**Project Feasibility Study (PFS)**

*Customer Name*

*Address Street
City, CA 92867*

*Project Title – Project ID (in iEnergy) #*

**Prepared by:**

Implementer/Developer Name

Address City, CA 95403

Primary Contact Name

Email

Phone: xxx-xxx-xxxx

|  |  |
| --- | --- |
| **Project Feasibility Study Preparer** |  |
| **Position / Title** |  |
| **Signature** |  |
|  |  |
| **Date** |  |
| *By signing above, you certify that you are authorized to make this declaration on behalf of the Developer/Implementer and that this Project Feasibility Study (PFS) and accompanying documents, are complete, true, accurate and correct to the best of your knowledge.**You acknowledge that misrepresentation will result in a rejection of all or part of the project.* |

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| Rev | Date | Author & Organization | Summary of Changes |
| 01 | mm/dd/yyyy | Name, Title, Organization | Provide summary of changes |
|  |  |  |  |
|  |  |   |   |

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# **Customer Information**

|  |
| --- |
| **CUSTOMER INFORMATION** |
| **Customer Name**Customer’s Business Name | **Utility Service Account No.** 3-000-0000-42 |
| **Customer Contact**Jane Doe  | **Title**Engineer |
| **Customer Address**555 Seal Beach Blvd | **City**Seal Beach  | **State**  **Zip**CA 90740 |
| **CA Climate Zone**13 | **Telephone** 562-225-5555 | **E-Mail**jeffrey.doe@Customer.com |
| **Customer’s Typical Operations** | Description of Customers’ typical operations (business type, product, etc.) |

|  |
| --- |
| **PROJECT SITE/FACILITY INFORMATION** |
| **Project Site Name** | Customer Building 23 |
| **Project Site Address** | Address | City | State | Zip |
| 555 Seal Beach Blvd  | Seal Beach | CA | 90740 |
| **Meter Number** | V010V-000555 |
| **Building Code and Type** | OFS  | Office -Small |
| **Square Foot & Space use** | 10,000 |
| **Sector** | Residential [ ]  Commercial [ ]  Industrial [ ]  |
| **Segment**  | Warehouses / Refrigerated Warehouses |
| **Segment Description** | Wholesale Trade |
| **NAICS Code** | 42xxxx |
| **Climate Zone** | 13 |
| **Hard to Reach (HTR)?** | Yes |
| **Disadvantaged communities (DAC)** | No |

|  |
| --- |
| **PROGRAM CONTACTS** |
| **Implementer/Project Mgr./Utility Eng.**Matt Clack | **Utility Program Manager**Anthony Smith | **Utility Account Representative**Jane Doe |
| **Telephone**555-202-5555 | **Telephone**626-101-5555 | **Telephone**555-303-5555 |
| **E-Mail:** johndoe@Implementer.com | **E-Mail:** a.smith@iou.com | **E-Mail:** jane.doe@iou.com |

# **Compliance with Applicable Law (SB1414)**

###

I, Full Name, am the implementer of Program Implementer Company, a California corporation, where I hold the title of Title Name.

My business address and email are as follows:

Implementer Company Name

ABC Avenue

City Name, CA XXXXX

Email: xxx@implementer.com

As a representative of the Company, Program Implementer Company, I certify that the project will comply with applicable State of California’s building and energy code requirements.

All documentation will be made available to SCE and/or any entity conducting an Ex Ante (pre-installation) and/or Ex Post (post-installation) review and inspection of this project.

I will review and confirm that the credentials for the “responsible persons” attesting code compliance for this project are in good standing with the entities issuing the licensees or certification.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[Name]

[Title]

[Implementer Company Name]

# **Workforce Standards (if applicable)**

For all Program Projects and for each HVAC Measure, installed, modified, or maintained in a non-residential setting where the project is seeking an energy efficiency incentive of $3,000 or more, Implementer shall ensure that each worker or technician installing, modifying, or maintaining the applicable Measure meets at least one of the following criteria:

* Complete a California or federal accredited HVAC apprenticeship.
* Be enrolled in a California or Federal accredited HVAC apprenticeship.
* Complete at least five years of work experience at the journey level as defined by the California Department of Industrial Relations, pass a practical and written HVAC System Installation Competency Test, and must have received credentialed training specific to the technology being installed.
* Have a C-20 HVAC contractor’s license from the California State Contractor’s Licensing Board.

For all Program Projects and for each lighting controls Measure, installed in a nonresidential setting where the project is seeking an energy efficiency incentive of $2,000 or more, installation technicians are required to meet the following requirement prior to initiation of work.

* Receive certification through the successful completion of the California Advanced Lighting Controls Training Program (CALCTP).

Please also note, these HVAC and lighting requirements **apply to every individual** that is involved in the installation of work, and **not** to the contracting firm(s) itself and are applicable on all Calculated projects.

​​

[ ]  I understand by checking this box and confirming by signature that I acknowledge and agree to the above Workforce Requirements.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

Authorized **Project Implementer** Signature Date

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Print Name

# **Executive Summary**

The Project Developer will use this section to provide readers a high-level summary of the project drivers/challenges, recommended energy efficient measures, estimated energy savings, measure costs, peak demand reduction, critical project details, and additional benefits relevant to the customer and project scope.

## **4.1 Project Eligibility**

* Does the customer pay PPP charges? [ ]  Yes [ ]  No
* Does the customer have cogeneration? [ ]  Yes [ ]  No
* Renewable energy [ ]  Yes [ ]  No
* Other non-utility generation [ ]  Yes [ ]  No
* Does the customer have another form of generation? [ ]  Yes [ ]  No
* If yes, describe the cogeneration system, and complete & supply a grid impact calculation and explain how it delivers power to the equipment/system.
* Discuss any load shifting strategies are being employed (i.e. Thermal Energy Storage)

Click here to enter text.

* Discuss if the customer is participating in any Demand Response Programs
	+ If this is not applicable, state not applicable

Click here to enter text.

## **4.2 Project Drivers**

Participants in the Stakeholders Custom Projects Review Combined Subgroup in collaboration with CPUC staff developed four pilot documents to pilot operational guidance on CPUC Resolution E-5115 for equipment viability and program influence. **Please refer to SCE’s DSM E-PPICs No. 056.2 or the latest version to document Project Drivers section.**

Project representative (internal IOU or external) describes the main project drivers and challenges (CPUC Staff require that assertions of program influence be backed up with supporting documentation that clearly demonstrates the implementer’s and utility’s roles in influencing customer decisions and actions on a measure level).

Program influence must include a project narrative and evidence that supports the narrative/project.

Program influence must demonstrate that the energy efficiency program motivated the customer to implement a more efficient alternative solution to the one or ones that would otherwise have been selected without program intervention. The evidence of program influence should outweigh evidence that suggests the customer would have chosen the more energy efficient alternative without program (IOU, Trade Professional, Implementer/Developer, etc.) support or financial support (audit, incentives, on-bill financing, return on investment, simple payback, etc.).

**Evidence should include copies of communications and supporting documents to and from end-use customers that document when and how the customers made their decisions, and may include, but is not limited to:**

* Screen shots of emails (we need to link IOU/implementer/developer influence on the Customer)
* Detailed and dated meeting minutes with list of attendees
* Audit reports with financial analysis and optional comparative measures (be able to support when, how and to whom they were presented)
* Receipts/invoices for existing inventory, pictures of existing inventory
* Maintenance records, etc. (see the 14 influence drivers below)
* Eligible evidence/influence does not include:
	+ Projects submitted without documentation (evidence) that supports the Narrative
	+ Customer statement with no additional evidence
	+ Statements such as, we’ve been working with the customer for 10 years
	+ One individual email that recaps all previous meetings and discussions
	+ Evidence that does not precede the incentive application

**Best Practices**

* Every action and verbal or in-person communication should be followed up by an email with an overview of what was discussed, provided, meeting minutes, etc.
* Ask the customer to confirm via a reply with comments and questions to make sure the information was noted accurately, and nothing was missed.
* Get the Customer’s payback and business requirements for the project in writing, then ask for documentation of the leverage we applied in an attempt to influence how those requirements were met with the project.

**Please complete the narratives below. Supporting evidence should also be included with each narrative as shown below. The evidence may be supplied as an attachment(s), screen shot, or both.**

1. When and how was the original communication with the customer initiated by the IOU/implementer/developer?
	* Describe when and how the Customer was made aware of the program’s features and measures for this project.
	* Describe any prior interactions between the Customer and any Third Party Design Consultants, Manufacturers and/or Vendors on the proposed measures including any reports or services provided by these Third Party entities prior to the Implementer’s/Developer’s engagement with the Customer, i.e. Audit Reports, Cost Estimates, Surveys, Financial Analysis, etc. provided by these Third Party entities.
	* Include cases of potentially negative influence including when the customer first initiated contact and why.
	* Has customer thought about potential upgrades, do they know the approximate cost to do so? Are they aware of potential utility incentives? Are they aware of the benefits (EE and non-energy)?

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. What are the pre-existing conditions of the energy consuming systems or equipment on the customer’s facility?
	* What is the age of this equipment?
	* If the age is difficult to establish, what makes you believe you can estimate the equipment age?
	* What upgrades or component replacements have been done?

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. Does the facility suffer from any pain points, things they don’t like, or anything they are unhappy about with their current systems or equipment?
	* Is the equipment very old or does it no longer meet load/production? How were these issues identified?
	* Any anecdotal evidence of increased failures, low reliability, increased maintenance?
	* Does the facility need re-programming of the EMS/BMS, need re-recommissioning of any systems, not bright enough, buzzing noises or flicker, need to upgrade the “image” of the space?

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. What was the Customer planning to do prior to implementer/developer/PA intervention?
	* Business as usual (do nothing) is not assumed, in fact, the case that they were going to do something needs to be disproven, if possible.
	* Are there any facility activities triggering code enforcement requirements that could affect the project?
	* Plans to install a less efficient or less technically advanced version?
	* Has the facility upgraded similar equipment in the recent past at this site or similar facilities and what are the conditions surrounding the initiation of that project, e.g., did they pursue incentives or on-bill financing, and did they follow a deemed or custom approach?
	* For projects that were previously identified but not implemented prior to program intervention. Need to obtain the reasons why customer did not implement previously, who identified (developer/customer/vendor, name and firm name) and when.

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. What specific recommendations were made for this project? How were they made?
	* Did the customer once partake of any “lost leader” activities offered by the PA such as measure identification, or an energy audit?
* Describe past energy savings estimates, reports, analyses, problems identified, etc. that were provided to the customer and identify whether the Implementer/Developer and/or Third Party entities provided these documents.

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. What did the customer do after interacting with the program administrator/implementer/developer?
	* Ex. They were going to do nothing and are now going to move forward with the project.
	* Ex. They were going to do the minimum efficiency (non-incentivized measure) and were moved to install the higher efficiency (eligible) measure.
	* Describe specific discussions and dialogue on key decision points that influenced customer’s decision and enabled the customer to adopt an alternative action that improves final efficiency.

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. Who are the Customer decision makers (company role and title) and what were the business requirements that had to be fulfilled in order for the Customer to move forward with the measure/project?
	* Financial criteria including access to financing, simple payback or ROI, bill savings, demand reduction, etc.
	* If we can identify an EE project that meets their general criteria, when would they be able to move forward? Would they find budget to do so this year? If not, would OBF allow them to implement it sooner?
* Customers with energy or carbon reduction, green or sustainability goals/plans, show how they were influenced to switch to electricity instead of gas, gas instead of electricity, or to use more water to save electricity or gas, and the net Btu reduction (3-prong test).

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

1. NMEC and Accelerated Replacement (AR) projects must demonstrate with a Preponderance of Evidence both that program staff convinced the customer that the project was feasible and that energy efficiency was the critical factor for pursuing the project. In other words, if not for the program the customer would not be moving forward with the project.
	* If a measure’s simple payback exceeds its [Effective Useful Life](https://www.sceonlineapp.com/SolutionCodesEUL.aspx) (EUL), the Customer should explain the reason(s) behind the business decision to implement the measure(s) even though on paper it appears that the project is not profitable.
	* If a measure’s simple payback is ≤ 2 years without incentives, financial savings should not be used as the primary influence driver.

Click here to enter text.

[ ]  Attachment(s) [ ]  Screen shot(s) [ ]  Both [ ]  Other

# **Project Details**

## **5.1 Facility Description**

Provide readers a concise and thorough overview of the site location, facility operation and general business focus.

* Climate Zone, Building Type and Description, Square Feet, Space Use
* Operating Hours - Provide Breakdown Hours/Day (M-F, and Sat-Sun)
* Seasonal off periods (maintenance/holiday shutdown)
* Production Data (if applicable)
* How the process type (steam, process heating, etc.) is utilized within the process and travels through the system
	+ Details on process operations can be provided in the appendix
* Provide a line diagram or Process Flow Diagram (PFD) to depict the facility process, equipment, and fuel use
* Include description of Non-IOU Fuel Sources

## **5.2 Energy Use Summary**

Tabulate the facility annual energy use totals for KWH, KW, and THERMS/YR for at least the last twelve (12) months;

Table 3.1: Facility Annual Electric Use

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Service Account Number** | **Tariff (rate)** | **Electric Meter Number(s)** | **Annual Electrical Usage** | **Peak (max) demand (kW)** |
| xxx-xxxx-xx | TOU-8-R | xxxxxxxxx | xxxxxxxxx  | xxxxxxxxx |

Table 3.2: Facility Annual Natural Gas Use (if applicable)

|  |  |  |
| --- | --- | --- |
| **Description** | **Value** | **Source** |
| Gas Meter Number(s) | xxxxxxxxxxxxx | xxxxxxxxxxxxx |
| Average natural gas use over the past # years, 2012-2017, 2 months normalized to a year | ###### therms/yr | xxxxxxxxxxxxx |

## **5.3 Facility Equipment Inventory**

Provide a list of all relevant major equipment that is enclosed in the project boundary.

* Equipment Type/Capacity/Manufacturer, Loads Served, Plate Rating
* Installation Dates (i.e. In Service Years)
* Equipment Schedule - Provide Breakdown Hours/Day (M-F, and Sat-Sun)
* Detailed sequence of operation (refer reader to attachments as needed)
* Operating characteristics (efficiency, load factor, fuel usage)
* Sources for all the above data
* **DO NOT** use general language, be very specific and include diagrams to describe processes

# **Proposed Energy Efficient Measures (EEMs)**

## **6.1 EEM 1 – Name of Measure (Measure/Solution Code)**

**Measure Application Type (Identify and justify the install type chosen for the measure):**

Accelerated Replacement (AR, previously RET or early retirement), Add-On Equipment (AOE, previously REA or retrofit add-on), Normal Replacement (NR, previously ROB or replace on burn-out), New Construction (NC), Building Weatherization (BW), BRO-Behavioral (BRO-Bhv), BRO-Retro-commissioning (BRO-RCx), and BRO-Operational (BRO-Op). Reference Resolution E-4818 Table 1.1.

**Effective Useful Life (EUL)/Remaining Useful Life (RUL):**

Provide the estimated EUL and source for this measure. Point out the exact DEER measure name and if varying from DEER Defaults, please provide source referenced. If non-DEER operating hours are being used, valid justification must be provided (e.g. logged data, EMS schedule) for the annual operating hours for all applicable measures. Provide RUL and calculation source if not defined by MAT.

**Standard Practice Discussion:**

Describe any applicable standard practice associated with this baseline/measure. Make direct reference to the energy codes by section and table number. It is not sufficient to state that a proposed installation is more energy efficient than a baseline measure while referencing a separate baseline document or standard practice (often proposed to be existing condition) without providing complete supporting materials and/or research.

Baselines must be well defined and describe the impact of applicable codes or standards. In situ, Code (Title 24 Section, Title 20, OSHA, AQMD, etc.), Industry Standard Practice (ISP study, other sources), where applicable. Address why all other non-applicable codes or standards are not applicable.

Provide alternative measures considered by the customer. Is there an outstanding disposition applicable to this project/measure?

Reference Resolution E-4939 and the CPUC ISP Study Guide.

**Existing Equipment/System Operation:**

Provide detailed description of the existing equipment or system operation, including location, operating hours (M-F, Sat-Sun), control method, equipment efficiency, etc.

* Utilize charts/graphs/references to present/support trend data
* Provide a picture that depicts the baseline state of the affected equipment
* **DO NOT** user general language, be very specific and include diagrams to describe processes
* Lighting measures require photo evidence in accordance with the Lighting Photos Guidelines.

**Proposed Equipment/System Operation:**

Provide detailed description of the proposed equipment or system operation, including location, operating hours (M-F, Sat-Sun), control method, equipment efficiency, etc.

* Utilize charts/graphs to present trend data
* What are the less efficient alternative measures?
* Compare facility operating hours vs. impacted equipment’s operating hours
* Quantify facility usage and measure savings
* Identify and quantify interactive effects
* Provide a picture that depicts the measure
* **DO NOT** use general language, be very specific and include diagrams to describe processes

Lighting measures should follow the Design Lights Consortium (DLC) Tech Spec for all LED lighting measures; all lighting measures should be UL or Edison Testing Labs (ETL) certified.

Residential lighting needs to incorporate ENERGY STAR in addition to the DLC lists;

For interior residential lighting, the lighting may be on the ENERGY STAR website and not the DLC.

Lighting measures require a signed affidavit from the customer stating that the lamps, fixtures, and ballasts/transformers removed during the project will be recycled or disposed of in accordance with federal regulations and California state-specific requirements. This is the only document related to recycling that will be required for the PFS stage of the project. However, be advised that post-installation will require additional documentation. Post-installation will require documentation (manifest, invoice, etc.) from the licensed hazardous waste transporter who performed the recycling showing quantities of lamps, fixtures, and ballasts/transformers removed during the project that have been recycled or disposed of. Documentation should show customer name and site address materials were taken from. If this is not attainable, a signed affidavit by the customer AND licensed hazardous waste transporter who performed the recycling certifying that the lamps, fixtures, and ballasts/transformers removed during the project have been recycled or disposed of in accordance with federal law and California state-specific requirements will be required.

**Non-IOU Fuel Source:**

Provide detailed description of how the Non-IOU fuel source effects this measure and how the effects where accounted for in the calculations. A reference to the calculation document should be included here so it can be found and reviewed.

**Refrigerant Avoided Cost Calculator (RACC)**

Per Attachment A of Resolution E-5152, reporting of refrigerant leakage avoided costs is enabled by the refrigerant avoided cost calculator[[1]](#footnote-2), to be included in cost effectiveness calculations and is applicable to all measures that add new refrigerant. The reporting applies to all claimed measures. For custom projects, the RACC should also be used if the project is fuel substitution with heat pump added, or replacing electric resistance technology with a heat pump, or if the project involves use of low-GWP refrigerants. Documentation of the refrigerant avoided cost inputs and a copy of the refrigerant avoided cost calculator are required to be included as part of the custom application documentation package. Provide the project reporting parameters for each EEM where RACC is applicable.

**Fuel Substitution**

In order to include a fuel substitution measure, it must be demonstrated that the proposed measure passes the Fuel Substitution Test implemented by Decision 19-08-009. The Fuel Substitution Test has two requirements:

1. The measure shall not increase source energy
2. The measure shall not harm the environment

The Fuel Substitution Test and the technical guidance document are applicable only to fuel substitution measures which are eligible for energy efficiency incentives and included in the program administrator's energy efficiency portfolios. For more information on fuel substitution measures, review Decision 19-08-009 and the CPUC website for Fuel Substitution in Energy Efficiency[[2]](#footnote-3). The Fuel Substitution Calculator is an excel based tool used to perform the Fuel Substitution Test calculations. The technical guidance document includes a guide for using the Fuel Substitution Calculator. Additionally, for downstream fuel substitution programs, the fuel substitution infrastructure upgrade costs must be collected by populating the Fuel Substitution infrastructure data reporting template. Please reference CP&S E-PPICs No. 054.2 Revised Fuel Substitution Requirements Pursuant to D.19-08-009 for additional information.

**Calculation Methodology:**

* If a preferred calculation tool is not utilized, the calculation methodology must be clearly and concisely documented
* Provide detail on inputs (metered data, assumptions, spec sheet)
* Complete calibration of energy simulation model
* Reference any study and data source and note all assumptions
* Include and label charts and pictures
* All custom projects must include documentation that clearly and concisely describes the calculation methodology proposed to be used to estimate the savings claims.
* Where custom spreadsheet analysis is used to estimate the expected savings impacts, the calculation methodology must be separately presented and summarized in a single place such as a clearly labeled, dedicated tab in a spreadsheet workbook or a dedicated section of a development report. It is not realistic to expect that a technical reviewer will hunt cell by cell, tab by tab through a spreadsheet to ascertain how the savings impacts are calculated.
* It is often the case that initial estimates of a custom measure’s savings impacts are performed using “placeholder” calculations which are estimates based on accepted engineering principals and assumptions, the basis of which must be clearly documented and reasonable. For many custom projects, the final savings claims estimates are based on pre-installation and post installation measurements with a savings calculation methodology that is different than the “placeholder” calculations.
* The calculation methodology description should be comprehensive and complete leaving only the final verified variables and data to be determined after project completion.
* All that should be required after the project is completed is to input final project post verified data and assumptions into the proposed formulae to determine the expected savings impacts.
* Generic methodology lacking such detailed specific associations is not acceptable
* Provide precise step-by-step calculation methodology and equations proposed to be used to estimate the expected savings impacts for each custom measure with detailed descriptions associating the proposed methodology with specific equipment and systems affected by the measure. The methodology must be logically organized
* When pre or post installation measurement and verification is proposed or required, the calculation methodology must describe in detail how the pre and post project measurements (will be used to estimate the expected savings impacts for this measure.
* Provide system diagrams to facilitate the review of the measure
* The energy savings principle for each measure should be discussed
* Provide concise equations with explanations demonstrating how the final savings estimates will be determined using the measured data.

**Estimated Savings:**

These savings estimates are only the savings for which the customer may receive incentives for

|  |
| --- |
| **EEM 1 – Measure Description Estimated Energy Savings** |
| Electricity Savings | **1,500,000 kWh** |
| Electric Peak Demand Savings | **20 kW** |
| Natural Gas Savings | **0 Therms/yr** |

## **6.2 EEM 2 – Solution Code (NMEC)**

**Measure Application Type:**

Provide the measure application type (MAT) for each measure.

EEM-1: Measure Description – MAT

* Provide clear justification and underlying assumptions on why the MAT was selected.

EEM-2: Measure Description – MAT

* Provide clear justification and underlying assumptions on why the MAT was selected.

Discuss the Project level MAT that is not only suitable for an existing conditions baseline, but also the one which accounts for the majority of the project savings.

**Effective Useful Life (EUL):**

Provide the EUL for each measure.

EEM-1: EUL, EUL ID

* Provide clear justification and underlying assumptions on why the EUL years and EUL ID was selected.

EEM-2: EUL, EUL ID

* Provide clear justification and underlying assumptions on why the EUL years and EUL ID was selected.

Weighted Average EUL:

Attach the Weighted Average Expected Useful Life worksheet[[3]](#footnote-4) as an appendix.  Discuss any variance from DEER EUL values or external sources for measures not identified by DEER or CPUC guidance.

**Code Compliance:**

Describe any applicable code requirement with each measure. Make direct reference to the energy codes by section and table number. Provide enough information (e.g., equipment specs, efficiency levels, applicable code requirements) at the measure level to show that the proposed measure provide to-code or above-code savings.

**Standard Practice Discussion:**

Measures that do not have a code requirement need to meet or exceed standard practice to be eligible for Site-level NMEC projects. The Industry Standard Practice shall be determined per Resolution E-4939 and the CPUC ISP Study Guide.

**Existing Equipment/System Operation:**

Provide detailed description of the existing equipment or system operation, including location, operating hours (M-F, Sat-Sun), control method, equipment efficiency, etc. for each measure.

* Utilize charts/graphs/references to present/support trend data
* Provide a picture that depicts the baseline state of the affected equipment
* **DO NOT**user general language, be very specific and include diagrams to describe processes

**Proposed Equipment/System Operation:**

Provide detailed description of the proposed equipment or system operation, including location, operating hours (M-F, Sat-Sun), control method, equipment efficiency, etc. for each measure.

* Utilize charts/graphs to present trend data
* What are the less efficient alternative measures?
* Compare facility operating hours vs. impacted equipment’s operating hours
* Quantify facility usage and measure savings
* Identify and quantify interactive effects
* Provide a picture that depicts the measure
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* Lighting measures require photo evidence in accordance with the Lighting Photos Guidelines.

Lighting measures should follow the Design Lights Consortium (DLC) Tech Spec for all LED lighting measures; all lighting measures should be UL or Edison Testing Labs (ETL) certified.

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Provide detailed description of how the Non-IOU fuel source effects this measure and how the effects where accounted for in the calculations. A reference to the calculation document should be included here so it can be found and reviewed.

**Refrigerant Avoided Cost Calculator (RACC)**

Per Attachment A of Resolution E-5152, reporting of refrigerant leakage avoided costs is enabled by the refrigerant avoided cost calculator[[4]](#footnote-5), to be included in cost effectiveness calculations and is applicable to all measures that add new refrigerant. The reporting applies to all claimed measures. For custom projects, the RACC should also be used if the project is fuel substitution with heat pump added, or replacing electric resistance technology with a heat pump, or if the project involves use of low-GWP refrigerants. Documentation of the refrigerant avoided cost inputs and a copy of the refrigerant avoided cost calculator are required to be included as part of the custom application documentation package. Provide the project reporting parameters for each EEM where RACC is applicable.

**Fuel Substitution**

In order to include a fuel substitution measure, it must be demonstrated that the proposed measure passes the Fuel Substitution Test implemented by Decision 19-08-009. The Fuel Substitution Test has two requirements:

1. The measure shall not increase source energy
2. The measure shall not harm the environment

The Fuel Substitution Test and the technical guidance document are applicable only to fuel substitution measures which are eligible for energy efficiency incentives and included in the program administrator's energy efficiency portfolios. For more information on fuel substitution measures, review Decision 19-08-009 and the CPUC website for Fuel Substitution in Energy Efficiency[[5]](#footnote-6). The Fuel Substitution Calculator is an excel based tool used to perform the Fuel Substitution Test calculations. The technical guidance document includes a guide for using the Fuel Substitution Calculator. Additionally, for downstream fuel substitution programs, the fuel substitution infrastructure upgrade costs must be collected by populating the Fuel Substitution infrastructure data reporting template. Please reference CP&S E-PPICs No. 054.2 Revised Fuel Substitution Requirements Pursuant to D.19-08-009 for additional information.

**Calculation Methodology:**

* If a preferred calculation tool is not utilized, the calculation methodology must be clearly and concisely

documented

* Provide detail on inputs (metered data, assumptions, spec sheet)
* Complete calibration of energy simulation model
* Reference any study and data source and note all assumptions
* Include and label charts and pictures
* All custom projects must include documentation that clearly and concisely describes the calculation

methodology proposed to be used to estimate the savings claims.

* Where custom spreadsheet analysis is used to estimate the expected savings impacts, the calculation

methodology must be separately presented and summarized in a single place such as a clearly labeled, dedicated tab in a spreadsheet workbook or a dedicated section of a development report.  It is not realistic to expect that a technical reviewer will hunt cell by cell, tab by tab through a spreadsheet to ascertain how the savings impacts are calculated.

* It is often the case that initial estimates of a custom measure’s savings impacts are performed using

“placeholder” calculations which are estimates based on accepted engineering principals and assumptions, the basis of which must be clearly documented and reasonable.  For many custom projects, the final savings claims estimates are based on pre-installation and post installation measurements with a savings calculation methodology that is different than the “placeholder” calculations.

* The calculation methodology description should be comprehensive and complete leaving only the final

verified variables and data to be determined after project completion.

* All that should be required after the project is completed is to input final project post verified data and

assumptions into the proposed formulae to determine the expected savings impacts.

* Generic methodology lacking such detailed specific associations is not acceptable
* Provide precise step-by-step calculation methodology and equations proposed to be used to estimate

the expected savings impacts for each custom measure with detailed descriptions associating the proposed methodology with specific equipment and systems affected by the measure. The methodology must be logically organized

* When pre or post installation measurement and verification is proposed or required, the calculation

methodology must describe in detail how the pre and post project measurements (will be used to estimate the expected savings impacts for this measure.

* Provide system diagrams to facilitate the review of the measure
* The energy savings principle for each measure should be discussed
* Provide concise equations with explanations demonstrating how the final savings estimates will be

determined using the measured data.

**Estimated Savings:**

These savings estimates are only the savings for which the customer may receive incentives for.

|  |
| --- |
| **EEM 1 – Measure Description Estimated Energy Savings** |
| Electricity Savings | **1,500,000 kWh** |
| Electric Peak Demand Savings | **20 kW** |
| Natural Gas Savings | **100,000 Therms/yr** |
| **EEM 2 – Measure Description Estimated Energy Savings** |
| Electricity Savings | **1,500,000 kWh** |
| Electric Peak Demand Savings | **20 kW** |
| Natural Gas Savings | **100,000 Therms/yr** |

# **Project Cost & Financial Analysis**

Provide a table (suggested format below) that details project cost estimates and sources of those estimates. Implementer to discuss and identify with customer the appropriate financial analysis (payback, NPV, as applicable) and detail the source of any assumptions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **Annual Estimates** |  |  |  |  |  |  |  |  |  |  |
| **EEM No.** | **Measure Description****(with Solution Code)** | **Measure Type** | **ElectricitySavings (kWh)** | **Electricity Savings (kW)** | **Gas Savings****(therms/yr)** | **Cost Savings** | **Estimated Installation Cost (GMC)** | **Estimated Incremental Cost (IMC)** | **Standard Measure Cost (SMC)** | **Estimated Accelerated Replacement Cost (ARC), for AR installation type only** | **Potential Utility Incentive** | **Effective Useful Life (EUL)** | **Remaining Useful Life (RUL), for AR installation type only** | **Estimated Payback (Years) no incentive** | **Estimated Payback (Years) with incentive** |
| EEM-1 | Lighting Upgrade(xx-12345) | NR |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EEM-2 | (NMEC Whole Building(WB-21715) | AR |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sources** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **TOTAL (ALL MEASURES)** |  |  |  |  |  |  |  |  |  |  |  |  |  |

## **7.1 California Public Utilities Commission (CPUC) NMEC Technical Guidance Document**

All NMEC projects require completion and submission of the CPUC Weighted Average Expected Life/Net to Gross Method Technical Document. This document named ‘ Weighted Average Expected Useful Life/Net to Gross Method’ is located on the [Rolling Portfolio Program Guidance (ca.gov)](https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/rolling-portfolio-program-guidance) on the CPUC.CA.GOV website.

 Please download and complete the “Project Components” tab on this document. Please attach the completed document under Section 8 of this PFS, “Additional Attachments.”

## **7.2 Southern California Edison Simple Payback Tool**

All calculated projects require completion and submission of the SCE Calculated Incentives EUL-Simple Payback Tool.

Please complete “Simple Payback - EUL Calculator v1.2.xlsx”

# **Measurement and Verification Plan**

 A complete M&V plan must provide the following:

* State if Pre- and/or Post- M&V will occur, if not, explain rationale
	+ Discussion of any rationale for any deviation from the Customized Guidelines
* The IMPVP Option used to determine savings
* Identification of project boundaries of the energy efficiency measure
* Data to be collected and/or measured
	+ Specify location of metering points on a line diagram
	+ Discussion of how the data will be used in the calculations
* Specifications of measurement equipment, period (i.e. 2 weeks), and interval (i.e. 15min increment)
	+ Discussion of the accuracy of the measurement equipment
	+ Include no less than 2 weeks of metered data (pre- and post-)
	+ Discussion of capturing seasonality (i.e. harvest) in metered data
* Specifications of the exact data analysis procedures, algorithms, assumptions, software tools (name and version)
	+ Reference relevant sections of energy efficiency standards or guides used for assumptions
* How the results will be reported and documented
	+ Discussion of uncertainty associated with the results
* Provide a statement regarding measurement accuracy and data uncertainty of measurement equipment.

All **BRO (Retrocommissioning and Operational) projects** require a three-year maintenance plan and/or service contract at IR. Additionally,Retrocommissioning and Operational projects must use a three-year EUL. Behavioral projects may be eligible for incentives on a project by project basis.

* The BRO (formerly known as RCx) Vendor must provide a maintenance plan and/or service contract for the duration of at least three years for the incentivized measure(s). Provide any other evidence available on how persistence will be maintained for the energy efficiency measures during the life of the measures.
* The Customer must supply evidence of the training taking place for a maintenance plan for the duration of at least three years for the incentivized measure(s).
* When building staff is not available or trained to perform maintenance tasks, owners may have a maintenance service contract in place with an equipment vendor, installing contractor, or a maintenance service contractor - at which time it becomes a Service Contract.
* Most companies providing service contracts focus on maintenance of equipment, and building owners and managers need to specifically request requirements that address operating issues in service contracts.
* If included in the Retrocommissioning Plan, the commissioning team can review any existing service contracts and make recommendations on how to enhance the current level of service to address efficient operation.
* The maintenance plan and/or service contract must be submitted during Implementation Review and Approval.
* Up-to-date building documentation, including O&M Manuals, Sequences of Operation, and System Diagrams, are produced through the retrocommissioning process and are essential to maintaining and troubleshooting equipment. The Preventive Maintenance Plan and a Recommissioning Plan should describe in detail the human and financial resources that are necessary to maintain the benefits of the retrocommissioning process for many years.

All **Normalized Metered Energy Consumption (NMEC)** projects must utilize the methodology described in the Statewide Calculated Savings Guidelines to determine the final savings. In accordance with Assembly Bill 802 and California Public Utilities Commission guidance, this methodology follows an International Performance Measurement & Verification Protocol (IPMVP) Option C approach in which metered energy use data prior to and after the Energy Efficiency Measures (EEM) have been installed are used to estimate savings. This approach requires that regression-based energy models be developed from baseline energy use and independent variable data. The model’s goodness of fit is determined to assess its accuracy in ultimately calculating savings.

A site-specific M&V Plan document should be attached separately to this PFS. A template has been provided for this M&V Plan that should be developed in accordance with program policies and CPUC guidance. The M&V Plan should be supported with a regression model to support baseline statistical criteria, raw data, detailed descriptions of independent variables utilized, type of model used, detailed description of any adjustments, data description, project boundary and any other necessary information to support assertions and strategy.

# **Project Parameters for Utility Energy Efficiency Programs**

Implementer to provide project reporting and technical parameters for each measure (measure/solution code) that is part of the submitted application for utility incentive. **EEM-1 AND EEM-2 are examples of Customized measures. EEM-3 is an example of a Normalized Metered Energy Consumption (NMEC) whole building project.**

|  |  |  |  |
| --- | --- | --- | --- |
| **EEM** | **1**  | **2** | **3**  |
| **Site # / SA Number** | Site #SA # | Site #SA # | Site #SA # |
| **Utility Solution/Measure Code** | LT-22005 | PR-78584 | WB-21715 |
| **Measure Description** | [MLC Only] Bollards - accelerated replacement | High efficiency process chiller | Whole Building |
| **MAT** | AR | NR | NMEC |
| **Standard Practice Applicable** | Yes | Yes | Yes, if no Code Requirement |
| **EUL (years)** |  |  | Project Weighted EUL |
| **EUL ID (Source)** |  |  |  |
| **EUL Justification** |  |  |  |
| **RUL (years)** |  |  |  |
| **RUL ID (Source)** |  |  |  |
| **RUL Justification** |  |  |  |
| **Therms Interactive Effects Justification** |  |  |  |
| **Facility Usage** | **kWh** |  |  |  |
| **kW** |  |  |  |
| **Therms/yr** |  |  |  |
| **1st Period Baseline Usage** | **kWh** |  |  |  |
| **kW** |  |  |  |
| **Therms/yr** |  |  |  |
| **2nd Period Baseline Usage** | **kWh** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **kW** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **Therms/yr** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **Measure Usage** | **kWh** |  |  |  |
| **kW** |  |  |  |
| **Therms/yr** |  |  |  |
| **1st Period Savings** | **kWh** |  |  |  |
| **kW** |  |  |  |
| **Therms/yr** |  |  |  |
| **2nd Period Savings** | **kWh** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **kW** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **Therms/yr** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **Gross Measure Cost [GMC]** |  |  | $1,500,000 |
| **Standard Measure Cost [SMC]** |  |  | N/A |
| **Incremental Measure Cost [IMC]** |  |  | N/A  |
| **Accelerated Replacement Cost [ARC]** |  | N/A for NR, NC, AOE, and BRO | N/A |
| **Cost Documentation [GMC]** | Describe Cost Estimate Reference  | Describe Cost Estimate Reference  | Describe Cost Estimate Reference |
| **Cost Documentation [SMC]** | Describe Cost Estimate Reference | Describe Cost Estimate Reference | N/A |
| **Cost Documentation [IMC]** | Describe Cost Estimate Reference  | Describe Cost Estimate Reference | N/A  |
| **Total****Estimated****Savings** | **kWh** |  |  |  |
| **kW** |  |  |  |
| **Therms** |  |  |  |
| **Total GMC** |  |  | $ |
| **PreDesc** | Description of existing base case | N/A for NR, NC, AOE, and BRO | N/A for NMEC |
| **StdDesc** | Description of Standard Practice | Description of Standard Practice for NR, NC, and AR. Description of existing case for AOE and BRO | Existing Conditions |
| **Tech Group** | Standard ExAnte Technology Group | Standard ExAnte Technology Group | Standard ExAnte Technology Group |
| **Tech Type** | Standard ExAnte Technology Type used to categorize measure | Standard ExAnte Technology Type used to categorize measure | Standard ExAnte Technology Type used to categorize measure |
| **E3TargetSector** | Values allowed for Avoided Cost Combo | Values allowed for Avoided Cost Combo | Values allowed for Avoided Cost Combo |
| **E3MeaElecEndUseShape** | Verify proper electric impact profile ID is specified. Ensure that electric load shapes align with E3TargetSectorso that these will be processed correctly through the CET calculator. | Verify proper electric impact profile ID is specified. Ensure that electric load shapes align with E3TargetSector so that these will be processed correctly through the CET calculator. | Verify proper electric impact profile ID is specified. Ensure that electric load shapes align with E3TargetSector so that these will be processed correctly through the CET calculator. |
| **MeasImpactType** |  |  |  |

**Data Fields:**

When RACC or Water-Energy Calculator is applicable, implementer to provide additional project reporting parameters for each measure that is part of the submitted application for utility incentive. Please contact SCE for directions to complete the data fields table for RACC and Water-Energy Calculator.

|  |  |  |  |
| --- | --- | --- | --- |
| **EEM** | **1** | **2** | **3** |
| **Site # / SA Number** | Site #SA # | Site #SA # | Site #SA # |
| **Utility Solution/Measure Code** | Solution Code | Solution Code | Solution Code |
| **Measure Description** | Measure Description | Measure Description | Measure Description |
| **UnitRefrigCosts** | Column H in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS | Column H in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS | Column H in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS |
| **UnitRefrigBens** | Column I in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS | Column I in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS | Column I in “eTRM Export” tab (per EEM basis) of RACC v1.3 Rev4 found on CEDARS |
| **Water Use** | Either “Indoor” or “Outdoor,” needs to be populated if the water savingsfields are populated | Either “Indoor” or “Outdoor,” needs to be populated if the water savingsfields are populated | Either “Indoor” or “Outdoor,” needs to be populated if the water savingsfields are populated |
| **UnitkWhIOUWater1stBaseline** | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 |
| **UnitkWhIOUWater2ndBaseline** | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 | Column J in “Output Table” tab (per EEM basis) of W-E Calculator 2.0 v2.0.4 |

# **Pre Installation Inspection Report**

## **10.1 Site Inspection Meeting Details**

|  |
| --- |
| **SITE INSPECTION DETAILS** |
| **Name, Title, Company** John Doe, Engineer, ABC Co. | **Name, Title, Company** John Doe, Engineer, Consultant Co. | **Name, Title, Company** Jane Doe, Engineer, Customer Co. |
| **Telephone**555-202-5555 | **Telephone**626-101-5555 | **Telephone**555-303-5555 |
| **E-Mail:** johndoe@Implementer.com | **E-Mail:** johndoe@consultant.com | **E-Mail:** jane.doe@customer.com |
| **Meeting Date**September 21, 2022 | **Meeting Time**11:00 am |
| **Customer Name**Customer’s Business Name | **Project Name**Enter Project Name |
| **Customer Contact**Jane Doe | **Stage**Project Application or Installation Report |
| **Site Address**555 Seal Beach Blvd | **City**Seal Beach |
| **CA Climate Zone**13 | **Building type**Commercial | **Market Segment**Large - Office |

## **10.2 Project Scope and Site Description**

The inspector will use this section to provide readers a high-level summary of the project scope and site description (i.e. office, retail, rental, process, manufacturing, etc.), site area square footage, site function/operation, existing equipment and recommended energy efficient equipment planned for the project, load served by existing equipment, etc.

## **10.3 Inspection Findings**

Include information on site inspection notes below:

**Pre-Installation Inspection Requirements:**

* Inspector to confirm that demolition nor installation have not been initiated and equipment has not been ordered.
* Does the equipment have a dedicated utility or non-utility energy meter. If yes, describe.
* Identify any site monitoring capabilities, i.e. existing meters, sub-meters, SCADA, BMS, etc.:
* Inspector to confirm that the existing equipment was verified to be operational. Photos and nameplate data taken.
* Accuracy/any data uncertainty of measurement equipment: (Example Brand X model 3 data logging equipment was used and meter was calibrated beforehand.)
* Indicate any similar proposed measure equipment already existing at the site (Customer Standard Practice):
* Site Photos and Videos: Inspector to confirm it has Located/Pasted all related site equipment/site condition photos or videos in the Photos and Videos in the Project Package.
* Does this site purchase electric power from a source other than SCE? If yes, provide details (source and qty.).
* Is Onsite Generation present at this Customer site or planned to be installed in the near future ? If yes, provide details; i.e. type, size, location, installation date)
* Are Load Shifting Strategies Implemented at this Customer site ? If yes, provide details of the Peak Load Shifting Strategies (battery storage, thermal storage, etc.)
* Is the Customer enrolled in Demand Response Programs ? If yes, provide the name of the program
* Equipment Operates During Peak Periods?
* List the supporting documentation included in the application that was used to establish the baseline/installed equipment during the site inspection.
* Provide a statement, including supporting documentation, of whether the Pre/Post-Installation Description is correct and accurate.
* Provide a statement regarding any redundant, non-operational equipment for each Installation that is part of the Project. Savings from such units or any other equipment that does not contribute to each of the Expected Energy Savings, Expected Demand Savings, or Expected TRC Ratio shall not be included in the savings estimate.
* Provide a statement on any adjacent or related equipment/phased projects (predecessor or future) that could impact the project
* Enumerate every equipment inventory (present at the site and/or inspected), including nameplate data, age and Remaining Useful Life (RUL), quantity, location, condition (including photographs), load served, and equipment operating procedures (e.g., schedules and set points, pressures, temperatures, etc.) that are associated with each Measure and with any Non-IOU Fuel Source(s).
* Clearly state the operating hours for the facility and the operating hours for the equipment.
* Provide a record of any unusual or abnormal conditions or events that occurred during the Site Inspection and any actions taken in response thereto.
* Provide a statement that will cover the equipment viability definition items including its physical operations and its ability to remain in service and meet customer requirements (maintain required Level of Service) for its Remaining Useful Life (RUL).
* Provide a statement on availability of spare parts for the existing equipment and spare parts currently in stock
* Identify all non-energy efficiency drivers that the Customer will benefit from in implementing the proposed measures
* Identify any Code and/or regulation impact to this project (i.e Title 24, Title 20, AQMD, OSHA, fire-life safety, etc.)
* Identify any fuel-switching implications of the project

# **Appendix**

Implementer shall include as an attachment any of the following required and applicable files (check appropriate box(es)):

[ ]  Comprehensive Existing System/Equipment Performance Data and operating conditions

[ ]  M&V data collection procedures/plan (Pre and Proposed Post Installation)

[ ]  M&V monitoring equipment used, interval data/frequency of M&V data, duration of M&V data (Pre and Proposed Post Installation)

[ ]  M&V Data (Pre Installation)

[ ]  Photos of system/existing equipment

[ ]  Schematic/Diagram of existing system

[ ]  Equipment Spec Cut sheets and performance data of existing equipment/system

[ ]  Proposed Equipment Spec Sheet (if applicable)

[ ]  Schematic/Diagram for proposed system

[ ]  **Calculated Incentives EUL-Simple Payback Tool (excel format)**

[ ]  Equipment schedule of proposed system/equipment and/or load balance

[ ]  Cost proposal for proposed equipment and installation (from Bid Proposals, Formal Quotes, from Professional Cost Estimating Firms, Industry Standard Cost Estimating References, recent Industry White Paper)

[ ]  Energy models

* + All whole building energy models **must** be calibrated to utility bills
	+ Provide paper and electronic copy of input files, output files, and reference to weather files
	+ Note what input parameters were measured and which were assumed by providing sources
	+ Report the accuracy with which the simulation results match the energy data used for calibration

[ ]  Production Data (if applicable)

Additional attachment(s), describe in full

[ ]  Click here to enter text.

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[ ]  Click here to enter text.

[ ]  Click here to enter text.

1. RACC Workbook for Deemed/Custom Measures found on [Supporting Files - CEDARS (sound-data.com)](https://cedars.sound-data.com/deer-resources/tools/supporting-files/) [↑](#footnote-ref-2)
2. [Fuel Substitution in Energy Efficiency (ca.gov)](https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency) [↑](#footnote-ref-3)
3. [Weighted Average Expected Useful Life/Net to Gross Method (ca.gov)](https://files.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/Combining_Measures_Claims.DRAFT.xlsm) [↑](#footnote-ref-4)
4. RACC Workbook for Deemed/Custom Measures found on [Supporting Files - CEDARS (sound-data.com)](https://cedars.sound-data.com/deer-resources/tools/supporting-files/) [↑](#footnote-ref-5)
5. [Fuel Substitution in Energy Efficiency (ca.gov)](https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency) [↑](#footnote-ref-6)