPUC considers the conditions for the expansion of SEM programs to non-industrial customers, they have indicated the following<sup>65</sup>:

- Application of the Industrial SEM NTG = 1.0 and the same EUL to non-industrial SEM is appropriate.
- Non-Industrial SEM programs may use the existing guides but must produce market sector-specific guides and a redline of the differences between the new sector-specific guides and the existing SEM guides.

### ***Data Sources***

1. Sergio Dias Consulting. "California SEM Design Guide For: Cycle 1, 2, and 3." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company.  
<https://pda.energydataweb.com/#!/documents/2647/view>
2. Sergio Dias Consulting. "California SEM M&V Guide." prepared for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. Version 3.02, July 6, 2022.  
<https://pda.energydataweb.com/#!/documents/2648/view>
3. CPUC R.13-11-005 "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues," Decision 23-02-002 issued February 2, 2023.

## **MCE's Modifications to the California Industrial SEM Guide for Non-Industrial SEM Programs**

The implementation plans for MCE's Commercial SEM program and Multifamily SEM program emphasize that the program design outlined in the California SEM Design Guide written for Industrial SEM provides quite applicable guidance for the structure of SEM for commercial and multifamily customers. The MCE Plans provide a point-by-point discussion of how the design and deployment of their programs align and

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<sup>65</sup> CPUC R.13-11-005 "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues," Decision 23-02-002 issued February 2, 2023; on allowing the use of strategic energy management approaches beyond the industrial sector.

differ from that in the general California guide for Industrial SEM. In doing so, these plans articulate specific modifications that make these SEM programs more specifically relevant to non-industrial market segments. This comparison illustrates the “redlining” that the CPUC has indicated will be required for the expansion of SEM to non-industrial markets by the IOU Program Administrators. More information about the MCE Commercial and Multifamily SEM programs is provided earlier in this appendix.

The excerpt below from MCE’s Multifamily SEM Program Plan illustrates the modifications to California’s guide Cycle 1 content and schedule of education and site-specific activities designed to increase the program’s effectiveness for this market sector, in particular the inclusion of activities directed to tenants in addition to the property owners and facility staff:

- Workshop spacing changes encourage participation.
- Workshop topics to better fit the multifamily audience as well as improve learning and accelerate savings opportunities for the residential sector.
- Site-Specific activity topic adjustment from energy mapping to opportunity register review and prioritization to better accommodate for multi-family properties, as energy maps are most relevant to industrial facilities.
- EMA timing allows the Program to detect improvements earlier and encourage action.
- Milestone and Performance Payment Incentive structure and timing to encourage participation throughout the program.

| Design Guide Schedule |                                |                                                 | Proposed MCE MF Schedule |                                                                             |                                                 |
|-----------------------|--------------------------------|-------------------------------------------------|--------------------------|-----------------------------------------------------------------------------|-------------------------------------------------|
| Month                 | Workshop                       | Site Specific Activities                        | Month                    | Workshop                                                                    | Site Specific Activities                        |
| 1                     |                                | #1 Kick-off Meeting and Existing Project Review | 1                        | #1 Starting SEM                                                             | #1 Kick-off Meeting and Existing Project Review |
| 2                     | #1 Starting SEM                |                                                 | 2                        |                                                                             |                                                 |
| 3                     | #2 EE 101                      | #2 Energy Map 101                               | 3                        |                                                                             | #2 Treasure Hunt 101                            |
| 4                     |                                | #3 Treasure Hunt 101                            | 4                        |                                                                             | #3 Review and Prioritize Opportunities          |
| 5                     |                                |                                                 | 5                        | #2 Stakeholder Engagement 101 <sup>1</sup>                                  | #4 Tracking: Performance 101 <sup>2</sup>       |
| 6                     | #3 Tracking: Performance 101   |                                                 | 6                        | #3 EE 101 (Season 1, Year 1) <sup>3</sup>                                   | #5 Employee Engagement                          |
| 7                     |                                |                                                 | 7                        |                                                                             |                                                 |
| 8                     | #4 Employee Engagement 101     |                                                 | 8                        |                                                                             |                                                 |
| 9                     |                                | #4 Employee Engagement                          | 9                        | #4 EE 201 (Season 1, Year 2) <sup>3</sup>                                   | #6 Energy Management System Assessment          |
| 10                    |                                | #5 Energy Management System Assessment          | 10                       |                                                                             |                                                 |
| 11                    | #5 Making it Stick             |                                                 | 11                       |                                                                             |                                                 |
| 12                    |                                |                                                 | 12                       | #5 Making it Stick                                                          |                                                 |
| 13                    |                                |                                                 | 13                       |                                                                             |                                                 |
| 14                    |                                | #6 Completion Report #1                         | 14                       |                                                                             | #7 Completion Report #1                         |
| 15                    | #6 EE 201                      |                                                 | 15                       |                                                                             | #8 Treasure Hunt 201                            |
| 16                    |                                | #7 Energy Map 201<br>#8 Treasure Hunt 201       | 16                       |                                                                             | #9 Review and Prioritize Opportunities          |
| 17                    |                                |                                                 | 17                       | #6 Tracking Performance 201 <sup>1</sup><br>#7 EMIS Planning/Implementation |                                                 |
| 18                    |                                |                                                 | 18                       |                                                                             |                                                 |
| 19                    | #7 Tracking Performance 201    |                                                 | 19                       | #8 EE 101 (Season 2, Year 1) <sup>3</sup>                                   |                                                 |
| 20                    |                                | #9 EMIS Planning/ Implementation                | 20                       |                                                                             |                                                 |
| 21                    |                                |                                                 | 21                       | #9 EE 201 (Season 2, Year 2) <sup>3</sup>                                   | #10 Energy Management System Assessment #2      |
| 22                    |                                | #10 Energy Management System Assessment #2      | 22                       |                                                                             |                                                 |
| 23                    |                                |                                                 | 23                       |                                                                             |                                                 |
| 24                    | #8 Celebrating Accomplishments |                                                 | 24                       | #10 Celebrating Accomplishments                                             |                                                 |
| 25                    |                                |                                                 | 25                       |                                                                             |                                                 |
| 26                    |                                | #11 Completion Report #2                        | 26                       |                                                                             | #11 Completion Report #2                        |

1: Workshop will focus on tenant engagement.  
2: Workshop will be delivered individually.  
3: Workshop will be held in two separate sessions, a maintenance staff workshop and a resident workshop. Workshop timing will depend on season.

Source: “Commercial Energy Efficiency Program – Implementation Plan”, p.36

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## Data Sources

1. "Commercial Energy Efficiency Program—Implementation Plan (MCE02a, MCE02b, MCE02c), PY2022-2023." Version 7.2. July 20, 2022. <https://cedars.sound-data.com/documents/download/2658/main/>
2. "Multifamily Strategic Energy Management Program—Implementation Plan (MCE01c), PY2022-2023." Version 1.2. July 20, 2022. <https://cedars.sound-data.com/documents/download/2655/main/>

## BPA's Commercial and Industrial SEM M&V Guide

The "Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide" was prepared for BPA in 2022<sup>66</sup>. It is based on industry best practices and outlines recommended methodologies to establish baseline energy models at a whole-facility or subsystem level, quantify and track energy savings associated with the implementation of multiple energy efficiency measures over a defined reporting period, and report energy savings from SEM projects.

The BPA guide is consistent with the California M&V guide in most every way. However, it also reflects the flavor of SEM programs—both Industrial SEM that BPA operates directly and the Commercial SEM that the BPA-served utilities offer. BPA-style SEM is not as explicitly prescribed as California's and BPA's guidelines for both program design and M&V are not identical with California's. In particular, not all of the activities, timelines, and reporting requirements included are applicable to or included in the BPA M&V guide. For example:

- The BPA guide does not address monitoring or reporting on greenhouse gases which the California guide does.
- The modeling strategy is the same in both. In contrast with the California guide which focuses on Industrial SEM, the BPA guide uses broader terminology to encompass non-industrial SEM. It explicitly includes modeling energy use and savings with drivers such as weather and occupancy schedules rather than industrially-driven production.
- **Multiyear SEM offerings will use an 8-year measure life.** While not explicitly mentioned in the BPA guide, on October 1, 2023 BPA's "Multiyear SEM" offering was launched with an 8-year measure life for industrial and non-industrial SEM programs,<sup>67</sup> whereas in California, the current regulatory guidance is to extend the Industrial SEM EUL = 5 years to non-Industrial SEM.

The BPA M&V guide content is used by a number of other utilities across the country that operate SEM programs.

## Data Sources

1. BPA Energy Efficiency Implementation Manual 2024-2025. <https://www.bpa.gov/-/media/Aep/energy-efficiency/document-library/24-25-RP-IM.pdf>
2. BPA SEM Calculator in the Document Library <https://www.bpa.gov/energy-and-services/efficiency/document-library> (Commercial Sector and Industrial Sector – Strategic Energy Management Calculator V8.3 (excel spreadsheet – BEETS Inputs section / SEM Verified Site Savings formula))

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<sup>66</sup> "Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide—version 1.0," prepared for BPA by Facility Energy Solutions, Energy 350, Stillwater Energy, March 31, 2022. <https://www.bpa.gov/-/media/Aep/energy-efficiency/evaluation-projects-studies/bpa-sem-persistence-study-report.pdf>

<sup>67</sup> Communication between BPA and the Study Team on October 3, 2023. BPA has updated its SEM Calculator v.8.3 to use the 8-year EUL and is currently updating their entire BPA M&V Protocols library (available at <https://www.bpa.gov/energy-and-services/efficiency/measurement-and-verification>), which will include new energy savings reporting content for the 8-year EUL within the BPA C&I SEM M&V Reference Guide.

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3. "Commercial and Industrial Strategic Energy Management Measurement and Verification Reference Guide—version 1.0," prepared for BPA by Facility Energy Solutions, Energy 350, Stillwater Energy, March 31, 2022. <https://www.bpa.gov/-/media/Aep/energy-efficiency/measurement-verification/12-bpa-ci-sem-mv-ref-guide-v10.pdf>
  4. "Energy Efficiency Implementation Manual 2024-2025", August 31, 2023. <https://www.bpa.gov/-/media/Aep/energy-efficiency/document-library/24-25-RP-IM.pdf>

## Workforce Support Data Sources

The data sources to conduct the research on workforce support efforts is presented below. The research finding can be found in Chapter 7.

### Climate Corps

1. Climate Corp website: <https://www.climatecorps.org/become-a-partner.html>
2. Conversation with Jake Pollack and Cy Allen, SEI Climate Corps, 7/17/23 and follow-up emails.

### ComEd SEM Internships (mentions CLEAResult)

1. City of Bolingbrook notice: "ComEd Strategic Energy Management (SEM) Internship Opportunity Available," March 22, 2023. <https://www.bolingbrook.com/index.asp?SEC=28490EF8-B3C9-4503-A4C1-B67E0C2B4B0C&DE=A644ABAE-AF46-45CE-86CA-523AC324D6CD>
2. "ComED Workforce Development and Energy Efficiency teams have partnered with CLEAResult's to develop the Strategic Energy Management (SEM) Retail Pilot program to provide internship opportunities to college students." [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewj59L\\_LxZSAAxXKhu4BHdwtBEc4FBAWegQIBxAB&url=https%3A%2F%2Fvillageofhazelcrest.org%2Fwp-content%2Fuploads%2F2023%2F03%2FComEd-Internships.docx&usq=AOvVawoUeRQhQ4GbJGfGYQXFh9SI&opi=89978449](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewj59L_LxZSAAxXKhu4BHdwtBEc4FBAWegQIBxAB&url=https%3A%2F%2Fvillageofhazelcrest.org%2Fwp-content%2Fuploads%2F2023%2F03%2FComEd-Internships.docx&usq=AOvVawoUeRQhQ4GbJGfGYQXFh9SI&opi=89978449)

### Portland Community College

1. Portland Community College, "We're Hiring A Strategic Energy Management (SEM) Associate!" job posting April 5, 2022. <https://www.pcc.edu/sustainability/2022/04/05/were-hiring-a-strategic-energy-management-sem-associate/>

### City of Bend

1. "Strategic Energy Management Intern: Aspiring & Emerging Local Government Talent," job posting, November 2020. <https://envirocenter.org/wp-content/uploads/2020/10/SEM-Intern-One-Pager-Recruitment.pdf>

## APPENDIX | B

## Interviews with Program Administrators, Program Implementers, and SEM Subject Matter Experts

Between April and August 2023, the Study Team conducted interviews with 36 people from 20 organizations, including:

- Four Program Administrators in California and four outside California.
- Six Program Implementers with SEM programs in several states.
- Eight Subject Matter Experts (SMEs), including two North American SEM Collaborative (NASEMC) roundtable member sessions.

When warranted, The Study Team initiated follow-up clarifying queries.

### Interviewees

The Study Team interviewed the following organizations and SMEs:

**Table B-1. List of Organizations Interviewed**

| Organizations Interviewed                          |                                             |
|----------------------------------------------------|---------------------------------------------|
| California Program Administrators                  | Non-California Program Administrators       |
| Pacific Gas & Electric Company (PG&E)              | Energy Trust of Oregon (Energy Trust)       |
| San Diego Gas & Electric Company (SDG&E)           | Bonneville Power Administrator (BPA)        |
| Southern California Edison Company (SCE) (*)       | Puget Sound Energy (PSE)                    |
| Southern California Gas Company (SoCalGas) (**)    | Tennessee Valley Authority (TVA)            |
| Marin Clean Energy (MCE)                           |                                             |
| Program Implementers                               | SEM Subject Matter Experts (SMEs)           |
| Alternative Energy Systems Consulting, Inc. (AESC) | Consortium for Energy Efficiency (CEE)      |
| CLEAResult                                         | Great Work Energy                           |
| Cascade Energy                                     | kW Engineering                              |
| Leidos                                             | Lawrence Berkely National Laboratory (LBNL) |
| SEI Inc. / Climate Corp                            | North American SEM Collaborative (NASEMC)   |
| Strategic Energy Group Inc.                        | Rouj Energy                                 |
|                                                    | Sergio Dias Consulting                      |
|                                                    | Strategic Energy Group Inc                  |

(\*) SCE elected not to be interviewed due to the SEM program solicitations in progress.

(\*\*) Cascade responded to the interview questions on SoCalGas's behalf.

### Interview Guides

The Study's research entailed conducting in-depth semi-structured interviews to gain insight into how SEM is currently implemented for non-industrial market segments, especially with regard to SEM Success factors and to program Design and M&V Guides. Customized interview questions were

developed for each category of interviewees. Tables B-2 through B-5, present the customized survey questionnaires used to conduct the interviews.

**Table B-2. Interview Questions for Program Administrators (Utilities and CCA)**

| Questions for PAs (Utilities and CCA) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                                    | Current SEM Programs / Markets <ul style="list-style-type: none"> <li>• In which SEM market(s) are you currently operating approved SEM programs?</li> <li>• What is it about those market(s) or segments that makes them currently successful?</li> </ul>                                                                                                                                                                                                                                                                                                                                                        |
| 2.                                    | Potential New SEM Markets / Segments <ul style="list-style-type: none"> <li>• Which non-industrial markets (or expanded industrial markets) are you currently considering that make sense for SEM in your service territory?</li> <li>• What is it about the markets or market segments you are considering that make them “ripe” or “near-ripe” for SEM implementation in your service area (e.g., strong customer relationship(s), potential ease of compliance with current CPUC rules for Industrial customers, customer challenges that SEM participation can help them overcome, other reasons)?</li> </ul> |
| 3.                                    | Selection of New Potential SEM Markets / Segments <ul style="list-style-type: none"> <li>• What are the most important factors your SEM team is using in its selection of potential new SEM markets for expansion?</li> <li>• How did or do you go about selecting feasible SEM markets? What do you see as the current challenges to selecting new SEM markets?</li> <li>• Does your team do a SWOT analysis on potential new SEM markets, based on your company’s account executive’s (or program) relationships with customer groups in targeted sectors, or in other ways?</li> </ul>                         |
| 4.                                    | SEM Market Expansion Study Focus and Value <ul style="list-style-type: none"> <li>• What are the key areas of focus that this Study can address to help you in expanding your SEM efforts into new markets in your service territory? In the short- term? Intermediate-term?</li> </ul>                                                                                                                                                                                                                                                                                                                           |
| 2.                                    | Multi-Market Program Operation <ul style="list-style-type: none"> <li>• What are the challenges your SEM team may face in running industrial and non-industrial SEM programs?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table B-3. Interview Questions for Energy Trust of Oregon – Kathleen Belkhat**

| Questions for Energy Trust of Oregon – Kathleen Belkhat                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| We're looking at a California market future with potential for multiple SEM non-industrial (Commercial, Ag, Multifamily) programs, with multiple providers. Your experience with non-industrial SEM at Energy Trust is valuable. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.                                                                                                                                                                                                                               | <p>What are the key lessons learned related to Energy Trust's experiences in sponsoring multiple commercial SEM offerings in multiple segments over the years?</p> <ul style="list-style-type: none"> <li>• Which non-industrial (Commercial, Ag, Multifamily) segments are you currently operating in?</li> <li>• What are the key success factors in selecting those commercial market segments? What makes them work? And what makes them not work?</li> <li>• Are there other segments you have tried and dropped? Why?</li> <li>• Have you added factors such as IDSM or GHGs into your SEM program process?</li> <li>• Challenges or insights that will help California avoid pitfalls?</li> <li>• What key challenges in Energy Trust's SEM offerings over the years caused a SEM program to fail or near-fail? What fixes did Energy Trust apply to better include these segments?</li> </ul>                                                                                                                                                                                                                                                                                                |
| 2.                                                                                                                                                                                                                               | <p>Best Practices for non-industrial (Commercial, Ag, Multifamily) SEM Markets</p> <ul style="list-style-type: none"> <li>• This study is focused on how the California IOUs and the CPUC can assess non-industrial markets and recommend the "Best-Fit" SEM markets both statewide and at the utility service territory level.<br/>"Best-Fit" = the market segment meets the established SEM criteria related to recruitment, sustainability, savings potential, other critical success factors.</li> <li>• What best practices for SEM selection and suitability criteria does or has Energy Trust used?</li> <li>• Does Energy Trust have a methodology for assessing commercial SEM segments, e.g.: <ul style="list-style-type: none"> <li>○ "Perfect-fit" market segments,</li> <li>○ "Good-fit" market segments,</li> <li>○ "Good-enough fit" market segments, or</li> <li>○ "Does-not fit" market segments.</li> </ul> </li> <li>• Has Energy Trust codified specific characteristics for different non-industrial SEM segments, delineating "best-fit" profiles for each of the SEM program offerings, including market transformational challenges / barriers and opportunities?</li> </ul> |
| 3.                                                                                                                                                                                                                               | <p>High-Level Operational Question</p> <ul style="list-style-type: none"> <li>• Has Energy Trust found major operational differences between commercial segments? Do design and M&amp;V guidelines tend to stay the same?</li> <li>• What are the segment guidelines to mitigate double counting with non-SEM EE commercial program offerings?</li> <li>• Is Energy Trust working in small and mid-size commercial markets? Please share your insights.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 4.                                                                                                                                                                                                                               | <p>Wrap Up</p> <ul style="list-style-type: none"> <li>• What additional advice do you have for the California folks as they launch new SEM efforts in non-industrial market segments? For instance: <ul style="list-style-type: none"> <li>○ When faced with challenges for a particular segment or customer, which ones should you try to overcome to enroll, and which should you walk away from? (i.e., any binding constraints)</li> <li>○ Is there an "easiest" market segment to approach first?</li> <li>○ The concept of 'SEM-Lite' has come up. In your experience, does this concept have any presence in Energy Trust's offerings? And is it still SEM?</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table B-4. Interview Questions for Program Implementers – Part 1**

| Questions for Implementers – Part 1 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                                  | Broad set of glasses on how you see SEM expansion in CA <ul style="list-style-type: none"><li>• What is your vision for an expanded SEM effort in CA to new non-industrial market segments over the next 3-5 years?</li></ul>                                                                                                                                                                                                                                                                                             |
| 2.                                  | What is your perspective on 'Success Factors' (PA goals, customer characteristics, accommodation of CA Design and M&V guide specifications) for the commercial sector? <ul style="list-style-type: none"><li>• How similar or different are they from those of the Industrial SEM program?</li></ul>                                                                                                                                                                                                                      |
| 3.                                  | What will be simple market segment choices for California SEM expansion from your perspective, given the existing Industrial sector SEM program characteristics?                                                                                                                                                                                                                                                                                                                                                          |
| 4.                                  | What criteria do you use to figure out what is simple vs challenging in different commercial segments? <ul style="list-style-type: none"><li>• Pros/Cons and Challenges</li><li>• What do we need to know for the Study that will help us make cogent recommendations to the IOUs and the Commission?</li></ul>                                                                                                                                                                                                           |
| 3.                                  | Which segments are more challenging for you, given the existing Industrial SEM program characteristics? <ul style="list-style-type: none"><li>• Pros/Cons and Challenges</li><li>• What do we need to know for the Study that will help us make cogent recommendations to the IOUs and the Commission?</li></ul>                                                                                                                                                                                                          |
| 4.                                  | Based on your experience in the commercial Sector (CA, USA), what are the key Lessons Learned that we need to be aware of relating to expanding CA SEM program to non-industrial markets? <ul style="list-style-type: none"><li>• Overall, what are the alignment and challenging differences in running industrial and non-industrial SEM programs?<ul style="list-style-type: none"><li>○ What about these programs worked and didn't work?</li><li>○ Any modifications made since initial offering</li></ul></li></ul> |
| 5.                                  | Are there any best-case examples / information to understand these issues?                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table B-5. Interview Questions for Program Implementers – Part 2**

| Questions for Implementers – Part 2                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| If you could implement a non-industrial program ignoring the CA Industrial SEM program characteristics, what would you do? Which markets / segments? What changes to the current California Industrial Guidelines should be considered? (Possibilities on what maybe different: Design, content, tools, scheduling, language used to recruit customers, sustainability (Industrial) vs competitiveness (Commercial)). |                                                                                                                                                                                                                                                                                                                                                                      |
| 1. Targeted markets                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>• Can you tell us about the Specific markets you've targeted, including both which market segments you have successfully enrolled and which not? How many enrolled?</li></ul>                                                                                                                                                  |
| 2. Customer Eligibility Criteria                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>• What is your program's eligibility criteria? (e.g., size, other characteristics such as energy champion, sustainability plan, specific end uses)</li></ul>                                                                                                                                                                   |
| 3. Design & Delivery Structure                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>• Design: cohort, individual or both</li><li>• Who does the recruiting (utility or implementer);</li><li>• Incentive types</li><li>• Types of measures</li></ul>                                                                                                                                                               |
| 4. Ancillary Design Issues                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>• What are the issues in incorporating GHGs and IDSM into SEM expansion in CA?</li><li>• What are the issues in incorporating DACs into SEM expansion in CA?</li></ul>                                                                                                                                                         |
| 6. M&V Issues and Approaches                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>• Is the current M&amp;V method suitable to be used with all sectors / programs?</li><li>• What is the optimal method for M&amp;V and how do we get there?</li><li>• What is the effect of allowing an NTG&lt;1 for commercial SEM programs? Are there issues with an NTG of 1 in commercial sector expansion in CA?</li></ul> |
| 7. Evaluation: Impact / Process Studies                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                      |

## Takeaways from Interviews

The main takeaway from the interviews is that SEM for the non-industrial market is already operational in several utility jurisdictions across the US and Canada. They all started in the industrial sector and branched out into large commercial, small/medium commercial, multi-family, and low income.

The Study Team has summarized the takeaways from the interviews and arranged them by the three Success Factors that were defined in Chapter 2. It is important to note that the comments below reflect the Program Administrators, Program Implementers, and SME's input and contributed to the development of the three Success Factors.

### Success factor 1: Availability of Organizational & Operational Alignment with SEM Implementation Needs and Principles

- All interviewees stressed the importance of the following key organizational requirements in implementing a successful SEM Program:
  - Organizations that can create a team in charge of energy management (can be one person) and can appoint an Executive Sponsor and an Energy Champion.

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- Organizations that have the appropriate structure to implement activities needed to comply with CA Design and M&V Guides. Design Guide - "Teaching customers to fish": the high touch customer engagement and coaching is very effective in customer retention, achieving energy savings, and persistence of energy savings.
  - Organizations with available data to establish energy use baselines and develop models (usage data, and data on parameters that drive energy use).
  - A few of the implementers noted the following:
    - M&V is often easier for non-industrial participants. The CA M&V Guide's regression model approach is well suited for the commercial sector, even more so than industrial because models are easier (weather driven).
    - CA SEM Design Guide applies very well to commercial and multi-family (MF) SEM. Commercial/MF SEM programs deviates from the guide, in only minor and practical ways, to better address the needs of the customer bases. This appears to be consistent with other implementers who had made the transition from industrial.

## **Success factor 2: Availability of SEM Savings**

- The majority of the interviewees agreed that market segments with high energy usage and "reasonable" potential energy savings allows for quick wins and rapid rewards and are a solid basis for establishing a continuous improvement culture.
  - Organizations with large enough baseload / EUIs are needed for the program to be cost effective.
- However, a few of the implementers noted that savings should not be the only criteria – e.g., workforce development (energy champions doing more than just SEM), company culture, increase capital savings, cross-EE program participation should be taken into consideration.

## **Success Factor 3: Availability of "Good" SEM candidates**

- The majority of those interviewed mentioned the following as key to a successful SEM candidate:
  - An Engaged organizational Culture - Customer with an existing organizational culture that effectively engages with their workforce. The customer can leverage this culture and/or "piggyback" on it to drive SEM success.
  - A highly motivated organization to drive behavior/cultural changes. Smaller customers are successful participants if they have motivated personnel and enthusiasm for the program.
  - Organizations that have a broad / long-term business and organization perspective and for whom Information is publicly and readily available (business/sustainability/ESG plans, mission and goals statements). This is needed for initial SEM readiness assessment.
  - Having a customer committed to a long-term investment in SEM program is paramount to driving change, along with an Energy Champion / Lead, an Executive Sponsor at early stage of recruitment (if Executive Sponsor buys in, the process is easier), and staff resources with relevant capabilities / willingness to be trained.
  - Organization with a large enough baseload / EUIs for the program to be cost effective.

## **Challenges Implementing Non-Industrial SEM Programs**

- Recruiting customers with complicated corporate / management structures; for example, office buildings managed by property managers because property managers are often national instead of

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local (financial commitment issues / on-site energy team challenges – the normal hallmark of SEM success is missing).

- Commercial real estate – national vs local property management (mixed success).
- Customer geographic spread with multiple fuel sources (e.g., Indian Casinos).
- Buildings with solar and other renewal fuels (e.g., campuses).
- Potential Cost effectiveness issues with customers with smaller savings and same reporting requirements as large customers.
- Multi-Family – availability of data is a barrier to creating data for savings model; spans commercial / residential (mix use) meters.
- Serving customers with gas equipment in the face of the State’s electrification goals.

## General Observations

- SEM Implementers – Flexibility and skills:
  - Implementers should be able to meet the customer where they are. This could mitigate many challenges and build lasting partnerships for SEM efforts.
  - Need multi-skilled implementers with both hard (technical M&V) and soft (teaching, coaching / facilitating, motivating, handholding) skills.
- Program Administrators:
  - Organizational Change vs a widget program: PAs need to understand that the organizational change aspect of SEM Programs is different from “selling a widget program” and that the customers will need to be engaged more deeply and continuously to enroll them in the SEM program.
- The majority of non-industrial SEM programs are Cohort-based with multi facilities (sites) engagement and mixed segments (with a few exceptions).
  - SMBs are looped into cohorts with larger commercial users. Examples of SMB sectors that have thrived in SEM include: Chain Establishments / Stores (financial institutions (chain of banks)); Retail / Grocery chains; small school districts and municipalities (e.g., TVA SEM “Schools” program); Goodwill Industries of the Columbia / Willamette (PNW).
  - It may not be a good idea to undertake a separate SMB program (non-chain) with current guidelines; may be best to integrate into larger cohort.
- Use candidate customer size as a guideline, not a firm requirement for eligibility. Customers with smaller usage but otherwise suitable characteristics can be successful participants.
- Organization structure matters most. SEM suitability varies more across customer within a market segment than between segments. Customers willing to ‘sell’ SEM internally have the greatest chance of success and are most cost effective for the program to engage.
- SEM as a delivery mechanism is the best way to serve all customers. Interviewees noted that SEM could be the gateway to all other programs.
- Customers who participate in SEM programs, participate in other programs more frequently than those who did not participate in a SEM program.

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- Staggering of participants' SEM start time (continuous sign-ups) works well. SEM works across multiple segments and with mixed segments – Community SEM (geographic area); Industrial / Munis / Commercial / School program.
  - Having each customer renew participation annually (rather than having multi-year commitment) better suits non-industrial customers. This allows hiatus and an avenue / encouragement to return when customers are ready.
  - The biggest difference is between customers in the same market, rather than between segments. Organizational structure matters the most.
  - SEM is expensive, so worthwhile recruitment is important. Use past experiences to assess suitability of each potential candidate.

## California's SEM Design and M&V Guides

Two reference manuals provide guidance and insight into the way SEM programs currently operate in California:

- California SEM Design Guide<sup>68</sup> (Design Guide)
- California SEM M&V Guide<sup>69</sup> (M&V Guide)

The operating principles and requirements for SEM programs are included in these two Guides are described in more detail below.

### California SEM Design Guide – Operational Principles and Requirements

The Design Guide is intended to be used by both SEM Program Administrators and SEM program implementation contractors and has requirements and recommendations for both. It is assumed that both the Program Administrator and the implementation contractor have experience with, and understanding of, SEM programs. The Guide provides detailed guidance on the operational components of the program in each of the two years in each of the 3 cycles. The operational principles and requirements included in the Guide are described below.

#### Parties and their Responsibilities

The Guide clearly identifies the three parties that need to be involved in the operation of the program and their respective responsibilities:

**The Program Administrator – *Utility Account Executive*.** Helps manage customer expectations for program participation, including (but not limited to) recruitment, commitment, and continued participation; provision of customer data including interval data, site level access for audits and treasure hunts, etc.; any optional activities. Ensures that any relevant utility staff are involved where needed.

**The Implementation Contractor – *SEM Coach*.** Ensures participants meet the program's objectives, all progress and projects are properly documented, and energy savings are properly modeled and documented. It is the customer-facing individual within the contractor's SEM team that maintains regular communication with the PA regarding participant progress and issues.

**The Participating Customer – *Energy Team*.** It is typically a cross-functional team (includes management, production, procurement, maintenance, HR). It meets regularly to manage and develop any energy management related business practices and activities. It includes the following roles:

- **Data Owner:** is responsible for ensuring that a plan is created and implemented for collecting energy and other relevant variable data and that the data are properly screened and documented.
- **Energy Champion:** is responsible for the success of the program at the site. Coordinates both with the SEM Coach and internally with any site staff, including the rest of the Energy Team, Data Owner, and Executive Sponsor.

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<sup>68</sup> Sergio Dias Consulting. "California SEM Design Guide For: Cycle 1, 2, and 3."

<sup>69</sup> Sergio Dias Consulting. "California SEM M&V Guide."

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- **Executive Sponsor:** should be the highest-level manager available at the site (typically the site or facility manager). Is responsible for ensuring the Energy Team has the resources it needs to succeed in the implementation of the program.

## Program Cycles

SEM in California is intended as a six-year customer engagement, with a series of activities to be completed in 3-cycles, each two years long. Each of the cycles builds upon the knowledge and experience gained in the previous cycle, with the end goal of the third cycle being a customer that can manage and save energy with limited or no program support. At a high level, each cycle has the following focus:

**Cycle 1** focuses on building energy management experience and achieving savings quickly. The focus is on developing informal, technical (e.g., engineering, operational, and maintenance) business practices.

**Cycle 2** builds on Cycle 1 and focuses on deepening savings and more deeply engaging program participant's employees. Cycle 2 helps participants work with top management, purchasing, and design and ensures there is management commitment, employee awareness, and operator competence.

**Cycle 3** focuses on locking in business practices that allow the customer to continue to improve energy performance beyond their engagement with the SEM program.

Progression of a specific customer from cycle to cycle must be at the discretion of the PA with input from the SEM Coach. Each cycle includes an activity to develop a brief transition plan, either to help the customer advance to the next cycle, or to help the customer exit the SEM program.

## Educational Modules and Site-specific Activities

The SEM program is delivered through a progression of *Educational Modules* and *Site-specific Activities* that build upon each other within and between the cycles. The Guide describes the modules and specific activities to be conducted each year. It also provides a very detailed roadmap, defining the order and timing of them. Processes and responsibilities are clearly identified. This includes specification of the requirements, objectives, and deliverables, in each year.

In addition, and possibly unique among SEM guides, California's SEM Design Guide outlines specific training and support the program may offer to SEM participants for tracking GHG emissions data and IDSM opportunities, for those customers who want it, along with the development of the participant's Energy Management System for tracking energy use. This reflects the CPUC's and Program Administrators' prioritization of IDSM and the state's GHG emissions reduction goals.

### **Educational Modules**

Educational modules provide the structure for the program's educational activities. The modules are structured around four sets of learning objectives for each topic, which is also usually a task: *Program-related Objectives* that help the customer understand the program related context for the topic or task, *Energy Management System (EnMS)-related Objectives* that relate to the task itself and are based on the Navigator task, *DSM-related Objectives* that help the customer understand how to apply the learning on the topic or task to broad energy-related objectives, and *GHG-related Objectives* that help the customer understand how to apply the learning on the topic or task to tracking and reducing energy-related GHG emissions.

There are eight modules in each Cycle as shown in Table C-1.

**Table C1. Educational Modules**

| Cycle 1                                                                                                                                                                                                        | Cycle 2                                                                                                                                                                                                  | Cycle 3                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <i>General Introduction</i> : gives participants an introduction to the Program and its structure in Cycle 1.                                                                                               | 1. <i>General Introduction</i> : gives participants an introduction to Cycle 2's approach to the general topics introduced in Cycle 1.                                                                   | 1. <i>General Introduction</i> : participants an update on the general topics introduced in Cycles 1 and updated in Cycle 2.                                                                        |
| 2. <i>Getting Started-Cycle 1</i> : provides participants practical guidance for establishing an EnMS in their organization.                                                                                   | 2. <i>Planning for Cycle 2</i> : focuses on development of a plan of action for Cycle 2 and incorporating lessons learned from participating in Cycle 1.                                                 | 2. <i>Planning for Cycle 3</i> : focuses on development of a plan of action for Cycle 3 and incorporating lessons learned from participating in Cycles 1 and 2.                                     |
| 3. <i>Improving Performance, Year 1</i> : provides participants with the knowledge and skills needed to identify and implement energy-saving projects as early as possible.                                    | 3. <i>Operational Controls</i> : helps participants understand how to review and update standard operating procedures (SOPS) and operational and maintenance controls to consider energy performance.    | 3. <i>Risks to Success</i> : teaches participants how to identify and act on high-level opportunities and risks that could affect the EnMS.                                                         |
| 4. <i>Measuring Success</i> : provides participants guidance on tracking energy performance.                                                                                                                   | 4. <i>Employee Engagement, Year 3</i> : focuses on strategies and tactics for developing energy awareness among participants' employees, and identifying and training employees who might need training. | 4. <i>Leadership Development</i> : helps participants understand how to ensure both management and the Energy Team are developed for long-term success of the EnMS.                                 |
| 5. <i>Planning, Year 2</i> : focuses on participants developing a plan of action for Year 2.                                                                                                                   | 5. <i>Planning, Year 4</i> : focuses on reviewing key elements of the EnMS and making appropriate updates for Year 4, and documenting participants' business practices.                                  | 5. <i>Planning, Year 6</i> : focuses on reviewing key elements of the EnMS and making appropriate updates for Year 6, with emphasis on ensuring customers make their business practices repeatable. |
| 6. <i>Improving Performance, Year 2</i> : focuses on identification of more advanced, complex, or resource-intensive (capital or human) energy improvement opportunities.                                      | 6. <i>EMIS, Year 4</i> : helps participants look at more advanced concepts for EMIS – best practices, approaches for improvements to energy data management, case studies, etc.                          | 6. <i>Employee Engagement, Year 6</i> : focuses on having participants understand how to create procurement and design processes that consider energy performance in the long-term.                 |
| 7. <i>EMIS, Year 2</i> : provides participants with tools and methods for understanding and tracking energy performance at a deeper level using the concept of an Energy Management Information System (EMIS). | 7. <i>Employee Engagement, Year 4</i> : focuses on looking at two processes that have the potential to have major impact on energy performance: energy considerations in design and in procurement.      | 7. <i>Documentation and Measurement of EnMS</i> : helps participants understand how to define their EnMS documentation needs and how to track trends in the performance of their EnMS activities.   |
| 8. <i>Celebration and Next Steps, Year 2</i> : recognizes participants' accomplishments and sets the stage for continuing engagement in the program.                                                           | 8. <i>Celebration and Next Steps, Year 4</i> : recognizes participants' accomplishments and sets the stage for continuing engagement in program.                                                         | 8. <i>Celebration and Next Steps</i> : recognizes participants' accomplishments and sets the stage for maintaining their EnMS after completing the SEM program.                                     |

### Delivery Approaches

Turning the educational modules into educational activities is up to the PA and implementation contractor staff. This includes:

- Format Delivery: on-line, or face-to-face.
- Media Delivery: examples include pre-recorded, live, interactive, or mix.
- Customer / Participant Delivery: one-on-one, cohort, or mix.

These approaches allow for some flexibility in program implementation that can be tailored to different sectors and customer cohorts.

## Site-Specific Activities

The Design Guide describes specific support activities that need to be implemented at each site. The majority of these activities are designed to help the site's staff apply what they have learned in an Educational Module to their specific situation and needs. This support provided through the on-site activities can vary significantly from participant to participant and may depend on a variety of factors, including the customer's objectives, priorities, expertise, infrastructure, available resources, etc. Site-specific activities that need to be implemented are presented in Table C-2.

**Table C-2. Site-Specific Activities**

| Cycle 1                                                                                                                                                                                                                                                                                                                                    | Cycle 2                                                                                                                                                                                                                                                                                                                                           | Cycle 3                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <i>Kick-off Meeting, Year 1 (individual sites only)</i> : begins site's engagement with the program.                                                                                                                                                                                                                                    | 1. <i>Kick-off Meeting, Year 3 (individual sites only)</i> : begins site's engagement with Cycle 2 of the program.                                                                                                                                                                                                                                | 1. <i>Kick-off Meeting, Year 1 (individual sites only)</i> : begins site's engagement with Cycle 3 of the program. Emphasizes a program exit strategy for end of year 6.                   |
| 2. <i>Energy Management Assessment (EMA), Year 1</i> : provides a baseline of the site's energy management practices relative to the business practices that will be introduced in Cycle 1.                                                                                                                                                | 2. <i>Energy Management Assessment (EMA), Year 3</i> : documents participants' baseline and energy management practices relative to business practices and assesses their EnMS progress.                                                                                                                                                          | 2. <i>EMA, Year 5</i> : similar to Cycle 2.                                                                                                                                                |
| 3. <i>Energy Map and SEU Selection Support</i> : helps participants start with Task 8 Data Collection (energy map-snapshot of energy use) and Task 9 Significant Energy Uses (SEUs).                                                                                                                                                       | 3. <i>Planning Support, Year 3</i> : focuses on reviewing impacts to Cycle 1 Action Plan and making appropriate changes to business practices for Cycle 2. Determines if a Treasure Hunt is needed.                                                                                                                                               | 3. <i>Planning Support, Year 5</i> : Reviews the experience and expectations set up in Cycle 1 and Cycle 2 for Cycle and annual planning.                                                  |
| 4. <i>Treasure Hunt, Year 1</i> : The SEM Coach assists participants in identifying energy waste and energy savings opportunities (simpler low- or no-cost) to meet Cycle 1's objectives that lead to future Treasure Hunts. Participants are expected to select projects to implement and develop actions plans to ensure implementation. | 4. <i>Treasure Hunt, Year 3</i> : SEM Coach assists participants in identifying and prioritizing energy savings opportunities not previously identified to enable modifications that will save energy to meet Cycle 2's objectives. Participants are expected to select projects to implement and develop actions plans to ensure implementation. | 4. <i>Treasure Hunt, Year 5</i> : similar to Cycles 1 and 2 and also ensuring participants have the processes and understanding to lead any future Treasure Hunts without program support. |
| 5. <i>Action Plan Support</i> : After prioritizing opportunities, the Energy Team creates action plans, gets necessary approvals, and implements opportunities.                                                                                                                                                                            | 5. <i>Operational Controls Support</i> : helps a site set and maintain optimum running conditions and maintenance practices, ensuring persistence of energy savings.                                                                                                                                                                              | 5. <i>Leadership Development Support</i> : helps participants improve long-term leadership for the EnMS, to ensure clear and repeatable practices.                                         |
| 6. <i>Planning Support, Year 2</i> : focuses on reviewing key items that might affect the site's approach for Year 2 and making appropriate changes. Annual planning is expected to be repeated and expanded through the remaining four years of the program.                                                                              | 6. <i>Employee Engagement Support, Year 3</i> (most important in Cycle 2): helps ensure that participants' staff have the awareness and competence to support the objectives / targets of the energy management system.                                                                                                                           | 6. <i>Planning Support, Year 6</i> : similar to #3 above.                                                                                                                                  |
| 7. <i>Treasure Hunt and Action Plan Support, Year 2</i> : focuses on identifying more complex or resource-intensive (capital or human) opportunities to meet Year 2 and beyond objectives.                                                                                                                                                 | 7. <i>Planning Support, Year 4</i> : similar to #3 above. Energy Team begins to lead their own planning sessions and develop processes to support this in Cycle 3 with minimal outside support.                                                                                                                                                   | 7. <i>Employee Engagement support, Year 6</i> : builds on the activity in year 4 reviewing, and recommending changes to processes.                                                         |
| 8. <i>EMIS Support, Year 2</i> : SEM Coach assists participants in analyzing how data, data processes, and data systems can potentially be used to right-size and prioritizing where                                                                                                                                                       | 8. <i>Treasure Hunt, Year 4</i> : similar to #4 but for Cycle 3.                                                                                                                                                                                                                                                                                  | 8. <i>Treasure Hunt, Year 6</i> : similar to #4 above.                                                                                                                                     |

| Cycle 1                                                                                                                                                                   | Cycle 2                                                                                                                                                                                               | Cycle 3                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data can be integrated into existing control and reporting systems.                                                                                                       |                                                                                                                                                                                                       |                                                                                                                                                                                                            |
| 9. <i>EMA, Year 2</i> : provides an end-of-cycle assessment of the site's energy management practices relative to business practices from Cycle 1.                        | 9. <i>EMIS Support, Year 4</i> : SEM Coach assists participants in analyzing how data, data processes, and data systems can potentially be used to support a more complete EMIS solution at the site. | 9. <i>Documentation and Measurement of the EnMS Support</i> : helps participants define design and procurement elements that may affect energy performance and begin discussions with participants' staff. |
| 10. <i>Completion and Next Steps Support</i> : helps the site understand and summarize their achievements and issues in Cycle 1 and decide whether to advance to Cycle 2. | 10. <i>Employee Engagement Support, Year 4</i> : helps participants define design and procurement elements that may affect energy performance and begin discussions with participants' staff.         | 10. <i>EMA - Year 6</i> : provides a final assessment of the site's energy management practices relative to business practices that were introduced or improved in Cycle 3.                                |
|                                                                                                                                                                           | 11. <i>EMA - Year 4</i> : provides a final assessment of the site's energy management practices relative to business practices from Cycle 2.                                                          | 11. <i>Completion and Next Steps Support</i> : helps site understand and summarize their achievements and issues in Cycle 3, and create a transition plan for once their SEM Program engagement ends.      |
|                                                                                                                                                                           | 12. <i>Completion and Next Steps Support</i> : helps the site understand and summarize their achievements and issues in Cycle 2 and decide whether to advance to Cycle 3.                             |                                                                                                                                                                                                            |

Changes to the sequence of activities are allowed in special cases and shall be approved by the PA. If changes are made, the changes shall consider the effect to both educational modules and site-specific activities. If needed, Site-Specific Activities can be repeated throughout a cycle or in following cycles. Optional site-specific activities are at the discretion of the PA.

## California SEM M&V Guide – Principles and Requirements

The M&V Guide defines the principles and requirements for a systematic M&V process to determine claimable energy savings from SEM programs, as specified by the CPUC in Decision 16-08-019 and Decision 23-02-002. The M&V Guide outlines a prescriptive process of (a) planning for the collection of data, (b) collecting and analyzing the data collected, and (c) measuring, verifying, and reporting energy performance or energy performance improvement for a defined boundary. The M&V Guide is based upon the common concept of determining energy savings based on a site-wide, existing baseline and utility metered-based approach. The M&V Guide also indicates where PAs have latitude in allowing deviations from the recommended process and also refers to CPUC's data and reporting requirements and its role in requesting information. The principles and requirements included in the Guide are described below.

### Goals and Objectives of the M&V Process

The goals of conducting the M&V process include:

- Develop a deeper customer understanding of the relationship between energy end uses, operations, and energy consumption.
- Determine energy and demand savings for customer and regulatory reporting purposes.
- Enable the customer to lead all or a majority of the M&V process.

The objectives of conducting the M&V process are to:

- Characterize the site's energy consumption, energy end uses, and relevant variables.

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- Develop a plan to collect energy data.
  - If possible, develop and use energy consumption models for each type of energy consumed within the M&V boundaries.
  - Quantify energy savings from implemented energy performance improvement actions (EPIAs) listed on the Opportunity Register.
  - Calculate energy savings realized during a defined Reporting Period.
  - Prepare documentation for reporting to the sponsoring PA and CPUC.
  - Teach the M&V process to the customer as part of their EnMS development.

## Participants in the M&V Process

The Guide clearly identifies the three primary stakeholders that need to be engaged in conducting the M&V process:

**The Program Administrator.** Sponsors the SEM program and is responsible for establishing the duration of the Reporting Period.

**The Implementation Contractor – *SEM Coach*.** Leads the full M&V process until the Customer slowly comes up to speed beginning in Cycle 2.

**The Participating Customer – *Energy Team*.** Conducts the data collection and other M&V activities.

## Data Collection Activities

Energy consumption data and other relevant variable data needs to be collected during the SEM Program Cycle regardless of the energy savings determination approach used. Preparing for the collection of data involves the creation and update of an Energy Data Collection Plan, Energy Data and Performance Tracking Tool, and Opportunity Register.

### ***Energy Data Collection Plan***

The SEM Coach works with the Customer to develop an Energy Data Collection Plan that identifies who is responsible for collecting data, how often data needs to be collected, and how to record data in the Energy Data and Performance Tracking Tool. The Plan needs to be reviewed and updated on at least an annual basis following review of the M&V boundaries and selection of relevant variables. The SEM Coach needs to check in with the customer on a regular basis to ensure the Energy Data Collection Plan is being updated as needed.

If a data collection process is already in place, it may be used at some sites. If data that need to be collected are not already being collected, it is important to determine if the organization has the means to collect the data or if it needs to acquire additional metering equipment or identify different data that will fulfill the same need.

### ***Energy Data and Performance Tracking Tool***

The Energy Data and Performance Tracking Tool needs to be developed based upon the Energy Data Collection Plan and reviewed annually.

### ***The Opportunity Register***

The Opportunity Register is a living document that includes identified and completed opportunities throughout the engagement in the SEM program. The SEM Coach needs to work with the PA and customer to identify opportunities. The Opportunity Register is used by the CPUC to determine influence

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of PA- sponsored SEM programs. Outside of a PA sponsored SEM program the customer can alter the Opportunity Register to meet their own needs.

## Baseline and Models

### ***Baseline***

Ideally, the Baseline Period will end immediately prior to the start of the SEM Program Cycle. However, the Baseline Period shall not end more than three months prior to or after the beginning of the Reporting Period for which an energy consumption adjustment model is being developed. The Baseline Period shall be 12 or 24 consecutive months with the following considerations:

- 12 months: Generally appropriate for sites with weather-dependent and seasonal operations.
- 24 months: Generally appropriate for highly seasonal models or models with monthly intervals, a 24-month Baseline Period may be optimal.

### ***Models***

The M&V Guide details two methods to determine energy savings based on:

- **Energy consumption Adjustment Model – Top-Down Approach.** One or more energy consumption adjustment models developed for each type of energy consumed within the M&V boundaries, and
- **Forecast Method – Bottom-Up Approach.** The aggregation of energy savings calculated for individual EPIAs implemented during the Reporting Period. If the forecast model cannot be developed, then the Implementer may use *the Backcast Model Method* for the purposes of regulatory reporting of energy savings. Only the Backcast model method is provided as an alternative in the M&V Guide.

The M&V Guide explicitly allows for tracking and modeling savings for both BRO and capital measures implemented within the SEM program and removal of savings from non-SEM measures.

## Summaries and Reporting Requirements

As the companion to the design guide, the M&V Guide outlines specific Summaries and Reporting requirements for both the Educational Modules and Site-specific Activities. Some of the reporting activities include:

### ***Summaries***

**Educational Module Summary** is provided by the SEM Coach and provides a summary for each activity related to each module and allows both the program and evaluator to understand who attended and what happened at each activity.

**Scoping Summary** is developed once during the SEM Program Year 1 (one summary per site) and allows both the SEM program and evaluators to understand conditions that existed at each site prior to SEM engagement, focusing primarily on energy efficiency history and plans.

**SEU Selection Summary** is included in the Energy Map and is updated as needed. Selecting SEUs allow both the customer and the SEM program to focus its efforts.

**EMA Summary** consist of questions (based on 50001 Ready Energy Management Assessment) relative to the tasks introduced or improved in each Cycle.

**Treasure Hunt Summary** is provided by the SEM Coach for each site and for each Treasure Hunt held.

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**Cycle Decision and Transition Summary** provides an overview of the site's intention as they complete each cycle.

### ***Reviews and Reports***

**Mid-Year Review** is an annual review of the M&V process and key SEM program design components conducted between the Implementer and the PA to ensure the program deliverables, including M&V deliverables, are being met prior to year-end reporting.

**SEM Reporting Period Performance Report** is a living documentation of the activities and outputs of the M&V process. It is intended to be for the PA but may be of use to the customer as a record of the M&V process that can be used in subsequent years.

## Detailed Technical Potential Input Assumptions and Data Sources

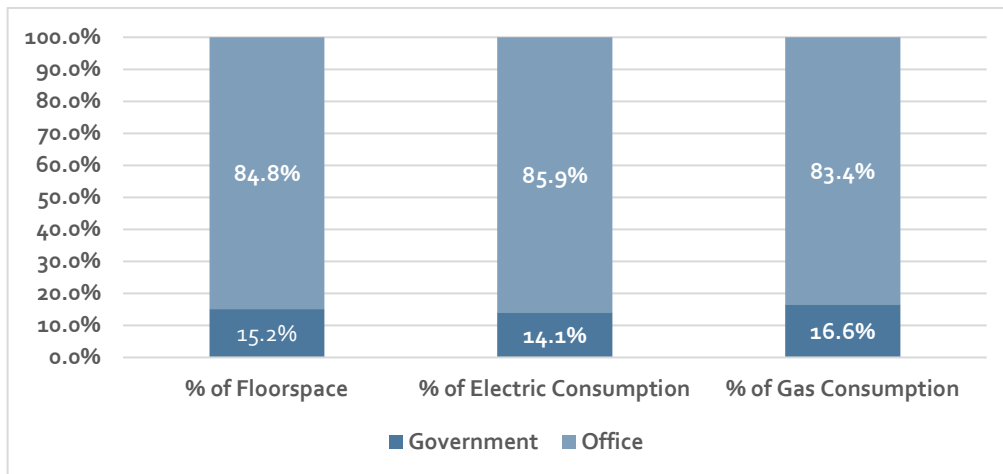
This appendix provides several tables detailing the input assumptions used in the technical potential analysis. Note that not all segments exactly match the source segments and some mapping was done by the Study Team. In addition, the market availability / applicability factors are often a combination of multiple factors from the source study that are all named slightly differently in each study. See Chapter 4 for more information from each source.

This Appendix also includes a list of the data sources used in developing estimates of technical potential savings for the 13 non-industrial segments considered in the analysis.

### Splitting the Health and Office Segments

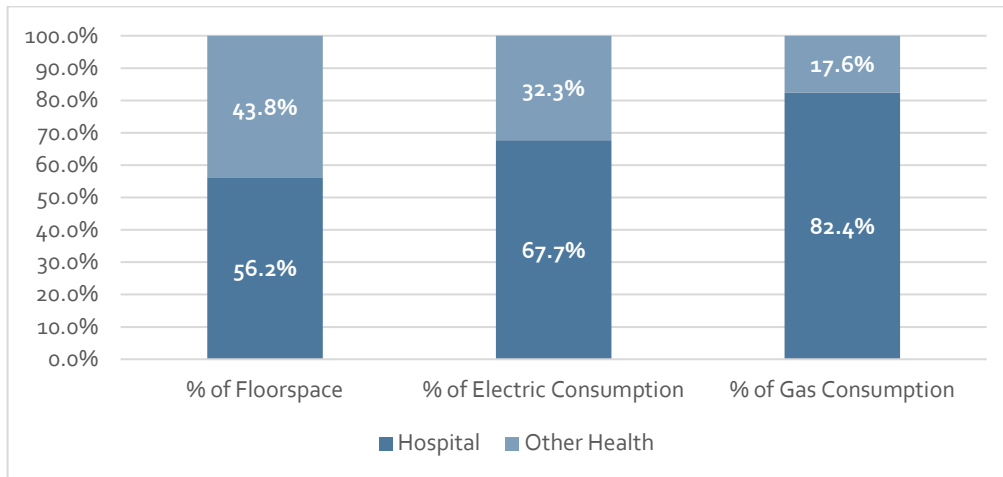
The Study Team broke out Health and Office from the Potentials and Goals study into multiple segments using EIA's 2018 CBECS<sup>70</sup>, sharing out floorspace, electricity consumption and gas consumption using the CBECS data. Figure D-1<sup>Error! Reference source not found.</sup> shows the share of total office space and consumption that is considered government office space vs standard office space from the CBECS analysis. Figure D-2 shows the share of healthcare floorspace and consumption categorized as hospital vs other healthcare from CBECS.

**Figure D-1. Government and Other Office Share of Total Office Space and Consumption**



<sup>70</sup> U.S. Energy Information Agency (EIA), 2018 Commercial Buildings Energy Consumption Survey (CBECS)  
<https://www.eia.gov/consumption/commercial/data/2018/> Tables B15, B16, C22, and C32

**Figure D-2. Hospital and Other Health Share of Total Healthcare Floorspace and Consumption**



## Input Assumptions

Tables D-3 through D-6 detail the input assumptions used in the technical potential analysis.

**Table D-3. Electric Percent Savings by Segment and Source**

| Source                                     | Higher Education | Grocery     | Hospital    | Lodging     | Office      | Gov.        | Other       | Other Health | Restaurant  | Retail      | k-12 Schools | Warehouse   | Large MF    | Average     |
|--------------------------------------------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|--------------|-------------|-------------|-------------|
| <b>CA Potential &amp; Goals Study 2023</b> | 3.0%             | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%         | 3.0%        | 3.0%        | 3.0%         | 3.0%        | 3.0%        | 3.0%        |
| <b>PacifiCorp CPA 2022</b>                 | 7.3%             | 3.0%        | 5.7%        | 5.7%        | 4.5%        | 4.9%        | 5.8%        | 5.7%         | 2.7%        | 5.5%        | 7.8%         | 6.2%        | NA          | 5.4%        |
| <b>PSE 2020 CPA</b>                        | 4.1%             | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%         | 4.1%        | 4.1%        | 4.1%         | 4.1%        | 4.1%        | 4.1%        |
| <b>NWPCC 2021 Power Plan</b>               | 4.9%             | 4.9%        | 4.9%        | 4.9%        | 4.9%        | 4.9%        | 4.9%        | 4.9%         | 4.9%        | 4.9%        | 4.9%         | 4.9%        | 4.9%        | 4.9%        |
| <b>MI Statewide Study</b>                  | 3.7%             | 3.7%        | 3.7%        | 3.7%        | 3.7%        | 3.7%        | 3.7%        | 3.7%         | 3.7%        | 3.7%        | 3.7%         | 3.7%        | 3.7%        | 3.7%        |
| <b>Implementor 1</b>                       | 4.7%             | 2.1%        | 0.3%        | 2.1%        | 5.8%        | 5.8%        | 3.0%        | 5.4%         | 2.1%        | 2.1%        | 3.4%         | 2.7%        | NA          | 3.3%        |
| <b>Implementor 2</b>                       | 7.3%             | 2.4%        | 3.6%        | 3.0%        | 5.0%        | 5.6%        | 4.0%        | 3.0%         | 0.0%        | 3.4%        | 4.3%         | 5.5%        | 5.3%        | 4.0%        |
| <b>Average % Savings</b>                   | <b>5.0%</b>      | <b>3.3%</b> | <b>3.6%</b> | <b>3.8%</b> | <b>4.4%</b> | <b>4.6%</b> | <b>4.1%</b> | <b>4.3%</b>  | <b>2.9%</b> | <b>3.8%</b> | <b>4.5%</b>  | <b>4.3%</b> | <b>4.2%</b> | <b>4.1%</b> |

**Table D-4. Electric Market Applicability/Availability Savings by Segment and Source**

| Source                                     | Higher Education | Grocery      | Hospital     | Lodging      | Office       | Gov.         | Other        | Other Health | Restaurant   | Retail       | k-12 Schools | Warehouse    | Large MF     | Average      |
|--------------------------------------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>CA Potential &amp; Goals Study 2023</b> | 85.0%            | 0.0%         | 45.0%        | 0.0%         | 50.7%        | 75.0%        | 0.0%         | 45.0%        | 0.0%         | 0.0%         | 90.0%        | 0.0%         | 0.0%         | 30.1%        |
| <b>PacifiCorp CPA 2022</b>                 | 63.0%            | 1.6%         | 69.0%        | 5.9%         | 33.8%        | 75.0%        | 0.0%         | 69.0%        | 1.8%         | 7.9%         | 19.4%        | 0.0%         | NA           | 28.9%        |
| <b>PSE 2020 CPA</b>                        | 63.3%            | 0.0%         | 63.3%        | 63.3%        | 63.3%        | 75.0%        | 28.1%        | 63.3%        | 0.0%         | 63.3%        | 63.3%        | 63.3%        | 63.3%        | 51.8%        |
| <b>NWPCC 2021 Power Plan</b>               | 74.6%            | 2.2%         | 81.9%        | 7.0%         | 40.7%        | 75.0%        | 1.9%         | 6.1%         | 1.9%         | 6.6%         | 22.7%        | 0.0%         | NA           | 26.7%        |
| <b>Implementor 1</b>                       | 72.0%            | 40.0%        | 60.0%        | 40.0%        | 67.1%        | 75.0%        | 40.0%        | 60.0%        | 40.0%        | 40.0%        | 72.0%        | 40.0%        | NA           | 53.8%        |
| <b>Implementor 2</b>                       | 85.0%            | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        |
| <b>Average % Applicable Market</b>         | <b>73.8%</b>     | <b>21.5%</b> | <b>67.4%</b> | <b>33.5%</b> | <b>56.8%</b> | <b>76.7%</b> | <b>25.8%</b> | <b>54.7%</b> | <b>21.5%</b> | <b>33.8%</b> | <b>58.7%</b> | <b>31.4%</b> | <b>49.4%</b> | <b>46.5%</b> |

**Table D-5. Natural Gas Percent Savings by Segment and Source**

| Source                                   | Higher Education | Grocery     | Hospital    | Lodging     | Office      | Gov.        | Other       | Other Health | Restaurant  | Retail      | k-12 Schools | Warehouse   | Large MF    | Average     |
|------------------------------------------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|--------------|-------------|-------------|-------------|
| <b>CA Potential and Goals Study 2023</b> | 3.0%             | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%        | 3.0%         | 3.0%        | 3.0%        | 3.0%         | 3.0%        | 3.0%        | 3.0%        |
| <b>PSE 2020 CPA</b>                      | 4.1%             | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%        | 4.1%         | 4.1%        | 4.1%        | 4.1%         | 4.1%        | 4.1%        | 4.1%        |
| <b>Implementor 1</b>                     | 7.3%             | 0.0%        | 2.2%        | 3.8%        | 3.7%        | 9.1%        | 5.9%        | 3.0%         | 0.0%        | 9.9%        | 5.1%         | 9.4%        | 3.4%        | 4.8%        |
| <b>Implementor 2</b>                     | 3.3%             | 2.8%        | 2.7%        | 2.8%        | 5.7%        | 5.7%        | 2.1%        | 6.5%         | 2.8%        | 2.8%        | 4.1%         | 2.6%        | 2.1%        | 3.5%        |
| <b>MI Statewide Study</b>                | 2.1%             | 2.1%        | 2.1%        | 2.1%        | 2.1%        | 2.1%        | 2.1%        | 2.1%         | 2.1%        | 2.1%        | 2.1%         | 2.1%        | 2.1%        | 2.1%        |
| <b>Average % Savings</b>                 | <b>4.0%</b>      | <b>2.4%</b> | <b>2.8%</b> | <b>3.2%</b> | <b>3.7%</b> | <b>4.8%</b> | <b>3.4%</b> | <b>3.7%</b>  | <b>2.4%</b> | <b>4.4%</b> | <b>3.7%</b>  | <b>4.2%</b> | <b>2.9%</b> | <b>3.5%</b> |

**Table D-6. Natural Gas Market Applicability/Availability Savings by Segment and Source**

| Source                                   | Higher Education | Grocery      | Hospital     | Lodging      | Office       | Gov.         | Other        | Other Health | Restaurant   | Retail       | k-12 Schools | Warehouse    | Large MF     | Average      |
|------------------------------------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>CA Potential and Goals Study 2023</b> | 85.0%            | 0.0%         | 45.0%        | 0.0%         | 53.3%        | 75.0%        | 0.0%         | 45.0%        | 0.0%         | 0.0%         | 90.0%        | 0.0%         | 0.0%         | 30.3%        |
| <b>PSE 2020 CPA</b>                      | 63.3%            | 0.0%         | 63.3%        | 63.3%        | 63.3%        | 75.0%        | 28.1%        | 63.3%        | 0.0%         | 63.3%        | 63.3%        | 63.3%        | 63.3%        | 51.8%        |
| <b>Implementor 1</b>                     | 85.0%            | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        | 85.0%        |
| <b>Implementor 2</b>                     | 72.0%            | 40.0%        | 60.0%        | 40.0%        | 68.4%        | 75.0%        | 40.0%        | 60.0%        | 40.0%        | 40.0%        | 72.0%        | 40.0%        | NA           | 54.0%        |
| <b>Average % Applicable Market</b>       | <b>76.3%</b>     | <b>31.3%</b> | <b>63.3%</b> | <b>47.1%</b> | <b>67.5%</b> | <b>77.5%</b> | <b>38.3%</b> | <b>63.3%</b> | <b>31.3%</b> | <b>47.1%</b> | <b>77.6%</b> | <b>47.1%</b> | <b>49.4%</b> | <b>55.2%</b> |

## Data Sources

### 1. Stocks/Consumption/Segments

- 2023 California Potentials and Goals Study, Guidehouse
  - <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/energy-efficiency-potential-and-goals-studies/2023-potential-and-goals-study>
  - The team used this study as the source of commercial segments and segment level consumption (electricity and natural gas) and building stocks (sq. ft.)

### 2. Savings and Market Availability/Applicability Sourcing

- 2023 CA Potentials and Goals, Guidehouse
  - <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/energy-efficiency-potential-and-goals-studies/2023-potential-and-goals-study>
  - Savings: 3% savings applied across the board
  - Market Availability/Applicability: Only one applicability factor is used in this study. Only 4 segments were actually shown as applicable (Higher Education, Healthcare, Large offices, and k-12 Schools). All other segments had 0 % applicability, resulting in 0 savings for the remaining segments.
- 2023 PacifiCorp Conservation Potential Assessment, AEG
  - [IRP Support & Studies \(pacificorp.com\)](#) – Appendix H
  - Savings: Savings were averaged across the 5 states analyzed in PacifiCorp's territory at the segment level. Additionally, savings were provided as savings/1000sqft of floor area, so the project team converted these to savings percentages using EUIs provided in the study
  - Market Availability/Applicability: Two factors are used from this study to determine the overall applicability and remaining stock remaining within each segment: the applicability factor combined with the baseline saturation factor. These two factors combined result in the remaining stock available eligible for SEM.
- 2021 PSE Conservation Potential Assessment for 2021 IRP, Cadmus
  - <https://www.pse.com/en/IRP/Past-IRPs/2021-IRP - Appendix E>
  - Savings: Savings were shown as savings/1000 sq ft, but the sourcing referenced a 4.1% savings factor derived from the 2014 NEEA Commercial Real Estate SEM study, which was applied uniformly to all segments.
  - Market Availability/Applicability: This study contains two factors that feed into the overall applicability: Applicability and Feasibility. These two factors are multiplied by each other to get the overall applicability factor – which is broad brush and most segments have the same factors, with only a few that have 0% applicability.
- 2021 Power Plan, Northwest Power and Conservation Council
  - <https://www.nwcouncil.org/2021-power-plan-technical-information-and-data/>
  - Savings: Savings for this study use one overall commercial percent savings (4.9%) applied to all segments – this is based on regional data sources in the PNW
  - Market Availability/Applicability: NWPCC has two factors impacting the overall applicability of SEM in different segments. The first is applicability, which reflects the percent of each segment SEM could be applied to, and the second is saturation. The saturation number is utilized differently for SEM and is meant to account for overlap with other measures in their modeling.
- 2021 Michigan Statewide EWR Potential Study, Guidehouse
  - <https://www.michigan.gov/mpsc/commission/workgroups/2021-energy-waste-reduction-and-demand-response-statewide-potential-study>
  - Savings: Savings for this study use one overall commercial percent savings (3.7%) applied to all segments
  - Market Availability/Applicability: This study utilizes applicability factors, but did not publish these in the publicly available data
- Implementor 1
  - Data provided directly to the project team under anonymity.

- 
- Savings: Savings from implementor 1 were provided at the implementor defined commercial segments. These segments were mapped to the study segments.
    - Market Availability/Applicability: The implementor provided their applicability factors used in their planning and potential analyses.
  - Implementor 2
    - Data provided directly to the project team under anonymity.
    - Savings: Savings from implementor 2 were provided at the study defined segment level.
    - Market Availability/Applicability: The study team discussed applicability factors with this implementor who believes that some form of SEM could be applied to basically all buildings in commercial. The Project team used 85% applicability across the board for this implementor, reflecting the NWPCC assumption that 15% of the market will never adopt.

## Market Assessment

This Appendix includes results of the first screen evaluation of non-industrial segments from the perspective of each of the three Success Factors. In addition, it includes comments provided by the Delphi Panel members and other SMEs on each of the 13 segments considered in the Market Assessment.

### First Screen Results

#### Success Factor 1 (Availability of Organizational & Operational Alignment with SEM Implementation Needs and Principles) Results

Table E-1 shows the Success Factor 1 scores from each Delphi Panel member as well as the average score for each segment. The segments are presented in ranking order from the segment with the highest average score to that with the lowest.

**Table E-1. Success Factor 1 (Availability of Organizational & Operational Alignment with SEM Implementation Needs and Principles) Score Results – Segments Ranked Based on Average Score (SF 1 Scores: 0.25-Low, 0.5-Medium, 0.75-High)**

| Non-Industrial Segment | Success Factor 1 |         |         |         |         |         | Average Score |
|------------------------|------------------|---------|---------|---------|---------|---------|---------------|
|                        | Score 1          | Score 2 | Score 3 | Score 4 | Score 5 | Score 6 |               |
| 1. Higher Education    | 0.65             | 0.65    | 0.75    | 0.75    | 0.7     | 0.65    | 0.7           |
| 2. Government          | 0.3              | 0.75    | 0.65    | 0.75    | 0.7     | 0.6     | 0.6           |
| 3. k-12 Schools        | 0.25             | 0.75    | 0.75    | 0.75    | 0.7     | 0.5     | 0.6           |
| 3. Hospital            | 0.25             | 0.75    | 0.75    | 0.65    | 0.7     | 0.6     | 0.6           |
| 5. Other Health        | 0.25             | 0.6     | 0.75    | 0.5     | 0.7     | 0.5     | 0.6           |
| 6. Warehouse           | 0.4              | 0.7     | 0.65    | 0.5     | 0.5     | 0.5     | 0.5           |
| 7. Office              | 0.25             | 0.35    | 0.75    | 0.5     | 0.7     | 0.5     | 0.5           |
| 8. Lodging             | 0.25             | 0.5     | 0.65    | 0.35    | 0.6     | 0.65    | 0.5           |
| 9. Retail              | 0.25             | 0.5     | 0.65    | 0.35    | 0.7     | 0.5     | 0.5           |
| 10. Grocery            | 0.25             | 0.6     | 0.65    | 0.25    | 0.6     | 0.5     | 0.5           |
| 11. Res. Multifamily   | 0.35             | 0.35    | 0.75    | 0.5     | 0.45    | 0.5     | 0.5           |
| 12. Other Commercial   | 0.25             | 0.25    | 0.75    | 0.5     | 0.6     | 0.35    | 0.5           |
| 13. Restaurant         | 0.25             | 0.25    | 0.65    | 0.35    | 0.6     | 0.5     | 0.4           |

As can be seen in the table, there is almost complete agreement in the scores assigned by all six Panel members for Higher Education. In the case of Government, k-12 Schools, Hospital, Other Health, and Lodging, there is very good agreement among five of the six Panel members and for Warehouse and

Grocery relatively good agreement among those Panel members. However, there is extensive disagreement among Panel participants for the remaining segments: Office, Retail, Residential Multifamily, Other Commercial, and Restaurant.

All segments received a total score of 0.5 or higher (corresponding to Medium and above) from at least three of the six Panel members and most from four or more members. Thus, all segments were considered by at least three Panel members, and in many cases by five of them, to have the characteristics required to be considered suitable for a successful SEM program from the perspective of Success Factor 1, that is they have an adequate level of operational capabilities to implement and SEM program. Higher Education, Government, k-12 Schools, Hospital, and Other Health have the highest level of organizational and operational alignment with SEM implementation needs and principles.

## Success Factor 2 (Availability of SEM Savings) Results

Table E-2 shows the Success Factor 2 scores from each Delphi Panel members as well as the average score for each segment. The segments are presented in ranking order from the segment with the highest average score to that with the lowest.

**Table E-2. Success Factor 2 (Availability of SEM Savings) Score Results – Segments Ranked Based on Average Score (SF 2 Scores: 0.3-Low, 0.6-Medium, 0.9-High)**

| Non-Industrial Segment | Success Factor 2 |         |         |         |         |         | Average Score |
|------------------------|------------------|---------|---------|---------|---------|---------|---------------|
|                        | Score 1          | Score 2 | Score 3 | Score 4 | Score 5 | Score 6 |               |
| 1. Higher Education    | 0.9              | 0.9     | 0.75    | 0.9     | 0.9     | 0.75    | 0.9           |
| 2. Hospital            | 0.9              | 0.9     | 0.6     | 0.9     | 0.75    | 0.75    | 0.8           |
| 3. k-12 Schools        | 0.9              | 0.75    | 0.75    | 0.9     | 0.75    | 0.6     | 0.8           |
| 4. Government          | 0.9              | 0.75    | 0.6     | 0.9     | 0.75    | 0.45    | 0.7           |
| 5. Grocery             | 0.6              | 0.6     | 0.6     | 0.6     | 0.75    | 0.6     | 0.6           |
| 6. Office              | 0.6              | 0.75    | 0.6     | 0.6     | 0.6     | 0.6     | 0.6           |
| 7. Res. Multifamily    | 0.6              | 0.6     | 0.6     | 0.9     | 0.45    | 0.45    | 0.6           |
| 8. Warehouse           | 0.6              | 0.45    | 0.75    | 0.6     | 0.6     | 0.6     | 0.6           |
| 9. Other Commercial    | 0.6              | 0.3     | 0.6     | 0.6     | 0.75    | 0.6     | 0.6           |
| 10. Other Health       | 0.6              | 0.6     | 0.45    | 0.6     | 0.6     | 0.45    | 0.6           |
| 11. Lodging            | 0.45             | 0.5     | 0.75    | 0.6     | 0.45    | 0.6     | 0.6           |
| 12. Retail             | 0.3              | 0.6     | 0.6     | 0.3     | 0.6     | 0.75    | 0.5           |
| 13. Restaurant         | 0.3              | 0.45    | 0.3     | 0.6     | 0.45    | 0.3     | 0.4           |

As can be seen in the table, there is very good agreement in the scores assigned by the Panel members to many of the segments, with almost complete agreement for Higher Education and very good agreement for Hospital, k-12 Schools, Grocery, Office, Other Health, and Restaurant. However, there is less agreement for the remaining segments, especially for Residential Multifamily, Warehouse, Other Commercial, Retail.

All segments received a total score of 0.6 or more (corresponding to Medium and above) from at least one of the six Panel members and most from four or more members. Higher Education, Hospital, k-12 Schools, Government, Grocery, and Office received a score of 0.6 or higher from all six Panel members.

Residential Multifamily, Warehouse, Other Commercial, Other Health, and Retail received a score of 0.6 or higher from at least four of the six members.

Thus, all segments, except Restaurant, were considered by at least three Panel members, and in many cases by five or six of them, to have the characteristics required to be considered suitable for a successful SEM program from the perspective of Success Factor 2. That is, they have an adequate level of potential energy savings. Higher Education, Hospital, k-12 Schools, and Government have the highest availability of SEM savings.

### Comparison with Technical Potential Estimates

As was indicated in Table 7 in Chapter 6, one of the two criteria included in Success Factor 2 was Annual Technical Potential Savings. The Delphi Panel was asked to score this criterion for each segment with the following values: 1: less than 2% savings, 2: between 2% and 4% savings, and 3: more than 4% savings; savings were not differentiated by electricity or natural gas. Table E-3 shows the scores assigned by each Delphi Panel member to this criterion along with the average score and, for comparison purposes, the Annual Technical Potential Savings estimated in Chapter 4.

**Table E-316. Technical Potential Savings Score Results – Segments Ranked Based on Average Score**  
(Technical Potential Savings Scores: 1: <2%, 2: >2% and <4%, 3: >4%)

| Non-Industrial Segment | Technical Potential Savings Criterion – Delphi Panel Members |                     |                     |                     |                     |                     |                           | Technical Potential Savings - Chapter 4 |                 |
|------------------------|--------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|-----------------------------------------|-----------------|
|                        | Score 1 / % Savings                                          | Score 2 / % Savings | Score 3 / % Savings | Score 4 / % Savings | Score 5 / % Savings | Score 6 / % Savings | Average Score / % Savings | Electric Savings (%)                    | Gas Savings (%) |
| 1. Higher Education    | 3 / >4%                                                      | 3 / >4%             | 3 / >4%             | 3 / >4%             | 3 / >4%             | 2 / 2% – 4%         | 2.8                       | 5.0                                     | 4.0             |
| 2. k-12 Schools        | 3 / >4%                                                      | 3 / >4%             | 3 / >4%             | 3 / >4%             | 3 / >4%             | 2 / 2% – 4%         | 2.8                       | 4.5                                     | 3.7             |
| 3. Government          | 3 / >4%                                                      | 2 / 2% – 4%         | 3 / >4%             | 3 / >4%             | 3 / >4%             | 1 / <2%             | 2.5                       | 4.6                                     | 4.8             |
| 4. Hospital            | 3 / >4%                                                      | 3 / >4%             | 2 / 2% – 4%         | 3 / >4%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 2.5                       | 3.6                                     | 2.8             |
| 5. Office              | 2 / 2% – 4%                                                  | 3 / >4%             | 3 / >4%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 2 / 2% – 4%         | 2.3                       | 4.4                                     | 3.7             |
| 6. Res. Multifamily    | 2 / 2% – 4%                                                  | 2 / 2% – 4%         | 3 / >4%             | 3 / >4%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 2.3                       | 4.2                                     | 2.9             |
| 7. Other Health        | 2 / 2% – 4%                                                  | 2 / 2% – 4%         | 2 / 2% – 4%         | 2 / 2% – 4%         | 3 / >4%             | 2 / 2% – 4%         | 2.2                       | 4.3                                     | 3.7             |
| 8. Retail              | 1 / <2%                                                      | 3 / >4%             | 3 / >4%             | 1 / <2%             | 3 / >4%             | 2 / 2% – 4%         | 2.2                       | 3.8                                     | 4.4             |
| 9. Warehouse           | 2 / 2% – 4%                                                  | 2 / 2% – 4%         | 3 / >4%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 2 / 2% – 4%         | 2.2                       | 4.3                                     | 3.7             |
| 10. Other Commercial   | 2 / 2% – 4%                                                  | 1 / <2%             | 3 / >4%             | 2 / 2% – 4%         | 3 / >4%             | 2 / 2% – 4%         | 2.2                       | 4.1                                     | 3.4             |
| 11. Grocery            | 2 / 2% – 4%                                                  | 1 / <2%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 3 / >4%             | 2 / 2% – 4%         | 2.0                       | 3.3                                     | 2.4             |
| 12. Lodging            | 1 / <2%                                                      | 2 / 2% – 4%         | 2 / 2% – 4%         | 2 / 2% – 4%         | 1 / <2%             | 2 / 2% – 4%         | 1.7                       | 3.8                                     | 3.2             |
| 13. Restaurant         | 1 / <2%                                                      | 2 / 2% – 4%         | 1 / <2%             | 2 / 2% – 4%         | 2 / 2% – 4%         | 1 / <2%             | 1.5                       | 2.9                                     | 2.4             |

As can be seen in the table, there is good agreement among Panel members for many of the segments with almost complete agreement for Higher Education, k-12 Schools, Other Health, and Warehouse and very good agreement for Government, Office, Residential Multifamily, Grocery, and Lodging. However, there is less agreement for Hospital, Retail, Other Commercial, and Restaurant.

For the segments where there is very good agreement among Panel participants, there is also good agreement with the annual technical potential savings values estimated by the Study Team in Chapter 4.

### ***Ranking in Terms of Overall Segment Technical Potential***

Table E-4 shows the technical potential for electricity, the technical potential for natural gas, and the overall total technical potential, for each of the 13 segments, that the Study Team estimated in Chapter 4. In each category, the segments are presented in ranking order from the segment with the highest potential to the one with the lowest.

***Table E-4. Non-Industrial Segments Ranked Based on Overall Technical Potential***

| Rank Based on Electricity Technical Potential |                                         | Rank Based on Natural Gas Technical Potential |                                         | Rank Based on Total Technical Potential |                                   |
|-----------------------------------------------|-----------------------------------------|-----------------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------|
| Non-Industrial Segment                        | Electricity Technical Potential (MMBtu) | Non-Industrial Segment                        | Natural Gas Technical Potential (MMBtu) | Non-Industrial Segment                  | Total Technical Potential (MMBtu) |
| Office                                        | 1,243,101                               | Residential Multifamily (Large)               | 1,513,568                               | Residential Multifamily (Large)         | 2,671,906                         |
| Residential Multifamily (Large)               | 1,158,338                               | Office                                        | 689,047                                 | Office                                  | 1,932,148                         |
| Hospital                                      | 456,405                                 | Other Commercial                              | 679,172                                 | Other Commercial                        | 1,005,403                         |
| Other Commercial                              | 326,231                                 | k-12 Schools                                  | 440,161                                 | Hospital                                | 781,606                           |
| Retail                                        | 297,322                                 | Higher Education                              | 345,775                                 | k-12 Schools                            | 629,430                           |
| Government                                    | 284,390                                 | Hospital                                      | 325,201                                 | Higher Education                        | 561,811                           |
| Warehouse                                     | 254,534                                 | Warehouse                                     | 256,170                                 | Warehouse                               | 510,704                           |
| Higher Education                              | 216,036                                 | Government                                    | 202,659                                 | Government                              | 487,049                           |
| Other Health                                  | 208,028                                 | Lodging                                       | 148,115                                 | Retail                                  | 428,235                           |
| k-12 Schools                                  | 189,269                                 | Restaurant                                    | 144,255                                 | Other Health                            | 299,877                           |
| Grocery                                       | 188,849                                 | Retail                                        | 130,913                                 | Lodging                                 | 256,877                           |
| Lodging                                       | 108,762                                 | Other Health                                  | 91,849                                  | Restaurant                              | 242,154                           |
| Restaurant                                    | 97,899                                  | Grocery                                       | 44,013                                  | Grocery                                 | 232,862                           |

### **Success Factor 3 (Availability of "Good" SEM Candidates) Results**

Table E-5 shows the Success Factor 3 scores from each Delphi Panel member as well as the average score for each segment. The segments are presented in ranking order from the segment with the higher average score to that with the lower.

**Table E-5. Success Factor 3 (Availability of "Good" SEM Candidates) Score Results – Segments Ranked based on Average Score (SF 3 Scores: 0.45-Low, 0.9-Medium, 1.35-High)**

| Non-Industrial Segment | Success Factor 3 |         |         |         |         |         |               |           |
|------------------------|------------------|---------|---------|---------|---------|---------|---------------|-----------|
|                        | Score 1          | Score 2 | Score 3 | Score 4 | Score 5 | Score 6 | Average Score | Range (%) |
| 1. Higher Education    | 1.35             | 1.35    | 1.15    | 1.35    | 1.3     | 1.35    | 1.3           | 15        |
| 2. k-12 Schools        | 1.1              | 1.2     | 1.35    | 1.35    | 1.25    | 1.15    | 1.2           | 39        |
| 3. Government          | 0.9              | 1.35    | 1.1     | 1.35    | 1.3     | 0.95    | 1.2           | 20        |
| 4. Hospital            | 0.9              | 0.95    | 0.9     | 1       | 1.1     | 1.35    | 1.0           | 44        |
| 5. Lodging             | 0.85             | 0.9     | 1.05    | 0.9     | 0.7     | 1.25    | 1.0           | 58        |
| 6. Office              | 0.9              | 0.65    | 0.85    | 0.9     | 0.7     | 0.85    | 0.8           | 31        |
| 7. Grocery             | 0.45             | 0.95    | 0.9     | 0.45    | 0.9     | 1.05    | 0.8           | 77        |
| 8. Res. Multifamily    | 0.45             | 0.65    | 1.1     | 0.9     | 0.65    | 0.95    | 0.8           | 83        |
| 9. Other Commercial    | 0.8              | 0.45    | 0.9     | 0.9     | 0.9     | 0.5     | 0.7           | 61        |
| 10. Other Health       | 0.45             | 0.55    | 0.85    | 0.9     | 0.9     | 0.65    | 0.7           | 63        |
| 11. Retail             | 0.45             | 0.5     | 0.85    | 0.45    | 1.05    | 0.9     | 0.7           | 86        |
| 12. Warehouse          | 0.45             | 0.6     | 0.85    | 0.9     | 0.5     | 0.85    | 0.7           | 65        |
| 13. Restaurant         | 0.45             | 0.45    | 0.45    | 0.45    | 0.85    | 0.5     | 0.5           | 76        |

As can be seen in the table, there is good agreement among the Panel members for some of the segments, with almost complete agreement for Higher Education, very good agreement for k-12 Schools, Government, and Office, and relatively good agreement for Hospital. However, there is disagreement for the remaining segments, especially for Grocery, Residential Multifamily, Retail, and Restaurant.

All segments received a total score of 0.9 or higher (corresponding to Medium and above) from at least one of the six Panel members and many from four or more members. Higher Education, Government, k-12 Schools, and Hospital, received a score of 0.9 or higher from all six Panel members. Lodging, Office, Grocery, Residential Multifamily, Other Commercial, Other Health, and Warehouse received a score of 0.9 from at least three of the six Panel members.

Thus, all segments, except Retail and Restaurant, were considered by at least three Panel members, and in many cases by five or six of them, to have the characteristics required to be considered suitable for a successful SEM program from the perspective of Success Factor 3. That is, they have an adequate level of motivation, engaged business culture, and available resources to make a long-term commitment to SEM. Higher Education, Government, k-12 Schools, and Hospital have the highest level of availability of "Good" SEM candidates.

## Delphi Panel – Comments From Participants

As mentioned in Chapter 6, the Study Team assembled a Delphi Panel composed of six non-industrial SEM Program Implementers and PAs with experience implementing successful non-industrial SEM programs in California and other States. The Panel conducted a scoring exercise to evaluate the non-industrial segments considered in this Study and as part of the exercise, provided comments explaining their scores for the criteria associated with each of the three Success Factors as well as some general comments. The tables below summarize these comments for each segment.

**Table E-6 Delphi Panel Participants and Other SEM SMEs' Comments on Higher Education, k-12 Schools, and Government Segments**

| Higher Education                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | k-12 Schools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| <ul style="list-style-type: none"> <li>- Higher Education institutions typically have numerous decent-sized buildings, a more forward thinking set of occupants (students and faculty) with sustainability goals, and sometimes an interest in being a showcase for sustainability technology (for their students and faculty).</li> <li>- Easy support from top and bottom for SEM. Higher Education institutions have staff and environmental targets that lend them to organizationally be prepared to take on the business practice development needs of SEM.</li> <li>- Many colleges are public institutions with accompanying level of transparency. They are also often well-capitalized and have a strong interest in the public relations aspect of reducing energy consumption. In addition, they appear to staff their facilities' teams better than other public/nonprofits.</li> <li>- Colleges generally have a dedicated facility team with the potential to deliver SEM opportunities. They commonly have data and staff with technical expertise who can implement projects and determine savings.</li> <li>- Lots of facilities of different types on college campuses. Colleges tend to have one or more large campuses with a diverse load of end uses and equipment. This diversity creates opportunities with O&amp;M.</li> <li>- In aggregate the larger universities can have a lot of usage and complex systems that can yield significant savings. Community College buildings in aggregate can also add up. Individual buildings however do not have that much usage.</li> <li>- Higher Education institutions have great potential, especially in California. Many large university systems and buildings that are aging and probably lack capital funds. If there are resources this could be good.</li> <li>- Unfortunately, a lack of submetering, sometimes even at the building level, plagues this sector.</li> <li>- Higher Education institutions are active participants in BPA's CSEM programs, PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, and MCE's Commercial program.</li> </ul> | <ul style="list-style-type: none"> <li>- Most schools are public institutions with accompanying level of transparency. They often have a strong interest in the public relations aspect of reducing energy consumption or may be driven by local mandates to reduce consumption.</li> <li>- Schools are great for SEM on multiple levels. They often struggle significantly with resources and SEM can support that. Their portfolio can also be large and complex which supports the need for SEM. -SEM can tie really well into k-12 education and workforce development.</li> <li>- Schools generally have a dedicated facility team with the potential to deliver SEM opportunities. Metering is generally at the building level which is appropriate for this building sector.</li> <li>- Even with prop 39 improvements, schools are under-funded and under-managed. This makes this segment a prime candidate for SEM and it is very important to support it. However, state needs to fund the resource to support the maintenance.</li> <li>- k-12 Schools are very close to Higher Education institutions, with different building "classes" (smaller elementaries, mid-sized middle schools, and large high schools and admin buildings) that may have different engagement (and M&amp;V and technical approaches).</li> <li>- School energy consumption is concentrated into school districts for whom energy costs represent a large cost. Large districts can have a lot of usage and a lot opportunity associated with them. The seasonal nature of the building operations also serves to increase SEM potential.</li> <li>- Lots of opportunity to save energy but challenging as each school is generally small.</li> <li>- District level staff will have time to engage. Local school staff will need to be brought in in creative ways.</li> <li>- Schools are active participants in BPA's CSEM programs, PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, MCE's Commercial program, and TVA's EnergyRight School program.</li> </ul> | <ul style="list-style-type: none"> <li>- Government facilities typically have numerous decent-sized buildings, a more forward-thinking set of building operators who are supporting the city's sustainability goals (among other goals). More cities than not have at least an interest in sustainability.</li> <li>- Many local governments have climate action plans- SEM is a conduit to goal attainment.</li> <li>- Government facilities are mandated to reduce energy consumption, but often don't have the right staff.</li> <li>- Many government-owned facilities have a dedicated facility team with the potential to deliver SEM opportunities.</li> <li>- There is great potential in government facilities. Especially for larger cities/counties/state departments. The bureaucracy makes it harder to navigate but even more important to get SEM involved.</li> <li>- Larger government buildings can be great for SEM, including jails, community centers, etc. They own buildings for a long time and have commitments to sustainability.</li> <li>- Facilities may not have the data collection systems ideally suited to SEM.</li> <li>- Looking at this in aggregate, there is major savings potential here.</li> <li>- Reduced savings potential due to limited funds to implement projects.</li> <li>- Depending on the agency and its management government can be very adept at developing business practices, alternatively they can be mired in their own processes and unable to adapt them to incorporate energy management practices.</li> <li>- Municipalities and other Government are active participants in BPA's CSEM programs, PSE's CSEM program, Energy Trust's Commercial and Institutional SEM program, and MCE's Commercial program.</li> </ul> |

**Table E-7 Delphi Panel Participants and Other SEM SMEs' Comments on Hospital Lodging, and Office Segments**

| Hospital                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| <ul style="list-style-type: none"> <li>- Hospitals are often large buildings or campuses with a diverse load of end uses and equipment.</li> <li>- Hospitals generally have sophisticated in-house facility teams and good data systems to engage with SEM. Lots of motivation and resources in large hospitals.</li> <li>- Hospitals are often committed to making the world easier to live in for humans. SEM falls in line with this commitment. Additionally, ownership does not changeover frequently and smooth running of the buildings is essential.</li> <li>- It's possible to have facility managers who are really excited/engaged, but there are some that are too risk averse to make changes.</li> <li>- Hospitals are limited in the changes they can make, in the time they have, and they are risk adverse.</li> <li>- Big energy baselines, we can eek savings out despite the challenges. In patient hospitals offer great savings and are large consumers.</li> <li>- Most hospitals are publicly traded or non-profits with reporting requirements. Generally well-capitalized and interested in reducing costs. Health and safety are north stars that may cause more conservative decisions around changing equipment operation.</li> <li>- Their high energy spend makes them good candidates in one way. They are challenged by "fiefdoms" run by the medical staff as well as realities /perceptions around energy needs related to health care (e.g., how much air is needed).</li> <li>- Lots of energy use, but often times have constraints that make it hard to see a high % of savings.</li> <li>- Hospitals are active participants in BPA's CSEM programs, PSE's CSEM program, and Energy Trust's Commercial and Institutional SEM program.</li> </ul> | <ul style="list-style-type: none"> <li>- At the corporate and individual site level lodgings have motivation and public relationship motivations making them good SEM candidates.</li> <li>- SEM can latch on to previous "green" and "water saving" campaigns and business practices. A lot of lodging has done well with "green" campaigns.</li> <li>- Large chains will have an advantage in terms of facility staffing able to take on Energy Champion role, while most independents or franchisees will struggle.</li> <li>- These organizations focus primarily on occupancy comfort and HVAC is often managed by transient tenants. Bottom lines and stakeholders are focused on numbers not savings.</li> <li>- Occupants are often focused almost solely on operating their hotel. However, if the hotel is part of a larger organization and there is a regional/national person that is sustainability /energy lead, gains can be made.</li> <li>- Consumption is spread across a large number of organizations/buildings.</li> <li>- Hotels often have good data availability and people who can access said data</li> <li>- Multi-site engagements are far more impactful, with participants more able to scale their participation, than for single-site facilities.</li> <li>- Average hotel has decent savings and consumption - large marque sites are good targets.</li> <li>- Larger chains will be more likely to want to participate than small chains or independents, who will have less access to capital and a shorter investment timeframe. Focus on tenant comfort may restrict willingness to pursue some operational updates.</li> <li>- Unless large, downtown buildings, usage may not be that high and ability to make changes can be hard.</li> <li>- Large Hospitality are active participants in BPA's CSEM Programs and Energy Trust's Commercial and Institutional SEM program.</li> </ul> | <ul style="list-style-type: none"> <li>- Mix of large and small organizations with varied facility staffing. Split incentive is a hurdle as vast majority of sites are leased and lease terms often put energy cost on the plate of the tenant rather than the building owner.</li> <li>- SEM organizational alignment and savings depend on the owner and tenant.</li> <li>- Large office buildings may have sufficient owner-controlled load to participate in SEM and some large tenants may likewise have enough load, but many sites will struggle with split incentive issue.</li> <li>- Data are available if local site staff are in charge of systems. A dedicated operator is not always in place.</li> <li>- Depending on site engaged can be big consumption and savings but in general is limited to smaller consumption compared to universities and hospitals.</li> <li>- Most office spaces are managed by property management companies that can be shortsighted. They have specific bottom lines to hit and stakeholders to answer to.</li> <li>- Commercial Real Estate (i.e., rented space, vis-à-vis property management companies) are more difficult to gain buy-in than owner-occupied office buildings.</li> <li>- Office can be good where the owner occupies the building. If there are renters/lessors the engagement and efforts can be challenging (and even problematic).</li> <li>- Wide disparity in the ability of office staff to engage with SEM activities, hindered by owner/occupant issues.</li> <li>- Unless large downtown buildings, usage may not be that high. Investment is there but often the buildings can get sold.</li> <li>- Property managers are active participants in PSE's CSEM program.</li> </ul> |

**Table E-8. Delphi Panel Participants and Other SEM SMEs' Comments on Grocery, Residential Multifamily, and Warehouse Segments**

| Grocery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Residential Multifamily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Warehouse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <ul style="list-style-type: none"> <li>- Most large grocery chains are publicly traded. They are motivated by competitive advantage from lower energy spend, which represents a higher % of costs than most other commercial enterprises. Most organizations are also interested in PR aspect of energy savings.</li> <li>- Fairly consolidated industry with the large and even regional chains generally having dedicated facilities staff. Metering is generally well-understood.</li> <li>- Sales come first. Depending on corporate or site engagement, staff will be limited to participate in SEM. The key exception is if there is a national /regional person for a larger organization, where that person is the sustainability/energy lead.</li> <li>- Refrigeration is a high expense and normally forward-thinking management occurs. However, they can be skeptical.</li> <li>- SEM success depends on if it is implemented at the corporate or site level. A one-off site may not have the people and data to be successful. A corporate team can provide much of the organizational needs with individual sites supplying local expertise and data.</li> <li>- Multi-site engagements are far more impactful, with participants more able to scale their participation, than for single-site facilities.</li> <li>- On its own, each site does not have that much usage; however, working with a chain of multiple stores can increase usage and savings.</li> <li>- Large Grocery stores are active participants in BPA's CSEM Programs and Energy Trust's Commercial and Institutional SEM program.</li> </ul> | <ul style="list-style-type: none"> <li>- Private ownership is the norm with associated limited information. Split incentives decrease appetite and ability to pursue energy savings.</li> <li>- Publicly-owned housing has public mission and commitment to meeting sustainability standards.</li> <li>- Often housing organizations don't have the right leadership or tools to participate well. Often times the facility operations are outsourced.</li> <li>- Large multifamily will have data and onsite staff with knowledge to support SEM.</li> <li>- The occupant engagement aspect can be challenging, but multifamily facilities are often part of progressive organizations, making them open to solutions that make them more sustainable and/or that support their occupant engagement.</li> <li>- Savings to be had in common areas as well as in units. Capital funding can be a challenge.</li> <li>- One of the only industries whose business is the building, but their stakeholder is the tenant and occupancy comfort. That said, affordable MF has seen some good success.</li> <li>- SEM has seen success in this market, but the turnover and resource constraints will make it hard to sustain.</li> <li>- PSE's Multifamily SEM program is open to all multifamily. However, the program has found that Senior Residencies are not a good fit for SEM.</li> <li>- Energy Trust's Commercial and Institutional SEM program is focused on affordable housing facilities.</li> </ul> | <ul style="list-style-type: none"> <li>- Mix of large and small organizations with varied facility staffing. High rates of owner-occupied facilities.</li> <li>- Private ownership is the norm with associated limited information. With the exception of refrigerated warehouses, energy costs are not a significant motivator for business.</li> <li>- Limited commitment to organizational business plan for energy.</li> <li>- Site staff are knowledgeable and data available but staff might not be available to support program.</li> <li>- Middle of the road on savings opportunities for non-refrigerated warehouses: lighting and some type of HVAC.</li> <li>- For refrigerated warehouse there can be major savings. Even for non-refrigerated (but still air conditioned) warehouses there can be great opportunities. Engaging warehouses that are part of large chains/companies where their leadership can be leveraged can be a great thing.</li> <li>- SEM success really depends on who owns the warehouse. Would follow whatever market they are working for.</li> <li>- Not great in our experience.</li> </ul> |

**Table E-9. Delphi Panel Participants and Other SEM SMEs' Comments on Other Health, Other Commercial, Retail, and Restaurant Segments**

| Other Health                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Other Commercial                                                                                                                                                                                                                                                                                                                                                                                            | Retail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Restaurant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <ul style="list-style-type: none"> <li>- Health care has a large energy footprint but much of that is concentrated in hospitals. Many buildings defined in other health would have SEM potential similar to office buildings.</li> <li>- Fairly consolidated so organizations should have facility staffing capacity. Split incentive may be an issue as % of facilities leasing is unknown.</li> <li>- SEM success really depends on the owner and tenant. It is hit or miss depending on if small healthcare has ability to engaged and have needed data.</li> <li>- Many hospital organizations own Medical Office Buildings as well. These are normally well suited for SEM, but have smaller savings potential and run into some of the same problems as hospitals.</li> <li>- Small healthcare facilities may not have staff available of with knowledge to engage with SEM.</li> <li>- In aggregate could add up.</li> <li>- Multi-site engagements are far more impactful, with participants more able to scale their participation, than for single-site facilities.</li> <li>- MOB's are sort of a cross between Hospital and Retail. They are often tenant occupied, making engagement and investments challenging. But their energy use can be relatively high and if there is a national/regional sustainability person that can be leverages, inroads can happen.</li> <li>- Medical buildings are active participants in Energy Trust's Commercial and Institutional SEM program.</li> </ul> | <ul style="list-style-type: none"> <li>- SEM alignment depends on the specific organization</li> <li>- Unsure how to rank. The building sectors considered represent the vast majority of building energy consumption in the US so there can't be much left here.</li> <li>- This segment has so many different building types in it. Hard to say.</li> <li>- Too many variables to really know.</li> </ul> | <ul style="list-style-type: none"> <li>- Mix of large and small organizations with varied facility staffing. Split incentive is a hurdle as vast majority of sites are leased and lease terms often put energy cost on the plate of the tenant rather than the building owner.</li> <li>- Sales come first. Depending on corporate or site engagement, staff will be limited to participate in SEM. The key exception is if there is a national /regional person for a larger organization, where that person is the sustainability / energy lead.</li> <li>- On its own, each site does not have that much usage, however, working with a retail chain of multiple stores can increase usage and savings.</li> <li>- Multi-site engagements are far more impactful, with participants more able to scale their participation, than for single-site facilities.</li> <li>- Big box offer savings and are big consumers.</li> <li>- Box stores and retail often have commitments to sustainability and have whole departments that focus on incentives procurement. However, they can be hard to get in front of and typically find smaller savings, when they are incentivized through larger incentives.</li> <li>- Have seen some participants in this area, but you have to be able to aggregate a lot of buildings.</li> </ul> | <ul style="list-style-type: none"> <li>- Composed of a very large number of buildings/organizations, especially when the franchise model is taken into account.</li> <li>- Unless it is a really large restaurant or you look at them in aggregate, this segment has limited savings potential and a small consumption baseline.</li> <li>- This is a low-margin business and low margin businesses are tough for SEM.</li> <li>- Based on participation rates in other EE programs, energy savings does not seem to be a priority for most restaurants.</li> <li>- These buildings are normally very small and have many high turnover employees. Facilities are not their focus. Upgrades to kitchen equipment a stronger move here.</li> <li>- Depending on corporate or site engagement staff will be limited to participate in SEM.</li> <li>- Multi-site engagements are far more impactful, with participants more able to scale their participation, than for single-site facilities.</li> <li>- These facilities have limited local staff resources. If they're part of a regional/national chain, where they can leverage a sustainability lead, they can work well.</li> <li>- Have not seen these types of participants too much. There is high savings potential, but perhaps not a lot of usage unless aggregated.</li> </ul> |

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