

**INDUSTRIAL STRATEGIC ENERGY MANAGEMENT (SEM)  
IMPLEMENTATION PLAN**

*Southern California Edison / Southern California Gas*

Revision Version: **DRAFT 9/10/2018**

## Table of Contents

Program Information .....	4
1. Program and/or Sub-Program Name: .....	4
2. Sub-Program ID number: .....	4
3. Program Implementer .....	4
4. SCE Business Plan Sector.....	4
5. Program Type.....	4
6. Intervention Strategies .....	4
7. Projected Program Budget.....	5
8. Savings Impact.....	5
9. Program Effectiveness.....	5
Implementation Plan Narrative.....	6
1. Program Description.....	6
Program Rationale .....	6
Program Objectives .....	7
Table 1: SCE/SoCalGas Industrial SEM Program.....	8
Table 2: Program Metrics and Targets .....	9
2. Program Delivery and Customer Services .....	9
Implementation Roles and Responsibilities.....	9
Customer Eligibility.....	10
Program Services.....	12
Incentive Structures .....	13
Funding Sources .....	13
Measures Incented .....	14
Table 3: Measure Definitions.....	16
Program Sequence .....	17
3. Program Design and Best Practices.....	18
Addressing Market Barriers .....	18
Learning from Industry Best Practices.....	19
4. Evaluation, Measurement and Verification (EM&V).....	20
5. Pilots .....	24
6. Additional information.....	24
7. Differences from the Design and M&V Guides .....	25
Supporting Documents.....	26

1. Program Manuals and Program Rules.....	26
2. Program Logic Model:.....	27
3. Process Flow Chart:.....	28
4. Incentive Tables, Workpapers, Software Tools:.....	30
5. Quantitative Program Targets: .....	31
6. Diagram of Program:.....	32

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## Program Information

### 1. Program and/or Sub-Program Name:

Industrial Strategic Energy Management

### 2. Sub-Program ID number:

SCE-13-SW-003D Strategic Energy Management Program;  
SCG3714 IND-CEI

### 3. Program Implementer

<b>Program Implementor</b>	<b>Yes</b>
SCE Only	
SCE – Statewide Lead	
Other PA – Statewide Lead	
Third Party	x
Other	

### 4. SCE Business Plan Sector

<b>SCE Business Plan Sector</b>	<b>Yes</b>
Residential	
Commercial	
Industrial	x
Agricultural	
Public	
Codes & Standards	
Workforce Education & Training	
Finance	
Other	

### 5. Program Type

<b>Program Type</b>	<b>Yes</b>	<b>No</b>
Resource	x	
Non-Resource		x

### 6. Intervention Strategies

<b>Primary Intervention Strategy</b>	<b>Yes</b>	<b>No</b>
Upstream		x
Midstream		x
Downstream	x	
Direct Install		x

## 7. Projected Program Budget

Latest available program budget data is on CEDARS. (<https://cedars.sound-data.com/filings/list/>)

## 8. Savings Impact

Latest available program savings data is on CEDARS. (<https://cedars.sound-data.com/filings/list/>)

## 9. Program Effectiveness

Latest available program effectiveness data is on CEDARS. (<https://cedars.sound-data.com/filings/list/>)

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# Implementation Plan Narrative

## 1. Program Description

### Program Rationale

Note: The Industrial SEM program is built on a foundation of statewide SEM program design and M&V guidelines developed in a joint process with the IOUs and the California Public Utilities Commission (CPUC). Reference guides for design and M&V are publicly available as the California Industrial SEM Design Guide<sup>1</sup> and the California Industrial SEM M&V Guide<sup>2</sup> and these documents are the main reference for SEM program implementation. Many sections of this Implementation Plan are taken or have been adapted and summarized from these materials, and we wish to acknowledge the authors, Sergio Dias and Dr. Peter Therkelsen, for their contributions. Differences from the SEM Design and M&V Guides required for better or localized implementation are few and minor, and are clearly identified and defined in this Implementation Plan in Section 7.

Although relatively new to the energy efficiency community, Strategic Energy Management (SEM) has proven to be a successful approach to significantly reducing energy consumption in the industrial sector. Because establishing SEM in a facility requires a broad set of skills and a significant commitment of staff time, external training and technical assistance is often critical to adoption. Energy efficiency programs across the US are demonstrating that they are a determining factor in SEM implementation by providing this critical assistance<sup>3</sup>. Building the knowledge, ability and willingness of management and staff to integrate strategic energy decisions into their work processes provides the foundation for significant, sustained and cost-effective energy savings.

The CPUC directs the utilities to adopt a robust Strategic Energy Management resource acquisition program using a statewide design. As noted in Decision (D.) 16-08-019: “Strategic energy management is a holistic, whole-facility approach that uses Normalized Metered Energy Consumption (NMEC) and a dynamic baseline model to determine savings from all program activities at the facility, including capital projects, maintenance and operations and retro-commissioning. The customer engagement enabled and sustained via the SEM program is long term. Because a well-designed strategic energy management approach provides for project tracking by the customer and the program administrator, these programs will facilitate

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<sup>1</sup> Dias, S, 2017, California Industrial SEM Design Guide. Sergio Dias Consulting  
[ftp://ftp.cpuc.ca.gov/gopher-data/energy\\_division/EnergyEfficiency/RollingPortfolioPgmGuidance/CA\\_Ind\\_SEM\\_Design\\_Guide.pdf](ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/CA_Ind_SEM_Design_Guide.pdf)

<sup>2</sup> Therkelsen, P, 2017, California Industrial SEM M&V Guide. Raven Consulting  
[ftp://ftp.cpuc.ca.gov/gopher-data/energy\\_division/EnergyEfficiency/RollingPortfolioPgmGuidance/CA\\_Industrial\\_SEM\\_MV\\_Guide.pdf](ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/CA_Industrial_SEM_MV_Guide.pdf)

<sup>3</sup> Burgess, J et al. 2014, *Industrial Strategic Energy Management Initiative*. Consortium for Energy Efficiency  
<https://library.cee1.org/content/cee-industrial-strategic-energy-management-initiative/>

identification of project influence and allow a default net-to-gross value of 1.0 to apply to custom projects when program influence is evident.”<sup>4</sup>

While the rulemaking refers to SEM as an NMEC program, it is important to note that M&V for SEM in industrial applications is not the same as more simplified Commercial NMEC that typically uses only occupancy and weather normalization. Industrial SEM M&V requires an advanced level of data collection and customized modelling that considers a wide range of potential variables specifically tailored to each facility and their production.

California’s Investor-Owned Utilities (IOUs) launched non-resource SEM programs called Continuous Energy Improvement (CEI) following the 2008 Strategic Plan’s Industrial Chapter<sup>5</sup> recommendations and goals. Lessons learned in administering the CEI programs and through their evaluations have informed and been incorporated in the statewide SEM design process. Going forward, with the direction set forth in R.13-11-005, Industrial CEI programs will make the necessary enhancements in 2018 to be able to obtain, track, and claim savings as resource acquisition through a variety of activities integrated through SEM, including behavioral, retro-commissioning, Operations and Maintenance (O&M), and capital projects.

The Industrial SEM Program is a multi-year approach (2-year commitment period with the potential for additional renewal periods), whole facility program that addresses all types of resource (Electric and Gas) reduction opportunities in a comprehensive manner within industrial facilities. This Core program will be jointly administered by Southern California Edison (SCE) and Southern California Gas (SoCalGas) and implemented with with a third-party implementer.

## Program Objectives

The program drives measurable savings through equipping and enabling plant management and staff to measure and manage energy use. Specifically, the program provides technical training and support to:

- Develop an Energy Management System (EnMS) to allow the facility to integrate energy into its existing management practices and continuously improve energy performance in the long-term.
- Identify, prioritize, and implement facility-wide energy savings opportunities.
- Develop energy regression models to allow the facility and program to estimate annual savings.

The Industrial SEM Program is designed to help facilities identify, prioritize and implement energy savings opportunities that they would not have implemented absent program support, including reducing energy waste in their behavior and operations as well as capital projects.

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<sup>4</sup> D.16-08-019, p. 41.

<sup>5</sup> California’s Long-term Energy Efficiency Strategic Plan, 2008, California Public Utilities Commission <http://www.cpuc.ca.gov/General.aspx?id=4125>

Estimates and customer incentives for SEM O&M savings will be calculated using an advanced form of post-measurement NMEC data, the methodology for which is defined in the California SEM M&V guide. Savings estimates and customer incentives for capital projects will follow applicable custom and deemed program protocols. Through the 2-year period, the Industrial SEM Program will aspire to achieve and sustain an average of 10% electric savings and 8% gas savings at participating sites. Table 1 below provides details and break out of expected savings over the 2-year implementation period.

Table 1: SCE/SoCalGas Industrial SEM Program

<b>SCE/SoCalGas Industrial SEM Program: 2-Year Program Summary</b>	
	<b>Therm Savings</b>
Gas, <u>SEM O&amp;M</u>	250,000
Gas, Capital	150,000
	<b>kWh Savings</b>
Electric, <u>SEM O&amp;M</u>	4,800,000
Electric, Capital	4,000,000

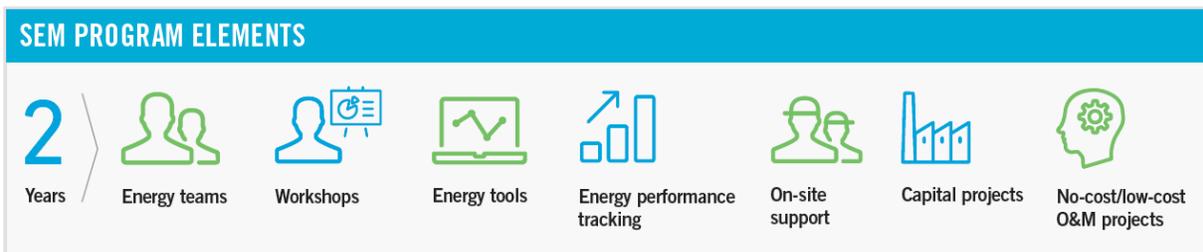
Based on market data in *Southern California Edison Company's Energy Efficiency Rolling Portfolio Business Plan for 2018-2025*, the industrial market consumes around 15,000 GWh annually, representing 18% of SCE's total load. Four percent of the more than 50,000 industrial accounts have peak loads above 250 kW, and they consume around 12,750 GWh, or about 85% of the total industrial load. This select group of 2,000 accounts consumes 6.375 million kWh/year on average and makes up the electrical side of the initial SEM customer base. Based on market data in the *SoCalGas Energy Efficiency Business Plan*, the industrial market consumes almost 1 billion therms annually, representing almost 25% of SoCalGas's load. A small number of the 17,600 industrial customers are considered very large and they consume 86% of the total industrial load, or 835,000 therms on average. We hope to attract a few of these very large users in addition to the base of medium and small users. The SEM program plans to recruit a cohort of eight participants averaging 11 million kWh and 625,000 therms of annual energy use.

As described in the Evaluation, Measurement and Verification (EM&V) section, the program will collect information on existing customer conditions, energy performance data, program interventions, and implemented and planned projects, and will collect energy and production data to develop energy savings estimates to support the verification of program influence and program savings.

Table 2: Program Metrics and Targets

Industrial SEM Goals	2018	2019	2020	Totals
Number of Participants Enrolled	8	0	0	8
Net Electric savings (kWh)		3,200,000	5,600,000	
Net Gas savings (Therms)		200,000	200,000	

## 2. Program Delivery and Customer Services



### ACTION

SEM is all about optimizing existing equipment and operations and understanding the resulting energy savings.

### WORKSHOPS

The two-year program is delivered through a series of workshops attended by a small group, or cohort, of local industrial companies.

### TRAINING

SEM coaches provide technical and organizational support as participants establish SEM practices and implement energy-saving projects.

### PROJECTS

SEM focuses on low- and no-cost energy-saving actions, but also identifies potential capital projects and supports their development and implementation.

## Implementation Roles and Responsibilities

The Implementer will work closely with SCE and SoCalGas in supporting participating industrial customers from recruitment through all phases of the program. The Implementer will deliver SEM workshops per the statewide SEM design and work with facilities one-on-one to: determine pre-defined activities, develop energy savings estimates, work with the customer to develop and maintain savings models and estimates, support the scoping and implementation of O&M and Custom Capital projects, and ensure proper records and reports are kept.

Key SCE and SoCalGas staff, which may include the SEM Program Manager, M&V engineer or engineering staff, and Customer Account Manager, will attend many of the workshops and activities to ensure the customer experience meets expectations. They will review key reports to ensure proper records of program influence and project implementation are kept and review energy models to ensure they meet predefined quality criteria and expectations (per the M&V guide). Program Managers for the calculated and deemed programs will review and process applications for capital project incentives. Utility SEM Program Managers will inform the

implementer of any changes to processes, CPUC and/or Utility initiated, for review/processing of deemed and custom measures

Outreach to customers will be done in coordination with Account Executives who, with support from the implementation contractors, will identify prospective candidate facilities, recruit and sign up participating facilities, and create pre-engagement records.

Energy Division (ED) staff at CPUC would like to be informed of all major SEM activities during implementation. ED staff were involved in developing the CA SEM Program Design and M&V guides, and they have communicated a general interest in the Industrial SEM program during this first 2 year implementation cycle. This includes their explicit EM&V role, which is addressed further in the EM&V section of this plan. In addition, ED staff are interested to understand and oversee how the programs are progressing through the implementation period. To promote transparency and facilitate understanding amongst all parties, the utility SEM Program Managers will work with ED staff and the Implementer to identify and share useful information about SEM program workshop and onsite activity schedules to enable attendance by CPUC staff and/or their contractors.

## Customer Eligibility

In order to participate, a customer facility must:

- Be classified as an industrial NAICs code (exception may be made for facilities with industrial processes that are classified in other sectors by the IOU; i.e. food processing)
- Be served by SCE and SoCalGas
- Spend at least \$100,000 annually on electricity and natural gas
- Be committed to saving energy through continuous improvement practices
- Be willing to implement no-and low-cost projects during the 2-year engagement
- Companies that sign up must be willing to:
  - Participate fully in the 2-year training by attending each workshop and completing assignments and onsite projects between workshops in a timely fashion.
  - Obtain management support for an energy champion, energy data manager and energy team to commit work time to SEM activities.
  - Assign a minimum of two staff members from the energy team to attend eight workshops on-site; There are also events on-site in which broader employee participation is encouraged.
  - Provide the program with at least 1 year of historical energy, production, and other relevant variable data for energy modelling and regularly update models with new data during the enrollment period.

SEM saves energy by equipping plant management and staff with the tools and information they need to strategically manage energy. As a requirement of enrollment, customers will identify and commit their own staff resources for critical roles in the SEM initiative:

#### Executive Sponsor

- Provide senior leadership support to the Energy Champion and energy team.
- Help communicate throughout the facility that energy efficiency is important and requires the support of all facility staff.
- Help resolve issues and make decisions to ensure success in the program.
- Allow the Energy Champion and other energy team members to invest time in identifying and implementing energy saving projects, as well as participate in all SEM activities.
- Set reasonable expectations to review SEM accomplishments and facility energy performance with the Energy Champion and energy team members.
- Allocate sufficient budget to support viable energy capital projects.

#### Energy Champion

- Act as committee chairperson for the energy team, coordinating all activities related to energy saving initiatives, projects and practices and communication with leadership.
- Recruit an energy team of facility coworkers and hold regular energy team meetings.
- Coordinate with the program Implementer's SEM coaching team, and attend, along with one or more coworkers, all SEM workshops.
- Ensure that all energy savings activities are tracked and documented.
- Work with energy team to train and motivate facility staff to support energy goals.

#### Data Master

- Work with the program Implementer's SEM coaching team to identify and share relevant energy and production data. Data sharing should be on at least a monthly basis.
- Update energy performance tracking results with support from Implementer.

## Program Services

Once signed up for the program, engagement with customers will include:

- On-site kick-off meeting to lay out clear program expectations
- Cohort workshops with clearly defined learning objectives and well facilitated peer-to-peer learning that include strategies on:
  - Developing SEM
  - Identifying and Implementing Energy Savings Projects (focused on O&M)
  - Employee Engagement
  - Persistence of Savings
  - Tracking Energy Performance
  - Designing and Implementing an Energy Management Information System
- On-site “Energy Treasure Hunt” to guide and introduce concepts to facilities that help them identify, track, prioritize, and estimate savings from O&M, capital projects, and other opportunities.
- On-site and remote support for: goal development, employee engagement, energy map development, energy data collection and data logging, project savings persistence strategies, as well as annual updates to key activities.
- Development of an energy savings regression model and annual updates to meet the requirements of a separate M&V guide.
- Implementation of an “Energy Management System Assessment” to assess progress on customer EnMS and plan future improvements.
- Where appropriate, supporting the customer in defining and implementing an “Energy Management Information System” to better track, report, and make decisions on energy data.

Software tools developed by the program and shared with the customer will include:

- A tool to record estimated energy consumption of major systems or processes (energy map)
- A tool to record, track, and prioritize energy savings opportunities (opportunity register)
- A tool to model and track energy performance (energy adjustment model)
- A tool to help assess progress on the Energy Management System (i.e. business processes) (energy management system assessment)
- Other tools will include:
  - Hardware to assist in measuring and characterizing energy consumption and savings for projects (data logging toolkit)

## Incentive Structures

The Industrial SEM program will offer a hybrid incentive approach designed to encourage SEM practices and drive cost effective energy savings at a site, as described in the CA SEM Design Guide. Adoption of SEM is a multi-year process, and incentive payments are staggered and tied to key milestones or specific accomplishments to keep customers engaged and retain focus on the highest impact SEM activities over the course of the long program.

1. Milestone incentive payments: Each site participating is eligible for a total of 5 Milestone incentive payments over the course of the 26 month engagement. Participants earn these \$1,000 milestone incentives through timely completion of key assignments related to tracking energy performance, such as providing data, and updating their models and Opportunity Registers by specific dates. Milestone incentives will be paid as earned.
2. Performance incentive payments: will be paid to customers based on energy savings calculated through the model, after netting out savings associated with pre-planned and incented EE projects. These savings are defined and required to be reported as “SEM O&M Savings” in the Guides. Program participants who comply with all program requirements are eligible to receive a post-measurement performance incentive of \$0.02/kWh and \$0.75/therm after 12 months of normalized metered data on energy saved. Performance incentives are paid twice, after the end of the year-1 performance period and after the end of the year-2 performance period for new savings achieved in year 2. Final determination of performance based savings and incentive payments rests solely with the utility.
3. Capital project incentive/rebate payments: Customers who participate in the Industrial SEM program are eligible to receive standard rebates for energy efficient equipment and incentives for custom projects. Savings from custom projects initiated due to the SEM effort will be assessed based on an existing conditions baseline and these projects will be assigned a Net to Gross (NTG) of 1<sup>6</sup>. Measures must be pre-approved, installed and verified according to the applicable program’s requirements and criteria prior to payment. Annex E of the SEM M&V Guide addresses this topic in detail and is the primary reference, along with the Custom Program Manuals for how capital project savings will be treated in the Industrial SEM program.

## Funding Sources

Program applicants will be responsible to cover the costs of all installed measures. These encumbrances may include and are not limited to internal labor costs and estimated capital costs as well as identifying the sources of funding for the project. However, incentives will be

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<sup>6</sup> See D.16-08-19 Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings at page 41 and page 101  
<http://ccag.ca.gov/wp-content/uploads/2016/10/6.5-Attachment-ALJ-Decision-16-08-019-081816.pdf>

provided through the program, and program implementers will provide program-related services, as described.

Use of other funding sources: SEM participants may choose to pursue other external funding for capital projects undertaken in the SEM program. Whether securing external funding indicates free ridership in an SEM Incented Project will be determined on a project by project basis. The program will document the influence of the SEM program on all capital projects. These will be assessed and determinations made through the CPUC's ex ante review process for incented SEM Projects.

## Measures Incented

The Industrial SEM Program objective is to influence and achieve persistent, cost-effective savings in a site holistically, across all energy using systems, including primary process, secondary process, and support systems such as lighting and HVAC. Participants will learn to identify energy waste and prioritize efficiency measures for implementation. For ease of implementation and to leverage existing resources, capital measures, rebates and incentives will be the same as those supported in the custom and deemed programs. The table below lists the possible measures applicable to the Industrial SEM holistic approach. For more information on quantifying measure savings, please refer to the EM&V section. For details on the qualifying measures, please see the supporting documents section "Incentive Tables."

According to both the SEM Design and M&V Guides, and in particular addressed in Annex E of the M&V Guide, there are 2 types of SEM savings claimed in the program: SEM Capital Project Savings and SEM O&M Savings.

SEM O&M Savings are determined based on advanced NMEC analysis and come from actions taken facility-wide except for SEM Incented Projects or Non-SEM/Pre-planned projects. The SEM O&M Savings will include low and no cost behavioral, operational and process efficiency actions. According to Annex E, the category ("measure") of SEM O&M Savings may also include savings from capital EE measures that do not qualify for other incentives. These aren't broken out in individual projects for savings claims, they will be receiving the same low incentive and measure life as all SEM O&M Savings.

Regarding categorizing opportunities or measures, M&V Guide Section 8.2 Calculating SEM Program Savings, lists requirements for the Opportunity Register and says that energy performance improvement actions listed should be categorized as behavioral, operational, capital or process. It states that the purpose of categorizing at a project level is to 1) track Pre-planned and SEM capital projects for netting out of facility-wide savings models and 2) to provide information to participants, implementers and administrators about the relative contributions of various individual actions to achieving energy performance improvement.

More importantly, due to the definition of SEM O&M Savings in the Guides, there is no direct link between these categorizations in the Opportunity Register and how savings are claimed. The Opportunity register provides for better understanding/ sanity check of modelled savings

and evaluation of what is planned and has occurred, but is not used as the basis for EM&V of savings.

#### SEM Capital Project Savings: Excerpts from SEM M&V Guide Annex E

Annex E of the M&V Guide provides guidance defining capital measures treated under the SEM program. “California Industrial SEM programs take a facility-wide approach to the determination of energy savings. Because of this, in some instances the energy savings that result from the implementation of custom capital projects must be netted out of this facility-wide energy saving value.”

“Custom capital projects, in this context, are defined as **technology based energy efficiency projects** that are designed and implemented for a given industrial facility and for which the **outlay of required capital** is considered large with respect to other energy efficiency projects undertaken by the facility”

“Energy Savings Terminology for California Industrial SEM Programs”:

“SEM Custom Project Savings: Custom projects identified, planned and implemented during the SEM engagement receiving incentives at or near the “capital project” incentive rate.”

Deemed capital projects that are influenced by the SEM program are not explicitly addressed in the SEM M&V Guide. Our definition is that anything currently available through the utility as a deemed measure for that type of facility is categorized and treated as such. For claiming savings, deemed capital measures are treated the same as “SEM Custom Project Savings” as described in the SEM guides.

For ease of implementation and to leverage existing resources, capital measures, rebates and incentives will be the same as those supported in the custom and deemed programs. The table below lists the possible measures applicable to the Industrial SEM holistic approach. For more information on quantifying measure savings, please refer to the EM&V section.

Table 3: Measure Definitions

<p>SEM O&amp;M Savings is a single measure, assessed annually as per the M&amp;V Guide. 5 year measure life and customer performance incentives of \$.02/kWh and \$0.75/therm.</p> <p>SEM O&amp;M Savings are estimated for each SEM participant based on advanced NMEC analysis. These savings derive from actions taken to save energy facility-wide, after backing out savings associated with SEM Incented Projects and Non-SEM/Pre-planned projects. This will include low and no cost behavioral, operational and process efficiency actions and may also include savings from capital projects that don't qualify for other incentives.</p>
<p>Custom Capital Projects</p> <p>The M&amp;V Guide Annex E defines custom capital projects in SEM:</p> <p>“Custom capital projects, in this context, are defined as <b>technology based energy efficiency projects</b> that are designed and implemented for a given industrial facility and for which the <b>outlay of required capital</b> is considered large with respect to other energy efficiency projects undertaken by the facility”</p> <p>And includes Energy Savings Terminology for California Industrial SEM Programs, this additional definition:</p> <p>“SEM Custom Project Savings: Custom projects identified, planned and implemented during the SEM engagement receiving incentives at or near the “capital project” incentive rate.”</p>
<p>Deemed Measures</p> <p>All deemed measures currently published and applicable for that particular facility type through the Deemed programs will be available to Industrial SEM Program participants, including but not limited to:</p> <ul style="list-style-type: none"><li>• Insulation for pipes, fittings, tanks</li><li>• Industrial refrigeration measures</li><li>• Variable speed drives on HVAC pumps and fans</li><li>• Deemed HVAC controls</li><li>• Industry-specific deemed process measures such as water pumping, efficient fryers and ovens for food processing, ozone laundry, modulating gas valve for corn processing.</li></ul>

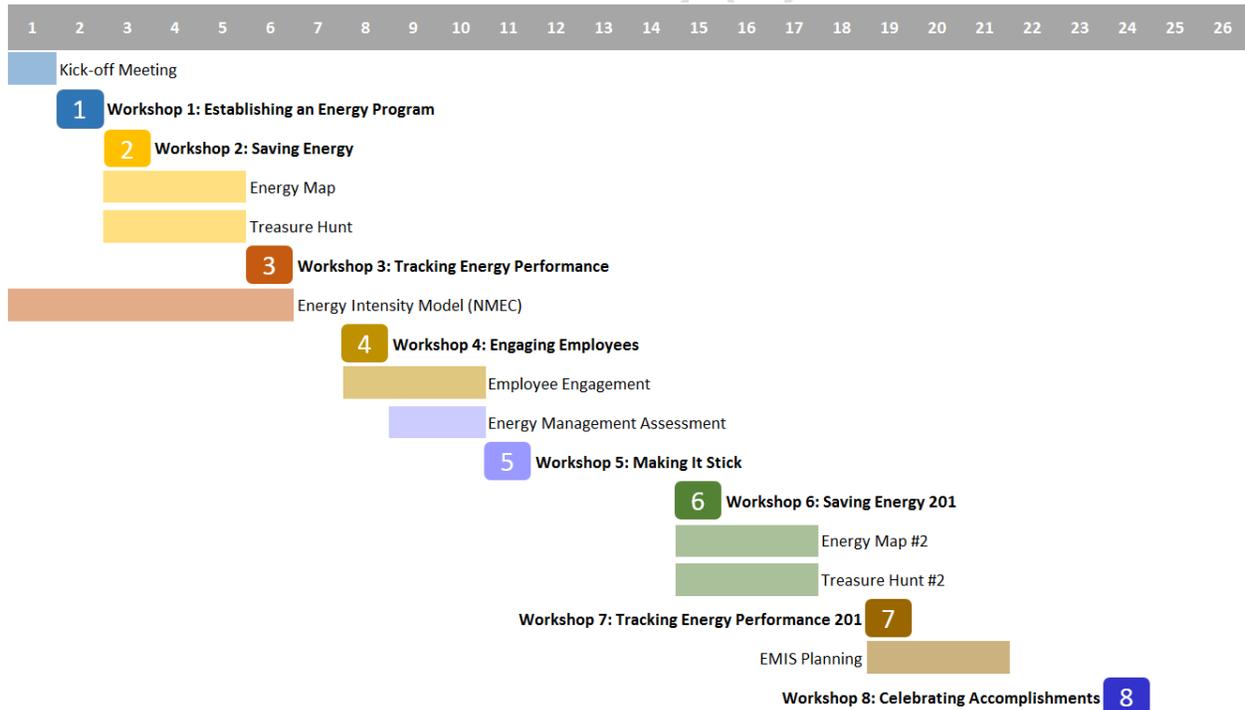
On the most basic level, to distinguish between SEM measure types requires identifying the capital projects and treating them according to protocol. For illustrative purposes, here is an

example of where different actions taken to reduce energy on the same end use system might fall into the different SEM measure categories:

	Custom capital project	Deemed measure	SEM O&M Savings
Compressed Air	Air compressor intermediate flow controller	Variable speed drive on air compressor control	-Restage compressor control sequence -Fix air leaks
HVAC	Energy efficient fan blade retrofits Ventilation thermostat controls	Variable-speed drive on condenser water pump control	Turning off equipment when not in use, HVAC controls

### Program Sequence

The program includes eight workshops, multiple plant-specific activities, and multiple performance model development activities that combined help achieve the customer and program objectives. The workshops define the rhythm and cadence of activities and key deliverables. Below is a general overview of the workshops and key activities:



### 3. Program Design and Best Practices

#### Addressing Market Barriers

Energy intensive industries have significant, ongoing opportunities to reduce energy waste and improve efficiency in their operations, with energy savings potential of 10 – 20% and more within reach for most, at a compelling Return on Investment (ROI). Unlike other end use sectors, staff and management in these businesses are often highly technical and motivated towards productivity and quality. But despite the strong ROI for reducing energy waste and capability of site staff, the majority of industrial savings potential is unrecognized and unrealized, while even good projects are delayed for years or never implemented at all due to competing priorities for business investment and staff or management time and attention.

This lack of awareness, acceptance and capacity were identified as primary barriers to energy efficiency in the Industrial sector IOU business plans<sup>7</sup>:

1. Energy Efficiency/Demand Response is not a top priority for industrial customers.
2. Industrial customers do not want to “fix” what is not broken.
3. Industrial customers lack capital and/or qualified resources (facility/energy managers).
4. Unique and complex facilities exist across industry customer segments bringing unique mixes and integrations of devices and end use equipment.
5. Industrial facilities face limited tools & difficulties surrounding measuring energy intensity.

To address the root of these organizational and behavioral barriers to efficiency, a growing number of utility resource acquisition programs are focusing on helping participants learn to optimize and manage their own energy performance, through Strategic Energy Management<sup>8</sup>.

The Industrial SEM program addresses these barriers by:

1. Educating customer staff on how to manage energy to ensure they understand how energy supports their business priorities.
2. Creating a long-term strategy for energy improvement that fits their needs, helping the customer prioritize efforts over the long term.
3. Training the customer to diagnose energy waste and identify, prioritize, and justify the highest return projects at their own site and based on their criteria, helping them fit energy efficiency into their own complex facilities.

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<sup>7</sup> SCE 2017 Energy Efficiency Portfolio Business Plan  
[https://docs.wixstatic.com/ugd/0c9650\\_9bf95393f6e9424db1686bdf67bdf13c.pdf](https://docs.wixstatic.com/ugd/0c9650_9bf95393f6e9424db1686bdf67bdf13c.pdf)

SoCalGas 2017 Energy Efficiency Business Plan  
[https://docs.wixstatic.com/ugd/0c9650\\_a9135c638d974c04ac7e99449d310d56.pdf](https://docs.wixstatic.com/ugd/0c9650_a9135c638d974c04ac7e99449d310d56.pdf)

<sup>8</sup> CEE 2016 Industrial SEM Program Management Summary  
<https://library.cee1.org/content/cee-2016-industrial-strategic-energy-management-program-summary-0>

4. Providing training and a consistent approach to measuring energy intensity to focus their efforts in supporting energy and sustainability goals.

### Learning from Industry Best Practices

In preparation for launching Industrial SEM programs, the California IOUs engaged in a statewide design process in 2016 and 2017 to gather and leverage emerging best practices from maturing programs in other regions. Key elements of the program design will be consistent across IOUs. Reference guides for design and M&V are publicly available as the *California Industrial SEM Design Guide* and the *California Industrial SEM M&V Guide* (referenced above).

The program design is based on documents, M&V protocols, and numerous conversations with national-leading programs that include:

- Consortium for Energy Efficiency (CEE) SEM Minimum Elements
- Energy Trust of Oregon's "Core SEM" program
- Bonneville Power Administration's "SEM Projects" program
- US DOE's "Superior Energy Performance" program

Elements of the design are also based on discussions with multiple program administrators and regional organizations from across the country including Wisconsin Focus on Energy, BC Hydro, Northwest Energy Efficiency Alliance, Northeast Energy Efficiency Partnership and Efficiency Vermont.

The third-party implementer who will be implementing this program has delivered SEM to industrial customers through corporate-direct programs since 2004 and through utility programs since 2009, engaging nearly 600 industrial sites to date with this approach. This experience involved many improvements in program design, delivery, and management, as well as innovation and customization to meet the needs of each customer. Part of the Implementer experience has included developing and successfully delivering 2 SEM programs in the Pacific Northwest. These Pacific Northwest programs provided proof of concept of SEM as an effective resource acquisition strategy for industry and laid the groundwork for the statewide California SEM design.

Based on best practices shared by leading SEM programs across the US, the California Industrial SEM program is designed with multiple customer objectives, which include:

1. Develop an Energy Management System (EnMS) to allow the facility to integrate energy into its existing management practices and continuously improve energy performance in the long-term.
2. Identify, prioritize, and implement facility-wide energy savings opportunities, building their internal capacity and a stronger relationship with the IOU that can lead to successful adoption of more complex energy projects and other advanced opportunities such as demand response.

3. Develop energy savings regression models to allow the facility and program to track energy performance and estimate annual savings.

The program does this by following a design that focuses on:

1. Facilitating peer-to-peer learning through a series of group workshops (where applicable)
2. Ensuring plant-specific success through one-on-one technical and EnMS support
3. Tracking energy performance and program influence through targeted and well defined M&V activities

#### 4. Evaluation, Measurement and Verification (EM&V)

The M&V Plan for the Industrial SEM program is designed to the requirements of the statewide *California Industrial SEM M&V Guide*, which describes procedures for quantifying the savings for each participating customer, as well as estimating program savings achieved. The SEM M&V Guide details the process for creating the energy model, testing its validity, making updates to it, calculating savings, and handling the reporting of pre-planned and incented capital projects such that energy savings are not double counted by the program. Further, the SEM program will leverage: (a) the California Statewide Customized Procedures Manual for Business<sup>9</sup> for performing bottom-up savings calculations for custom capital project implementation and (b) Utility-specific rebate catalog information / work papers for determining savings for deemed measure implementation resulting from SEM program engagement.

The M&V Guide was developed using methodologies, protocols and best practices from national SEM leaders including:

- US DOE's Superior Energy Performance
- Energy Trust of Oregon
- Bonneville Power Administration

Industrial SEM savings will be calculated using at least one year of pre-engagement, whole-facility data to develop the energy saving adjustment (i.e. regression) model that is based on IPMVP Option C<sup>10</sup>, using essentially the same methodology that has been used successfully in the mature SEM resource acquisition programs<sup>11</sup>.

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<sup>9</sup> 2018 Statewide Customized Offering Procedures Manual for Business  
[https://www.pge.com/pge\\_global/common/pdfs/save-energy-money/facility-improvements/custom-retrofit/Customized-Policy-Procedure-Manual.pdf](https://www.pge.com/pge_global/common/pdfs/save-energy-money/facility-improvements/custom-retrofit/Customized-Policy-Procedure-Manual.pdf)

<sup>10</sup> IPMVP Concepts and Options for Determining Energy and Water Savings Volume I  
<https://www.nrel.gov/docs/fy02osti/31505.pdf>

<sup>11</sup> Uniform Methods Project: SEM M&V Protocol  
<https://www.nrel.gov/docs/fy17osti/68316.pdf>

BPA MT&R Reference Guide  
<https://semhub.com/resources/mt-r-reference-guide-revision-5-0>

The program is designed to include several self-evaluation elements. These include:

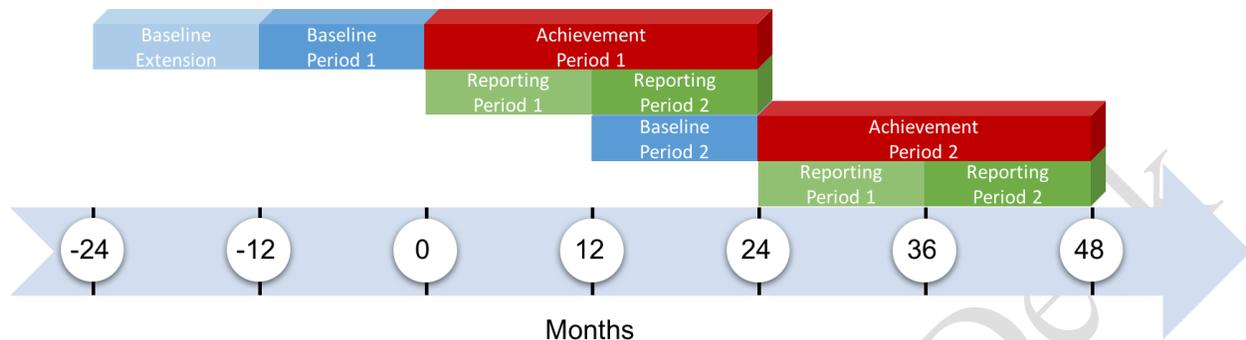
- A clear record of pre-engagement energy savings plans by the customer
- Consistent reporting of milestones and deliverables
- Evaluations, by participants, of all workshops and key activities
- A clear log of identified energy saving opportunities, including savings estimates and implementation dates
- An annual assessment of energy management practices
- A clear annual summary of each customer's activities, energy saving projects, estimated savings, and interaction with the program
- An annual energy consumption adjustment model that includes:
  - Data quality reviews by the implementer
  - Model reviews by the IOU twice annually
  - At least 12 months of baseline data and 12 months of performance data for each performance year
  - Clear documentation on decisions taken in the development of the model
  - At least bi-yearly data updates

Detailed in the M&V Guide are three key reports which collectively make up the M&V Report:

1. An Energy Data Collection Plan, which documents pre-planned energy projects and outlines: time periods, facility boundaries, energy consumption data availability, and relevant variable data availability.
2. An Energy Data Report, which outlines details regarding the collected energy and relevant variable data, including: data collected, outliers, the effects of outliers and any efforts taken to replace them, omission of data points, and any conversion factors used to convert units.
3. An Energy Savings Calculation Report, which details the adjustment models created and the resulting energy savings calculated. This report includes information regarding any preliminary adjustment models, final models, graphs to confirm relationship between data, model parameters, documentation of validity tests and values, and any documentation needed to support the models. The report also documents energy savings calculations from pre-planned projects and incented projects implemented due to the SEM program's influence.

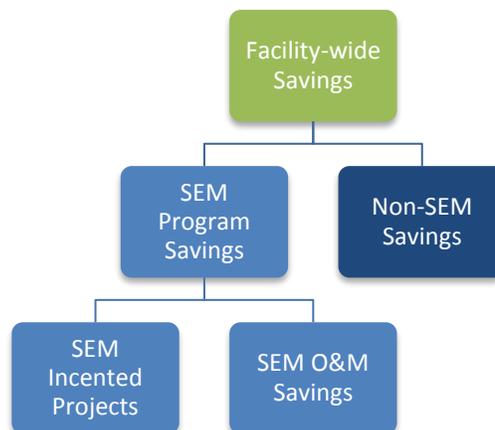
The achievement period is comprised of two 12-month long reporting periods. The two reporting periods sequentially follow one another. As such, the first reporting period begins immediately following the conclusion of the baseline period. The second reporting period begins immediately following the conclusion of the first reporting period and ends at the conclusion of the achievement period.

Energy savings are determined using a baseline period that is valid for two years (the duration of an achievement period). As such, a progression is made of every second reporting period becoming the new baseline period.



Consistent with the 2012 CEI Evaluation, savings for the Industrial SEM program will be reported as follows:

1. **Facility-wide Energy Savings:** The overall savings the facility achieved during the reporting period. This includes all savings listed below and is used by the facility to estimate their performance improvement versus goal.
2. **Non-SEM Savings:** Pre-existing projects identified and planned prior to SEM engagement and implemented during the SEM engagement, whether receiving incentives or not.
3. **SEM Program Savings:** Facility-wide Energy savings minus Non-SEM Savings, used by the program to calculate program effectiveness.
4. **SEM Incented Project Savings:** Incented projects (i.e. custom capital projects) identified, planned, and implemented during the SEM engagement receiving incentives at or near the incentive rate for another program (i.e. “capital project” incentive rate).
5. **SEM O&M Savings:** SEM Program Savings minus SEM Incented Project Savings.



The above approach to SEM energy savings ensures that SEM O&M Savings are calculated net of the savings that result from SEM Incented Projects (i.e. custom capital projects and prescriptive rebates). Custom SEM Incented Projects will be facilitated via the process described in the 2018 Statewide Customized Offering Procedures Manual for Business.

Clarifying nomenclature: “SEM O&M” vs. “BRO”

California utility programs and regulators have adopted the use of the acronym “BRO” (behavior, retrocommissioning, operations) to indicate operational savings in businesses. D.16-08-019 discusses SEM as a strategy to get BRO savings in industry. Basically, BRO and O&M are synonyms in their general use.

The term “SEM O&M Savings” appears throughout the CA SEM design documents and is used throughout this plan. The design language reflects prior successful SEM programs in other states, who all adopted the term “O&M” to refer to operational savings in industry primarily because this is language that industrial customers use and understand. Industrial O&M has most commonly been defined as low and no cost actions to save energy that primarily rely on knowledge and internal capacity to implement and maintain. In SEM programs, it is determined at the meter level through modelling. This is in contrast with capital projects.

We note that the definitions recently published by CPUC discriminating between B, R and O for purposes of NMEC programs are geared towards Commercial business HVAC systems and Commercial RCx, and are not applicable for Industrial operations. In particular, there is little or no valid technical basis for discriminating between R and O in industry, and no clear benefit to doing so. But it is accurate to say that most SEM O&M savings are BRO.

Finally, we note that using the term “SEM O&M Savings” as defined above from the SEM M&V guide is more technically accurate and useful than using BRO in this circumstance., SEM O&M Savings in California is a custom measure, with savings determined through advanced NMEC analysis, with ineligible/ pre-planned and already incented projects netted out. While most savings in the model will come from BRO-type measures, capital project savings will also be reflected in this measure, when these are influenced by SEM and not otherwise incented. So, SEM O&M Savings will derive from both BRO and some capital, and it will be calculated at the meter level, not by individual measure analysis. Calling this measure “SEM BRO” could muddy the waters for these definitions in California.

An Opportunity Register spreadsheet tool is used by participants and the implementer to manage energy improvements from identification through completion. The Opportunity Register provides a record of implementation of all types of energy saving activities and projects, including pre-planned and capital projects, and is a key source of information used in SEM M&V.

- Opportunity name
- Description of the opportunity
- Type of action (behavioral, operational, capital or process)
- Date initiated

- Date completed
- SEM influence (documentation of how this opportunity came to be)
- Subsystem
- Location
- Energy savings estimate
- Implementation Status
- Owner of implementation
- Persistence strategy

EM&V consists of activities that evaluate, monitor, measure and verify performance or other aspects of energy efficiency programs or their market environment. Energy Division has management and contracting responsibilities for all EM&V impact-related studies that will be used to 1)measure and verify energy and peak load savings; 2)generate data for savings estimates, cost-effectiveness inputs, and the Commission's adopted performance basis and 3) evaluate whether portfolio goals are met.<sup>12</sup>

For the Industrial SEM program, ED is responsible for carrying out EM&V responsibilities. Their efforts will include real time review of various activities, which will be guided by the draft Real Time Review Guide for SEM and other draft materials. Their role will also include ex-ante and ex-post review for SEM incented projects. The final process and steps of ED's EM&V review for SEM have not been fully defined at this time, but it is expected that ED staff and their EM&V contractors who are assigned to SEM and knowledgeable about the SEM M&V Guide will be working with both the utility program administrators and their implementers throughout the process.

## 5. Pilots

N/A

## 6. Additional information

N/A

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<sup>12</sup> California Public utilities Commission, Energy Efficiency Policy Manual, v.5 (July 2013)

## 7. Differences from the Design and M&V Guides

This SEM program from SCE and SoCalGas follows the CA SEM Design and M&V Guides very closely. To the best of our knowledge, the only differences between the SEM program and the Guides are as follows:

1. Deemed/ prescriptive measures influenced by the SEM program will be included and counted in the SEM Incented Projects category. These are not mentioned in the Design Guide, which is not surprising, as the majority of industrial EE savings potential is in Custom projects.

SEM influences all types of energy improvement at a site. It is by definition holistic, and includes curriculum on operational and procurement practices that drive purchase of efficient products that are eligible for rebate, such as pipe insulation. Deemed measures will likely be a small portion of industrial SEM savings.

2. Coaching services provided to individual sites in between workshops and onsite activities. These are not mentioned in the Design Guide, but we believe this was probably just an omission, as this is a common practice in other utility SEM programs.

Extensive prior experience implementing SEM shows high value, including better program savings outcomes, from providing customized coaching services on site and over the phone. Participants are integrating SEM practices learned in workshops to their organization's specific systems and culture to create change and save energy. Having access to the advice of a coach along the way can clear obstacles to success, and more touch points with the coach also creates greater accountability for the Energy Champion and Energy Team to keep going. Different participants in a cohort may need more or less support to successfully adopt SEM, especially in the first year.

## Supporting Documents

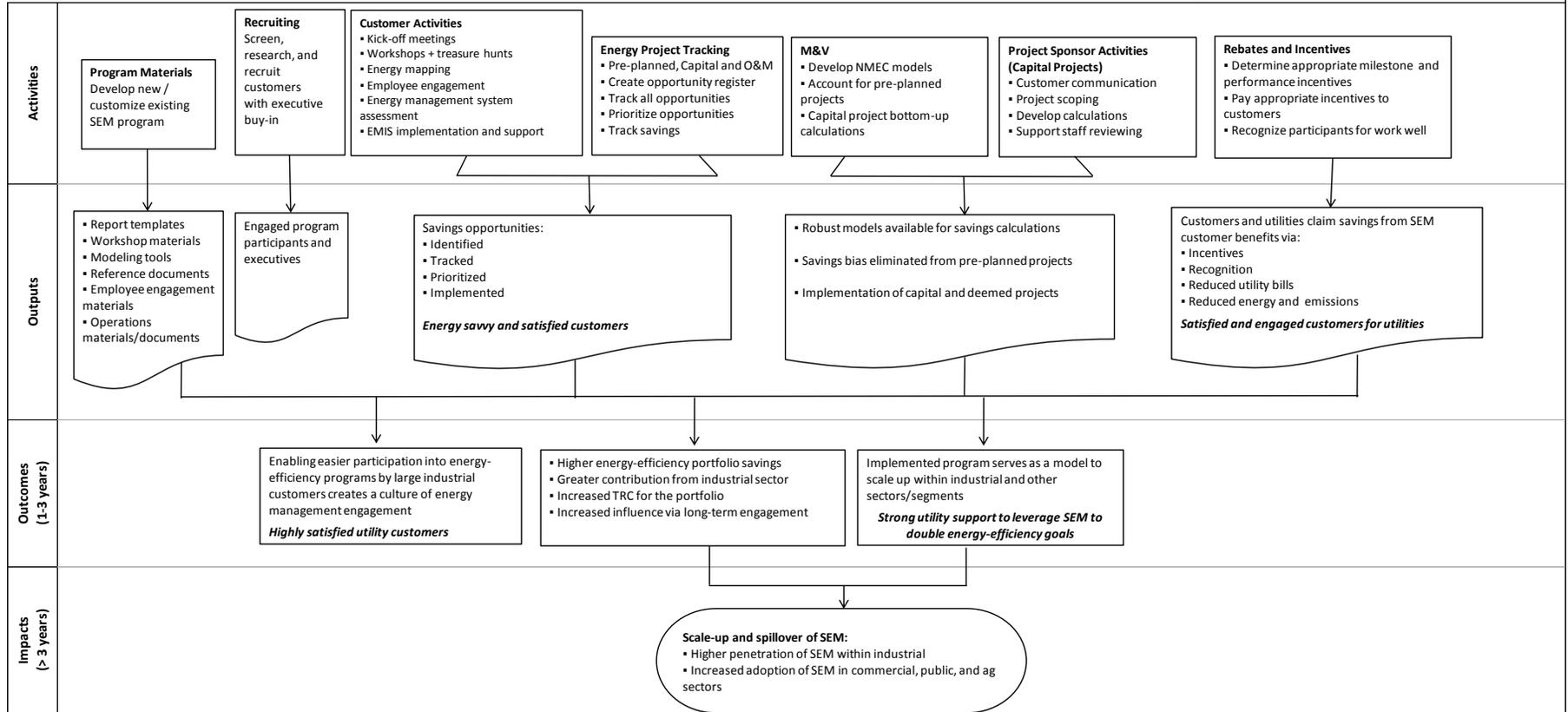
### 1. Program Manuals and Program Rules

The Industrial SEM Program Operations Manual is submitted as a separate attachment.

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## 2. Program Logic Model:

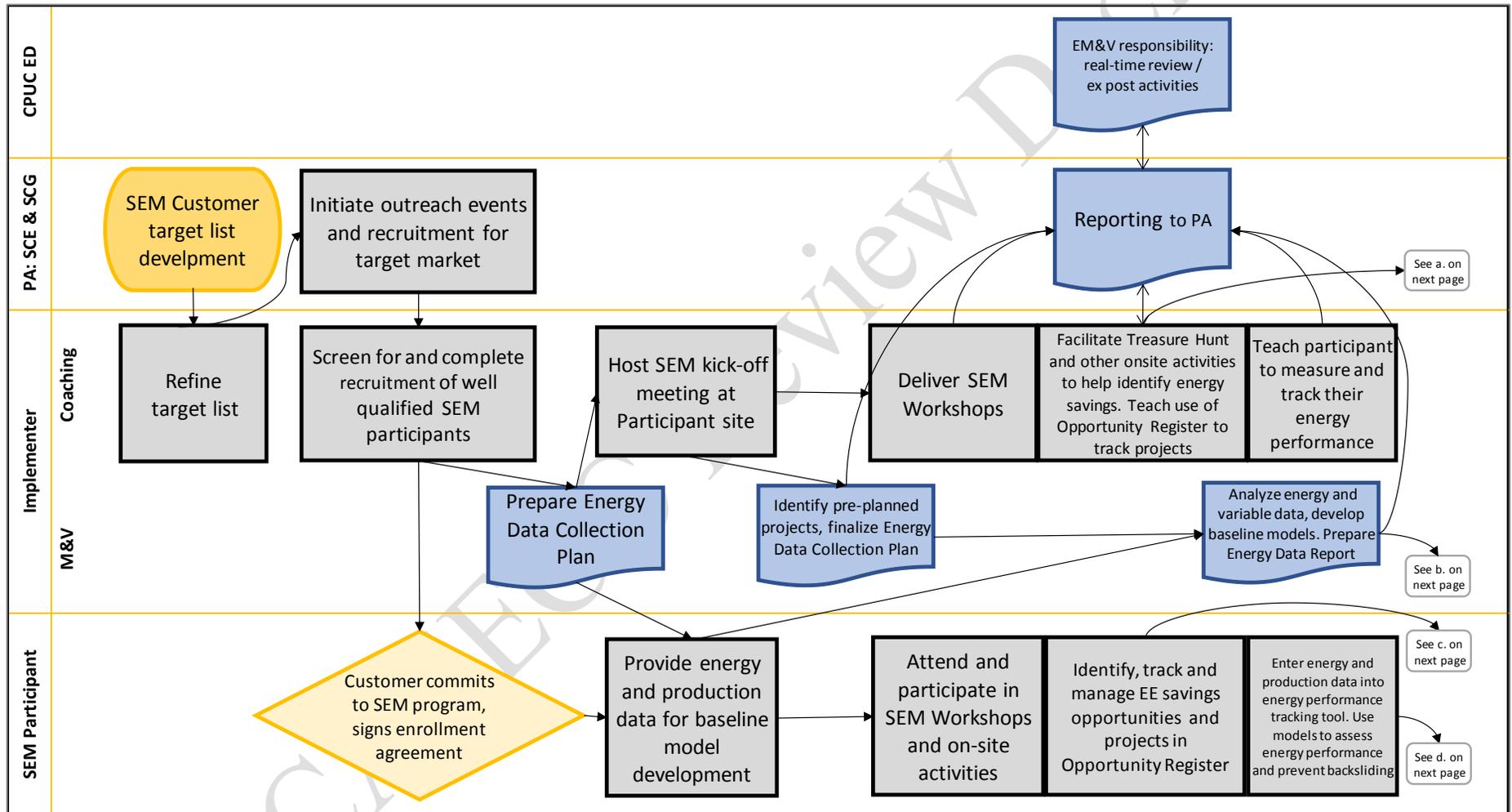
CA Strategic Energy Management Program Logic Model



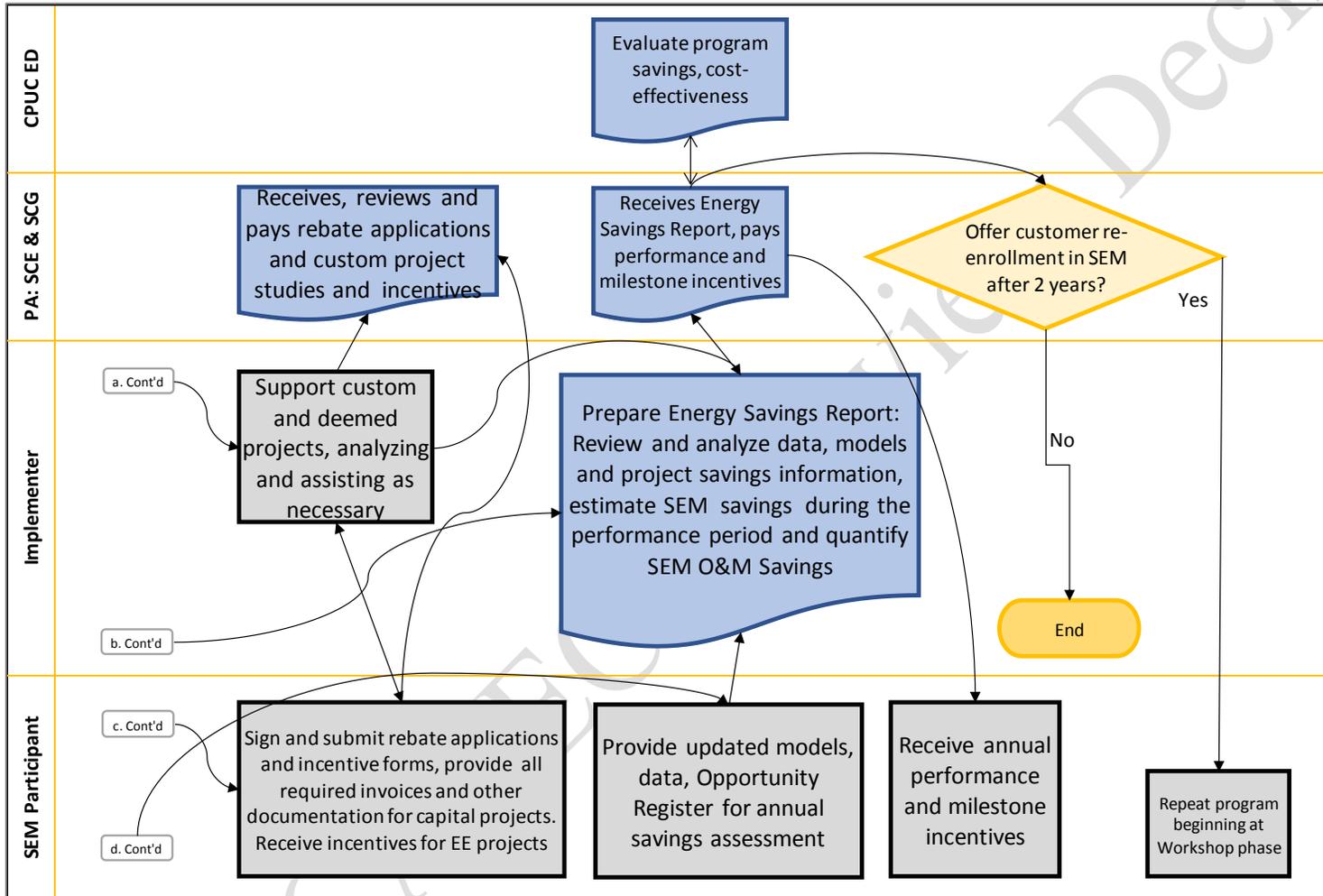
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### 3. Process Flow Chart:

This chart continues on the following page.



Process Flow Chart (continued)



#### 4. Incentive Tables, Workpapers, Software Tools:

Performance incentives (SEM O&M): \$.02/ kWh and \$0.75/therm, 5 year measure life

SEM O&M Savings are determined based on advanced NMEC analysis and come from actions taken facility-wide except an SEM Incented Project or Non-SEM/Pre-planned project. This will include low and no cost behavioral, operational and process efficiency actions, also known as BRO. According to Annex E, the category (“measure”) of SEM O&M Savings may also include savings from capital EE measures that don’t qualify for other incentives. These aren’t broken out in individual projects for savings claims, they will be receiving the same low incentive and measure life as all SEM O&M Savings.

#### SEM Incented Projects

Incentives for Custom calculated projects are provided based on analyzed electric and gas savings from participant capital investment in equipment and controls that improve efficiency. Calculated savings measures and incentives are used where applicable and available through the current utility programs. These often apply to more common systems such as lighting, comfort HVAC, and building envelope. Custom projects save energy from capital investment in a wide variety of technology for unique industrial end uses including, but not limited to, primary and secondary processes, and are eligible for the standard incentives available through those programs.

Rebates for deemed measures applicable for that particular facility type will be available to Industrial SEM Program participants, for measures including but not limited to:

- Insulation for pipes, fittings, tanks
- Industry-specific deemed process measures such as agricultural pumping, efficient fryers and ovens for food processing, ozone laundry process, modulating gas valve for corn processing.

For capital projects, all Custom calculated incentives and Prescriptive rebates available to that type of facility through the utilities’ current Deemed and Custom programs will be available for SEM participants. These programs develop and maintain the deemed and calculated measures and incentives, including workpapers and software tools. There are more than 500 individual deemed and calculated measures currently available for these types of customers across the two utilities. Detailed information is available from those programs and customer facing information is posted online:

<https://www.sceonlineapp.com/Docs.aspx?dt=2>  
<https://www.socalgas.com/for-your-business/energy-savings/rebates-and-incentives>

5. Quantitative Program Targets:

<b>SCE/SoCalGas Industrial SEM Program: 2-Year Program Summary</b>	
<b>Therm Savings</b>	
Gas, SEM O&M	250,000
Gas, Capital	150,000
<b>kWh Savings</b>	
Electric, SEM O&M	4,800,000
Electric, Capital	4,000,000
<b>Program participants</b>	
8-10	

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## 6. Diagram of Program:

