

T1 Working Group Report

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Executive Summary

This document summarizes the Track 1 Working Group (T1WG) activity and recommendations on measure-level baseline assignment in the new default paradigm, as well as refinement of the current preponderance of evidence process for differentiating among normal replacement and accelerated replacement as directed by Decision 16-08-019.

Background and Stakeholder Process. CPUC Staff initiated the formation of a working group in late August 2016. In late September ERS, an evaluation contractor currently under contract with CPUC, was tasked with organizing and facilitating a collaborative process as directed by the Decision. Stakeholders were invited to a formal all-day kick-off meeting October 12th with 31 stakeholders in attendance, including implementers, program administrators (PAs), Office of Ratepayer Advocates (ORA) representative, ex ante review team members, ex post evaluation team, and advocacy groups. The Working Group (WG) was divided into two tracks: T1WG, concerned with the measure-level baseline assignments and preponderance of evidence process and T2WG, tasked with streamlining ex ante review and refining the ISP guidance document. The T1WG had a firm deadline of December 7 for reporting out results and recommendations in order to meet the end-of-the-year filing requirement set by D.16-08-019.

During the seven-week period, the T1WG members were actively engaged, with an average of 28 attending the weekly two-hour webinars. Stakeholders generated over 100 independent documents (emails, responses to surveys, responses to prompts) each rich with ideas, questions, and dissent. The discussions were often contentious, but this was almost always offered in a constructive manner. The results of this effort are two guidance documents, the Baseline Assignment Guidance (BGDV1.0) and the Preponderance of Evidence Guidance (POEV2.0) presented in Attachment A and B, respectively.

The measure-level assignments focused on first defining the terms used in the program-level assignment Table 1 of D.16-08-019 in such a way, that the actual assignment of a baseline to a measure was a direct outcome of those definitions. The bulk of the WG effort was in crafting those definitions, but once they were defined, the actual measure-level assignment was straightforward. Improving the functionality of POE assessment of accelerated versus normal replacement depended on a two-pronged approach: First, standardize the method for assessing preponderance of evidence so that it is more predictable and objective, with clear definitions; and second, identify measure-program-market combinations that could bypass the “full” POE methodology and instead use a simplified approach without introducing excessive savings risk.

Not unexpectedly, viewpoints tended to be split between “implementation” – those most interest in simplifying the processes to “unlock further project opportunities” – and the “reviewers” – those most concerned with managing the “real and significant risk of a widening gap between expected and actual free ridership” and of low evaluated savings realization rates.

There are many areas in each of the measure-level and POE documents where the stakeholder group achieved broad consensus, including introducing significant new definitions and processes that will expedite processes and unlock savings. The group had particularly good success doing so with the overall definitional and POE frameworks. There are some areas where it might be possible to craft a general agreement, if not unanimity, with the POE survey for example, with more time. There are a few areas where stakeholders’ positions bifurcated and common ground was not achievable during the T1WG period and may not be reasonable to expect going forward. In such instances the document text drafted by the facilitators takes a clear position rather than leaving the issue unresolved, by either articulating a middle ground or one of the more polar positions. In such instances, Sections 2 and 3 articulate the

facilitator's understanding of these dissenting viewpoints, and state the rationale for the positions as they are presented in the appendices. Stakeholders will have the opportunity to reinforce, change, or clarify these positions further during the later public comment period.

D.16-08-019 directed the working group to reach a consensus.¹ This was largely achieved on the major conceptual issues the group grappled with. Notable exceptions to this are summarized below and addressed in detail in Sections 2 and 3.

It must be noted that on some key issues where there was tabulated input from surveys or verbal votes, there were a marked number of abstentions, particularly from the reviewer perspectives. This may have been due to their not having an opinion on a particular issue, being concerned that this was not the appropriate channel to voice their opinions, not having had the time to form an opinion on the topic, or other reasons, but it was notable. Only one of the reviewer stakeholders provided written commentary on the final draft documents. Both the ORA representative and two members of Ex Ante Review team actively participated in the workshop, but did not provide written comments. Reviewer dissent expressed in this document may also reflect earlier written material and the minutes of the Nov 30 meeting.

Summary of Results. The topics of the two guidance documents are complex and were subjects of debate well before AB802. The implementation of these guidance documents will have meaningful impact on how energy efficiency business is undertaken in California, and hence, this generated sharp debate within the working group. The issues are interrelated as well and could not be resolved sequentially, requiring revisiting earlier conclusion based on a subsequent development. The compressed timeframe was difficult for all the parties, particularly as activities drew to a close and stakeholders were asked to provide their "final answer." However, real progress was made, with a shared agreement in a framework for tackling the topics and an agreement on important specifics.

Measure Level Assignment Results

Appendix A of this report is the Measure Level Assignment report that is the product of the working group's efforts. There are topic areas for which there is general agreement, additional work required, and material disagreement, as summarized below.

General Agreement

- There was general agreement that the Measure Default Baseline Assignment Table (Table 6-1 in BGDV1.0) is a sound basis for assigning measure-level default baselines. Table 6-1 is a derivation of the program-level baseline assignment Table 1 in D.16-08-019.
- There was general agreement that explicit definitions of each of the terms in Table 6-1 are necessary and should be incorporated into single baseline guidance documents. There was agreement on the general concept but not necessarily the fine points of the definitions for existing and new terms including: Code baseline (in contrast to existing baseline), existing baseline, restored vs. improved efficiency measures, and savings calculation congruency.

¹ The definition of "consensus" is subject to interpretation, ranging from a simple majority to unanimous agreement. The facilitators follow the Merriam-Webster dictionary definition of the term, which is of "general agreement" and "the judgment arrived at by most of those concerned." The facilitators include in this definition conclusions or positions developed and accepted during discussions without written record of substantive dissent. When unanimous agreement was reached this is noted distinctly. Prior ALJ language appears to use the term both to imply either this same definition or unanimity.

- There was general agreement on measure-specific baseline assignments presented in a companion spreadsheet, although additional and relatively minor work is required to clarify some of the measure descriptions. The algorithm for assignment follows the definitions for installation types and Table 6-1.
- There was general agreement that SBS, REA, NR, and AR installation types must present a nominal improvement over the existing measure. Measures which restore or return equipment efficiency to its original state are restorative and that is characteristic of BRO measures.
- There was general agreement that the accelerated replacement installation type had three different potential paths for proving equipment viability depending upon whether the existing equipment was broken (repair eligible), had a history of repair (repair indefinitely), or was likely to remain in place through the RUL (early retirement). There was not widespread agreement, however, that a repair-eligible approach should be eligible.
- There was general agreement that an accelerated replacement installation type could be assigned to a deemed measure, if appropriately defined and supported in the working papers. The working paper would also define the preponderance of evidence standard for the measure.

Additional Work Required

There were several issues where it appeared that additional discussion and reflection could have led to general agreement or where the outcome of the second working group could impact BGDV1.0 or POE2.0.

Measure Level Assignment

- Further work is necessary to refine measure descriptors where the initial measure list provided in the companion spreadsheet does not have enough information to define the type with certainty. The list should also be examined for comprehensiveness.
- The revised ISP guidance document, a product of the second working group track, could impact the definition of "Code" requiring revisions of the BGDV1.0 definition of Code, which includes Industry Standard Practice (ISP) as one possible baseline source.
- Further discussion is required to define how sub-optimally or non-operating equipment is treated consistently for controls, lighting, and other measures. While the discussions appeared to be converging on more specific language, there was not enough time to reach a conclusion.

Disagreements Presented by One or More Stakeholder Groups

While there was agreement to the broader frameworks presented in these two documents, there was also strong and vocal dissent to many of the details and in some cases, a categorical rejection expressed by a minority of a stakeholder group. These are articulated as follows:

Measure Level Assignment

- At their essence, the Shell-and-Building System installation type (SBS) measures tend to persistent overtime without a major event, like a renovation. The views on what technologies should be included ranged, as follows:
 - The most restrictive view, provided by a CPUC advisor, was that only weatherization and lighting fixtures met this definition, and then, only with additional evidence.
 - The middle ground view (which is reflected in the BGDV1.0) was that this category includes all shell, pipe insulation, windows, DHW fixtures, lighting fixtures, and lamp

and ballast replacements.

- The broadest view, provided by an implementer and supported by CEEIC, was that AB802 has set an existing baseline as the default and virtually all building equipment should be assigned an existing baseline unless there was a specific reason for excluding it. It should be noted that these commenters made thoughtful contributions to the crafting of the middle ground view as well.
- At its essence the Add-on Equipment (AOE) installation type includes equipment that enhances the efficiency of the system to which it is applied. There was general agreement that almost all controls should be described as an AOE installation type. The implementation wing advocated for a definition that allowed for pony measures, which are measures designed to increase the efficiency of the system overall by serving a portion of the load with a smaller, more efficient system.
 - Some of the reviewers strongly objected to pony measures as a potentially abusive backdoor for adding capacity.
- The Staff Baseline White Paper² expanded the types of equipment eligible for Accelerated Replacement to include potentially broken equipment (repair eligible) and equipment maintained well past its EUL (repair indefinitely). Both of these scenarios require a different consideration of the definition of viable operation and how this might be demonstrated by the preponderance of evidence. BGDV1.0 defines includes both the repair-eligible and repair-indefinitely scenarios in the Accelerated Replacement installation type.
 - Misgivings were expressed by the reviewer wing about how a program could allow the replacement of broken equipment without introducing high levels of free-ridership risk.

Preponderance of Evidence for Accelerated Replacement Results

Appendix B, a new POE guidance document, is the product of stakeholder group efforts. The group made a series of decisions that drive version 2 of the guidance document with at least general and sometimes unanimous agreement. These structural changes drive the document contents and include:

1. Adding a scoring system to provide guidance on relative values of evidence when full POE methods are used
2. Providing more detail regarding what constitutes good evidence of accelerated and normal replacement when using the full POE method
3. Adding a simplified POE protocol to demonstrate accelerated replacement of small and medium size projects
4. Adding “direct to decision” criteria for a selected measure-program-market combinations that allow accelerated replacement claims without POE
5. Adding a protocol to address deemed savings measures

One stakeholder objected to deemed being in scope; a reviewer stakeholder fairly cautioned that data are not available to support the structural changes.

The draft guidance also allows a significant degree of modularity that gives the CPUC and Staff flexibility. While it is not particularly recommended, some concepts could be adopted without adopting

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all of them at the same time. The document also includes a new policy update plan that proposes to use early data to validate or refute the new approach structure.

The group also decided that three types of changes were technically relevant and worth considering but inappropriate for this stakeholder group scope:

1. Specifying POE roles
2. Removing program influence from the POE-based assessment
3. Using POE findings on a prospective rather than site-specific retrospective basis

For such policy as this document addresses, the devil is in the details. There were several detailed topics about which either consensus could not be reached or the minority concern was particularly strong or pointed. The document presents what is believed the most balanced and cohesive structure. A partial selection of the more significant issues, taken from what are expected to be remaining areas of concern or dissent, is listed below. All of the categories listed here are addressed in detail in this report's body or Appendix B, the Accelerated Replacement document itself.

1. The full POE scoring system needs refinement.
2. The "tier 1" simplified protocol requires third-party administration of a questionnaire as written. This requirement faced strong resistance from those with an implementation perspective but is believed to be necessary for review-oriented stakeholders to support the creation of the lower rigor tier.
3. "Continued" viability. Multiple implementers requested relying solely on existing functionality as evidence of viability without needing to demonstrate future viability.
4. Consequences clause. The consequences clause written into the Guidance requires that customers who do not respond accurately to potentially forfeit their incentive, future program participation, and possibly be subject to legal proceedings. All items were of some concern to implementers and the last item was of particular concern. As with the first issue above, *such consequences are expected to be necessary to gain consensus support for a simplified POE method.*
5. Ex post evaluators may apply the full POE approach. The simplified approach closes with the observation that ex post evaluators may use the full POE approach. Multiple implementers, at least one IOU, and the Cal TF reviewers objected to this. Facilitator context for proposed language: Ex post evaluators always have the option of elevated rigor compare to applicants when investigating any factor under their purview, including equipment monitoring, attribution, and other factors. Compromise language may be possible to develop with more time.
6. Use a single standardized questionnaire in the simplified approach instead of one tailored to the program or measure.
7. There was objection to the state Staff authority to prohibit use of the simplified tiers for a specific program.

1 Introduction

This section describes the regulatory background leading to the formulation of the Working Group (WG) and the WG activities that led to the final WG products.

1.1 Regulatory Background for Track 1 Topics

D.16-08-019 (August 18, 2016) recommended the formation of a collaborative working group to specifically address measure-level baseline assignments and preponderance of evidence standards required for dual baseline treatment. D. 16-08-019 (p. 47) recommended the establishment of a working group to “address baseline treatment details more fully” and “[identify] the measure-level treatment for baselines, and if these should vary within sectors or program savings determination categories.” D. 16-08-019 further requested that the WG reach consensus on a measure-level table similar to the program-level table provided in Table 1: Adopted Default Baseline Policy for All Sectors (D. 16-08-019 p. 49)

Additionally, D. 16-08-019 (p. 48) recommended the establishment of a working group to “bring back to us a set of more detailed guidelines for documentation required for repair-eligible or accelerated replacement treatment.” This request is related to the “preponderance of evidence” (POE) standard, which was characterized by D. 16-08-019 (p. 48) as having “no standard definition of what that really means in practice and what will be workable in the context of project-level engagement.”

The findings of fact observe that there is not enough information and a lack of clarity regarding measure-level baselines and accelerated replacement policy, respectively (p. 97 at 14 and 15). The Decision concludes with high-level baseline characterizations that affirm Table 1 information (p. 100–102 at 22–24, 26–31, and 33–34), and commissions WG formation to address measure-level interpretation rules and to expand guidance on accelerated replacement interpretation (p. 102 at 35 and 36).

The T1WG track has concerned itself with these two tasks.

1.2 Working Group Activities

The work activity commenced with a kick-off meeting held at CPUC offices on October 12th. Attendance was solicited through a list serve invitation. The kick-off meeting was organized in two tracks, the T1WG (measure level assignment and POE) and T2WG (ex ante review process streamlining and revision of the ISP guidance document). The kick-off meeting was designed to identify the key issues and to focus the scope of the WG on the mission for both tracks. Attendees included representatives from all major stakeholder groups associated with the POE process:

- Implementation contractors (Implementers)
- Investor-owned utility (IOU) companies
- IOU Technical Assessment (TA) advisors
- Ex ante review consultants
- Ex post evaluation consultants
- Office of Ratepayer Advocate (ORA)
- Other advocacy groups such as the California Energy Efficiency Industry Council (CEEIC)
- The California Technical Forum (Cal TF)
- CPUC Energy Division staff (Staff)

During the seven weeks following the kickoff, the T1WG met weekly, via webinar. The facilitators organized an overarching agenda for the six-week period designed for a guided discussion of key elements of the measure-level assignment and POE in an orderly fashion. Each weekly call-in was followed with minutes and prompts for the next week’s meeting. The prompts included a mix of draft language proposals and electronic survey materials and were designed to capture input on relevant topics from all of the stakeholders while advancing the production of a final product. Each week’s prompts were summarized and reported back in the next call-in. During this period, there was an additional call to specifically address deemed measures, as well as numerous calls with various stakeholders to clarify comments or upon request. At the conclusion of the six-week period, the facilitators drafted two guidance documents, one for assigning baselines at the measure-level and the second for refining the preponderance of evidence process. The drafts were reworked in a culminating all-day workshop on November 30, at which time the text was finalized. These final drafts of the guidance documents are presented in Attachments A and B of this document. Stakeholders were invited to provide final commentary on the drafts to register any final dissent.

The implementation-side stakeholder groups tended to be over-represented in meetings compared to review-side stakeholders in terms of numbers of attendees but actual participation was balanced. The facilitators took special care to allow time during the meeting for all stakeholder group representatives to speak and to solicit feedback directly from individuals throughout the process to ensure broad input. Votes, survey responses, and narrative input were categorized by stakeholder group as well.

1.2.1 Meeting Content

Both of the above T1WG directives came with a deadline of the end of 2016, in the form of a staff resolution for Commission approval. Given the expedited schedule, and the close relationship of baselines with the preponderance of evidence system, working group facilitators (WGFs) decided to combine both research topics into a single working group that convened during six weekly meetings after a public kickoff on October 12, 2016.

After the kickoff and during the week leading up to the first working group webinar on October 20, 2016, facilitators collected nominations and requests from a diversity of stakeholder groups: program administrators (PAs), implementers, ex ante review contractors, ex post evaluation contractors, advocacy groups and other organizations, and Commission staff. Working group nominations were solicited through verbal and written requests at the kickoff meeting as well as emails to the cpuc@ers-inc.com mailbox. WGFs sought to ensure fair representation from the major stakeholder groups to offer a diversity of viewpoints that, through collaborative discussion, might evolve to a consensus recommendation. A comprehensive list of working group members and their attendance is included in Appendix C.

The Track 1 Working Group held its first meeting on October 20, 2016, via webinar. A summary of each WG meeting’s topics and work products is provided in Table 2.

Table 2: Track 1 Working Group Meetings and Topics

Meeting Date	Working Group Topics	Work Products
10/12/16 (in person)	Kickoff Organized working groups into two tracks Developed scope Gathered input and priorities	Nominations via email and in-person for working group attendance
10/20/16 (webinar)	Organized future working group meetings	Writing Prompt #1: proposed modifications to D. 16-08-019 Table 1,

	<p>Initiated D. 16-08-019 Table 1 discussion on:</p> <ul style="list-style-type: none"> • Definition of code baseline • Retrofit Add-On for non-building projects • Strategic Energy Management (SEM) <p>Definitions of Shell & Building System (S&BS) and Repair Eligible (RE)</p>	<p>scope by topic, various definitions</p> <p>Inventory of active measure lists from CalTF and PG&E</p>
10/25/16 (webinar)	<p>Reviewed recommended revisions to D. 16-08-019 Table 1</p> <p>Continued discussion on S&BS and RE measure definitions</p> <p>Initiated discussion on tenant fit-outs</p>	<p>Writing Prompt #2: RE baselines over measure life, proposed measure baseline assignment decision tree</p>
11/1/16 (webinar)	<p>Update on Track 2 Working Group activities</p> <p>Introduction and in-depth discussion on POE: deemed vs. custom, weighting evidence, roles and relationships in current process</p>	<p>Draft measure-level definitions document</p> <p>Writing Prompt #3: proposed D. 16-08-019 Table 1 interpretation via sequenced footnotes</p> <p>POE survey #1: establishing current process, identifying possible "defaults," definitions and use of evidentiary types</p>
11/8/16 (webinar)	<p>Continued discussion on POE: roles and responsibilities, single-factor baseline assignment without POE, review of survey results, breakout of deemed POE discussion to a subgroup</p>	<p>POE survey #2: examples of "direct-to-decision" factors, evidentiary rigor levels, scoring and weighting, prevalence/value of evidence types</p>
11/15/16 (webinar)	<p>Revisit measure-level points of contention: tenant fit-out definition and triggers, different types of RE measures</p> <p>Continue POE discussion: review survey results, identify consensus items, frame future subgroup discussion on deemed POE</p>	<p>Request for past examples of POE submissions to use as examples.</p>
11/22/16 (webinar)	<p>Final consideration of select measures, including EMS and</p> <p>Continue POE, report out on deemed measure call-in.</p>	<p>Draft Working Group Report and Measure-Level Baseline Guidance documents for review</p> <p>Draft POE Guidance Recommendations for review</p>
11/30/16 (in person)	<p>Final workshop to determine language for final draft documents.</p>	<p>Revised Working Group Report, Measure Baseline Guidance, and POE Guidance documents submitted to Commission</p>

Other than one sub-group meeting on the current POE requirements for deemed measures, the Track 1 Working Group covered all content summarized in this document in the two in-person meetings and six call-in meetings described in Table 2. Though the topics varied, each working group meeting followed a

similar format. The WGFs presented slides intended to promote collaborative discussion from a variety of stakeholder representatives. Weekly minutes and transcripts were circulated less than 24 hours after each meeting, along with a set of “prompts” and/or online surveys designed to collect a depth of written insights as well as a breadth of diverse viewpoints among the various stakeholder groups. Comments, both verbal during the weekly meetings and written in the prompts, were incorporated into the next week’s slides or the draft deliverables. Copies of the prompts are included in the Appendix C.

1.2.2 Final Workshop and Products

To confirm consensus and non-consensus elements as part of developing the final drafts, the working group held an in-person workshop at Commission offices on November 30, 2016. The workshop focused on specific areas of the documents that required further clarifying input from the WG or where differences of opinion had been expressed, but where more common ground might be found. The timeframe was very compressed, with drafts of the documents issued the morning of November 28 to stakeholders, comments returned and compiled the evening of November 29 for the next day’s workshop, the final “frozen” drafts delivered to stakeholders Dec 1 and final comments provided by stakeholders December 5.

The WG products, prepared by the facilitator as a record for Commission consideration in the development of the resolution include the following:

- Draft Baseline Guidance Document (BGDV1.0, Appendix A) – the document in this appendix defines the terms and protocols required to assign an existing, Code, or dual baseline to specific measures and is based on the D. 16-08-019 Table 1 which defines program level baseline assignments. A companion spreadsheet entitled “Measure Level Installation Types” accompanies this document.
- Draft Accelerated Replacement Using Preponderance of Evidence (POEV2.0, Appendix B) – this document defines terms and protocols for clarifying and streamlining the preponderance of evidence process for differentiating among normal replacement and accelerated replacement installations.
- This Track 1 Working Group Report – documents the T1WG processes, outcomes, and known dissenting opinions.

Ultimately, the two draft guidance documents BGDV1.0 and POEV2.0 may be combined into a single document.

Multiple stakeholders recognized the necessity of compressed development given the Decision instructions but requested more time and possibly another workshop, describing “great progress” but that the “wide ranging impacts have not received the full consideration they are due,” for example. The limited time for review and discussion of the deemed aspects of the POE framework in particular was of concern.

2 Measure-Level Assignment

The measure-level assignments task focused on first defining the terms used in the program-level assignment Table 1 of D.16-08-019 in such a way that the actual assignment of a baseline to a measure was a direct outcome of those definitions. The bulk of the WG effort was spent in crafting those definitions. Once they were defined, the actual measure-level assignment was straightforward and flowed from those definitions.

The key areas of debate included:

- Identifying the correct concept of the Shell-and-Building-System (SBS) installation type
- Articulating the expanded accelerated replacement category to include additional equipment viability options
- Identifying criteria for accepting an existing baseline as viable, particularly when measures are installed concurrently with a tenant improvement
- Distinguishing between enhanced and restored efficiency achieved by the measures

The final product of this effort is the Baseline Guidance Document (BGDV1.0) in Appendix A. This chapter of the WG Report discusses the deliberations which occurred in producing this document.

2.1 Scope of the Document

There were several areas where parties disagreed with the WG scope or where there were other overarching issues.

2.1.1 Strategic Energy Management (SEM) and Normalized Metered Energy Consumption (NMEC)

The WG largely agreed that defining some of the terms in D.16-09-018 Table 1 would require incorporating complex guidelines and protocols that were under development within other settings and were not within scope of T1WG. These include BROs, NMEC, RCT, and experimental design. The proposed text leverages these terms and their underlying concepts but does not attempt to define them. A second reason for their exclusion was to limit the scope to what the WG could accomplish in the short timeframe.

- A dissenting viewpoint noted: "SEM should be added back as a separate subsection of "Non-building projects", since the CPUC Decision clearly states that projects (including capital projects) implemented through a SEM approach should receive existing baseline treatment." (Implementer)
- While Decision 16-09-018 elaborated on some of the characteristics of SEM, it was not specifically included in Table 1. The implementation stakeholders, in particular, advocated for the WG to define SEM's place in Table 2 1. Without SEM, "it is not clear where industrial fits."
- One commenter noted that SEM should not be restricted to the industrial and agricultural sector but should be available to the commercial sector as well.

This discussion took place in the Oct 12 kickoff and October 20 meeting, and these comments were received in that timeframe.

Additional comments were provided in the post-workshop round of commentary concerning NMEC and the definition of the existing baseline particularly with its requirement to meet "anticipated future requirements". These are summarized as follows:

- "...this entire document only addresses baselines for individual measures, not whole building level baselines for projects using Normalized Metered Energy Consumption (NMEC)."
- "When a whole building NMEC approach is employed, the existing baseline should simply be what is measured on the meter, normalized for weather. There should be no other adjustment. Revising or adjusting the baseline for "anticipated future requirements" or "post-installed operation" or the restoration of essential services, will be subjective and inaccurate."

2.1.2 Revision of EUL/RUL Language

BGDV1.0 included language from the previous Preponderance of Evidence Document V1.0 that was required to allow the two new documents to fully replace the old POEV1.0. The effective useful life and remaining useful life definitions were copied nearly verbatim from POEV1.0 to BGDV1.0. The copying of this language is not intended to be viewed as an endorsement or acceptance of that language, but given the time frame and that revision of this language, expediency was not germane to the task at hand.

However, there were many suggested revisions to that language from the implementers and PAs, summarized as follows:

- Some parties suggested removing the language entirely, since it was not the subject of deliberation or consensus.
- A number of commenters cited specific measures where the current EUL appears to be low (for example, for LED lighting) or where the EUL was not likely accurate for certain customer segments. Similar comments applied to the RUL. Commenters suggested that this would be an area that would benefit from data-oriented research.
- A number of commenters objected to the requirement that a whole-building approach list individual EULs by measure. "Requiring individual measures to be broken out even when they are identified and calculated together will be very cumbersome for very little savings."

2.1.3 Nomenclature

The terms used in the document were consistent with D.16-08-019 use of terms. For example, the "add-on equipment" was used, as noted in Table 1 of the Decision rather than "retrofit add-on" or "add-on retrofit" used elsewhere. One PA commenter noted "AOE is an unnecessary category change that will have massive impact in implementation, training, and reporting but have no improvement". Other than this one comment, strong preferences for terms were not expressed. However, this was likely a secondary concern given the other topics.

2.1.4 Future Revisions of BGDV1.0

The BGDV1.0 document included Section 1.2 which acknowledges updates will be required in the future due to other activities and suggests that this would, ideally, would be conducted through a stakeholder process. One commenter (an implementer) noted that using the word "ideally" will make it "extremely difficult to push for a stakeholder process" and requested that a stakeholder process be required for updates.

2.2 Definition of "Code" (In contrast to existing baseline)

Section 2.1 of the Baseline Guidance Document defines the source of a baseline where a non-existing baseline is not available or does not apply. The exact definition of this standard can be contentious in ex ante or ex post reviews. The intention of this section is to definitively specify the sources of the

standards, their order of precedence (if ordering is required), and the method for determining the applicable vintage of the source.

A summary of WG discussion points supporting the BGDV1.0 language follows:

- The definition of Code in the Measure-Level Assignment Guide V1.0 was adopted without objection at the Nov 30 workshop.
- There was agreement that a single term, "Code," should be interpreted to include all potential sources for a non-existing baseline including building code, various standards, and industry standard practice. Although it was agreed that using the term "Code" to also include ISP and regulations can be confusing, no acceptable alternative was found.
- The WG rejected a more detailed listing of potential standards (for example, specifically calling out the California Appliance Efficiency Regulations) with the simpler broader reference. The WG rejected ordering the standards by precedence where more than one standard applies and instead concluded that they all applied to a project with the exception that the California Building Code has precedence over ISP.

A summary of disputed or unresolved issues:

It was recognized that the revisions of the ISP Guidance document, which is the topic of another working group (T2WG), will likely affect this definition and revisions will be necessary.

The BGDV1.0 Code definition references only the publicly available Industry Standard Practice documents. The term "normal practice," an undefined term, is used to characterize the baseline for those projects where building code, published ISP, or other regulations do not apply. This definition of "normal practice" remains open and will likely be affected by the outcome of T2WG.

A summary of substantive post-workshop commentary follows here:

A request for an amendment to the Title 24 reference to include a clause that in the case of a retrofit, the reference code "includes any applicable exceptions and/or requirements that apply specifically to additions, alterations, and repairs to existing buildings." This would ensure that in the case of an alteration, the code standard enforced by a code official would match the baseline and a potentially more stringent new construction standard. The commenter provided an example: "The risk if we do not add is that CS, utility staff or 3rd party reviewers could interpret these regulations as saying that (for example) since daylight control is required in new construction offices and many upgrades that there can be no incentive offered for those controls. But, in fact, in retrofit situations a customer can be exempted from the code requirement." (Implementer)

There were various proposed edits for more restrictive or clarifying language noted by both implementers and PAs, such as adding clarifying language for terms like "relevant" and "vintage." (Implementer, PA)

2.3 Existing Baseline

Section 2.4 in BGDV1.0 defines when it is viable to use the existing baseline and whether an existing baseline requires adjustments for non-optimal existing conditions.

A summary of WG discussion points supporting the BGDV1.0 language:

- There was an agreement that in some cases an existing baseline is not viable, where it would otherwise apply. There are two such cases that were identified and noted in the definition:

- The baseline for measures installed concurrently with the tenant improvement should be Code, since the existing operation can no longer serve as a credible and viable baseline for the measures. A tenant improvement is a common practice of renovating spaces to meet the needs of a new tenant. This clause results in lighting retrofits concurrent with a tenant improvement to be treated with a Code baseline.
- The existing baseline is only viable for measures where the existing equipment could have served the load through its RUL. This is consistent with POE equipment viability language.
- The WG largely agreed that the existing operation must be able to serve the load in order for existing conditions to be a viable baseline. If the compressor of a failed air-conditioner was running constantly, existing conditions would not be viable, because it was not serving the load and measurement of that baseline would show a load cycle that should not be used in calculating the high efficiency operation.

A summary of disputed or unresolved issues:

- It was acknowledged by implementers and PAs that treating a tenant improvement with an existing baseline, particularly for larger property managers, could result in high free-ridership. However, it was also noted that there would also likely be missed opportunities in tenant improvement offers, particularly with smaller properties. Implementers did acknowledge this dilemma but felt that the standard was too restrictive for small properties. (Implementer)
- In the BGDV1.0 definition, the existing operation is defined to allow for suboptimal performance but is required to maintain essential services. This clause is intended to allow actual existing conditions (i.e., as observed or metered at the site) to be used as the baseline particularly for controls. For example, consider a lighting occupancy controls scenario where the essential service of lighting is provided, but the controls do not capture the intended savings due to equipment overrides and individual component failures. The definition allows for an existing conditions baseline where the savings would be calculated using the pre-existing poor equipment operation.
 - It was argued that the savings should be disaggregated into two components: a below-optimum component eligible as a BRO measure savings and an above-optimum component eligible for other installation types. While it is appealing on a conceptual level, it can be a difficult calculation since there is no easily definable “optimum” operation baseline for controls. The exercise of parsing out savings “to-optimum” is reminiscent of the pre-AB802 exercises to parse out the “to-code” savings from “above code” savings and can have the effect of zeroing out controls savings. (CPUC Staff)

In contrast, in a retrofit where 20% of the lamps/ballasts had failed, those lamps were not providing essential services, and the existing baseline would require adjustment.

- There are three ways to treat this situation: a) assume the failed 20% are operating as the other 80% and calculate savings on 100% of the fixtures; b) treat them as “existing as existing” and factor in the zero usage of the 20% of the failed equipment, greatly reducing the overall savings if those lamps/ballasts are replaced; and c) treat the 20% failed as normal replacements and the balance as retrofit.

Current implementation practice is to assume that failed lamps/ballasts (up to 25%) are operating. This approach inherently assumes that the failed lamps/ballasts would eventually be replaced. ORA strongly objected to assuming that failed units are operating.

At least as a partial solution, the WG agreed that savings calculations needed to have a “congruent” approach to defining pre- and post- conditions for calculating savings. Congruency is discussed in Section 4.0, which defines the Delivery and Savings Determination Type.

While these topics were discussed throughout the WG meetings and at length during the work shop, no clear revisions of the definition emerged for defining the treatment of sub-optimal existing conditions consistently for “essential” services like lighting and for non-essential controls.

Post-Workshop Commentary

- The tenant improvement definition is “too conservative for the residential and small commercial market in which changes to ownership and leasing, as well as changes in space function often do initiate retrofits or equipment upgrades that are easily referenced against previous existing operations. We propose an exemption be added to this language that states: *Projects that otherwise require Tier 1 and Tier 2 POE standards may claim Existing Conditions as baseline in these situations.*” (Implementer)”
- For those cases where the existing baseline is not viable, the alternative is to treat the measure as a “normal” installation. (Implementer)
- There was a request for more restrictive and clarifying language, for terms like “essential” and “adjustment.” (Implementer, PA)

2.4 Restorative vs. Improved Operation

These terms, defined in Section 2.3 of BGDV1.0, were developed to distinguish between measures which restore equipment at or near the original operation and those that incrementally enhance the operation above the design intent. This is a useful definition for distinguishing between measures that are purely BRO (if they only restore equipment through repair, adjustments, or replacement with like components) and the other installation types which require installation of nominally more efficient equipment or operations. Some of the most difficult and contentious measures in the past and within the WG are retrofit add-ons in general and steam traps, pump-overhauls, and EMS controls in particular. These measures have in common that the existing operation is often compromised due to degraded and failed components and potentially much, if not all of the savings, is derived from restoring the equipment to its original operation.

There was a consensus that the SBS, AOE, Normal, and AR installation types were required to improve the efficiency over the baseline while the BRO installation type could improve or restore operations over the baseline.

Here is a summary of disputed or unresolved issues:

- The commenter stated: “The intent of inclusion of this paragraph is unclear. As drafted it give me heartburn. California allows optimization of operations, not restoration to its original intent. The term ‘original intent’ is dated; if included, it should be subject to providing another form of evidence to establish the original intent, which no one will like and will be hard to come by. This paragraph with its reference to like replacement appears to allow like-to-like replacement that is still banned under the to-code directions. Non-hardware operational changes are BRO measures. I would strike this paragraph in its entirety. This group is not chartered with coming up with a definition of BRO measures.” (CPUC contractor)
 - The utility of the paragraph is to define these two states, not necessarily to endorse their use for one purpose or the other.

2.5 Alterations Type

The WG considered explicitly adding Major Alterations as a sub-alteration type within the Existing Buildings; however, this was abandoned. The WG also considered adding the tenant improvement exclusion to the definition of New Construction, Added Load. However, that approach seemed to be at odds with D.2016-08-019. Instead the tenant improvements clause was added to the definition of existing baseline as an explicit case of where the use of an existing baseline is not appropriate because of changing conditions. The WG appeared to be largely satisfied with this approach.

There were no substantive comments on Section 3.0 in BGDV1.0 in the post-workshop commentary.

2.6 Delivery and Savings Determination Type

The definitions of the delivery and savings determination types were not items of debate. However, an important concept of “savings calculation congruency” was added to Section 4.0 of BGDV1.0 as a result of workshop discussions and appears to have wide support. This concept requires savings calculations to apply consistent methodology in defining the pre- and post- conditions. As an example, if metering performance defines the pre-existing conditions, metering performance must be used in defining the post-performance. The congruency definition also requires including any appropriate expected degradation to be factored in to the post-installation state.

Two post-workshop comment of note:

- For BRO installation types, the baseline should be the measured performance of the degraded system and the post-installation should be the measured performance of the system after the installation of a BRO measure. The degradation of the BRO installation type is already taken into account through the measure EUL, which is 3 years. (Implementer)
- A provision should be added to allow IPMVP Option C as a methodology to continually monitor energy savings to demonstrate persistence of savings. Projected degradation would require further guidance and was not addressed by this WG. (PA)

2.7 Shell and Building System Installation Type

Definition of SBS was one of the first topics of discussion for the WG. The WG had difficulty articulating what was intended to be included in the SBS category. This category, defined in Section 5.0 of BGDV1.0, along with Repair Eligible, is expected to unlock the savings potential that previous policy may have discouraged. The terms themselves introduced a level of ambiguity, as a building system refers to all of the multiple components of a functioning whole (like the pumps, boiler, chiller, pipes, controls of an HVAC system) yet the Staff White Paper seemed to focus on components (just pipes, just insulation, just DHW fixtures).

There was more debate considering lighting. Lighting is a major contributor to the portfolio, and therefore its treatment could have a large impact on capturing stranded assets or higher rates of free ridership, or both. Lighting does not obviously meet the SBS definition, since it appears to require “periodic replacement” because lamps burn out on a regular basis. However, while lamps and ballasts burn- t and are replaced, the underlying system and the original efficiency point remains unchanged, fitting the intent of the SBS type to include systems that do not turn over except in the face of a major alteration. Furthermore, the lighting lamp and ballast is the core of the lighting system, defining the lumens per watt efficiency of the system, and therefore it defines the critical SBS system. Based on this reasoning, the WG concluded:

A summary of WG discussion points supporting the BGDV1.0 definition:

- There was general agreement that the essence of this installation type was that its equipment that typically maintains the status quo, staying in place indefinitely until there is a major event (like a renovation or externally caused damage) and that suboptimum performance, even failure, does not impact the provision of essential services to the building.
- There was general agreement that this class of measures was intended to include equipment that is “behind the walls” (insulation, ducts, pipes) or part of the building structure (windows).
- The WG generally agreed that the replacement of HVAC systems, like boilers and chillers did not belong in this category because the equipment is expected to be replaced in the life cycle of the building (although there were objections noted below to this concept).
- An SBS lighting measures replaces at a minimum the lamp and ballast system with a more efficient lamp and ballast (or driver). The replacement may also include a fixture, lamp, and ballast replacement or a fixture, lamp, ballast, and controls replacement. A lamp replacement alone does not qualify as an SBS measure, nor does a TLED, which places an LED luminaire with a built-in driver in place of a linear fluorescent.

Dissenting view points, including post-workshop commentary

- Commenter disagreed with almost all of the measures proposed as SBS and argued for a narrower definition, excluding lighting fixtures (as they are not shell or building systems), insulation (since OSHA requirements apply to insulation on hot surfaces). Agreed to include “just windows and shell insulation as allowable measures in this category – subject to evidence assessment for these and other measures over time.” (CPUC contractor)
- Commenter believes that the SBS definition is too narrow and should include “mechanical systems when the project scope includes updating multiple components of any building system,” in line with the category name of Building System. This point of view was expressed in early discussions and comments provided in earlier prompts. As one implementer commented, “It seems the intent of this definition is to exclude as many measures as possible from the definition which is clearly not the intent of Decision 06-08-019 and Table 1.” Similar comments were provided by three other implementers.

2.8 Equipment Add-on/Add-on Equipment (AOE)

Decision 16-08-019 accepted AOE as a valid installation type permitting existing baseline treatment as presented in Table 1 from the D. 16-08-019. This table combined SBS and Add-on Equipment and did not apply it to the non-building projects. Since the Decision did not offer any comments or further clarifications to the definition, the POE Guidance Document was the starting point for the development of this installation type.

Prior to the Decision, there had been an ongoing effort to redefine and refine this type. A draft revision was proposed by the ex ante review team in February 2015. The EAR team proposed dual baseline treatment for AOE measures including a requirement to show program influence meeting a preponderance of evidence test. The impetus for the revision was to better address any to-code savings that might concurrently occur with an AOE, eliminate O&M measures, and to close a “backdoor” entry point for measures that are normal replacement or add capacity (which could happen with a pony measure). These concerns are addressed in the Proposed Baseline Guideline as follows:

- The Decision’s assignment of an existing baseline to AOE measures eliminates the to-code conundrum.
- BGDV1.0 definition explicitly excludes one-for-one type replacements of an existing add-on

component and only permits an AOE claim if the new equipment is an energy efficiency upgrade.

- The proposed definition explicitly requires the existing host equipment to serve the primary load as a mechanism to prevent using AOE as a backdoor to adding capacity.

The WG considered the following questions in deliberating on this installation type:

Did the Decision intentionally intend to exclude non-building measures from AOE considerations?

Table 1 in Decision 16-08-019 at least appeared to exclude the non-building measures from potential classification as an Add-on measure. However, process-oriented measures have been classified as AOE as a matter of course in the non-building sector in the past. The WG concluded that this may have been an oversight, since Table 1 combined AOE and SBS installation types into the same column. Clearly, SBS does not have an application in the non-building alteration type, which may have been the reason for NA in the Decision 16-08-019 Table 1. The consensus among the stakeholder groups was that AOE should be available for non-building alteration type measures and therefore “all sectors” is noted in the AOE definition and Table 2 1.

How are controls and energy management systems treated?

A control loop is designed to maintain a measures parameter setpoint, such as temperature. Most HVAC, motors, refrigeration, and other equipment have built in control loops (a sensor to measure the parameter and an actuator that responds to the measurement) that maintain the essential operation of the equipment, that for example modulate the refrigerant expansion valve or shut down the equipment when a fault is detected.

Energy efficiency control measures typically overlay these essential controls. Reset control, for example, changes the parameter setpoint and the on/off schedule of a motor for more efficient operation. Energy efficiency controls are treated as add-on equipment, which is appropriate, as the host equipment can typically operate without them and the energy savings occurs at the host equipment. An energy management system is a generic term for equipment with wide-ranging difference in complexity, cost, and functionality. An EMS in concept networks all the energy efficiency control loops within a building or campus together, allowing for complex algorithms and centralized monitoring and optimization. An EMS includes these subsystems: the sensors and actuators mounted on host equipment in the field (called points), the input/output hubs to which the field equipment is interfaced, the building communications network, and the front end, which is the primary method for the human interface.

Does this installation type include maintenance and repair measures?

The definition includes the provision that AOE measures must be a nominal efficiency improvement compared to the existing nominal equipment. The nominal efficiency of the existing the installed add-on equipment must be an energy efficiency improvement over any existing add-on measure. These provisions should exclude substantive repairs of the host system and one-for-one type replacements of add-on equipment, which is a repair by another name.

Should the definition retain an explicit requirement that its “primary purpose of the equipment should be to reduce energy”?

The requirement that the primary purpose of the equipment should be to reduce energy has been dropped. It is implicit in all measures that the intention of incentives is to induce customers to reduce energy use, and the Decision exclusively identified the Accelerated Replacement category as requiring program influence to be demonstrated.

Should “pony” measures be included or excluded from this category?

Some commenters were concerned that a pony measure would be an avenue for including what is actually new load-serving equipment. Examples included: “a new extrusion machine to handle special projects more efficiently than the existing line or adding a space heater for the family room claiming this prevents running the central system”.

2.9 Accelerated Replacement

Decision 16-08-019 accepted Repair Eligible as a valid installation type permitting dual baseline treatment when supported by the preponderance of evidence together with Accelerated Replacement (AR). Neither term was defined further in the Decision. The Staff Baseline White Paper is the source of Repair Eligible (RE) type. Since the Decision did not offer any comments or further clarifications to either definition, the POE Guidance and the Paper were the starting point for the development of this installation type.

The Staff Baseline White Paper qualifying RE as “Certain types of equipment are repairable far beyond their expected useful lives” or “may in fact be completely inoperable and require a replacement.” The candidates nominated in the Paper included technologies identified in saturation studies as “where saturation studies indicate a significant percentage remains in use well past its expected useful life. (Residential and commercial: Split/Package Air Conditioner, Split/Package Heat Pump, Furnace; Commercial: Chillers, Boilers).” The Paper goes on to note, that allowing existing conditions across the board for this equipment will significantly increase free ridership. The staff recommended requiring preponderance of evidence of operational viability and program influence to qualify for dual baseline treatment, and the ALJ accepted these terms.

The HOPPs Ruling acknowledged that some equipment might be “repaired indefinitely” with the proviso that “a data-supported case [must be made] that a given piece of equipment has a history of being repaired rather than replaced”.

The WG agreed considered two definitions of RE: equipment that was inoperable, but repairable and/or equipment with a history of repair, but currently fully operable. Separate terms were agreed to define each, Repair Eligible (equipment is failed, but could be repaired less expensively than the cost of new equipment and Repair Indefinitely (equipment demonstrated a history of repair). Both concepts received various levels of support or concern.

- One commenter noted: “Why would we use a dual baseline for broken equipment that the customer needs to fix/replace?” and “if the existing equipment is dead, code is the baseline.”
- While a second commenter supported the measure noting that when equipment broke, it offered “a decision point where the customer could be influenced by the program to replace the equipment instead of repair it.”

There was more support for the Repair Indefinitely subtype. “We do see plenty [of cases of equipment] that have passed the DEER EUL (and therefore are considered failed, even though it works fine). ...The standard practice for [example, a large boiler] is to repair/overhaul indefinitely until it is no longer feasible or cost-effective.”

The WG considered the following questions in deliberating on this installation type:

Was RE restricted to only that equipment noted in Table B-3 of the Paper or to other technologies where there was independent evidence the population had an extended life or could other measures that otherwise met the standards be classified as RE? For example, if a fifty-year-old industrial process boiler showed a robust history of repair and maintenance, could it qualify as a repair

indefinitely measure without evidence that a significant percentage of the population of industrial boilers remains in use well past the EUL?

The WG agreed that while Table B-3 of the Paper presented good examples of the types of equipment that are often repaired and maintained, the key criteria for qualification as an accelerated replacement was site evidence of operational viability.

Is there a reason to preclude deemed measures from an RE categorization?

The WG agreed that there was no reason to exclude deemed measures from this categorization; however, the work paper for the deemed measure must specify how the preponderance of evidence standards would be met.

What role does the EUL play into either allowing or excluding measures from participating?

The WG agreed that EUL should not be used to automatically include or exclude a measure from an accelerated replacement classification.

Prior to the Decision, it was the practice if not a hard and fast rule to automatically exclude a measure from early retirement consideration if the age of the existing equipment exceeded its EUL. The POE Guidance explicitly notes “program-induced early retirement claims become more difficult to demonstrate as the age of the existing equipment approaches or exceeds the equipment EUL”.

With the expansion of the definition of AR to explicitly include very old equipment, the EUL is no longer a barrier, although the evidence requirements for dual baseline assignment will differ for newer equipment versus older equipment.

2.10 Measure Default Baseline Assignment Table 6-1

The Decision 16-08-019 Table 1, which defined program-level default baselines, was the starting point for defining the measure-level assignment table. The WG strove for consistency between the two tables and only proposed adaptations that added clarity to the measure-level assignment.

Multiple layouts of Table 6-1 in BGDV1 were considered, to further simplify the table or to arrange elements for maximum clarity. This final design appears to balance the intent to closely reflect Table 1 of the Decision but with modifications some modifications for added clarity and to reflect the measure-level refinements developed by the WG. Changes between D.16-08-019 Table 1 and BGDV1.0 Table 6-1 are summarized in Table 2.

Table 2. Differences between D.16-08-019 Table 1 and BGDV1.0 Table 6-1

Change	Rationale
Refined the term “Accelerated Replacement” as used in D.16-08-019 to include three sub-types: ER, RE, and RI. This recommendation is discussed in Section 5.4 of BGDV1.0.	The WG recommends referring to all measures requiring POE to be classified as AR measures and to identify three sub-types (ER, RE, IR) which are distinguished by the evidence required to establish operational viability.
Expanded the non-building alteration type to distinguish permitted delivery and savings determination types and the associated baselines. This recommendation is discussed in Section 3.0.	In Table 1 of the Decision, the single default baseline noted per installation type is at odds with the notation that states that “any” delivery and savings determination is allowable. This has been clarified by explicating including the types associated baselines for non-building types in

	Table 6-1.
Separated SBS and Add-on Equipment (AOE) into two columns. This recommendation is discussed in Section 5.1 and 5.2 of BGDV1.0.	While SBS measures clearly do not apply to non-building measures, AOE measures have been available for non-building measures in the past and none of the Decision language appears to have precluded that practice from continuing.

Most of the WG deliberations in adapting the program level defaults of Table 1 of the Decision to the measure-level adaptations of Table 2 1 of the Baseline Assignment Guidance are discussed in other sections of this report as noted in Table 2.

2.11 Measure-Level Assignments Table 6-2

Table 6-2 of BGDV1.0 lists 200 measures by their “Measure Groupings” description extracted from 2015 claims. An installation type was assigned to each of the measures by applying the installation type definitions to the measures as described. An interested party can determine the baseline for a particular installation using the assigned installation type in Table 6-2 and referencing the correct cell in Table 6-1 for the project’s alteration, delivery, and savings determination type.

There were no objections to the overall strategy for assigning installation types to measures or to granularity of the assignments to about 200 unique measures. There were relatively few objections to the proposed assignments and those had to do with ambiguous measure group descriptions, which were modestly edited to address some of those concerns.

Assignment strategy. The Measure Grouping descriptions provide a reasonable basis for inferring the installation type following the following algorithm:

- Envelope measures and DHW fixtures are assigned SBS
- All lighting lamp-only categories are assigned NR/ER, while other categories were assumed to be lamp/ballast and/or fixture replacements with an SBS type
- All controls, EMS, and VFD measures are assigned an AOE installation type. The list was scanned for other unique AOE measures, like refrigeration night covers
- All maintenance and repair type measures are assigned a BRO installation type (i.e., coil cleaning, filter replacement)
- Whole-building measures (surveys) are assigned a BRO installation type
- The remaining measures were assigned a normal with accelerated replacement potential (NR/AR) installation type

Further work required. However, further work is necessary to refine measure groups where the measure group description does not have enough information to define the type with certainty. For example the measure grouping description for “Process Cooling Equipment” might include equipment replacement (NR/AR), repair and optimization (BRO), or controls (AOE). The ambiguous measure grouping should be divided into two or more measures groupings to identify these distinctions. The list should also be examined for comprehensiveness. One commenter noted that Quality HVAC Installation was not included in the list.

Another commenter suggested re-organizing the table by Measure Group with columns for each sector

indicating the assignments by sector. This format reduces the size of the table, making it more manageable, and was incorporated into the final version of the document. Commenters' notes on individual measures are included in a second tab of the spreadsheet.

3 Preponderance of Evidence

The overall WG kickoff was September 29. The Track 1 group has met via conference calls weekly through October and most of November, and has participated in several surveys between meetings to provide perspective on specific issues.

Multiple stakeholders recognized the necessity of compressed development given the Decision instructions but requested more time and possibly another workshop, describing “great progress” but that the “wide ranging impacts have not received the full consideration they are due,” for example. The limited time for review and discussion of the deemed POE framework in particular was of concern.

3.1 Structural Change Results

The results are summarized in two: Structural Changes Made and Unaddressed Structural Changes. For each, we first summarize the degree of consensus that the facilitators observed, then describe the issue.

Proposed POE Process Structural Changes and Degree of Consensus for Each

Element	Unanimous or Near-Unanimous Consensus	Non-Consensus, but Clear Recommendations	Non-Consensus, but More Work Needed
Preponderance of Evidence			
1. New POE document	X		
2. More detailed text regarding what constitutes good evidence or early retirement and normal replacement and examples of the same are added.	X		
3. Deemed measure POE is in scope.	X		
4. The new deemed measure POE protocols allows either site-specific or program-level demonstration of early retirement or normal replacement.	X		
5. Guidance on relative values of evidence is included.	X		
6. Proposed scoring system is added.	X		
7. “Direct to decision” and “direct to default” criteria are adopted.		X	
8. Lower rigor tiers for smaller custom measures are not introduced.			X

3.1.1 Explanation of Structural Elements

- 1) New POE Document. It was proposed that the POE document be replaced rather than edited. After discussion there was no dissent and the decision considered to be unanimous consensus.
- 2) More detailed text regarding what constitutes good evidence or early retirement and normal replacement and examples of the same are added. This was unanimous. Examples were provided by various stakeholders and incorporated into the POE document.

- 3) Deemed measure POE is in scope. The 2014 is written for custom measures. It does expressly exclude deemed measures and is not easily adapted to deemed measures. Similarly, the August 25 CPUC Decision is silent on the specific matter of POE for deemed measures. It was strongly requested to be in scope by the Cal TF and supported by others. SoCalGas later questioned the choice. The decision to include is considered to be near-unanimous consensus.
- 4) The new deemed measure POE protocols allows either site-specific or program-level demonstration of early retirement or normal replacement. This flexible approach was proposed by a subgroup that conceived the deemed approach and presented it to the full group. There was no objection, although it was requested that program-level be given preference. This is considered a unanimous consensus outcome.
- 5) Guidance on relative values of evidence is included. There was unanimous consensus that the updated POE document should add guidance on the relative worth of different types of evidence for and against early retirement to increase predictability and perceived objectivity of assessment. There was unanimous or near-unanimous consensus that the relative valuation guidance include a numerical scoring system.
- 6) Proposed scoring system is added. The facilitators developed a draft scoring system based on the input of stakeholders. The proposed structure, with 1 to 3 relative values and evidence descriptions for each element, was supported by the majority of stakeholders but not unanimously endorsed. All parties either articulated support or were silent on it except for the ORA and a portion of the ex ante review team. All but one of those parties suggested that the scoring system could represent an improvement if the details were improved upon (as of 11/15/16). One stakeholder found the system flawed fundamentally. Another described major detail concerns, but ones that the facilitators believe are surmountable. No alternative systems were proposed. With this general but not unanimous agreement, optimism that enhanced details could draw further support, and with no alternative proposal, the facilitators constructed new POE guidance based on the proposed scoring system framework.
- 7) "Direct to decision" criteria adopted for two scenarios; "direct to default" criteria are adopted for others. It was initially proposed that up to 10 measure-program-market segment combinations be immediately and definitively characterized as either (1) early retirement, (2) normal replacement, or (3) absent program influence, without full POE-type consideration. While the principle of accelerated simplified decision-making was supported, this proposal did not gain consensus endorsement by all groups for all or most scenarios. Rather than abandon the concept, the stakeholders endorsed a reduced number of "direct to decision" scenarios and introduced the principal of "direct to default."
- 8) With "direct to default," the scenarios lead to a specified default characterization but do not definitively characterize them. This approach lessens the level of rigor expected to support the default condition, increases the burden of proof to demonstrate the non-default characterization, and allows for exceptions to the default. After discussion on this alternative approach there was no dissent regarding the structure and the decision considered to be unanimous or near-unanimous consensus. There is not unanimous consensus on the specific scenario assignments in the two categories, but there is believed to be majority and likely general agreement on those presented.
- 9) Lower rigor tiers for smaller custom measures are introduced. This proposal garnered support in principle and from a significant majority of individuals in early discussion, but initially there was lack support for codification of this principle from multiple stakeholder perspectives (ex ante review, ORA). Through persistent discussion and addition of consequences for misrepresentation as a condition of its inclusion, general agreement was reached to include two lower rigor tiers of POE

assessment. Implementers have grave concerns about at least some of the consequences, but the structure of employing multiple rigor tiers has broad support.

3.2 Unaddressed Structural Changes

Three structural elements were not addressed in the new document:

Element	Unanimous or Near-Unanimous Consensus	Non-Consensus, but Clear Recommendations	May Be Plausible but out of WG Commissioned Scope
Preponderance of Evidence			
1. Specifying POE roles is not in the scope for this effort.		X	
2. Remove program influence from POE scope			X
3. Prospective rather than site-specific application of results			X

1) Specifying POE roles is not in the scope for this effort. There was general acknowledgement by all parties that the POE roles are imperfectly supported. Specifically, if an implementer concludes that early retirement is appropriate for a measure, the implementer typically assembles evidence to support this conclusion and submits it for review. This leaves it to reviewing parties to investigate and assemble evidence in support of normal replacement for POE, as POE protocol requires consideration of both perspectives, even when a default condition exists. In practice, this means that either the ex ante or ex post review team typically conducts such investigation and then judges the results. After some discussion and proposed solutions, a strong case was made that a “Phase 3” work group to be commissioned in 2017 is certain to have this issue in their scope, and that it was inappropriate to include in this Track 1 group’s scope. After discussion there was no dissent. Later comments revealed residual concern with this document being developed before roles are redefined. The decision to defer was considered to be general agreement but not unanimous consensus.

2) Removing program influence from the POE-based assessment. Just using the POE assessment to judge continued viability and leaving program influence for later ex post evaluation was suggested. Such a change would clearly be contrary to prior Commission decisions and guidance. After preliminary investigation the facilitators, Staff, and others concluded that this degree of change to the POE process was beyond the commissioned scope in the August 25 decision and was not pursued further.

3) Prospective rather than site-specific application of results. It was postulated that separating site-specific POE results from their application would enhance data quality and smooth the review process. Specifically, implementer early retirement assignments would be reviewed but customer-specific incentives would not be conditional upon the outcome. Site results later would be aggregated to compute a program-level early retirement correction factor that would be applied. The positive consequence of such an approach would likely be less biased data collection and possibly less conflict. The negative consequences would be delayed application of results and more customers receiving accelerated replacement incentives that actually are normal replacement participants or free riders. The facilitators, staff, and others concluded that this degree of change to the POE process was beyond the commissioned scope in the August 25 decision and was not pursued further.

3.3 Content Summary – Major Remaining Stakeholder Concerns

The POE Guidance document represents what the facilitators believe to be the best representation of the collective choices of the T1WG. There were unanimously agreed-upon solutions or at least a general agreement found for much of the content, but in some cases this was not possible.

This report section documents the areas believed to be major design elements with material disagreement by at least one stakeholder group. There are four such issues. All of them relate to the newly introduced simplified POE approach to be used for both custom and deemed measures in **Section 6**.

For each such issue we note the concern, which stakeholder groups have expressed it, and then add explanation for why the text is included as written.

1. **Third-party implementation of the questionnaire for Tier 1 measures.** Most but not all implementers, the CEEIC, at least one IOU (SoCalGas), and Cal-TF objected to the requirement that an independent third party conduct the interview for practical reasons (cost, customer disruption, delays). Three alternative suggestions were to (1) remove the requirement and leave later EM&V to assess the level of bias if any in non-independent data collection, (2) have the independent third party “verify” or “corroborate” the interviews rather than “conduct” them, or (3) consider an IOU representative as sufficiently independent. Independent third-party administration did receive support at least for medium and large projects from one implementer (Ecology Action). The ORA, CalTF, and it is believed ex ante reviewers all expressed a desire for a more stringent standard that third-party administration would provide. SCE objects to using a questionnaire at all, contending that the NTG research should be used.

Facilitator context for proposed language: This was part of the compromise. Implementers desired the simplified approach but reviewers and the ORA were wary. The addition of the independent third-party administration was a compromise that gave the latter group some assurances. The facilitators believe that removing the independent third party would cause loss of support from stakeholder groups currently warily supporting the simplified approach. The facilitators included the third-party requirement for the higher-level simplified approach (Tier 1) and removed for the lower-level approach (Tier 2) as a compromise position.

2. **“Continued” viability.** Multiple implementers contended that assessment of future expected operation is unreasonable to inquire about in a questionnaire and requested relying solely on existing functionality as evidence of viability.

Facilitator context for proposed language: Unlike in the full POE protocol, this simplified protocol provides no other mechanism than the questionnaire to project continued viability, which prior Decision language specifies as necessary to claim accelerated replacement. Removing it from the questionnaire, imperfect as this source is, without replacing it with another tool (none was proposed) is perceived as too great a deviation from precedence to retain the support of the reviewers as a group and ORA.

3. **Consequences clause.** The consequences clause written into the Guidance requires that customers who do not respond accurately should potentially forfeit their incentive and future program participation, and possibly be subject to legal proceedings. This clause does not reflect consensus at all and is believed by the facilitators to be the POE issue of most contention. Multiple implementers and one IOU (SCE) request that the penalty language be tempered, the actual consequences be tempered, or both. One implementer (CLEAResult) questions the legality of all three elements of the clause. They and another (Energy Solutions) plus another IOU (PG&E) and the Cal-TF request that the requirement be omitted entirely, describing it as a “deal killer.” CEEIC agrees. It was argued

that the added trouble to protect a possible “bad 5%” is excessive and will deter too many of the remaining 95%, and contends it should not be necessary if the other specified evidence (photos and questionnaire without affidavit) is provided. Energy Solutions’ proposed alternative text to the consequences sentence is: “The customer (and contractor) represent that the answers to the above questions are in fact accurate and correct. The customer (and contractor) are willing to supply additional proof or evidence if requested. I understand that any false statements may require me to pay back the rebate and include suspension in current and future rebate programs.” This alternative eliminates the legal aspect and leaves the suspension period unspecified but is otherwise similar.

Regarding the penalty clause, a Staff consultant (Gandhi) notes that consequences should result for the implementer as well as the customer. At least one implementer (Ecology Action) supported the penalty’s inclusion if the possible legal threat is removed, and supported the addition of implementer consequences that are severe but less stringent than “one strike and you’re out.”

Facilitator context for proposed language: Such consequences were supported by ex ante reviewers and specified as necessary for support by ORA in order to support a simplified tier based solely on visual and questionnaire evidence. The legal consequences phrase is preceded by “possibly including,” making it non-mandatory, and which was added in a later revision round in response to previously expressed concerns. The original language was proposed by an implementer. An undesirable possible consequence of omitting such language is abandonment of the simplified tier altogether for lack of ability to reach agreement. The combination of Energy Solutions’ proposed alternative language, adding contractor or implementer consequences, and further tempering or removal of the legal threat could result in a solution.

4. **Ex post evaluators may apply the full POE approach.** The simplified approach closes with the observation that ex post evaluators may use the full POE approach. Multiple implementers, at least one IOU, and the Cal TF reviewers objected to this.

Facilitator context for proposed language: Ex post evaluators always have the option of elevated rigor compare to applicants when investigating any factor under their purview, including equipment monitoring, attribution, and other factors.

3.4 Content Summary – Other Stakeholder Concerns

There are other material issues for which the group did not achieve unanimity. Each is presented in the same fashion as above, by guidance document section.

3.1.2 Section 1 Introduction

Multiple stakeholders would prefer that the idea of assembling evidence in support of normal replacement not be introduced in Section 1 and in the POE definition, even though later it is made clear that normal replacement need not be proven if normal replacement is claimed.

Facilitator context for proposed language: It was left in despite the expressed concern because that principle is in fact part of the definition of POE. Consideration of both accelerated and normal replacement is required to make a full POE-based assessment. If an implementer chooses only to prepare the accelerated replacement side of a full POE assessment they are open to later reversal. Later text makes clear there is no burden of proof requirement to go through the exercise if normal replacement is being claimed.

3.1.3 Section 4 Direct-to-Decision and Direct-to-Default Baselines

Two reviewers recommended that “Tenant space build-outs where the tenant, space purpose and

equipment use patterns remain the same” should be direct-to-default rather than direct-to-decision. Conversely, the Cal-TF contends that more combinations should be direct-to-decision now and that there be a mechanism to add more later. SCE specifically proposes to advance the “direct to default” criteria to be the same as “direct to decision.”

Facilitator context for proposed language: The tenant space combination could be moved. It was left as shown because it was initially placed there during broad stakeholder meeting discussion. Regarding the latter issue, the direct-to-default set previously was proposed as direct to decision. The group arrived at a compromise of moving them to the newly created direct-to-default category rather than striking them altogether. Moving them back seems contrary to the larger group solution. Other direct-to-default combinations can be considered as proposed, likely in the next round of review after lessons are learned from testing the new procedures.

No data to support direct decisions. The combinations of reduced sets of factors associated with direct-to-decision were identified based on expert judgment. A Staff contractor (Gandhi) noted that the data are not necessarily available to support these assignments: “Ex post evaluations have not found that projects in these categories are predominantly early replacement.” He also has concerns about segment definition, and believes the lower rigor approaches below should mitigate concerns about burden on implementers.

Facilitator context for proposed language: The combinations had support throughout the process from most parties. If there are data showing substantive misalignment these assignments should be reconsidered.

3.1.4 Section 5 Preponderance of Evidence-Based Assessment for Custom Measures

One IOU (PG&E) finds the scoring system nonlinear, asymmetric, unfair, and vulnerable to cherry-picking. Another (SoCalGas) requests an equal number of categories for each of in favor and opposed to program influence to improve balance.

Facilitator context for proposed system: The stakeholder group generally wanted a scoring system and objected to a flowchart logic-based system. Most reviewers seemed to support the principles. No other system was proposed. It is possible that the objection is valid, as the system is untested. Piloting the system is necessary to determine if it is balanced. Back-application of scoring of past projects with known POE results for testing is an option, but likely an expensive one. Because applications are not required to submit evidence in all categories and only those that are relevant, the number of categories should not inherently skew the results. More could be added.

SoCalGas has concerns with numerous specific scoring elements. Some were addressed in the final version. An implementer (OnSite) contends that demonstrated existing operability should be considered “strong” 3-pt evidence, especially if by a third party.

Facilitator context for proposed scoring: These could be addressed through further detail meetings at a later date, or after a test period.

Section 6 Simplified Site-Based Preponderance of Evidence Protocol for Custom and Deemed Measures

There were concerns in this section in addition to the “major” ones noted above.

Having multiple tiers for deemed is problematic. The simplified approach has two tiers of complexity, with eligibility for each distinguished based on the incentive dollar value. The Cal TF and CEEIC together and SCE separately all contend that all deemed measures “must” be assessed using the same protocol regarding of incentive size. Another IOU (PG&E) appeared willing to work with deemed

measures in a two-tiered structure. In a related comment an implementer (Energy Solutions) contends that deemed procedures should be completely separate from custom.

Facilitator context for proposed approach: The original basis was consistency regarding site-specific assessment. The change is possible and comes from those with experience but was not vetted by the larger stakeholder group.

Using a single standardized questionnaire is recommended in the simplified approach. Regarding a standardized questionnaire, some implementers (including Ecology Action) and Cal-TF with CEEIC endorsed a single approved questionnaire instead of tailoring. A CPUC contractor (Gandhi) comes to a similar conclusion, believing any benefits of tailoring would be outweighed by the introduced variability and lack of ability to control, and thus recommends a single standard questionnaire. He is skeptical of the ability of a questionnaire to diagnose effects due to inherent problems and challenges with interviewing the right person. He also emphasizes the need to pilot all such questionnaires.

Facilitator context for proposed text: The language was added out of concern that measures and programs differ so much from one another that program influence cannot be generically questioned. This topic did not receive full consensus discussion. A single questionnaire is a possible goal.

At least one implementer (Energy Solutions) and Cal-RF believe the word “influence” should not be in the questionnaire, as they contend that some government entities are not allowed to answer questions about influence.

Facilitator context for proposed text: Free rider scripts have long had such questions. It is possible that one particular government agency’s dilemma is being generalized (this is entirely conjecture on the facilitator’s part). The language was proposed by an implementer.

Ecology Action suggests that Tier 2 is not very different from Tier 1 and that the photographic evidence requirement be dropped.

Ecology Action objected to Staff’s authority to prohibit use of the simplified tiers for a specific program.

3.1.5 Section 7 Program-Level Preponderance of Evidence-Based Assessment for Deemed Measures

Exclude deemed. One IOU (SoCalGas) expressed concern about deemed being in scope at all.

Facilitator context for proposed text: This was advocate for strongly by other stakeholders, especially Cal-TF, in the kick-off.

Deemed workpaper rigor specification. One implementer (Energy Solutions) requested more specificity regarding the expected level of rigor and statistical accuracy or duration basis for this, such as 2 years of program operation data is adequate especially with regard to the “best available” concern.

Facilitator context for proposed text: This was considered beyond the scope.

One IOU (SoCalGas) expressed concern about finding the funding to support the requisite ongoing data collection to support program-level deemed savings.

Duly noted.

3.1.6 Section 8 Policy Update Plan

SCE notes that a systematic update plan for not just this but all documents (such as the EE Policy Manual) should be created.

Duly noted.

3.2 Modularity

The draft POE guidance v.2 represents a dramatic departure from past guidance and introduces new untested concepts. The draft guidance also happens to have a significant degree of modularity that gives the CPUC and Staff flexibility. That is, not all concepts have to be adopted together for any of them work. The scoring system could be introduced and tested without introducing the simplified methods, or vice versa. Deemed POE for accelerated replacement could be tested separately before or after custom changes.

The facilitators do not particularly recommend this approach. The proposed changes were hard-earned ideas developed through the stakeholder efforts. Revisiting the same decisions later would be challenging. Learning first about the scoring will help little regarding the simplified approach, and vice versa. Every additional application processed in the old way is a lost opportunity for improvement sooner. But if dissent is unbrokerable or more planning time is desired for one or two elements or the changes in aggregate are uncomfortably large, gradual roll-out is an option.

Appendix A: Baseline Guidance Document V1.0



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1 Introduction

1.1 Purpose of This Document

This document provides guidance on the assignment of measure baselines and the assembly and documentation of evidence of accelerated replacement.

The intended audience is all parties associated with initial and final baseline characterization: program implementation contractors, investor-owned utility (IOU) representatives directly developing projects or reviewing those of their contractors, IOU technical review consultants, CPUC ex ante review consultants, CPUC ex post evaluation contractors, and CPUC staff. Staff retains ultimate authority for each decision.

1.2 Updating This Document

This document was drafted through collaboration by a working group directed by Decision 16-08-019 to address multiple initiatives, including measure baselines, POE for Early Retirement projects, clarifying ISP protocols, streamlining ex ante reviews, and further development of NMEC, RCT, and other tracks. Given this context, it is recommended that this document should be reviewed and updated periodically through, ideally with a stakeholder review process, to ensure its alignment with other work; however, the update methods have yet to be determined.

1.3 Regulatory Background

This document builds on a body of previous decisions and documents, which define energy efficiency as “activities or programs that stimulate customers to reduce customer energy use by making investments in more efficient equipment or controls that reduce energy use while maintaining a comparable level of service as perceived by the customer.”¹ Prior conventions and understandings of cost-effectiveness requirements, attribution, and eligible measures are the backdrop for the changes engendered by AB802 and Decision 16-08-019.

The intention of this document is to provide clear and practical direction for assigning measure baselines and fulfilling evidentiary standards for accelerated replacement measures. It attempts to balance multiple and sometimes conflicting goals expressed in the Decision:

- To provide guidance in the application of using the “existing conditions baseline as the default assumption, with certain justified exceptions”

¹ D.05-04-051 Attachment 3 (Policy Manual V 3 – the basis for existing PM most recently adopted by Decision) Appendix B (Terms and Definitions)



- To facilitate the “unlock[ing of] further project opportunities that the utilities and industry were observing were not being captured by the code baseline default framework”
- To estimate savings “based on all estimated energy savings and energy usage reductions”
- To manage the “real and significant risk of a widening gap between expected and actual free ridership,” which will be somewhat mitigated by a return to net goal calculations that should “allow for a simpler framework with fewer exceptions to a default existing conditions baseline”
- To maintain cost-effectiveness factoring in full measure costs

An additional and guiding directive was: “We agree with the many parties that suggest that an overly complicated framework may not serve our goals and may actually make it harder to achieve them,” and that other elements of the decision “allow for a simpler framework with fewer exceptions to a default existing conditions baseline.”

1.4 Document Content

This document defines the terms required to assign a baseline to a measure.

2 Supporting Terms

The following terms are used in defining the savings calculations methods applicable for each baseline treatment category.

2.1 Code Baseline

A Code baseline is determined by an activity or installation that would take place absent the energy efficiency program – either as required by code, regulation, or law or expected to occur as a standard practice – that would provide a comparable level of service as the energy efficiency measure. An activity or installation used to establish a code baseline must:

- A. Meet the minimum requirements of California Building Energy Efficiency Standards (Title 24 – Part 6) applicable to the baseline installation / activity
- B. Adhere to applicable existing approved Industry Standard Practice guidance document made publically available by the CPUC or Program Administrator (for customers or project types not subject to Title 24 – Part 6)
- C. Comply with applicable federal, state, and local regulations or requirements that are relevant to the baseline activity / installation
- D. Be a normal practice or otherwise viable option that meets the anticipated functional needs of the customer, building, or process



The correct vintage of a code or standard is established by the date of project approval or at the date of permit issuance. The vintage of the second baseline is set by the end date of the RUL of the installed measures and should reflect any approved standards that are scheduled for implementation prior to the end of the RUL.

The protocols and practices associated with defining Industry Standard Practice are subject to review and revision, subject to a collaborative working group process that is underway and expected to conclude in early 2017. The outcomes of this working group process could result in refinements to Code and subsequent revisions to this document.

2.2 Existing Baseline

An existing baseline refers to the actual load-serving operation of the existing equipment prior to its replacement, adjusted, where applicable, for the post-installed operation. The existing operations can be suboptimal, but it must reflect equipment performance that maintains essential services. In order to use an existing baseline, the existing equipment is expected to be able to meet customer current and anticipated future requirements (e.g., for the remaining life of the equipment). In the case of projects that occur concurrently with a change in ownership or a lessee, or a change in the function of the space (e.g., office to laboratory), or a substantial change (e.g., 30% or more) in the design occupancy there is no reference operation for existing conditions and the pre-existing conditions may not be applicable to the project.

Implications of this requirement include the following:

- The existing baseline required to maintain essential services is the equipment restored sufficiently (at least in theory) to service the load. Examples follow:
 - A pump where the performance has degraded to where it can no longer maintain head pressure is not providing essential service, and the actual existing baseline for the pump must be adjusted to meet the head requirements.
 - A pump where the performance has degraded but it still can maintain head pressure is providing essential service, and the actual operation of the pump may be used as the existing baseline.
- The existing baseline for non-essential controls is their actual performance prior to replacement, even in a suboptimal state. The existing baseline for controls required for essential services is the restored state.
 - Lighting occupancy control is not an essential building service. Occupancy controls are often overridden, broken, or not optimized for the application. The existing baseline for lighting controls should reflect their actual operation, including the effects of the overrides and poorly implemented strategies.



2.3 High-Efficiency Operation

The high-efficiency operation is used in considering measure classification and savings calculations and refers to the operation of the equipment after the energy efficiency measure is installed. The high-efficiency operation is further distinguished as follows:

- **Improved operation** – In this case the high-efficiency measure is nominally more efficient than the pre-existing system as demonstrated by an increase in nameplate efficiency or an improvement in the operational specifications of the equipment.
- **Restored operation** – In this case the high-efficiency measure restores the pre-existing equipment efficiency. These measures entail like replacement of equipment, repair of equipment, or non-hardware operational changes.

2.4 Effective Useful Life

Effective useful life (EUL) is an estimate of the median number of years that the measures installed under the program are still in place and operable.² That is, the EUL of a measure is the point at which 50% of the measures installed in a program are still operating, which typically is not the manufacturer-determined life of the equipment associated with the measure. The EUL is used in calculating lifetime savings and lifetime benefits. The EUL is capped at 20 years for computing lifetime savings and benefits, although a different cap applies for estimating the remaining useful life (RUL), as described in the next section. Also, the EULs of the existing equipment and the newly installed equipment may be different.

DEER provides estimated EUL values for many different measures. EUL values should be taken from DEER, or when not in DEER in a work paper or custom project documentation substantiated by manufacturers' published data with considerations for equipment operating environment and or run time as appropriate. The proposed value will be subject to review. When a non-DEER EUL is proposed for a system, the life, in years, of its major subsystems must be considered.

Calculated projects that combine multiple measures into a single project, such as a whole-building approach used in new construction and some retrofit projects, must list the individual EUL value (and EUL source) of each measure included in the calculation. The approach for reporting the EUL value by solution code may vary depending on the program administrator's reporting practice, but it must follow practices that provide accurate cost-effectiveness results as well as accurate first-year, life-gross, and net savings. Combining multiple measures into a single project claim should only be done when the individual measure EUL values are equal or very close, so as to maintain the accuracy of both the savings and cost-effectiveness

² Energy Efficiency Policy Manual Version 5, July 2013, page 49.



calculation results. Any method for combining measures with unequal EUL values must be documented and is subject to Commission staff approval. Commission staff does not expect to perform this review or give approval on a project-by-project basis but rather requires that the proposed methods be submitted for approval for entire classes of projects.

2.5 Remaining Useful Life

The remaining useful life (RUL) is an estimate of the median number of years that equipment replaced under the program would have remained in place and operable had the program intervention not caused the replacement. The most common uses of equipment RUL values are the following: 1) to establish the acceleration or first baseline period for program induced accelerated replacement projects; 2) to place an upper limit on the life of add-on measures based on the RUL of the host equipment; or 3) to establish the life for other equipment removal activities, such as appliance recycling.

Per D.12.05.015 at 347, the starting point default estimate for any equipment RUL is one-third the EUL for that equipment. Use of an alternate value for RUL requires evidence that must be documented and maintained in the project files and must be based on an approach subject to Commission staff approval. Commission staff does not expect to perform this review or give approval on a project-by-project basis but rather requires that the proposed methods be submitted for approval for entire classes of projects.

Add-on measures are assigned an existing baseline for the shorter of: a) the EUL of the add-on measure or b) for the RUL of the host equipment. This requirement accounts for the potential shortening of the life of the add-on measure due to replacement or failure of the host equipment. All other measures assigned an existing baseline use a single existing baseline for the measure EUL.

The RUL of the host equipment is estimated to be equal to one-third of its EUL, unless evidence provided in the project file supports a longer life.

The expected useful life for removed equipment is 30 years in program-induced early retirement applications, when calculating the RUL for accelerated replacement measures for all projects undertaken by schools (i.e., all K–12 and community college projects and not just those funded by Proposition 39); programs targeting specific transmission, distribution, or generation constrained areas (other than bottom cycling combined heat and power projects); and water/energy projects. The maximum EUL used in estimating the RUL for all other measures is capped at 20 years.

2.6 Measure Cost

Measure costs are required to determine cost-effectiveness or in some cases to support evidentiary requirements for accelerated replacement.



Full Measure Cost

The full installed measure cost (FMC) is all labor and materials associated with installing the high-efficiency measure. Allowable projects costs may include audits, design, engineering, construction, e equipment, materials, removal, recycling, overhead, tax, shipping, and labor. Labor costs can be contractor or in-house if proof of direct project hours and costs are provided.

Eligible costs may not include spare parts and maintenance supplies, maintenance contract, standby/back-up equipment, and equipment that does not directly contribute to realization of energy savings.

Incremental Measure Cost

The incremental measure cost (IMC) is the additional cost of installing a more efficient measure calculated from the price differential between energy-efficient equipment and services and standard or baseline state. These costs include any direct or indirect incremental cost that is attributable to the energy efficiency activity. This may include design assistance, surveys, materials and labor, commissioning costs, etc.

Accelerated Replacement Cost

The measure or project cost utilized for a dual baseline is the FMC of the high-efficiency measure, reduced by the net present value of the FMC that would have been incurred to install the Code second baseline equipment at the end of the RUL. The measure cost for customer installed accelerated replacement projects is governed by the TRC participant cost calculation given by:

$$\text{TRC}_{\text{participant cost}} = \frac{\text{FMC} - \text{IMC}}{(1 + D)^{\text{RUL}}}$$

where,

TRC participant cost = Participant cost for accelerated replacement projects used in the total resource cost test calculation

FMC= Full measure cost paid by participant

IMC = Incremental measure cost of measure over code or ISP paid by participant

D = The CPUC adopted PA discount rate

RUL = The remaining useful life of the existing equipment

Any program rebates to the customer are to be limited by the calculated accelerated replacement measure cost, not the full measure cost or incremental cost.



3 Alteration Type

The alteration type distinguishes between measures installed in new construction and those installed in either existing buildings or within existing industrial or agricultural processes.

3.1 New Construction, Expansions, Added Load

The new construction alteration type includes new equipment that has been installed in any one of the following:

- a) New building projects wherein no structure or site footprint presently exists
- b) Addition or substantial expansion of an existing building or site footprint
- c) Expansion or addition of substantial load to an existing facility

All new construction projects use a Code baseline.

3.2 Existing Buildings

The existing building alteration type addresses non-process equipment in an existing building; they typically maintain building habitation and are addressed by the building code (e.g., lighting, HVAC, service hot water, plug-loads) or commercial services (e.g., cooking, refrigeration, commercial compressed air, laboratory hoods).

The alteration applies to all sectors. However, in an industrial or agricultural facility, the existing building alteration type only applies to the non-process measures related to maintaining building habitation and commercial services.

Measures installed in the existing building alteration type require additional information before a baseline can be assigned.

3.3 Non-Building Projects

Non-building projects address equipment and processes that do not directly support building habitation or commercial services. Non-building projects typically include industrial or agricultural equipment or other processes not treated by the building code.

4 Delivery and Savings Determination Type

The delivery and savings determination type specify the program delivery model and savings estimation approaches.

Methods for determining savings, regardless of the determination type, should use a congruent approach when characterizing the pre- and post-project conditions - e.g., the efficiency rating of preexisting equipment is compared with the efficiency rating of installed



equipment, or the metered performance of degraded performance of the pre-existing equipment is compared to a projected degraded performance of the installed equipment.

4.1 Upstream and Midstream

Upstream and midstream programs target manufacturers, and distributors and retailers, respectively.³ These programs offer incentives to manufacturers or retailers of high efficiency products in order to encourage their production and sales.

Savings claimed through Upstream or Midstream delivery type program are assigned a Code baseline.

4.2 Downstream

Downstream programs target end-use customers. These programs typically offer incentives directly to customers as rebates. Measure baselines vary within this delivery type dependent upon the savings determination and installation types.

Downstream program savings methodologies include calculated, deemed, NMEC, randomized control trial, and experimental design. The baseline varies by alteration, delivery, and savings determination type.

Deemed measures savings rationale, methods, and parameters are documented in work papers. A deemed measure work paper establishes the existing and high efficiency baselines, the EUL and RUL of the measure, the measure cost, and the preponderance of evidence requirements for accelerated measure types.

5 Installation Type

The installation type refers to the different installation models that are possible in implementation.

5.1 Shell & Building Systems (SBS)

A shell and building system (SBS) measure improves from the nominal efficiency of pre-existing equipment that is otherwise expected to perform essential building functions throughout the course of a building's life cycle, without regular replacement.

³ Per Rulemaking 13-11-005, Midstream does not include contractors and installers.



Clarification

SBS measures improves the efficiency of equipment that does not burn out or when they do burn out the building can function without them; thus, this equipment is typically not replaced unless there is a major building renovation. As such, the RUL of existing equipment for SBS measures is effectively equal to the EUL. An SBS measure must be a nominal energy efficiency improvement over the existing equipment.

- Insulation walls and pipes, windows, and ducts maintain essential building conditioning and are expected to last through the building life cycle without scheduled replacement. This equipment is eligible for SBS treatment. A roof itself is expected to be repaired or replaced during the building life cycle and is not considered a building system.
- Lighting systems (hard-wired systems only) provide the essential service of lighting. Fixtures are typically left in place until a major renovation occurs. Lamps and ballasts can be replaced with like technology as they individually fail, maintaining the original system efficiency indefinitely. Therefore the lighting system (fixtures, lamps, ballasts, and controls) and the replacement of subsystem of ballasts and lamps with a higher efficiency subsystem is a SBS measure. Lighting controls alone and lamps alone do not qualify as a building system but could qualify under other installation types.
- Mechanical equipment can be expected to be replaced or repaired during the building life-cycle (i.e., boiler, chillers, pumps, air-handlers, motors) in order to maintain essential building services and are categorized as other installation type measures..

Rules and Exceptions

SBS classified measures may optionally be treated as a normal replacement if determined appropriate by the Program Administrator.

Examples

SBS#1: A customer pursues an LED fixture upgrade in their office space. At the time of the project, about 15% of the lamps and ballasts had failed and most of the occupancy controls were in manual override. The project replaced the existing fluorescent lamps and ballasts with linear LEDs and drivers with integral daylight dimming and occupancy control. In order to maintain congruency in the calculation of savings, depending upon the best fit for the project this a) assumes that all existing systems were operational and uses the change in rated efficiency to as the basis of savings (requires FMC since this is the existing baseline) and b) assumes failed units had no usage and uses a change in metered based usage as the basis of savings with normal replacement for the failed units.

SBS#2: The existing R8 chilled and hot water pipe insulation has degraded over time. The existing insulation was removed and replaced with R10 insulation, although the savings were calculated using an estimate of the R-value of the poorly performing pipe insulation. This is an



eligible SBS measure. If the existing insulation had been removed and replaced with the same rated insulation, this measure would not have qualified as an SBS measure, since there was no nominal improvement in efficiency, although it may qualify as a BRO installation type.

5.2 Add-On Equipment (AOE)

An Add-on Equipment (AOE) measure installs new equipment onto an existing host improving the nominal efficiency of the host system. The existing host system must be operational without the AOE equipment, continue to operate as the primary service equipment for the existing load, and be able to fully meet the existing load at all times without the add-on component. The actual energy reduction occurs at the host equipment, not at the add-on component, although any add-on component energy usage must be subtracted from the host savings.

Examples

AOE#1: A VFD replaced a throttling valve in modulating the flow in a pumping system. In the course of installing the VFD, minor repair and replacement of a portion of the controls and/or inverter duty motor was necessary to implement the VFD/VSD primary function. This measure qualifies as an AOE because it is a component that was added on to existing equipment that still serves the load.

AOE #2: A VFD modulates pump speed on an existing system in order to modulate flow. The VFD fails and the equipment is temporarily operated in bypass mode. The replacement of the VFD is not an AOE measure since the new VFD is not nominally more efficient than the previous VFD, but it could be BRO.

AOE #3: The initial installation or replacement of lighting controls can be an AOE measure, if it is added on to a system that currently does not have lighting controls or if it is an upgrade to an existing control system. If the lighting system is upgraded (lamps, ballasts, and controls), the measure is an SBS measure. If the proposed controls are not an upgrade to the existing controls, the measure is not an AOE measure but could be BRO. Table 5-1 summarizes the lighting control cases:

Table 5-1. Lighting Control Example

Existing Conditions	High Efficiency Equipment		
	New simple receptacle occupancy control	New Central control upgrade	New Lighting system upgrade: lamps and ballasts and controls
No lighting control	AOE	AOE	SBS
Simple receptacle occupancy control	Normal	AOE	SBS
Central control	Not applicable	Normal	SBS



AOE #4: An investigation of an EMS resulted in fine-tuning of equipment schedules and reset schedules. Since no actual equipment was replaced or added, this does not qualify as an AOE measure; however, it is a valid BRO-type installation.

AOE #5: An existing controls system with scheduling features only is replaced with a new system capable of multiple additional functions including optimized start/stop, local occupancy override, and other functions that are not present in the old system. The implementation plan includes the replacement of existing on/off actuators and temperature sensors.

This measure is largely an AOE since controls are an add-on measure and the proposed system is a nominal improvement over the old system with additional energy functionality. However, the replacement of like-with-like components (actuators and sensors) is restorative.

AOE #6: A 20-story office building primarily houses "9-to-5" tenants but one floor is devoted to a 24-hour call center. The current chiller fully serves the whole building, including the call center. A smaller-capacity "pony" chiller was installed to serve the relatively small but constant cooling load. By operating the pony chiller overnight when all but one floor of the building is largely vacant, operation of a much larger chiller, along with its associated chilled water pump, condenser water pump, and cooling tower, is avoided. This measure qualifies as an AOE measure since the host system had the capacity to serve entire load and continues as the primary chiller.

AOE #7: An existing agricultural pump performance has degraded over time. The pump impeller, seals, and bearings can be replaced, restoring the pump to its former operating condition, although not exceeding its previous operation. This measure is restorative and does not qualify as an AOE measure.

5.3 Behavioral, Retrocommissioning, and Operational (BRO)

Measures installed within in the BRO installation type are assigned an existing baseline and may include measures that either restore or improve energy efficiency.

5.4 Normal Replacement

The Normal Replacement (NR) type includes measure installations where the existing equipment has failed or no longer meets current or anticipated needs or is being replaced due to normal remodeling or upgrading or replacement activities that are expected and undertaken in the normal course of business.

5.5 Accelerated Replacement

The accelerated replacement category includes replacements of existing equipment with nominally higher efficiency equipment and where the preponderance of evidence supports that a) the existing equipment would have remained in operation for at least the remaining life of the existing equipment, performing its current service requirement and b) the energy



efficiency program activity induced or accelerated the equipment replacement. The RUL must be at least one year to qualify as Accelerated Replacement.

Clarification

This installation type includes three sub-types, all of which are subject to proof of both program influence and the long-term viability of the existing equipment as demonstrated by the preponderance of evidence. The evidence supporting the long-term viability must meet one of three criteria (depending on the existing equipment status) as follows:

- **Repair eligible** – The existing equipment needs a major repair to return the equipment to fully serving the load and that repair cost is less than 50% of the full measure cost (FMC).
- **Repair indefinitely** – The existing equipment exceeds its EUL and has a history of repair and maintenance and could continue to be maintained to serve the load for the RUL of the existing equipment.
- **Early retirement** – The existing equipment is fully operational and meets new and existing load service requirements and could continue to do so for the RUL of the existing equipment.

Existing conditions and code define the first and second baselines for all three sub-types, where the repaired state is considered existing conditions for the repaired measure.

Examples

AR#1: A primary chiller serving a large facility failed prematurely, well before its EUL. Meanwhile, the back-up chiller was serving the off-season load, but a replacement decision is urgent since it alone cannot meet the summer load. The cost of repairs required to return the plant to service is about a third of the cost of a higher efficiency replacement unit as demonstrated by valid quotes for both the repair and replacement. The evidence indicates that the customer was ready to proceed with the repair without the program technical assistance and incentives. This is a valid accelerated replacement measure with repair-eligible evidence of viable operation. The existing equipment operation is based on plant records of the failed unit performance with additional proxy measurements from the back-up chiller supporting the analysis.

AR#2: A food processing plant replaced an air-cooled chilled water system with a water-cooled system concurrent with an increase in production. The existing air-cooled chilled water capacity was more than sufficient to meet the increased production rates of the plant and records indicated that the plant was well maintained. Assuming that evidence supports program influence, this is an accelerated replacement measure with early retirement evidence of viability. The existing baseline for is the air-cooled chiller performance but adjusted for the post-production rates. If the existing plant did not have the capacity to meet the increased



production rates, the measure would have been classified as new construction with a Code baseline.

6 Default Measure-Level Baseline Assignment Table

The default baseline treatment for a measure is noted in individual cells of Table 6-1, below, that correspond to the alteration type, delivery, savings determination, and installation type of that measure. The terms in the table have specific technical definitions, rules, and exceptions that must be met in order to make a correct baseline determination at the measure level. Any conclusions about measure baseline selection should only be made after consulting all of the sections of this document. This table is based on Table 1 of Decision 16-08-019.

The measure baseline assignments apply across all sectors, except as noted.

As an example of how to use the Table 6-1: A wall insulation measure (which meets the definition of an SBS installation type) installed in an existing building and delivered in a downstream program through a deemed savings program would be assigned an existing baseline. If the same measure was delivered in an upstream program, the measure would be assigned a code baseline.

Table 6-1. Measure Default Baseline Assignment Table¹

Alteration Type	Delivery	Savings Determination	Installation Type				
			Shell & Bldg System	Add-On Equipment	Behavioral, Retrocommissioning, and Operational	Normal Replacement	Accelerated Replacement
New Construction, expansions, added load	Any	Any	Code	Code	N/A	Code	N/A
Existing buildings, including major alterations	Upstream & Midstream	Any	Code	Code	N/A	Code	N/A
	Downstream	Calculated	Existing	Existing	Existing	Code	Dual
		Deemed	Existing	Existing	Existing	Code	Dual
		NMEC	Existing	Existing	Existing	Existing, Program Design	Existing
Non-building projects, including Ind. & Ag.	Upstream & Midstream	Any	N/A	Code	N/A	Code	N/A
	Downstream	Calculated	N/A	Existing	Existing	Code	Dual
		Deemed	N/A	Existing	Existing	Code	Dual
		NMEC	N/A	Existing	Existing	Existing, Program Design	Existing
	RCT/ Experimental	N/A	Existing	Existing	Existing	Existing	

¹Table 6-1 is only to be used in conjunction with the definition, terms, clarifications, and rules defined in this document.

Table 6-2 is an excerpt of a larger table in Appendix A. The baseline for a measure can be determined using the installation type in Table 6-2 and Appendix A in conjunction with the alteration, delivery, and savings type of the project. The measures are organized end-use with installation type assignments by sector.



Table 6-2. Measure Installation Type Assignments

Measure	COM	IND	AG	RES
Ag Irrigation			NR/AR	
Water Heating Faucet Aerator	SBS			SBS
Water Heating Other	NR/AR			NR/AR
Water Heating Showerhead	SBS			SBS
Water Heating Storage Water Heater	NR/AR	NR/AR		NR/AR
Water Heating Tankless Water Heater	NR/AR	NR/AR		NR/AR
Building Envelope Ceiling-Roof Insulation				NR/AR
Building Envelope Insulation Other	SBS		SBS	SBS
Building Envelope New Windows	SBS	SBS		SBS
Building Envelope Other	SBS			SBS
HVAC Chiller Air Cooled	NR/AR	NR/AR	NR/AR	
HVAC Chiller Other	NR/AR			
HVAC Chiller Water Cooled	NR/AR	NR/AR		

7 Baseline Treatment

Measure baseline assignment has implications for calculating the savings and for determining the measure cost. These requirements and other considerations are discussed in this section in detail and summarized in Table 7-1.

Table 7-1. Baseline Treatment

	Existing Baseline	Existing: AOE (Add-on)	Code Baseline	Dual
1 st Baseline	Existing	Existing	Code	Existing
2 nd Baseline	N/A	N/A	N/A	Code
1 st Period (Years)	EUL	Minimum of RUL of host or EUL of Add-on	EUL	RUL
2 nd period length (Years)	N/A	N/A	N/A	(EUL-RUL)
Measure cost	FMC	FMC	IMC	ARC

The baseline assignment dictates calculation methodologies that depend on supporting terms, which are described in this section.



Savings calculations are calculated using the following equation:

$$\textit{First year savings} = \textit{1st baseline usage} - \textit{High efficiency usage}$$

$$\begin{aligned} \textit{Lifetime savings} = & (\textit{1st baseline usage} - \textit{high efficiency usage}) * \textit{1st period} \\ & + (\textit{2nd baseline usage} - \textit{high efficiency usage}) * \textit{2nd period} \end{aligned}$$

The second period of a dual baseline measure may be zero savings.

Appendix B: Accelerated Replacement Using Preponderance of Evidence

Accelerated Replacement Using Preponderance of Evidence

Version 2.0

Revision History

Version No.	Date	Description	Author
0.91	January 29, 2013	Draft	SCE
0.92	May 9, 2014	Draft living document – comments lead to revision	SCE
1.0	July 16, 2014	Final living document	SCE/CPUC
2.0 draft	December 7, 2016	Draft	ERS

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1 Introduction

When an energy efficiency program funds a measure that replaces a less efficient system, the implementer and subsequent reviewers must determine whether the measure's baseline to use to calculate savings is an alternative new system installation or the pre-existing system. CPUC regulatory guidance specifies that if the typically greater savings associated with accelerated replacement is claimed, it must be demonstrated that the prior equipment would have continued in use without the program by showing both (1) the continued viability of the pre-existing system and (2) the program influence on the decision to retire the system early. It further requires that the demonstration rely on consideration of the "preponderance of evidence."¹ This means that the evidence for both accelerated and normal replacement baselines must be assembled and considered and that the more likely baseline must be chosen. Accelerated replacement is most likely to be successfully demonstrated to evaluators and CPUC in programs expressly designed and executed to achieve it through measure screening and built-in data collection protocols that support it.

This document provides guidance on when and how to assemble and document evidence of accelerated and normal replacement, and on how to determine the outcome.

The intended audience is all parties associated with initial and final baseline characterization: program implementation contractors, investor-owned utility (IOU) representatives developing projects directly or reviewing those of their contractors, IOU technical review consultants, CPUC ex ante review consultants, CPUC ex post evaluation contractors, and CPUC Staff.

¹ Decision 11-07-030, July 14, 2011, *Application of SCE for Approval of its 2009-2011 Energy Efficiency Program Plans and Associated PGC and Procurement Funding Requests*, on p. 41 observes that "There needs to be compelling evidence to determine whether a project is 'replace on burnout' or 'early retirement.'" The same Decision's Attachment B: *Custom Project Review Process* flowchart on p. B12 also specifies the need for "compelling evidence." On B13 the *Process* specifies that "Pre-existing equipment baselines are only used in cases where there is clear evidence the program has induced the replacement." While this decision does not introduce the term "preponderance of evidence" explicitly, a later Decision does. Decision 12-05-015, May 10, 2012, Section 17.1.5 addresses Ex Ante Value Gross Savings Baselines on p. 347 and directs Staff "to indicate that a preponderance of evidence on the motivation for equipment replacement shall be utilized to determine which of the two baseline alternatives is applied for all gross savings estimates." This same section commissioned version 1 of this guidance document. In the same 12-05-015 Decision, Attachment A *Summary of Changes to Database for Energy Efficiency Resources 2011*, affirms the same: "(W)hen early retirement is an option the evidence that supports program induced early retirement must be weighed against the evidence supporting a replace-on-burnout or normal replacement baseline or new construction choice. It is necessary to establish that a preponderance of evidence indicates the program has induced the replacement rather than merely caused an increase in efficiency in a replacement that would have occurred in the absence of the program." Lastly, Decision 16-08-019, August 18, 2016 *Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings*, p.42 recognized that the preponderance of evidence standard for repair eligible or accelerated replacement needed further refinement to be practically applied: "(T)here is no standard definition of what it really means in practice and what will be workable in the context of project level engagement" and on p. 102 and 109, directed further articulation, the result of which is v2 of this document.

2 Applicability

This protocol applies to the following types of measures:²

- 1) Custom or deemed measures in existing facilities delivered through downstream programs, or
- 2) Any non-building custom or deemed measure including industrial and agricultural

Exceptions: Even if the measure meets the above criteria this protocol does not apply if it is:

- 1) Associated with new construction, expansion, or added load that cannot be met with existing equipment
- 2) Delivered through an upstream program
- 3) Implemented as part of a behavioral, retrocommissioning, or operationally oriented program
- 4) A building shell, building system,³ or add-on equipment measure type, or
- 5) A program with savings estimation based on a randomized control trial or experimental method

An illustrated version of the applicability is shown in Table 1, modified from Decision 16-08-019's Table 1.

Table 1: When Preponderance of Evidence-Based Assessment of Accelerated Replacement is Relevant

Alteration Type	Delivery	Savings Determination	Shell & Bldg System	Add-On Equipment	Behavioral, Retrocommissioning, and Operational	Normal Replacement	Accelerated Replacement - Early Retirement and Repair Eligible
New Construction, expansions, added	Any	Any	Code	Code	N/A	Code ?	N/A
Existing buildings, including major alterations	Upstream & Midstream	Any	Code	Code	N/A	Code	N/A
	Downstream	Calculated	Existing ¹	Existing	Existing	Code	Dual
		Deemed	Existing ¹	Existing	Existing	Code	Dual
		NMEC	Existing	Existing	Existing	Existing, Program Design	Existing
	RCT/ Experimental	Existing	Existing	Existing	Existing ?	Existing	
Non-building projects, including Ind. & Ag.	Upstream & Midstream	Any	N/A	Code	N/A	Code	N/A
	Downstream	Calculated	N/A	Existing	Existing	Code	Dual
		Deemed	N/A	Existing	Existing	Code	Dual
		NMEC	N/A	Existing	Existing	Existing, Program Design	Existing
	RCT/ Experimental	N/A	Existing	Existing	Existing	Existing	

² Relevant applications and exclusions are defined in Table 1 of Decision 16-08-019, August 18, 2016, *Order Instituting Rulemaking Concerning EE Rolling Portfolios Business Plan Filings*, p. 49.

³ Footnote on the definition of "building system" per parallel work.

3 Key Definitions

The definitions of accelerated and normal replacement and preponderance of evidence are critical to understanding and assessing evidence that distinguishes between the two.

3.1 Accelerated Replacement

The accelerated replacement (AR) category applies for measures where an energy efficiency program activity induces or accelerates equipment replacement. The existing equipment being replaced would have continued to function and perform its original design intent and satisfy customer requirements in absence of the replacement for the remainder of its expected useful life. Subcategorizations within accelerated replacement include “early retirement,” “repair eligible,” and “repair indefinitely.” All are associated with “dual baseline.”

3.2 Normal Replacement

Normal (NR) replacement applies when new or replacement equipment has been installed due to normal remodeling or upgrading or replacement activities that are expected and undertaken in the normal course of business or ownership. The category also includes measure installations where the existing equipment is still functional and the available evidence does not support a determination of program-induced accelerated replacement. For the purposes of this document, which is concerned with determining the appropriate baseline normal replacement, “replace on failure” and “replace on burnout” circumstances and the “normal/natural turnover” term are functionally equivalent but they are not synonyms.

3.3 Preponderance of Evidence

“Preponderance of evidence” is a term borrowed from civil law. The preponderance of evidence standard requires that evidence for two opposing conditions be considered – in this case accelerated replacement and normal replacement baselines – and the condition more likely to be true (greater than 50% probability) be chosen.

If an implementer decides an accelerated replacement baseline is compelling for a particular measure but fails to fully investigate, document, and provide evidence to score the alternative normal replacement baseline it will be impossible to proceed with certainty that any subsequent review will uphold the implementer’s decision on baseline type, because the preponderance of evidence exercise has not been completed. Strong evidence for one baseline condition alone will be at best suggestive.

4 Direct-to-Decision and Direct-to-Default Baselines

There are certain circumstances for which a small combination of types of evidence make a compelling case for one of the three possible outcomes of accelerated replacement, normal replacement, or no program influence. This section addresses such circumstances.

“Direct-to-decision” means that the combination of site-specific or program-level evidence provided is sufficiently compelling such that further preponderance of evidence assessment is not necessary. This guide identifies three such circumstances for accelerated replacement:

1. Custom measures installed through residential and small commercial direct install

programs⁴

2. Tenant space build-outs where the tenant, space purpose and equipment use patterns remain the same.
3. Pre-existing equipment was functional and the measure was proposed in an implementer-provided audit through a program that the Commission has approved as being designed to expressly target early replacement.

“Direct to default” means that the evidence is strongly suggestive of one of the three outcomes and the burden of proof to justify another outcome is high. It is not definitive and does not guarantee an outcome but effectively reduces the rigor for additional requirements necessary to support the default baseline. This guide identifies seven such technology-program type-market combinations:

<u>Evidence</u>	<u>Default Baseline</u>
1. C/I energy management systems that don't fit in the “add-on” category	AR
2. C/I/Ag refrigeration	AR
3. Public sector, including primary and secondary schools	AR
4. The pre-existing equipment is functional and its age is less than ½ of EUL	AR
5. The pre-existing equipment is broken and the repair cost exceeds ½ of the replacement cost	NR
6. Measure associated with major alteration during tenant change-out	NR
7. The payback time after incentive exceeds the measure EUL	No influence

If a measure meets the “direct to default” criteria for accelerated replacement, a simplified protocol may be used to demonstrate that the measure is in fact accelerated replacement. See the simplified POE protocol described in Section 6. A measure that does not meet the above criteria is not certain to be the opposite of the default baseline shown. It simply means it is not “direct to default.”

5 Full Site-Based Preponderance of Evidence-Based Assessment for Custom Measures

Custom measures are those for which the customer financial incentive and the ex ante energy savings are determined using a site-specific analysis of the customer's facility.⁵ Baseline assessment therefore must be site-specific. Determination must assess (1) the continued viability of the pre-existing system and (2) the program influence on the decision to retire the system early.

It is worth emphasizing that evidence that the equipment simply **could** have remained operational only addresses viability. Evidence indicating that the equipment **would** have remained in operation addresses both criteria.

Generally speaking, the default baseline is assumed to be normal replacement and the burden

⁴ CPUC Staff must pre-approve the direct install program as being appropriate for such classification. For deemed measures with these customer classes, see the deemed section.

⁵ California Energy Efficiency Policy Manual v5, July 2013, p. 49 and D.11-07-030, p. 31.

of proof is to demonstrate accelerated replacement, with “more likely than not” being the threshold criteria. Exceptions to this general rule are noted in later sections. Normal replacement generally does not require justification.

5.1 Standard Preponderance of Evidence Protocol – Relative Value of Evidence

A preponderance of evidence-based assessment is subjective by definition. It requires consideration of opposing positions and then judgment regarding the more likely counterfactual scenario.

To make the evidence evaluation process more predictable, transparent, and practical to apply, this guide provides a scoring system that shows the approximate relative value of different types of evidence assembled to determine accelerated versus normal replacement. The process retains a degree of subjectivity and does not guarantee an outcome.

This is a substantive exercise. Implementers may follow the “standard” protocol described in this section for any custom measure and must use it for large custom measures. Large is defined as measures with an uncapped incentive claim that exceeds \$100,000.

Table 1 organizes the evidence in four major categories: evidence that demonstrates support for the case of continued viability of the pre-existing system; evidence against the same; evidence of program influence regarding the decision to retire early; and evidence against the same. Within each category Table 2 includes examples of multiple types of evidence. The list is not intended to be exhaustive.

Evidence can have greater or lesser value depending on what it demonstrates and the quality of the evidence itself. To help standardize the evaluation of the evidence by those involved, Table 2 includes columns with labels for Strong, Moderate, Corroborative, and Inconsequential quality evidence, with scoring values descending from 3 to 0, respectively. Implementers need not submit evidence associated with every row. If a compelling amount of evidence is assembled there is no need for more.

The scoring principle is simple: For a measure to qualify as accelerated replacement, the sum of scores for evidence in favor of continued equipment viability must exceed the scores against, and also the sum of scores for evidence in favor of program influence in the accelerated replacement decision must exceed evidence against. Otherwise the measure is normal replacement.

As the quality indicators illustrate, determination of accelerated replacement or normal replacement is not based on the amount of evidence but rather on the more convincing evidence based on its probable truth and/or accuracy. Two pieces of evidence demonstrating the same thing do not each warrant scores.

Table 2: Examples of Evidence For and Against Continued Equipment Viability and Program Influence and Relative Value

Descriptor	Strong	Moderate	Corroborative	Inconsequential	
Approximate Relative Value:	3	2	1	0	
Parameter					
Evidence of Viable Operation through RUL					
OPERATIONS	Equipment serves its current load	Directly collected customer or implementer pre-installation metered data showing capacity is met.	IOU or independent site inspection report validates claim. Photos of EMS screen shots showing operation in expected bounds.	Customer inspection report. Photos or videos of system operating with customer statement to this effect.	
	The load served is expected to remain the same through the RUL period.	Interviews confirm and independent analysis of historic and projected trends show use/production is not changing.	PA or implementer statement that use/production is not expected to change.	Customer signed statement that use/production is not expected to change.	
	Evidence of Against Viable Operation through RUL				
	Equipment is not operating or is poorly operating.	Repair costs > 25% of replacement costs, or customer interview indicates repair is an unattractive option.	Documented history of escalating repair costs, performance degradation, or user dissatisfaction.	Customer describes recent poor performance.	
	The load served is changing within the RUL period	Interviews confirm and independent analysis of historic and projected trends show use/production is changing.	Customer expects changes in load and can describe basis and expected magnitude of change.	Customer expects changes in load but without strong indication of timing, magnitude or certainty of change.	
	Evidence of More Program Influence				
PROGRAM INFLUENCE	Explicit customer communications concerning measure options	Customer formal affidavit affirming influence.	Customer email or other informal statement affirming influence.		
	Timing/Customer Communications Trail	Documents form formal presentation of measure by program to customer, with attendees and discussion noted.	Absence of project in Year 1 CapEx plan. Documented intervention after that plan. Presence of budget set-aside for project in Year 2 CapEx plan.	Email chain showing program marketing outreach to customer and their response requesting follow-up for the measure.	
	History of Energy Efficiency Activity	The measure is Stage 2 of a previously funded Stage 1 event for which influence already has been demonstrated.	Documented prior engagement between implementer and customer resulting in efficiency project(s) for which influence was demonstrated.	Documented prior engagement between implementer and customer resulting in efficiency project(s).	
	Significant financial impact	Payback is reduced by 35% or more, or Payback time is reduced by 20% or more plus reduced from greater than 2 or 3 years to less.	Payback is reduced by 25% to 35%, or Payback time is reduced by 20% or more plus reduced from greater than 5 years to less.	Payback is reduced by 20% to 25%.	
	Evidence of Less Program Influence				
	Timing/Customer Communications Trail	Communications that indicates the customer decided to install a measure before program engagement.		Customer's CapEx plan showed the measure before program intervention.	
	Incentive is a relatively small benefit.	Payback is reduced by 5% or less.	Payback is reduced by 5% - 15%	Payback is reduced by 15% - 20%	
	Equipment fulfills a regulatory mandate.	Equipment can be brought to compliance, but at high economic or other cost.	Equipment can be brought to compliance at moderate cost, nominally 20% to 40% of replacement cost.	Equipment can be brought to compliance at low cost, nominally 5% to 20% of replacement cost.	
	Corporate Sustainability Policy		Evidence that the customer prioritizes efficiency over other comparably economically attractive investments.	Customer has a sustainability policy and there is evidence that it has active support (not greenwashing).	
	Non-Program Energy Efficiency Investments	The customer previously installed the same measure at the same facility without an incentive.	The customer previously installed the same measure at another facility with or without an incentive.	The customer has a history of energy efficiency investments outside of California.	
Proactive Replacement Scheduled	Customer indicates scheduled refresh is planned before program involvement.		The project timing coincides with a market-typical renovation cycle.		

5.2 Standard Preponderance of Evidence Assessment – Types of Evidence

As the scoring matrix indicates, evidence in favor of or against accelerated replacement may be drawn from a wide variety of sources and may be voluminous. If so, the submittal package should include a cover memo or completed template that will help reviewers navigate the package. For example, the cover memo or template should summarize:

- The measure description
- The principal decision-makers and decision-making process associated with approving the measure
- A summary of the overall measure timetable to date describing the stages of measure development and points of influence
- What each document demonstrates
- Age of relevant pre-existing equipment, if known, and its EUL
- Other narrative that supports the position but may not be associated with documented evidence.
- Scoring summary

As a POE- and not algorithmically-based protocol, this guidance does not specify questions that, if answered, definitively categorize the measure.⁶

5.3 Evidence for and against Continued Viability of Equipment at least through RUL

To score the evidence of viable operability through the remaining useful life (RUL) of the equipment, two types of evidence will be collected: evidence in favor of viable operation and evidence against viable operation. The scores for each will be summed separately. The greater of the two will indicate whether the viability portion of the POE standard has been met for demonstration of accelerated replacement.

Evidence in Favor of Viable Operation

The evidentiary requirements for viable operability will be scored based the strength of the evidence provided.

Equipment serves its current load – the equipment must be operating and capable of meeting current load or meeting its intended level of service. For example, a chiller must be capable of providing sufficient cooling to meet the occupant and space temperature requirements during the entire cooling season. The relative strength of evidence is scored as follows:

- Strong evidence (3 pts): Measured operating data from customer or an independent source that demonstrates that the current load or service level requirements for the equipment is met.

⁶ A questionnaire that does so algorithmically can be found in the Nonresidential Downstream Lighting Impact Evaluation Report to the CPUC, Appendix G, starting on page G-160, available at http://www.calmac.org/publications/Nonresidential_Downstream_Lighting_Impact_Eval_Report_Appendices_A-J.pdf. Also, the ex ante team and SCE have developed a short six-question version of an accelerated replacement POE interview for HVAC assessment. These documents are included as Appendix A.1.

- Moderate evidence (2 pts): IOU or independent site inspection report that confirms the equipment operation is satisfactory to meet its current load or service level requirements. The site inspection should include photos of equipment and/or screen shots of operating parameters from equipment control system to substantiate that the equipment is installed and operating within design parameters
- Corroborative (1 pt): Customer site inspection report that confirms satisfactory equipment operation. The site inspection should include photos of equipment and/or screen shots of operating parameters from equipment control system to substantiate that the equipment is installed and operating within design parameters.

The load served is expected to remain the same through the RUL period – The building use or process requirements are not changing and are not expected to change in the near future (as defined by the RUL time period). The relative strength of evidence is scored as follows:

- Strong evidence (3 pts): Based on interviews and analysis, an independent source confirms that the building use or plant production is not changing in a manner that requires the equipment to be replaced or modified.
- Moderate evidence (2 pts): PA or implementer site assessment report that confirms that the building use or plant production is not changing in a manner that requires the equipment to be replaced or modified.
- Corroborative (1 pt): Customer signed statement that building use is not changing or that plant production is not changing in a manner that requires the equipment to be replaced or modified.

Equipment age is less than its expected useful life – The equipment has been in operation for less time than its EUL. The relative strength of evidence is scored as follows:

- Strong evidence (3 pts): Building plans, equipment invoices, manufacturer-provided data, or equipment labels that indicate the age of the equipment is less than two-thirds of its EUL, or when the EUL is unknown, the equipment is less than 5 years old.
- Moderate evidence (2 pts): Building age where the equipment resides is less than two-thirds of the equipment EUL.
- Corroborative (1 pt): Customer provides statement indicating the equipment is less than two-thirds of the equipment EUL, or when the EUL is unknown, the equipment is less than 5 years old.

Evidence against Viable Operation through RUL

The evidentiary requirements against viable operability will be scored based on the strength of the evidence provided.

Equipment is not operating or equipment is operating poorly – The equipment is either not operating at all or is operating so poorly that it cannot meet the current load or service level requirements but is repairable for less than half of the replacement cost:

- Strong evidence (3 pts): Independent interview of customer indicates that the repair costs are equal to or greater than 25% of the equipment replacement costs. Or the

customer indicates that the equipment is not operating and does not consider repair to be a viable option to replacement.

- Moderate evidence (2 pts): Historical maintenance and repair costs are available and indicate either a pattern of escalating costs or significant performance issues. Or there is a documented history of building occupant or operator dissatisfaction with either equipment operation or its ability to meet its intended service level. Or, site-measured data shows that the equipment is experiencing performance problems. For example, there is a documented history of occupant complaints that the building space is too hot or too cold with corrective actions taken to fix the issues.
- Corroborative (1 pt): Pre-retrofit measurement of equipment operation (where required) is not available due to equipment not operating or operating poorly. Or a customer, PA, or third-party implementer site energy assessment indicates that the equipment is experiencing performance problems, but does not have supporting performance data.

The load served is changing within the RUL time period and the current equipment cannot accommodate those changes – The equipment’s current load or service level requirements have changed or are expected to change within the equipment’s RUL time period (or when the RUL is unknown, within 5 years).

- Strong evidence (3 pts): Customer or independent assessment of facility operation indicates that the equipment load or plant production has changed or will change by an amount that can no longer be met by the current equipment.
- Moderate evidence (2 pts): Customer indicates that building end use is changing in a way that may impact the equipment’s ability to meet the customer’s needs. Or a plant has a scheduled rebuild planned within the RUL time period and the customer anticipates production will increase beyond the existing equipment capabilities.
- Corroborative (1 pt): Customer or independent source suggests that equipment needs will change beyond the existing equipment capabilities, but without a clear indication of the timing, magnitude, or certainty regarding the changes.

5.4 Evidence of Program Influence or Lack Thereof

As with viable operability, to score the evidence program influence on early replacement as compared to normal replacement, two types of evidence will be collected: evidence in favor of and against. The scores for each will be summed separately. The greater of the two will indicate whether the program influence portion of the POE standard has been met for demonstration of accelerated replacement.

Evidence of Program Influence

Explicit customer statement. A customer testimonial or questionnaire regarding program influence is the most direct possible evidence of program influence.

- Strong evidence (3 pts): Formal statement by the customer that they have been influenced to replace the equipment (or proceed with the EE measure) by the program through incentives or program activities. Example evidence: Letter signed by a customer

representative with authority to represent the company or institution and with direct knowledge of the decision-making process associated with the measure's approval on company letterhead, and/or a form signed by the customer that includes answers to key questions.

- Corroborative (2 pts): Informal interview or statement that the customer has been influenced to replace the equipment by the program.

Example evidence: Email statement from the customer's technical contact.

Timing/organic customer communications trail. Series of informal exchanges can demonstrate how IOU or implementer staff engaged and persuaded the customer to install the measure.

- Strong evidence (3 pts): Strong direct evidence. *Example evidence: Formal presentation materials pitching the immediate replacement over in situ condition to decision-makers. Attendees, discussion, and outcomes are documented.*
- Strong evidence (3 pts): Audit performed by implementer or PA as part of the Program
- Moderate (2 pts): Strong indirect evidence. *Example evidence: A December 2016 year capital expenditure (CapEx) plan for 2017 does not list the proposed measure. Program contact or an audit regarding the measure demonstrably occurs in 2017. The measure appears in the December 2017 CapEx plan before being installed in 2018.*
- Moderate (2 pts): Moderate direct evidence. *Example evidence: An email chain that starts with a customer requesting technical advice on efficiency options from an IOU, followed by such support*
- Corroborative (1 pt): *Example evidence: Meeting notes with attendee names noted; an email from an implementer marketing a program to a customer, followed by their responding request for help.*

Evidence protocols: When assembling such evidence through email exchanges the implementer need only assemble key evidentiary correspondence and those necessary for context, and that key passages be highlighted. Providing a large number of emails mainly to demonstrate an implementer-customer relationship is unhelpful and discouraged, for example. Also IOU account manager and implementer email content should be specific by including:

- Names of all attendees at meetings or calls
- Dates of events (not just email transmittal dates)
- Description of meeting technical topics covered
- Next steps or action items

History of Energy Efficiency Activity. Past engagement by the customer with the implementer demonstrating a pattern of influence is indicative of program influence.

- Strong evidence (3 pts): Staged project development. The particular technology being considered for an incentive is the second or later stage of a multi-stage project and the initial stage is or was demonstrated to be influenced by the program. *Example evidence: (1) Prior measure application plus (2) one-paragraph description of how the current measure*

is technically linked to the prior one, plus (3) evidence of program influence on prior project.

- Moderate evidence (2 pts): Historical relationship with customer. The implementer can demonstrate a long-term relationship with the customer, such as previously funded projects unrelated to the one currently under consideration. *Example evidence: (1) Prior measure application plus (2) evidence of program influence on at least one prior project from prior ex ante review, ex post evaluation, or implementer.*
- Corroborative (1 pt): The same staged project development as described previously, but absent evidence of prior program influence.

Significant financial impact. Evidence that the program incentive makes a material difference in the customer's cost-effectiveness as measured simply by payback time is evidence of likely influence, especially in or above the typical 30% "sweet spot" range. *Example evidence: Provide simple payback calculations with and without the program administrator incentive, and a comparison to the customer payback threshold.*

- Strong evidence (3 pts): Payback time changes by 35% or more, or
- Strong evidence (3 pts): Payback time changes by 20% or more and decreases from greater than 2 or 3 years to less than the same.
- Moderate evidence (2 pts): Payback time changes by 25% to 35%, or
- Moderate evidence (2 pts): Payback time changes by 20% or more and decreases from greater than 5 years to less than 5 years.
- Corroborative (1 pt): Payback time changes by 20% to 25%

Add one point if the calculations are based on firm quotes in hand, with the quote being dated prior to decision-making. The savings calculations must use an existing (or repaired) condition baseline.

Evidence of Absence of Program Influence

Timing/organic customer communications trail. Just as communications can show the sequence of events that reveal program influence, they can reveal the reverse. If the decision to replace equipment was made before program intervention, causality is unlikely.

- Strong evidence (3 pts): Email or any other communications chronology that indicates the customer has installed or decided to install a measure before program engagement. IOU: "I hear you are planning to install... We have an incentive for that."
- Corroborative (1 pt): Indirect evidence. Example evidence: A prior year CapEx plan included the measure (without consideration of incentive) and it was prioritized relatively highly on the list.⁷

Incentive is a relatively small benefit. Some efficiency measures have benefits that have nothing to do with energy costs. If the payback time for a measure is not materially changed by a program incentive, this suggests that other factors are the predominant reasons for the decision to act. If the program design includes professional services such as energy audits,

⁷ Using the CapEx plan to demonstrate influence is weighted with a "2" in favor while using the CapEx plan to demonstrate absence of influence is weighted less, with a "1" against, because the measure's presence on a plan is not assurance of funding.

design, or management, evidence of program discovery or support can more than offset this financial-only criteria. *Example evidence: The combination of measure cost and annual savings from applications.*

- Strong evidence (3 pts): Payback is reduced by 5% or less.
- Moderate evidence (2 pts): Payback is reduced by 5% - 15%
- Corroborative (1 pt): Payback is reduced by 15% - 20%

If the incentive has a low effect on payback time but there is a reason that this should not be considered indicative of an absence of influence, such as the program provided substantial non-incentive benefits to influence the customer, this should be noted in the cover summary. In such cases the factor should be excluded from the scoring.

New equipment helps fulfill a regulatory mandate. Aid in compliance with law is a non-energy benefit that can be definitive and trump all other considerations. If the only way to meet a requirement is to replace the old equipment, then it cannot be the baseline and accelerated replacement is not an option. However, in some cases the pre-existing equipment can be renovated, upgraded, or otherwise modified to be brought into compliance, in which case the renovated case may be the baseline if it is economical. *Example evidence: South Coast Air Quality Management District (SCAQMD) permit or tune-up report data, which is required to be retained for at least 24 months, combined with maintenance records shows that a pre-existing 3 MMBtu/hr boiler cannot consistently meet NO_x emission limits, despite attempts to tune it to do so.*

- Definitive evidence. The pre-existing equipment cannot be brought into compliance. New equipment must be the basis of the baseline.
- Strong evidence (3 pts): The pre-existing equipment can be brought into compliance, but the cost is high or other practical considerations such as size or stack height concerns make retention unattractive.
- Moderate evidence (2 pts): The pre-existing equipment can be brought into compliance. The cost to do so is moderate relative to new system cost, in the range of 20% to 40%.

Efficiency activity is driven by corporate policy. It is common for large corporations to have sustainability policies and similar doctrines that state intentions regarding investment in “green” practices. Such policies may drive action or they may be necessary but not sufficient to do so, with incentives being required as well. They can be pure “greenwashing.”

- Moderate evidence (2 pts): The customer generally pursues other efficiency projects with lesser financial standards than other investments. *Example evidence: In an interview a customer describes company investments in green practices without financial return or publicity, or describes having less-restrictive financial criteria for green investments over other types.*
- Corroborative (1 pt): The customer has a policy regarding sustainability or similar stated intentions that has active support. *Example evidence: Periodic internal company reports tracking green metrics. A manufacturer has integrated the ISO 50001 energy management system (EnMS) standards into operations.*

- Inconsequential (0 pts): The customer has a policy declaring support for sustainability or similar stated intentions without evidence of active commitment. Example evidence: Company web site, annual report sustainability statement, general sustainability signage.

Non-program EE investments. A demonstrable history of energy efficiency of investment absent engagement with California efficiency programs suggests a potential lack of program influence, especially if the prior measures were similar to the one under consideration.

- Strong evidence (3 pts): The customer previously installed the same measure at the same facility without an incentive. *Example evidence: Customer interview.*
- Moderate evidence (2 pts): The customer previously installed the same measure at another facility with or without an incentive. *Example evidence: Customer interview.*
- Corroborative (1 pt): The customer generally has a demonstrable history of energy efficiency investments at other facilities outside of the California IOU territories without incentives. *Example evidence: On-site observation of efficient equipment installation for a new program participant; interview response describing prior activities similar to the ones funded, without program engagement.*

Proactive replacement scheduled. Some customers replace equipment or remodel spaces on scheduled cycles, or have planned a major renovation independent of any program activity. Implementing a measure near the time of a scheduled remodel suggests normal more than accelerated replacement.

- Strong evidence (3 pts): Example evidence: An email from the customer stating "I am going to switch out all of the task lighting later this year to refresh the space. Can you help me get incentives?"
- Corroborative evidence (1 pt): Example evidence: An upscale hotel replaces its existing inefficient absorption cycle under-counter refrigerators/mini-bars with more efficient (but noisier) vapor compression units. The hotel last renovated its rooms seven years ago, according to an interview.⁸

6 Simplified Site-Based Preponderance of Evidence Protocol for Custom and Deemed Measures

Full preponderance of evidence-based assessment of accelerated replacement is an intensive process that requires collection of evidence for and against each of continued system viability and program influence. It requires material effort of customers, implementers, and reviewers. For measures with low uncertainty, low impact, or low ability of the process to improve the accelerated replacement assessment, a simplified approach to POE is warranted. This guide allows two simplified methods of POE to demonstrate an accelerated replacement baseline in the following conditions:

⁸ "(R)ooms are generally renovated once in 6-7 years."

http://hotelexecutive.com/business_review/3489/renovation-cycles-putting-money-back-into-your-asset. Certain market categories may refresh less frequently.

Simplified Tier 1 eligibility:

- 1) Custom measure savings would result in an uncapped incentive of \$25,000 to \$100,000.
- 2) Custom measure savings would result in an uncapped incentive of over \$100,000 and is “direct to default” per Section 4; or
- 3) Deemed measures would result in an incentive of at least \$25,000 and site specific assessment is used by the implementer instead of the program level assessment described in Section 7.

The simplified Tier 1 requirements are specified as all of the following:

- 1) Photograph or short video showing the pre-existing equipment in place and operating in the condition described in the application, to establish pre-retrofit functionality. Photos of gauges indicating a system running at elevated temperature or current draw are options. If such visual evidence is not practical other alternatives such as operational data may be permissible.
- 2) Completion of a short (nominally eight questions or less) interview conducted with a facility operator or other technical equivalent that determines prior intent to continue operation in the pre-retrofit condition for at least one year. A general “core” questionnaire will be developed. It is recommended that this is pre-approved by CPUC staff prior to use. If there are concerns for individual measures, a customized questionnaire tailored to the specific measures or target market may be addressed.⁹ Administration of this questionnaire should be conducted by an independent third party without financial interest in the outcome.
- 3) An affidavit, optionally incorporated into the questionnaire, signed by an individual with authority to represent the company or institution and direct knowledge of the decision-making process associated with the measure’s approval or a pre-agreed affidavit template signed by that individual and the implementer that affirms the accelerated replacement decision in both the viability and influence aspects. The text also must acknowledge a specific consequence for misrepresentation, including customer suspension from IOU efficiency programs for three years, reimbursement of any measure-related incentives with a 3-year statute of limitations on claims to any clawback, and possibly include language indicating that willful misrepresentations by any party may be prosecutable offenses under state law.

Simplified Tier 2 eligibility:

- 1) Custom measure savings would result in an incentive of less than \$25,000; or

⁹ Example questionnaires that can be used as the basis for drafting a program-specific low rigor questionnaire are included in Appendix A.

- 2) Deemed measures would result in an incentive of less than \$25,000 and site-specific assessment is used by the implementer instead of the program-level assessment described in Section 7.

The simplified Tier 2 requirements are specified the same as for Tier 1 except that the photo/video evidence is optional and the questionnaire administrator is not required to be an independent third party.

Full POE-based assessment is always allowable. If eligible for and submitted with the simplified basis, any ex ante review will use the same standards. However, if a measure is later selected for ex post impact evaluation, the evaluator always has the option of choosing a full POE-based assessment, even for measures originally assessed with this simplified approach. Further, if Staff concludes that the simplified approach is not an effective assessment tool for a program through EM&V or similar study, they have the option to withdraw this option and use the full POE method for future measure assessments in that program.

7 Program-Level Preponderance of Evidence-Based Assessment for Deemed Measures

The prior discussion addresses accelerated replacement consideration using preponderance of evidence principles on a site-specific basis. For deemed measures, program-level assessment rather than site-specific assessment is an option and is the preferred – but not required – approach. Program-level means that, for a deemed measure with both normal replacement and accelerated replacement options, a program demonstrates that either that all participants' measures are either accelerated replacement, that they are normal replacement, under which market conditions they are one or the other, or if they are a predictable blend of the two. If a blend, use a single weighted average deemed savings value for all program measures.¹⁰

Determination must rely on population-market research type data. This means the data must be of the type that can be collected for the subject population through market or participant study rather than on-site performance assessment. Business type, business size (e.g., revenue, number of employees, energy use), and equipment size all are examples of valid population market-based metrics. Metered hours of operation, load factors, and reported hours of use are examples of site-specific data inappropriate to consider for deemed measure accelerated replacement assessment.

As with custom measures, deemed measure evidence of accelerated replacement must demonstrate both the continued viability of the pre-existing system and program influence on the decision to retire equipment early.

The program-level approach does not require documentation submission for approval for each

¹⁰ This document is not intended to give program design guidance but notes that the blended average approach should be used cautiously. If is used not just for savings reporting but also as the basis of an incentive offering, there is risk of overpaying normal replacement participants (and reducing evaluated savings per dollar spent) and/or underpaying accelerated replacement participants (and therefore enrolling an undesirably high number of free riders).

separate application. However, it does require submission of program design and market data supporting the accelerated replacement claim, as well as later submission of program data demonstrating the degree of accuracy of the design assumptions. Care must be taken to ensure that program data is not used inappropriately to characterize a market baseline. The design document should describe rules and defining measures and markets expected to have high levels of accelerated replacement for commission approval, and the customer screening process. It also should describe data to be collected on-site to demonstrate that the customer/measure qualifies. Data collected is expected to be made available for evaluation. An interim approval process should be expected for new programs or new measures within programs, until sufficient data are collected to support or refute the accelerated replacement claim.

7.1 Program-Level Evidence of Continued Viability or Lack Thereof

For deemed measures, showing that the program typically is replacing equipment that was “installed and operating” constitutes adequate evidence of meeting the “continued viability” requirement.¹¹ Viability could be demonstrated using existing market data, such as the The California Lighting and Appliances Saturation Study (CLASS), Commercial Saturation Survey (CSS), Commercial Market Share Tracking (CMST) Commercial End-Use Survey (CEUS), or RASS (residential appliance saturation survey).

For example, if the existing market data show that the measure’s average EUL exceeds the EUL in DEER, the data could be used to show ongoing measure viability and accelerated replacement. Alternatively, if the market data shows that the average measure age in the market is far less (at least 30% less) than the DEER EUL, this is evidence of normal replacement. Market data may reveal that the particular segment of the market targeted by the program is an exception to broader trends.¹²

Market evidence of this or of normal replacement could feature data showing that the program targets a particular segment of the market that is clearly one type or the other (less than 20% or more than 80% accelerated replacement) for the program or a quantifiable blend. A direct install program that targets small businesses could claim 100% ER on the basis of the business size and program design.

7.2 Program-Level Evidence of Program Influence or Lack Thereof

Program influence can be established through the NTG ratio, which should be refined throughout program implementation using ex post EM&V. The same market data cited above may be possible to use to demonstrate expected program influence as well.

¹¹ The simplified approach described elsewhere is presented as being applicable for both deemed site-specific application and for small custom measures. In this one respect the deemed standard differs. Deemed has a lesser requirement, not obliging the implementer to show the replaced system was expected to continue to operate.

¹² Caution: Some of these studies are dated and in situ vintages are not direct evidence of EULs. Appropriateness of the data for this purpose will need to be assessed.

7.3 Insufficient Market Data for either “Viability” or “Program Influence

The program-level approach can be used even if market data is insufficient to establish viability or program influence prior to program launch. If no market data are available, three alternatives within the program-level construct are to: (1) conduct early ex ante research and later refine estimates through ex post evaluation or other program re-assessment; (2) hypothesize a blended rate and then collect relevant data of the first year program participant population to prove, refute, or adjust the assumed ER/NR proportion; or (3) use prior program evaluation results such as net-to-gross data. The second alternative entails considerable performance risk to the implementer. Program use of an up-front tool or checklist to screen potential participants for eligibility in accordance with the program design assumptions could mitigate the risk.

7.4 Ongoing Data Collection

Whether the original basis is market research or hypothesis, once the program is operational and starts to accumulate data, the most appropriate data source is that of past participants, either firmographic, common custom early retirement claims, or survey-based data collected by the implementer, perhaps from a sample of participants. For example, participant survey data might show continued long-term viability of removed equipment for 80% of replaced items. Separately, the targeted market’s saturation data might indicate a low measure adoption rate, an indirect indication program influence, perhaps 20% after excluding participants from the market. Together, the information provides a firm basis for estimating an 80% blended accelerated replacement/normal replacement rate.

For deemed measures, the survey would need to be short, likely less than ten questions, and may be possible to integrate into application materials.

Regardless of the basis of the initial absolute or blended estimate, annual or other periodic reassessment agreed to by implementers and CPUC staff is required and should be used to update workpapers.

7.5 Documentation of deemed measure POE requirements

All workpapers should describe rules and defining measures and markets expected to have high levels of early retirement. The program documents should contain clear eligibility requirements to ensure incented measures are accelerated replacement. If the measure is likely to also have high levels of normal replacement, then the basis of the blended savings calculation must be presented. This percentage can be refined during program implementation.

If a program develops program-specific non-DEER workpapers for a measure that compute deemed savings values for both normal replacement and accelerated replacement alternatives, the workpaper or workpaper section containing the accelerated replacement measure should articulate the evidentiary standard the program will use to determine if the measure is accelerated replacement or the proportion of participants that are accelerated replacement—which may be the same across all core statewide workpapers. If the program will rely on DEER-based deemed savings estimates for these alternatives, the program planning document should do the same.

8 Policy Update Plan

This version of POE guidance (v.2) represents a significant departure from v.1. While some changes simply clarify or further illustrate the principles described in v.1, there is a new scoring rubric and simplified procedures that are untested. These reflect major changes. After one year or other similar period the guidance should be re-assessed, likely through a similar stakeholder working group process, regarding accuracy of outcomes (e.g., appropriateness of scoring criteria and values in producing valid conclusions) and functionality (e.g., validity of simplified approach), and likely refined. There are three specific aspects for which evidence is particularly desired in order to update the policy:

- What are the most appropriate payback time thresholds to use as indicators of program influence? See Section 5.4. **Incentive is a relatively small benefit.**
- Is it possible and appropriate to incorporate a sliding scale that elevates accelerated replacement evidentiary requirements as the pre-existing equipment approaches or exceeds its EUL?
- A standard “Tier 1” questionnaire that has been used successfully and can be used as a template for other programs as the basis for their program-specific questionnaires.
- The absence or presence of significant measure non-energy impact (NEI) could be evidence of program influence or the absence of it. Absence of them could be seen as elevating the importance of an incentive, for example, the presence of them combined with a low impact on the payback time by the incentive could indicate a lack of program influence. Documentation of NEIs is generally expected to grow in importance in the future.

9 Appendix A.1 – Two Examples of Accelerated Replacement/Normal Replacement Assessment Questionnaires from Other Research

From the 2010 – 2012 Nonresidential Downstream Lighting Impact Evaluation Report, Appendix G:

“Approximately how old was the equipment that were removed and replaced with &Prgm_LT1_Desc?”

1. Less than 5 years old
2. Between 5 and 10 years old
3. Between 10 and 15 years old
4. More than 15 years old

“How would you describe the condition of the lighting equipment that was removed and replaced as a result of the installation of &Prgm_LT1_Desc? Would you say it was...”

- 1 In poor condition
- 2 Fair condition, or
- 3 Good condition

“Approximately what percentage of the lighting equipment that was removed and replaced was broken or not working prior to installing &Prgm_LT1_Desc?”

“How many more years do you think your lighting system would have gone before failing and required replacement?”

“If the program had not been available, what is the likelihood that you would have done this project at the same time as you did?”

“If the program had not been available, how likely is it that you would have replaced your existing equipment within one year of when you did?”

- 1 Definitely would have
- 2 Probably would have
- 3 50-50 chance
- 4 Probably not
- 5 Definitely not

“There are usually a number of reasons why an organization like yours decides to participate in energy efficient programs like this one by installing energy efficient lights. In your own words, can you tell me why you decided to participate in this program?”

- 1 To replace old or outdated lighting equipment
- 2 As part of a planned remodeling, build-out, or expansion
- 5 Had process problems and were seeking a solution

- 6 To improve lighting equipment performance
- 8 To comply with codes set by regulatory agencies
- 10 To comply with company policies regarding regular lighting retrofits or remodeling

Now using this scale please rate the importance of each of the following in your decision to implement the MEASURE at this time.

- N3a. The age or condition of the old equipment (Corresponds to A₃ = 1)
- N3j. Standard practice in your business/industry (Corresponds to A₃ =10)
- N3m. Corporate policy or guidelines (Corresponds to A₃ =10)
- N3o. To improve your overall quality of lighting (Corresponds to A₃ = 5 or 6)
- N3p. Compliance with state or federal regulations or standards such as Title 24 (Corresponds to A₃ = 8)
- N3r. Compliance with your organization's normal remodeling or lighting replacement practices (Corresponds to A₃ = 2 or 10)

From the HVAC Early Retirement Questionnaire in
ER Customer Questionnaire To SCE 22Aug2016.xlsx.

Rubric	Questions
1	<p>The primary consideration for replacing this HVAC equipment is to increase reliability and decrease current maintenance concerns for this equipment.</p> <p>Strongly Agree Agree Neither agree nor disagree Disagree Strongly Disagree</p>
2	<p>The units being replaced are operating and we would normally retain them in service for at least 3 years.</p> <p>Strongly Agree Agree Neither agree nor disagree Disagree Strongly Disagree</p>
3	<p>My company had allocated budget and/or scheduled the replacement of this equipment.</p> <p>Strongly Agree Agree Neither agree nor disagree Disagree Strongly Disagree</p>
4	<p>The financial incentives, information, recommendations, and support received has accelerated the decision of this unit replacement by</p> <p><1.5 years ≥ 1.5 but < 3 years >3 years No Plan Unknown</p>
5	<p>Would you have installed the exact same program qualifying equipment without the SCE Early Retirement Program financial support?</p> <p>similar efficiency lower efficiency Higher efficiency repaired existing Done nothing</p>
<p>Scoring Instructions</p> <p>Add up the total score using the following points:</p> <ul style="list-style-type: none"> • Bold blue = 2 • Non-bold blue = 1 • Black = 0 • Non-bold red = -1 • Bold Red = -2 	
<p>A 0 or positive score is demonstrates “preponderance of evidence” (POE) and shows that the project may claim early retirement. A negative score means the project does not meet POE and may not claim early retirement.</p>	
<p>Additional Information</p> <p>Each answer in bold blue will mitigate any answer in bold red. Each answer in non-bold blue will mitigate any answer in non-bold red. (The “Agree” and “Disagree” words are in non-bold font while the “Strongly” phrases are bolded)</p>	

Appendix C: Stakeholder Engagement

Appendix C: Stakeholder Engagement

The following documents are included in this Appendix:

- Call-In and In-Person Participation Matrix
- Example of a prompt with previous comments noted (Straw-dog Measure Baseline Assignment Guidance, Nov 3)
- SurveyMonkey Summary (Nov 14)

T1WG Attendance Record

Full Name	Stakeholder Group	Organization	11/30 (Final Workshop)	11/22	11/15	11/8	11/1	10/25	10/20	10/12 (Public Kickoff)
Andrew Meiman	Implementer	Arc Alternatives		Yes	Yes	Yes	Yes			Phone
Anne Arquit Niederberg	Implementer	Enervee							Yes	
Annette Beitel	Other Organization	CalTF	Attended	Yes					Yes	Attended
Athena Besa	PA	SDG&E		Yes			Yes	Yes	Yes	
Ayad Al-Shaikh	Implementer	CLEAResult	Attended	Yes	Yes	Yes	Yes	Yes	Yes	Phone
Brian Maloney	PA	SCE	Attended	Yes	Yes	Yes				
Bryan Warren	PA	SCG	Attended					Yes	Yes	Attended
Christie Torok	Commission & Contractors	PUC	Attended	Yes	Yes	Yes	Yes	Yes	Yes	Attended
Colman Snaith	Implementer	TRC	Phone		Yes	Yes	Yes	Yes	Yes	Phone
Dan Buch	Advocacy	ORA	Attended	Yes	Yes	Yes	Yes	Yes	Yes	Attended
David Paton			Attended							Phone
Elsia Galawish	Implementer	Galawish Consulting				Yes	Yes		Yes	Phone
Eric Eberhardt	Universities	University of California Office of the President	Attended		Yes					Phone
Erin Martin	PA	PGE	Attended				Yes	Yes		Attended
Fabio Mantovani	PA	PGE							Yes	
Halley D Fitzpatrick	PA	PGE	Attended	Yes		Yes	Yes	Yes	Yes	Attended
Jake Oster		EnergySavvy								
James Hanna		Energy Solutions	Attended	Yes	Yes	Yes	Yes			
James Liu	PA	PGE	Attended	Yes	Yes	Yes	Yes		Yes	Attended
Jeff Guild	Implementer	Enovity	Phone	Yes		Yes	Yes			Phone
Jeff Hirsch	Commission & Contractors		Attended	Yes	Yes	Yes	Yes	Yes	Yes	Attended
Jesse B Emge	PA	SDG&E		Yes			Yes		Yes	
Jesus Preciado	Implementer	CLEAResult	Attended		Yes	Yes	Yes		Yes	
Jonathan W. Stage	Implementer	Newcomb Anderson McCormick		Yes	Yes					
Joseph St. John	Implementer	DNVGL							Yes	Phone
Josiah Adams	Implementer	Ecology Action	Attended	Yes	Yes	Yes	Yes			
Karen Maoz	Implementer	DNVGL	Attended	Yes			Yes	Yes		
Katherine Hardy	Commission & Contractors	PUC							Yes	
Katie Wu	Commission & Contractors	PUC	Attended	Yes	Yes	Yes	Yes		Yes	Attended
Keith Rothenberg	Commission & Contractors	Energy Metrics	Attended							Attended

T1WG Attendance Record (continued)

Full Name	Stakeholder Group	Organization	11/30 (Final Workshop)	11/22	11/15	11/8	11/1	10/25	10/20	10/12 (Public Kickoff)
Kellie Smith	Policy Director	California Energy Efficiency Industry Council	Attended							
Kevin Madison	Commission & Contractors	Madison Engineering	Phone		Yes	Yes		Yes	Yes	Attended
Kira Kimick	Other Organization	CEEIC								
Lara Ettenson	Advocacy	NRDC					Yes			
Les Owashi	Other Organization	DNVGL	Attended							
Margie Gardner	Advocacy	CEEIC					Yes	Yes	Yes	Attended
Mark Reyna	PA	SCG	Attended	Yes	Yes	Yes		Yes	Yes	Attended
Melanie Gillete	Other Organization	CEEIC	Attended	Yes	Yes	Yes	Yes			
Milena Usabiaga	Implementer	Nexant					Yes	Yes		
Mushtaq Ahmad	Implementer	Nexant	Attended	Yes	Yes	Yes		Yes		
Nick Brod	Implementer	CLEAResult	Attended							
Nikhil Gandhi	Commission & Contractors	Strategic Energy Technologies	Phone	Yes	Yes	Yes	Yes	Yes		Phone
Paden Cast	PA	SCG	Attended	Yes	Yes	Yes	Yes	Yes		Attended
Paul Pruschki	PA	SDG&E								
Peter Ford	PA	SDG&E		Yes	Yes	Yes		Yes		
Peter Lai	Commission & Contractors	PUC	Phone	Yes		Yes				Phone
Peter Miller	Advocacy	NRDC							Yes	Attended
Priscilla Johnson	PA	PGE					Yes			
Rafael Friedmann	PA	PGE	Attended			Yes	Yes		Yes	
Rich Sperberg	Implementer	Onsite Energy	Attended	Yes		Yes		Yes	Yes	Attended
Rod H Houdyshel	PA	SDG&E	Phone	Yes	Yes		Yes	Yes	Yes	
Sabarish Vinod	Implementer	Lincus	Phone							
Scott Higa	PA	SCE								
Scott Mitchell, J.D., P.E.	PA	SCE	Attended	Yes	Yes	Yes	Yes	Yes	Yes	
Sean Harleman	Implementer	kW Engineering			Yes	Yes				Phone
Sepideh Shahinfard	Commission & Contractors	Cadmus	Attended	Yes	Yes	Yes	Yes	Yes	Yes	Attended
Spencer Lipp	Implementer	Lockheed Martin	Attended	Yes	Yes	Yes	Yes	Yes	Yes	Attended
Tim Melloch	Implementer	TM EE Consulting			Yes	Yes				
Tim Xu	PA	PGE	Attended			Yes			Yes	Attended
Yang Hu			Attended							
Yeshpal Gupta	Implementer	Lincus	Attended	Yes		Yes	Yes	Yes		Phone
			40	30	27	32	31	24	29	31

**Your Name and Organization:**

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Directions

This document proposes a measure-level assignment process, the associated installation type definitions and measure-level assignments for measure types. These will be incorporated into a final “Measure Baseline Assignment Guidance Document” (Baseline Guidance). The Baseline Guidance will be the ‘living’ document supplanting the “Early Retirement Using Preponderance of Evidence” document of July 2014. The Baseline Guidance and a T1WG Report will be referenced by a CPUC Staff resolution to be submitted to the Commission and for public review in December.

The review milestones for this document include the following:

- November 11, COB initial comments.
- November 15 call-in meeting. The meeting will focus on key areas of any disagreement. This will include any additional comments received through November 11.
- November 27, distribution of the draft Baseline Guidance and T1WG report.
- Nov 30/Dec 1 (TBD) – in person workshop to finalize the drafts
- Dec 7, delivery of report to CPUC

We accept comments throughout this period. However, it is helpful for the WG to identify key points of potential conflict early, so more general comments can be useful earlier, while refinements to the language can be provided later.

Please use tracked edits to make your suggested revisions and comments.

Organization of this Document

Sections 1 through Sections 6 address content that will be incorporated into the Baseline Document.

- Section x.0 of each section is the text and figures that would be directly incorporated into the Baseline Document.
- Section x.2 is a discussion of the rationale for Section. Section x.3 summarizes formal written comments provided by members of T1WG.

There are two appendices to this document:

- Appendix A: Summarizes discussions about other terms in Table 1, but beyond the scope of the T1WG.
- Appendix B: The last section of this document includes citations of Decisions, white papers, and guidance documents.



SECTION 1: TABLE 1 BASELINE ASSIGNMENT

1.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

Measures are assigned the baselines as instructed in Table 1, applying the footnotes in numerical order until a positive response is reached. The definition of the installation type is provided in other sections of this document.

Table 1 - Decision 16-08-019 Table 1 Annotated

Alteration Type	Delivery	Savings Determination	Installation Type Categories			
			Shell & Bldg System ⁸ and Add-On Equipment ⁷	Behavioral, Retro-commissioning, and Operational ⁶	Normal replacement ⁹	Accelerated replacement and repair eligible ¹⁰
New construction, expansions, added load¹	Any	Any	Code [†]	N/A	Code [†]	N/A
Existing buildings, including major alterations²	Upstream ³ & Midstream ³	Any	Code [†]	N/A	Code [†]	N/A
	Downstream	Calculated	Existing	Existing	Code [†]	Dual
		Deemed ⁴	Existing	Existing	Code [†]	Dual
		NMEC	Existing ⁵	Existing ⁵	Existing, Program Designed ⁶	N/A
		RCT/ Exper ⁵	Existing	Existing	Existing	N/A
Non-building projects, including industrial and agricultural processes	Any	Any	Existing (Add-On Equipment only)	Existing	Code [†]	Dual

1. Is the measure part of new construction, per definition? If yes, use a code baseline.
2. Is the measure part of a tenant improvement in an existing building, per definition? If yes, use a code baseline.
3. Is the measure delivered through an upstream or midstream delivery mechanism? If yes, use a code baseline.
4. Is the measure delivered through an NMEC, RCT, experimental delivery method? If yes, use an existing baseline.
5. Is the measure delivered through a BRO program? If yes, use an existing baseline as qualified by program design.
6. Is the measure a retrofit add-on, per the definition? If yes, use an existing baseline.
7. Is the measure a building S&BS measure, per the definition? If yes, use an existing baseline.
8. Is a deemed savings value used to define the measure’s savings claim? If yes, reference the workpaper for baseline.
9. Is the measure a normal replacement, per the definition? If yes, use a code baseline.
10. Does the measure meet the POE standards for ER or RE, per the definitions? If yes, use a dual baseline. If no, use a



† A **code** baseline in this context refers to the California energy efficiency building code, where a building code applies; or if there is no building code by federal, California, or other regulatory standards where they may apply; or if there are no codes or standards by industry standard practice.

1.1.1 Baseline assignment treatment

The baseline assignment dictates calculation methodologies as described in the following sections.

1.1.1.1 Treatment of Code Baseline Measures

Measures assigned a Code baseline use a single Code baseline for the effective useful life of the measure. A Code baseline in this context refers to the California energy efficiency building code, where a building code applies; or if there is no building code by federal, California, or other regulatory standards where they may apply; or if there are no codes or standards by industry standard practice.

The EUL used for lifetime savings estimates is defined in DEER or, if not in DEER, in custom project documentation.

The measure cost is the incremental cost difference between the high efficiency equipment cost and Code-standard equipment cost.

1.1.1.2 Treatment of Existing Baseline Measures

Measures assigned an existing baseline use a single existing baseline for the effective useful life of the measure.

The EUL used for lifetime savings estimates is defined in DEER or, if not in DEER, in custom project documentation with these exceptions:

- The EUL of the REA measure is the lesser of the EUL of the add-on component or the RUL of the host system. The EUL of the add-on component is defined in DEER or, if not in DEER, in custom project documentation.

The measure cost is the full installed cost of the high efficiency equipment equipment.

1.1.1.3 Treatment of Dual Baseline Measures

Measures that meet the evidentiary standards for repair eligible are assigned a dual baseline. A dual baseline uses the existing conditions for the RUL of the measure and Code for the second baseline for the length of the second period (EUL – RUL).

A Code baseline refers to the California energy efficiency building code, where a building code applies; or if there is no applicable building code by federal, California, or other regulatory standards where they apply; or if there are no codes or standards, by industry standard practice. The second period Code baseline should reflect any approved Code changes which are scheduled to be in effect at the conclusion of the RUL period.

The EUL used for lifetime savings estimates is defined in DEER or, if not in DEER, in custom project documentation.

The RUL is calculated as one-third the EUL by default unless site specific documentation supports an alternative RUL.

The measure cost, for a measure using a dual baseline, is the full cost of the energy efficiency measure minus the net present value of the Code equipment installed at the end of the RUL.



1.1.1.4 Special treatment of repair eligible measures

To be added.

1.2 DISCUSSION

The Decision (page 49) references a program-level table on baseline policy by alteration type and installation type, and states that this table is the basis of assigning measure-level baselines.

The Working Group explored different options to systematically assigning baselines to measures, using methods such as a decision tree that incorporates the considerations delineated in the table. As we feel one objective of the Decision was to not overly complicate baseline assignment, we recommend building upon the simplicity of the Decision’s Table 1 with a set of considerations to be addressed in a specific order via the footnote numbering in our proposed measure-level table below.

1.3 COMMENTARY

Comments related to format of the Working Group’s recommendations on measure-level baseline assignment are presented below, along with a summary of the comment’s incorporation in this document.

Stakeholder suggested language or comment	Result
Is an order-of-operations or a decision tree a feasible approach to systematically assigning baselines to groups of measures? If no, what are some alternatives you suggest?	
Spencer Lipp, Lockheed Martin: Yes...as long as the differentiations are well defined. I would also suggest a couple of examples that show some of the key parameters in the measure determination with this decision tree.	A variety of illustrative examples have been added to definitions and rationale throughout this document.
Halley Fitzpatrick, PGE: Yes, there would be some order of operations. The depth of the decision tree is too deep as presented in the prompt. PG&E would propose these three A. Table 1* B. Measure list* C. Then additional documentation as appropriate for measure group (C/E, PoE, RE documentation) *measure list or measure group category definitions should include sector and or customer factors, if determined appropriate	This document reduces the depth of the previous strawman decision tree and relies more on Decision Table 1. Additional documentation, addressed in Sections 8 and 9 of this document, will also be thoroughly addressed in future PoE discussions and the eventual guidance document.
Mushtaq Ahmad, Nexant: The overarching criteria for assigning baselines should be what is laid out in Table 1 and if are going the decision tree route, that tree should reflect Table 1.	This draft document now closely reflects Table 1.
Scott Mitchell, SCE: SCE believes the baselines should generally known/assigned in advance for all common measures. A decision tree would be helpful but should only be used for one-off or unconventional projects.	Installation type and delivery model constricts the number of measures assigned a baseline without reservations.
Rich Sperberg, Onsite Energy: I also wanted to point out that the	Installation type and delivery



<p>comprehensive measure list is not static, but is a living, changing list with new measures and changing application of technology (especially in the Industrial Sector), so I would discourage us from trying to categorize baselines for each measure. There also needs to be a clear transition from measures that were applicable to previous policy and those measures that would apply to the new Decision policy.</p>	<p>model constricts the number of measures assigned a baseline without reservations.</p>
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SECTION 2: NEW CONSTRUCTION

2.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

The New Construction (NC) category includes new equipment that has been installed in any one of the following:

- a) New building projects wherein no structure or site footprint presently exists
- b) Addition or expansion of an existing building or site footprint
- c) Equipment installed to change the capacity of existing systems due to changes in new load handling requirements.

2.1.1 Clarification

None.

2.1.2 Rules

None.

2.1.3 Example

Please offer.

2.1 MEASURES IN THIS CATEGORY

There are no measures that are exclusively new construction.

2.2 DISCUSSION

This definition is a synthesis of previous definitions proposed in the POE Guidance Document¹, consistent with Savings By Design Handbook² definitions, and suggestions in comments.

There are two areas of concern: Tenant Improvements and Process Expansions:

Tenant Improvement. A tenant improvement (also called a tenant build-out or tenant fit-out) is a common practice of renovating spaces to meet the needs of a new tenant and that improvement usually triggers a code event requiring the alterations to meet building code. This is addressed as a separate definition.

Reviewers: should it be incorporated into the new construction definition?

Industrial Process Expansion. The Decision states that “new construction will be defined to include any expansion or addition of substantial load to an existing facility”. Based on that language, a plant that produced additional product at reduced electric or thermal load would not be considered new construction and the demonstrated savings would be eligible for early replacement consideration. The Decision definition focuses on facility load, and not production efficiency, however. Given that direction, a plant

¹ <http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5325>

² <http://www.savingsbydesign.com/sites/default/files/imce/2016-SBD-Participant-Handbook%20-FINAL%20%28002.1%29.pdf>



that increased the efficiency of production by 10%, but also increased the number of units produced by 10%, would not result in any savings.

Other jurisdictions follow other protocols which allow for concurrent production efficiency and in units of production increases using a mix of existing and ISP baselines for portions of the production. The WG report can include a description of those protocols in the record.

2.3 COMMENTARY

The intention largely reflects a proposal by PG&E.

Stakeholder suggested language or comment	Reasoning for disposition
<p>Rich Sperberg, Onsite Energy Corp.: Increased capacity retrofits should be clarified. Some industrial energy efficiency projects are completed that increase the efficiency of the base system, but also have the capability of increasing capacity. The savings from these retrofits should use existing baseline for the base capacity.</p>	<p>See previous section.</p>
<p>Spencer Lipp, Lockheed Martin: Maybe not incredibly important but this definition does cross multiple programs. A new building or gut rehab is New Construction program or Savings By Design but an increase in capacity to an existing system is a retrofit program. I don't really have any concerns about this definition.</p>	<p>See previous section.</p>
<p>Scott Mitchell, SCE: Only if it fits into definition of "new construction, expansion, or added load." Otherwise, it fits in the "Existing buildings, including major alterations: row. The tenant fit out distinction was specifically removed in the decision (sec 3.7) because of the difficulty defining this sector.</p> <p>Main criteria: Does it invoke Title 24?</p>	



SECTION 3: TENANT IMPROVEMENT (TI)

3.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

The Tenant Improvement (TI) category includes new equipment installed in an existing space to meet the needs of a new tenant or owner or to meet the needs of an existing tenant or owner with changes in occupancy or space use.

3.1.1 Clarification

The tenant improvement installation type defined in this document is not intended to reflect or to determine specific code treatment required for any particular projects. The term is solely intended to be used as a straightforward method for assigning projects a baseline.

In those situations where an existing space is renovated while maintaining the existing occupancy and space use, the installation type need not be treated as new construction for the purposes of baseline assignment.

3.1.2 Rules

The change in occupancy noted in item d) is intended to reflect changes in occupancy of 20% or more that are reflected in the design of the space and not intended to reflect normal fluctuations in the number of employees assigned to a space in any period of time.

3.1.3 Example

Consider an existing space that is used for offices for 20 occupants within in a larger building. Table 2 summarizes the resulting baseline treatment under various scenarios.

Table 2. Example Scenarios Illustrating Baseline for Space/Occupancy Variations

New Space Use	New Occupants	Tenancy	Baseline
Office space	10	Old tenant remains	Code
Office space	20	Old tenant remains	Existing
Office space	30	Old tenant remains	Code
Office space	20	New tenant	Code
Laboratory/storage	20	Old tenant remains	Code
Office space, added sqft	20	Old tenant remains	Code

3.1.4 Measures in this Category

There are no measures that are exclusively tenant improvement measures.

3.2 DISCUSSION

A tenant improvement (also called a tenant build-out or tenant fit-out) is a common practice of renovating spaces to meet the needs of a new tenant and that improvement usually triggers a code event requiring the alterations to meet building code.



Decision 16-08-019 3.6, in reference to major alterations, notes an intention to avoid “set[ting] a different standard [from code] and create additional criteria to complicate matters” and that “in code ... major alterations are activities that happen in existing buildings so we will not reclassify them to be included in new construction [alteration type category].” This does not imply that all major alterations are not to be treated as if code does not exist, but simply that code also regulates renovations in existing buildings therefore there is no need to falsely include that activity in New Construction. The Decision also rejected complicated or ambiguous criteria (Class A office space, etc.) for delineating projects that can use an existing baseline and those that use code.

There was general WG agreement that an existing baseline is not appropriate for a tenant improvement. However, AB802 is seeking to encourage the replacement existing systems, lighting systems in particular, that have resisted turn-over. The conundrum is in how to distinguish between a tenant improvement and a high value energy efficiency measure, where both may entail the replacement of similar equipment. The criteria for the distinction needs to be unambiguous and use verifiable and reasonably gathered data.

The approach of using more observable criteria: use of space, number of occupants, and tenancy should make this a more straightforward application.

3.3 COMMENTARY

The intention largely reflects a proposal by PG&E.

Stakeholder suggested language or comment	Reasoning for disposition
Halley Fitzpatrick (on behalf of Erin Martin) for PG&E: The New Construction (NC) category includes new equipment that has been installed in a newly constructed area or an area that has been subject to a major expansion or, or equipment installed to increase the capacity of existing systems due to existing or anticipated new load handling requirements, or equipment installed in an existing space to meet the needs of a new tenant, changing occupancy, or space use.	The definition is similar, but uses the SBD bullet format. SBD terminology was adopted where it was more specific (a and b).
PG&E: Existing space example: an existing 5000SF office space with ~20 occupants is: <ol style="list-style-type: none"> 1) reconfigured/upgraded office for use by ~10 occupants: New construction 2) a reconfigured/upgraded office for use by ~30 occupants: New construction 3) reconfigured/upgraded office for use by ~20 occupants with the same tenant or owner : NOT New construction 4) reconfigured/upgraded office for use by ~20 occupants with a new tenant or building owner: New construction 5) converted to a laboratory: New Construction 6) converted to a storage area: New Construction 7) expanded to 6000SF: New Construction 	Example was presented as a table. Reviewers should consider which method (list or table) conveys the information with the most clarity.



SECTION 4: SHELL & BUILDING SYSTEMS

4.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

A shell and building system (S&BS) is equipment that is expected to maintain essential building services throughout the course of a building's life cycle without regular maintenance or replacement.

Alternative:

A shell and building system (S&BS) is equipment that does not require replacement or repair to maintain essential building services.

4.1.1 Clarification

Lighting fixtures are not subject to failure, do not require maintenance, and are required to maintain the essential service of lighting. Lamps and ballasts can be replaced indefinitely as they individually fail. Therefore the lighting system (fixtures, lamps, ballasts, and controls) and the subsystem (ballasts *and* lamps and controls) are each considered building systems. Individual lamps or ballasts do not qualify as building systems, nor do lighting controls alone qualify as building systems.

Insulation of walls and pipes, windows, and ducts maintain essential building conditioning and are expected to last through the building life cycle without regular maintenance or replacement. This equipment is considered a building system. A roof is expected to be repaired or replaced during the building life cycle and is not considered a building system.

Mechanical and electrical equipment can be expected to be replaced or repaired during the building life-cycle (i.e. boiler, chillers, pumps, air-handlers, motors, **controls**) in order to maintain essential building services and are categorized as other installation type measures.

4.1.2 Rules

These measures may be treated as a normal replacement at the discretion of the applicant.

4.1.3 Examples

Reviewers, please suggest examples.

4.2 MEASURES IN THIS CATEGORY

See the companion spreadsheet.

4.3 DISCUSSION

The Working Group had difficulty articulating what was intended to be included in the S&BS category. This category, along with Repair Eligible, is expected to unlock the savings potential previous policy may have discouraged.

There was a general agreement that this class of measures was intended to include equipment that is “behind the walls” (insulation, ducts, pipes) or part of the building structure (windows and fixtures). The Working Group generally agreed that the replacement of HVAC systems, like boilers and chillers did not belong in this category, nor did lamp only replacements. There was also general agreement that the simultaneous replacement of lamps and ballasts was in this category and should use an existing baseline, except for tenant improvement scenarios where Code applies.

The Baseline White Paper had included controls and EMS as S&BS measures, where it was implied that this equipment can fail and the building can function without them. Controls are typically designed to fail



safe, which means the equipment continues to provide essential building services, but use more energy than necessary (like failed economizers or VFDs set in bypass mode). But it was also noted that controls do not necessarily fail safe. EMS and controls require regular maintenance to maintain essential services. Including controls introduces considerations of maintenance practices, since all but the simplest controls are expected to have regular maintenance. Finally, controls are not expected to remain in place for the life of the building, as might be expected for insulation, for example.

This installation type was noted as particularly requiring clarification by commenters. The previous POE Guidance document was a target of proposed revisions and extensive commentary.

4.4 COMMENTARY

Stakeholder suggested language or comment	Reasoning for disposition
<p>Halley Fitzpatrick (on behalf of Erin Martin) for PG&E. Agree to including in scope: however PG&E [believes’ separating “Shell” from “Building system” is not in scope nor advised by PG&E. PG&E suggests maintaining “Shell and Building System” as a single term/category as intended by the ED Staff Whitepaper and Decision.</p>	<p>The two were combined.</p>
<p>PG&E. Shell and Building System (S&BS) measures directly impact building energy systems and are typically expected to remain in place over the course of a building’s operation, absent a change in occupancy, expansion, or other major alteration. These measures tend not to be routinely replaced and often remain in operation past their effective useful life. S&BS measures use a single existing condition baseline and full cost of the energy efficiency measure. Existing S&BS equipment RUL defaults to its EUL (e.g. Insulation EUL = 20, RUL =20).</p> <p>Measures that may be classified as SB&S are still eligible and in some cases may be better suited to be classified as Normal Replacement. For example deemed workpapers that are prepared as normal replacement or ROB, may continue to do so as appropriate and/or until workpapers or processes are updated to account for the new baseline. Another example could be if there is damage to a building that requires certain SB&S measures are replaced, the installed measures would be classified as Normal Replacement (and use a code baseline).</p> <p>See above. By virtue of a building system’s definition, it is inextricably linked to the Shell and this category should therefore be combined with the above.</p> <p>Also virtually everything “can fail” and the note about “consuming more energy” is confusing... is that the failure mode? Many technologies slowly degrade in performance over time</p>	<p>“absent a change in occupancy, expansion, or other major alteration”</p> <p>The phrase was not included since the new construction definition reflects this language.</p> <p>“often remain in operation past their effective useful life”</p> <p>The phrase was not included since extended life is not a requirement for this category and might be confused with repair eligible.</p> <p>“Existing S&BS equipment RUL defaults to its EUL (e.g. Insulation EUL = 20, RUL =20). “</p> <p>With a single baseline, an RUL is not necessary so is not noted.</p> <p>Added language to allow normal baseline treatment.</p>



<p>Scott Mitchell, Southern California Edison. Perhaps call this Building Shell System which includes the structure and measures as described.</p> <p>Building system is commonly understood to mean a group of components that achieve a high level purpose. Examples include:</p> <p>Building Shell (incl structure and envelope), Lighting System (incl. equipment and controls), HVAC System (incl. equipment and controls), Water System, Life Safety System, etc.</p> <p>If this definition is used, it is not clear how the building systems (e.g. lighting systems) would be differentiated from the components (e.g. luminaries. This needs to be very clear. For instance if 25% of the ballasts fail, has the lighting system failed or lighting components?</p>	<p>With this definition,</p>
<p>Melanie Gillette, on behalf of CEEIC: It is CEEIC’s position that all these measures should be Existing Condition unless there’s rationale for why they should not be – this gets to our previous comment that Existing Condition should be the default; it feels like we are coming at this backwards</p>	<p>That is largely the intention.</p>
<p>Rich Sperberg, Onsite Energy Corp. This should be clarified</p> <p>The requirement that “Such a component must not be able to operate on its own” should be re-visited. Some system improvements, where additional equipment is added to the system (e.g. an additional chiller or compressor) to increase the system efficiency, should qualify for REA.</p>	<p>See the definition.</p>
<p>Mushtaq Ahmad/Milena Usabiaga – Nexant, Inc.</p> <p>Yes, this should be included in the scope. Current definition of REA measures is opened to different interpretations, creating inconsistencies and delays for project approval. Due to the complexity of POE and getting approval for early retirement is extremely difficult at this moment, REA is becoming more common which is causing even greater scrutiny on these projects and further elongating the extremely long review timelines at the utility and at CPUC (if picked for EAR).</p> <p>This definition is not clear and creates issues when applying this definition to real life projects. Replacing equipment that does not use energy (e.g. pipes, nozzle) should be classified as retrofit add on, because they are improving the overall efficiency of the systems and they don’t operate on its own.</p>	<p>“Replacing equipment that does not use energy (e.g. pipes, nozzle) should be classified as retrofit add on”</p> <p>Adding pipe insulation in a non-building sector would fall in this category.</p> <p>Replacing existing nozzles and pipes would not in a non-building would not, since they are replacements, not additions. It appears that you agree with the classification, but POE is too difficult.</p>
<p>Halley Fitzpatrick (on behalf of Erin Martin) for PG&E. The Retrofit Add-on category includes measures that involve new equipment that is installed</p>	<p>Definition used with some edits.</p>



<p>onto an existing system with the purpose of increasing the system’s operational efficiency. The existing host system must be able to provide service without the add-on component, and the add-on component must not be able to provide an equivalent level of service without the host system. The EUL of REA measures is the lesser of the add-on component and then RUL of the host system.</p> <p>Note: PG&E would like to add a clear path for “pony” type equipment within the REA category. The only thing that was preventing it there before was a “cannot operate on its own” requirement. The language above is an attempt to that.</p>	
<p>Scott Mitchell, Southern California Edison. Add to the definition: The existing system must be able to function without the new equipment.</p> <p>The language highlighted [a substitution of a pre-existing add-on component] must be revised. If replacement of any existing equipment or component occurs, REA is off the table and the project must claim another install type.</p> <p>How is life of the system with REA determined?</p>	<p>See Baseline Treatment.</p>
<p>Spencer Lipp. This should be in the scope of this effort. A definition that is clear without interpretation is important.</p> <p>The “primary purpose to improve the overall efficiency of the system” is the challenging language here. HVAC controls is an example. What does that mean and who determines that? Let’s look at a VFD on a pump that replaces a throttling valve. The throttling valve is a flow control device. So, is the VFD’s primary purpose a flow control of to improve efficiency? This is where we get caught on semantics. The impacts are critical as if it cannot be REA then we have to determine what ISP is for the baseline.</p> <p>If there are some existing controls, is that a NR/ER project? I would say it is a replacement of a pre-existing add-on component. However, I’ve seen this be forced into NR.</p>	
<p>Scott Mitchell SCE Responses:</p> <ol style="list-style-type: none"> 1. If the equipment is not functioning and could be repaired (as described), the baseline should be its performance should the repair be carried out (“Repaired and restored” at 77% CE). <ol style="list-style-type: none"> a. What is definition of repair eligible? From the staff white paper it appears to be equipment where “saturation studies indicate a significant percentage remains in use well past its expected useful life.” Factors to be proven by POE include: <ol style="list-style-type: none"> i. burned-out or highly degraded ii. individual equipment being replaced could otherwise be repaired iii. cost of repair would have been less than 50% of the replacement cost 	



<p>including all necessary costs (e.g. building modifications required to remove a large boiler from the basement)</p> <p>b. The definition implies that there is an established list of equipment that qualifies as repair-eligible. Who is responsible for creating and maintaining that list?</p> <p>2. If documentation on the particular equipment is available, that information can be used. If it is not available, the repair eligible equipment list described above, should list efficiency degradation and lifetimes to be used for each type of equipment.</p> <p>a. For example, boiler efficiency started at 75% and degrades at 0.5% per year. A tube replacement increases efficiency by 5% from existing condition (as calculated using the degradation rate and age of the equipment). A burner replacement increases efficiency by 3% from existing.</p> <p>i. For a 10 year old boiler, the baseline would be 70% (constant, non-degrading over time) and a burner replacement would kick it back up to 73%.</p> <p>b. While not entirely precise for every project, this methodology will provide a balance between reasonable average savings values, cost of implementation, and ease of calculation/documentation.</p> <p>3. As stated in the example above, SCE believes the baseline efficiency should be estimated based on a degrading performance, but savings should be calculated with a constant baseline.</p> <p>4. EUL for the replacement boiler should be the non-capped true EUL of the boiler population. RUL should be ½ of the EUL.</p> <p>5. If the equipment is operating and could be repaired with new components, it should be early retirement and the baseline should be “existing operation” at 72%.</p> <p>a. [Early retirement and repair eligible occupy the same cell of Table 1, so should be treated the same.]</p>	
<p>In reference to specific measure assignments to S/BS and REA:</p>	
<p>Spencer Lipp, LM: Why is one VFD measure included but other VFD measures are not?</p>	
<p>Insulation appears multiple times, can we simply say any insulation?</p>	
<p>Scott Mitchell, SCE: This depends on the definition of “shell/building systems”, which has not been resolved. Generally, anything replacing lighting fixtures would be more of a Lighting System replacement as they are not normally replaced often. Replacement of lamps seems to be more of a normal replacement (if on burnout) or accelerated replacement. Ballast replacement is along the same lines, but with different life spans</p>	<p>See revised definition and rationale.</p>



than lamps.	
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SECTION 5: ADD-ON RETROFIT (REA)

The Retrofit Add-on is a measure in any sector installed onto an existing host system or as an upgrade for an existing add-on component. The existing host system must continue as the primary service equipment for the existing load and be able to fully serve and service the existing load at all times without the add-on component.

5.1.1 Clarifications

None.

5.1.2 Rules

None.

These measures may be treated as a normal replacement at the discretion of the applicant.

5.1.3 Examples

REA#1: Adding a VFD/VSD to an existing motor in a pumping system is normally an add-on retrofit even when this may involve replacement of a portion of the controls and/or inverter duty motor to be able to implement the VFD/VSD primary function. The measure EUL is limited by the RUL of the pumping system to which the variable speed drive was added

REA#2: Adding lighting controls to an existing lighting system will be classified as an add-on retrofit if it involves replacement of a simple on/off switching control, whereas replacing or upgrading an existing central or automated lighting control system with a new one, with no other lamp and ballast changes, will be considered a normal replacement or early retirement.

REA#3: System tuning and system optimization not involving equipment replacement, except in some limited cases of non-critical or minor component upgrades, will normally be classified as retrofit.

REA#4: A 20-story office building will primarily house “9-to-5” tenants but one floor will be devoted to a 24-hour call center. A smaller-capacity “pony” chiller is installed to serve that relatively small but constant cooling load. By operating the pony chiller overnight when all but one floor of the building is largely vacant, operation of a much larger chiller, along with its associated chilled water pump, condenser water pump, and cooling tower, is avoided. The larger building chiller has the capacity to serve the call center space.

5.1 MEASURES CATEGORY

See the companion spreadsheet.

5.2 DISCUSSION

This installation type was noted as requiring further clarifications from a number of commenters. At least two revisions to the original preponderance of evidence definition were circulated prior to the Decision. The Decision’s admonition to simplify and to assume existing conditions as the default has influenced the structure of the definition.

Before proceeding to other issues, it is important to note, that Table 1 in the Decision at least appeared to exclude the non-building measures from an REA classification. There was consensus among all of the stakeholder groups that REA should apply to the non-building sector and that is noted in the definition.

The requirement that the primary purpose of the equipment should be to reduce energy has been dropped. It is implicit in all of the measures that the intention of incentives is to induce customers to reduce energy



use and it is not evident why this installation type requires this redundancy. As noted by the Decision: “We have already addressed the question of potential additional free-ridership from moving to existing conditions baselines by returning to a net goal calculations; this alleviates much of the need to consider detailed concerns ... and allows for a simpler framework”.

The definition reflects specific input as follows from members:

- Include pony measures, which is a smaller capacity unit designed to operate in the off peak period more efficiently than the primary unit is alone. This has been added with a clarification that the host system must remain as the primary service unit and that it has the capacity to serve the load even during peak periods. This should not be a backdoor for adding capacity.

5.3 COMMENTARY

Stakeholder suggested language or comment	Reasoning for disposition
<p>Rich Sperberg, Onsite Energy Corp. This should be clarified</p> <p>The requirement that “Such a component must not be able to operate on its own” should be re-visited. Some system improvements, where additional equipment is added to the system (e.g. an additional chiller or compressor) to increase the system efficiency, should qualify for REA.</p>	<p>See the definition.</p> <p>As long as the existing equipment can serve the load.</p>
<p>Mushtaq Ahmad/Milena Usabiaga – Nexant, Inc.</p> <p>Yes, this should be included in the scope. Current definition of REA measures is opened to different interpretations, creating inconsistencies and delays for project approval. Due to the complexity of POE and getting approval for early retirement is extremely difficult at this moment, REA is becoming more common which is causing even greater scrutiny on these projects and further elongating the extremely long review timelines at the utility and at CPUC (if picked for EAR).</p> <p>This definition is not clear and creates issues when applying this definition to real life projects. Replacing equipment that does not use energy (e.g. pipes, nozzle) should be classified as retrofit add on, because they are improving the overall efficiency of the systems and they don’t operate on its own.</p>	<p>“Replacing equipment that does not use energy (e.g. pipes, nozzle) should be classified as retrofit add on”</p> <p>Adding pipe insulation in a non-building sector would fall in this category.</p> <p>Replacing existing nozzles and pipes would in a non-building would not, since they are replacements, not additions. It appears that you agree with the classification, but POE is too difficult.</p>
<p>Halley Fitzpatrick (on behalf of Erin Martin) for PG&E. The Retrofit Add-on category includes measures that involve new equipment that is installed onto an existing system with the purpose of increasing the system’s operational efficiency. The existing host system must be able to provide service without the add-on component, and the add-on component must not be able to provide an equivalent level of service without the host system. The EUL of REA measures is the lesser of the add-on component and then RUL of the host system.</p> <p>Note: PG&E would like to add a clear path for “pony” type equipment</p>	<p>Definition used with some edits. Pony type equipment qualifies.</p>



<p>within the REA category. The only thing that was preventing it there before was a “cannot operate on its own” requirement. The language above is an attempt to that.</p>	
<p>Scott Mitchell, Southern California Edison. Add to the definition: The existing system must be able to function without the new equipment.</p> <p>The language highlighted [a substitution of a pre-existing add-on component] must be revised. If replacement of any existing equipment or component occurs, REA is off the table and the project must claim another install type.</p> <p>How is life of the system with REA determined?</p>	<p>This requirement is included.</p>
<p>Spencer Lipp. This should be in the scope of this effort. A definition that is clear without interpretation is important.</p> <p>The “primary purpose to improve the overall efficiency of the system” is the challenging language here. HVAC controls is an example. What does that mean and who determines that? Let’s look at a VFD on a pump that replaces a throttling valve. The throttling valve is a flow control device. So, is the VFD’s primary purpose a flow control of to improve efficiency? This is where we get caught on semantics. The impacts are critical as if it cannot be REA then we have to determine what ISP is for the baseline.</p> <p>If there are some existing controls, is that a NR/ER project? I would say it is a replacement of a pre-existing add-on component. However, I’ve seen this be forced into NR.</p>	<p>Like for like will not produce savings, so an upgrade is required.</p>
<p>In reference to specific measure assignments to S/BS and REA:</p>	
<p>Spencer Lipp, LM: Why is one VFD measure included but other VFD measures are not?</p> <p>Insulation appears multiple times, can we simply say any insulation?</p>	



SECTION 6: NORMAL REPLACEMENT

6.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

The Normal Replacement (NR) category includes measure installations where the existing equipment has failed or no longer meets current or anticipated needs or is being replaced due to normal remodeling or upgrading or replacement activities which are expected and undertaken in the normal course of business or ownership.

6.1.1 Clarification

None.

6.1.2 Rules

None.

6.1.3 Examples

Please suggest.

6.1 MEASURES IN THIS CATEGORY

There are no measures that are exclusively tenant improvement measures.

6.2 DISCUSSION

The normal replacement category has not been controversial.

6.3 COMMENTARY

Stakeholder suggested language or comment	Reasoning for disposition
Karen Moaz DNVGL: This needs further definition since NR for one business type, business size, or other demographic group may be different than another.	The WG did not seem to favor further segmentation of the markets for assignment of these types.
Mushtaq Ahmad/Milena Usabiaga – Nexant, Inc. Normal replacement should only account for equipment that has failed. If a critical system of the building, such as a chiller for example, has failed then the measures should be classified as normal replacement. With repair eligible measures being added, the part of the definition which says “end of useful life” becomes irrelevant as many measures will qualify for repair eligible.	<p>“Normal replacement should only account for equipment that has failed.”</p> <p>The Decision has retained the early retirement category and the associated POE for equipment that has not failed.</p> <p>“With repair eligible measures being added, the part of the definition which says “end of useful life” becomes irrelevant”</p> <p>This has been dropped from the definition.</p>
Halley Fitzpatrick (on behalf of Erin Martin) for PG&E. The Normal Replacement (NR) category includes measure installations where the existing equipment has failed or no	This has largely been adopted.



<p>longer meets current or anticipated needs or is being replaced due to normal remodeling or upgrading or replacement activities which are expected and undertaken in the normal course of business or ownership. Normal replacement uses a single standard practice baseline and incremental measure cost.</p>	
<p>Scott Mitchell, Southern California Edison. Is the useful life EUL from DEER or something else?</p>	<p>Noted in Baseline Treatment in Section 1.</p>
<p>Spencer Lipp, Lockheed Martin. How is “end of useful life” determined? The EULs used in our programs are not representative of the equipment operating in the field. This really is the opposite of repair eligible. Perhaps this criteria should be revised as:</p> <ol style="list-style-type: none"> 1) Failed 2) Does not meet service requirements (e.g. HVAC system that can’t meet load) 3) Does not qualify for Repair eligible or Early Retirement 4) Replaced due to normal remodeling, upgrading, or replacement activities 	<p>This has largely been adopted.</p>



SECTION 7: EARLY RETIREMENT (ER)

7.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

The Early Retirement (ER) category includes measure installations where the site specific preponderance of evidence supports that a) the existing equipment could have continued to function and perform its original design intent during the proposed RUL and b) the energy efficiency program activity induced or accelerated the equipment replacement.

7.1.1 Clarification

None.

7.1.2 Rules

Deemed measures define the specific baseline appropriate for this measure as well as POE requirements specific to that measure for establishing early retirement.

REVIEWER NOTE: Evidentiary standards are the next topic for the WG.

7.1.3 Examples

Please provide.

7.2 DISCUSSION

The definition captures the two pronged test required for assigning a measure dual baseline treatment rather than Code treatment, which is the essential distinction of this category.

Note that the second baseline for code is defined as follows:

A Code baseline refers to the California energy efficiency building code, where a building code applies; or if there is no applicable building code by federal, California, or other regulatory standards where they apply; or if there are no codes or standards, by industry standard practice. The second period Code baseline should reflect any approved Code changes which are scheduled to be in effect at the conclusion of the RUL period.

7.3 COMMENTARY

Stakeholder suggested language or comment	Reasoning for disposition
Rich Sperberg, Onsite Energy. This is important, but is dependent on the resolution of the POE issues. This ties closely with the POE discussion.	Agreed and the definitions may be revisited for adjustments after completing the POE.
Mushtaq Ahmad/Milena Usabiaga – Nexant, Inc. The IMC>0 requirement for early retirement should be removed. There are many optimization projects in which an existing system with more equipment is removed and replaced by a more efficient system with less equipment. It is an energy efficiency project because the current system is not failing, it is providing the required service and the shortcoming of that system could not have been	Note: For the purposes of cost-effectiveness calculations, for a dual baseline, the cost of the measure is equal to the installed cost of high efficiency system minus the NPV of the ISP system. In a new load scenario, one might compare the standard practice and the high efficiency scenario. Are you claiming the high



<p>identified without influence from a system level study. However the new system most probably will be less costly as compared to what is installed.</p>	<p>efficiency equipment is cheaper, but the customer would not have known about it without a study?</p>
<p>Scott Mitchell, Southern California Edison. Is RUL officially defined anywhere? DEER defines as 1/3 of EUL, but may need to be better supported.</p>	<p>The concept is defined, but actual data to support current RUL assumptions. Given that paucity of data, CPUC has agreed to the RUL = 1/3 EUL as a default.</p> <p>Primary data collection could result in a change in this practice, although this is beyond the scope of this study.</p> <p>Is there a recommendation to commission a study to more rigorously define these values? If so, how do you see the priority?</p>
<p>Spencer Lipp, Lockheed Martin. This is related to POE. However, I think for consistency, a definition should be agreed upon.</p> <p>I think it might be important to add the preponderance of evidence requirement to the definition and use the definition of this as “more likely than not”.</p>	<p>Added.</p>
<p>Ben Lipscomb, NCI HVAC. We are actually advocating for an exception to the Default Baseline Policy for HVAC installation measures [rightsizing, quality installs]. This baseline would apply in lieu of the code baseline for new construction, upstream and midstream, and downstream normal replacements that don’t use NMEC or RCT/experimental savings. The baseline would recognize that code compliant equipment is generally installed in these scenarios, but that code-assumed efficiencies are not generally achieved by the equipment or the system that they are a part of. This would give programs the opportunity to address the issue. There are many different program approaches that could be employed, and I’m not necessarily advocating for a particular approach.</p>	<p>The deemed option offers a path for accomplishing this goal for either the RE or ER installation types.</p>



SECTION 8: REPAIR ELIGIBLE

8.1 PROPOSED ENTRY FOR THE BASELINE DOCUMENT

The Repair Eligible (RE) category includes measure installations where site specific preponderance of evidence supports that a) the existing equipment could have been cost-effectively repaired to perform its original design intent during the proposed RUL and b) the energy efficiency program activity induced or accelerated the equipment replacement.

A deemed measure can be treated as repair eligible if overhaul or ongoing repair of existing equipment is standard practice rather than replacing existing equipment with new.

8.1.1 Clarifications

None.

8.1.2 Rules

A repair is assumed to be cost-effectiveness if the total cost of an overhaul (first cost) or ongoing repairs to maintain service (net present value) is less than xx% of the cost of replacing the existing equipment. Alternate thresholds (higher or lower) are allowed when evidence suggests there is a standard practice for a given measure or customer sector repair/replace decisions.

Deemed measures define the specific baseline appropriate for this measure as well as POE requirements specific to that measure.

NOTE TO REVIEWERS: The POE discussion may identify

8.1.3 Examples

ER #1: One common EE measure is overhauling pumps... which could be considered, under this framework, as a "to-code" Early Retirement using a Repair Eligible baseline. In this case, the second baseline is an overhaul, and as such many pump overhauls would have zero savings in the second baseline.

8.2 DISCUSSION

1. While it was generally agreed that the targeted equipment for this category was likely long lived, there wasn't an agreement that this category should be a) restricted to measures with EULs greater than a certain threshold or b) that the population had to demonstrate it was standard practice to exceed its EUL. Therefore references to life of the measure were dropped from the definition.
2. This measure's justification is that customers may choose to repair indefinitely rather than replace equipment; therefore a cost test is in order to see if that is true. Recommendations for a repair threshold have been:
 - a. PG&E recommended a 75% threshold.
 - b. CPCU Staff recommended a 50% threshold in the Staff Baseline White Paper.

8.3 COMMENTARY

Stakeholder suggested language or comment	Reasoning for disposition
Karen Moaz, DNVGL. Compressed air, industrial boilers/furnaces, etc. Should a certain level of degradation of performance be considered if a smaller system is	



<p>needed to compensate for reduced performance?</p> <p>PG&E. Repair Eligible (RE) measures are a subsidiary of Early Retirement measures that consider an overhaul or ongoing repair of existing equipment to be standard practice, rather than replacing existing equipment with new. RE measures must have market and/or site specific data that demonstrates repairing or overhauling existing equipment is less expensive and/or more common than replacing with new. RE measures use a dual baseline, with existing conditions and full energy efficiency measure cost for the first baseline, and standard practice of repair or overhaul for the second baseline energy savings and cost basis.</p> <p>By default, to classified as “repair eligible,” the cost of an overhaul (first cost) or ongoing repairs to maintain service (net present value), could be required to less than 75% of the cost of replacing the existing equipment. Alternate thresholds (higher or lower) are allowed when evidence suggests there is a standard practice for a given measure or customer sector repair/replace decisions.</p> <p>Note: One common EE measure is overhauling pumps... which could be considered, under this framework, as a "to-code" Early Retirement using a Repair Eligible baseline. In this case, the second baseline is an overhaul, and as such many pump overhauls would have zero savings in the second baseline.</p>	
<p>Scott Mitchell, Southern California Edison. SCE questions why repair eligible calls for dual baselines in the calculated and non-building projects. Most of the time the 2nd baseline savings would be zero.</p>	<p>Not necessarily. If the installed equipment is more efficient than code, there will be savings in the second period.</p>
<p>Scott Mitchell, Southern California Edison. Suggested edits in red. The Repair Eligible (RE) category includes measures replacing existing equipment a) where the market has demonstrated that the equipment is typically maintained far beyond its EUL, and b) there is site specific or market (deemed) documentation that the equipment could have been repaired.</p>	
<p>Spencer Lipp, Lockheed Martin. This may be related to REA but we did not discuss process systems. If you have many components of a system, they do not operate independently and such, if that component is upgraded while operating where does that fall? If the system can produce product without this equipment just perhaps not as effectively, where does this measure get categorized.</p> <p>I think we need to develop more on the REA measures and what these consist of as part of this decision tree. Perhaps even BROs as well.</p>	
<p>PG&E Pumps that maintain fluid levels in reservoirs are often sized according to worst-case or peak service conditions. Since the requirements of worst-case conditions are often significantly higher than those of normal operating conditions, many pumps are oversized relative to the demands of their application for most of their operating lives. The penalties of using an oversized</p>	



<p>pump include frequent energizing and de-energizing of the motor, operation away from the pump’s best efficiency point (BE), and high friction losses—all of which add to energy and maintenance costs.</p> <p>Adding a smaller pump to handle normal system demand relieves the burden on the larger pump, which can be energized as needed during high load conditions. A smaller pump can operate more efficiently and require less maintenance (US DOE, 2006. p. 27).</p>	
<p>Nikhil Gandhi, Technical Consultant. For repair-eligible measure, the working group has thus far not discussed evidentiary standards to establish degraded efficiency. The efficiency of repaired equipment can vary depending on the repair practice. Allowing consideration for degraded efficiency will need more discussion on typical efficiency of repaired equipment and ways to establish typical repair efficiency – a document similar to the ISP guidance document might be needed.</p> <p>The group has also not considered test the perpetual repair hypothesis. Certain classes of equipment cannot be repaired forever because of degradation that is beyond repair and the obsolescence issues.</p> <p>The definition of measures for use in any measure-based baseline would be important. All pumps are not the same and the meaning of boiler controls should be more specific, for example.</p>	
<p>On the use of cost-effectiveness as a measure-level consideration on baseline:</p>	
<p>Spencer Lipp, LM: Yes, project costs are a key parameter of TRC and are not always known at this time. Also, the same measure may get treated differently in two different projects. I think this screening is a shortcut for Program Design. The CPUC/IOUs need to evaluate and monitor cost effectiveness of the programs early on and if this causes the portfolio to not be cost effective, then they need to make adjustments to the incentives.</p>	
<p>Mushtaq Ahmad, Nexant: All measure groups should be taken care of through the first two considerations or the combination of alteration types and installation types elaborated in Table 1. Table 1 is agnostic of cost effectiveness as well as the size of the customer.</p>	
<p>Ben Lipscomb, NCI HVAC. We are actually advocating for an exception to the Default Baseline Policy for HVAC installation measures [rightsizing, quality installs]. This baseline would apply in lieu of the code baseline for new construction, upstream and midstream, and downstream normal replacements that don’t use NMEC or RCT/experimental savings. The baseline would recognize that code compliant equipment is generally installed in these scenarios, but that code-assumed efficiencies are not generally achieved by the equipment or the system that they are a part of. This would give programs the opportunity to address the issue. There are many different program approaches that could be employed, and I’m not necessarily advocating for a particular</p>	<p>The deemed option offers a path for accomplishing this goal for either the RE or ER installation types.</p>



<p>approach.</p> <p>Scott Mitchell SCE Responses:</p> <ol style="list-style-type: none"> 1. If the equipment is not functioning and could be repaired (as described), the baseline should be its performance should the repair be carried out (“Repaired and restored” at 77% CE). <ol style="list-style-type: none"> a. What is definition of repair eligible? From the staff white paper it appears to be equipment where “saturation studies indicate a significant percentage remains in use well past its expected useful life.” Factors to be proven by POE include: <ol style="list-style-type: none"> i. burned-out or highly degraded ii. individual equipment being replaced could otherwise be repaired iii. cost of repair would have been less than 50% of the replacement cost including all necessary costs (e.g. building modifications required to remove a large boiler from the basement) b. The definition implies that there is an established list of equipment that qualifies as repair-eligible. Who is responsible for creating and maintaining that list? 2. If documentation on the particular equipment is available, that information can be used. If it is not available, the repair eligible equipment list described above, should list efficiency degradation and lifetimes to be used for each type of equipment. <ol style="list-style-type: none"> a. For example, boiler efficiency started at 75% and degrades at 0.5% per year. A tube replacement increases efficiency by 5% from existing condition (as calculated using the degradation rate and age of the equipment). A burner replacement increases efficiency by 3% from existing. <ol style="list-style-type: none"> i. For a 10 year old boiler, the baseline would be 70% (constant, non-degrading over time) and a burner replacement would kick it back up to 73%. b. While not entirely precise for every project, this methodology will provide a balance between reasonable average savings values, cost of implementation, and ease of calculation/documentation. 3. As stated in the example above, SCE believes the baseline efficiency should be estimated based on a degrading performance, but savings should be calculated with a constant baseline. 4. EUL for the replacement boiler should be the non-capped true EUL of the boiler population. RUL should be ½ of the EUL. 5. If the equipment is operating and could be repaired with new components, it should be early retirement and the baseline should be “existing operation” at 72%. <ol style="list-style-type: none"> a. [Early retirement and repair eligible occupy the same cell of Table 1, so 	
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should be treated the same.]	
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APPENDIX A: ADDITIONAL DISCUSSION AND COMMENTARY

BEHAVIORAL, RETRO-COMMISSIONING, AND OPERATIONAL

Comments regarding these terms follows.

8.4 COMMENTARY

The following comments related to BRO measures were received as part of Working Group activity.

Stakeholder suggested language or comment	Reasoning for disposition
<p>Mushtaq Ahmad, Nexant: BRO needs a completely separate category of measures. Currently they have been in most cases defined as REA measures which again by definition is not the right home for these measures especially RCx. RCx measures are identified and implemented by following a very specialized process which includes detailed system level investigation and then implementation through a combination of programming and sometimes significant costs associated with control components.</p> <p>Another major issue with RCx measures is the arbitrary way the eligible costs associated with these measures are defined.</p> <p>In more than one cases, we have been told by that the costs for RCx measures should be “few hundred dollars” without any backup information/reference.</p> <p>If BRO measures are not classified separately during this process then it is a huge missed opportunity as significant potential from building and non-building end-uses will still be stuck in process where the BRO measures will only be shaped by individual project dispositions. And this is not ideal for an area which was specifically emphasized in both AB802 and staffs final decision.</p>	

UPSTREAM AND MIDSTREAM DELIVERY METHODS

Comments regarding these terms follows.

SAVINGS DETERMINATIONS

Comments regarding these terms follows.



Commentary

Stakeholder suggested language or comment	Reasoning for disposition
Does this baseline guidance potentially leave too much for interpretation and may become inconsistent among the PAs?	
Spencer Lipp, LM: Yes, I think that is the case. In reviewing the table, I don't see any difference in downstream deemed versus custom for the baseline. This may not even be needed unless I'm missing the intent here.	
Mushtaq Ahmad, Nexant: Second for deemed vs custom, it is very clear in Table 1 which installation types have which baselines. Why are we making this as a separate criteria.	
Scott Mitchell, SCE: All deemed measures refer to WPs for all savings info, including baseline. Is there such a thing as a deemed (no workpaper) measure?	

NMEC

OTHER COMMENTS

Some comments from Working Group stakeholders did not fit into the previous sections of this document. These are presented below.

Stakeholder suggested language or comment	Reasoning for disposition
Strategic Energy Management (SEM)	
<p>Spencer Lipp, LM: SEM was called out in the Decision as existing conditions baseline. I think it's important to have this definition vetted through this process and somehow referenced in the table 1.</p> <p>Someone on the phone indicated that SEM did not include capital projects. I was not able to speak before this topic got tabled. This is not the case. A simple google of "strategic energy management" capital projects reveals that capital projects are included in an SEM at other utilities. An SEM is a process that often includes behavioral types of measures but is not limited to these.</p> <p>http://www.franklinenergy.com/wp-content/uploads/2015/02/SEM_WhitePaper_v01_011915.pdf</p> <p>http://www.energycentral.com/c/iu/utilities-engage-industrial-customers-strategic-energy-management</p> <p>https://energytrust.org/commercial/equipment-upgrades-remodels/strategic-energy-management/# See building examples like Oregon convention center as an example.</p>	



<p>Melanie Gillette, CEEIC: SEM needs to be included in Table 1, and pending further discussions we'd place it as a separate subsection of "Non-building projects: – Existing Conditions (EC) baseline" as established in legislation and confirmed in Decision. Please note that: Conclusion of Law # 26 from the EE Decision specifically includes Industrial SEM as EC baseline.</p> <p>We appreciate the discussion on the October 25 call to commit to including SEM in Table 1 after additional discussion. We want to make sure those discussions include stakeholders, are facilitated, and generate consensus in time to file this working group's report. They also need to include the discussion of whether SEM projects include capital improvements. We clearly read the Decision as including capital projects.</p>	
<p>Rich Sperberg, Onsite Energy: The discussion on SEM, especially whether or not it included capital projects was cuts short and suggested to be taken "off-line". This is an important topic to the future of Industrial EE programs and needs to be discussed sooner rather than later. When can this discussion be scheduled?</p>	
<p>Rich Sperberg, Onsite: SEM is (or will be) important to Industrial EE Implementers as an avenue to capture lost opportunities in the Industrial market. Your slide that "Program Designers" are now engaged with defining SEM is duplicative for the T1WG to define SEM and it is not the primary focus of this group is concerning to those of us that see this as an opportunity to clarify an important aspect of the baseline policy in the CPUC decision. First, since the decision calls for more third party involvement in Program Design (in fact is seems to restrict PA's from designing future programs), so "Program Designers" will be third parties, yet it seems that the PA's are "reserving" the SEM design to themselves. Second, I disagree that this topic is not in the scope of defining baseline policy. I don't want to see this shuffled off to another effort that is not part of this facilitated working group process, but if the decision is to separately address this topic, it should be done immediately (maybe a sub-group of this process?). Third, the Table 1 (I think as you agree) should somewhere reflect that SEM has a different baseline treatment from other Industrial and AG "non-building" projects.</p> <p>SEM should be added back as a separate subsection of "Non-building projects", since the CPUC Decision clearly states that projects (including capital projects) implemented through a SEM approach should receive existing baseline treatment. "Standard Practice" under the Normal replacement category should be replaced with "ISP". The working group deliberation on revised ISP guidance is important to determine how this will be treated. There should also be a consistent use of Early Retirement/Accelerated replacement.</p> <p>SEM is an approach, not necessarily a "program design". SEM should be applied broadly to all programs as long as SEM criteria are met. We need to agree on SEM qualification requirements.</p>	



<p>Halley Fitzpatrick, PGE: Defining SEM is not in scope. However, referencing and describing it may be required.</p>	
<p>Scott Mitchell, SCE: Proposed addition of Strategic Energy Management (SEM) should be as a note (“Existing (includes SEM activities)”) in the Non-building projects, BRO column.</p> <p>This should focus on maintenance, operations and retrocommissioning. Capital and custom projects that result from the SEM strategy should proceed through normal channels.</p>	
<p>Mushtaq Ahmad, Nexant: SEM should be in the scope. Simple suggestion to include that as an additional row in Table 1 and utilize the same criteria as non-building projects.</p>	
<p>Karen Moaz, DNVGL: SEM is a subset or part of BRO. BRO programs could result in capital equipment not captured via other programs. This also happens with HERs that impacts can include structural and behavioral.</p> <p>On slide 10, the addition of SEM should also consider Commercial SEM and having it under the alteration type is misleading.</p> <p>Not completely agree that capital projects and custom calculation should be here. I would need more discussion.</p>	
<p>Preponderance of Evidence (to be incorporated in future PoE Guidance Document)</p>	
<p>Melanie Gillette, CEEIC: As you think about POE models, we would like to include future discussions on a model that would consider existing condition as the default, per legislation, and require ISP/Code to be the exception that has to be justified (rather than the reverse, which is how the draft POE model appears to be constructed.)</p>	
<p>1. Scope</p> <p>a. The preponderance of evidence (POE) standard is currently applied to several aspects of custom and deemed projects including: general utility program influence, chain specific influence, project specific influence, measure-specific influence, and delivery influence.</p> <p>b. The discussion on page 40 (text below) of the decision seems to indicate that the working group should generally look at the definition of POE as applied throughout the custom review process rather than limiting to determination of repair eligible equipment. This contradicts ordering paragraph 4, which is focused only on accelerated replacement and repair eligible projects. Was it CPUC’s intent to limit the scope of this working group?</p> <p>i. Page 40: “One issue appropriate to be discussed by this working group is the definition of “preponderance of the evidence,” a standard applicable in custom review as well as for repair eligible or accelerated replacement treatment for dual baseline treatment for these types of projects (see below</p>	



in Section 3.13 a discussion about items deferred to working groups).”

ii. Page 109 Ordering Paragraph 4: “Commission staff shall facilitate a working group ... to discuss measure-level baseline rules and documentation required to meet the “preponderance of the evidence” standard for accelerated replacement and repair eligible projects. Staff shall bring a resolution for the Commission’s consideration by January 1, 2017 with recommendations for resolving these issues. “

2. Definition and application

a. POE is generally defined as a standard by which one side’s version of events is more likely accurate (51%) than the other sides’ version of events, based on the evidence presented to a neutral trier of fact.

b. As currently applied, there is no neutral trier of fact. PAs present their estimated savings claims to the EAR team, who reviews, conducts analysis, and makes a decision. While we do not wish to create a quasi-judicial process to process savings claims, there must be a way to effectively separate the position advocate and decision-making functions.

c. The resource cost of determining POE should be aligned with the value of reducing the uncertainty of the net resource impact to the grid



APPENDIX B: REFERENCE MATERIAL

NEW CONSTRUCTION

Decision 16-08-019 Section 3.6

New Construction (including expansions and any added load)

The simplest exception to the general default policy of an existing conditions baseline is in the case of new construction programs. In new construction, it should be impossible to install equipment and building shell measures that do not meet codes or standards. Thus, for new construction projects in any sector, our policy will remain that baseline will be set based on the required codes and/or standards. No party disputes this determination.

For this purpose, new construction will be defined to include any expansion or addition of substantial load to an existing facility.

The Staff White Paper had also proposed to treat “major alterations” to existing buildings in the same category as new construction and expansions. In general, in the code and in concept, major alterations are activities that happen in existing buildings, so we will not reclassify them to be included as part of the new construction category for purposes of baseline policy. The building code already has a number of requirements that apply to these types of projects and we do not wish to set a different standard and create additional criteria to complicate matters.

We will treat major alterations as part of the existing buildings category and determine the baseline accordingly. We reach this conclusion in part in response to the comments about simplifying our framework.

Decision 16-08-019 Section 3.7

Commercial Sector Issues

Continuing from the discussion about major alterations in the previous section, in particular, staff recommended a series of distinctions and exceptions that applied in the commercial sector to new tenant retail, chain commercial, and office space, and included requirements for documentation and program design.

Many parties commented that this framework proposed by staff for the commercial sector is not practical in the real world, because the definitions of different types of buildings are based on practices that differ across different subsectors and are not readily operationalized. Ecology Action, in particular, offered a number of clarifications about the categories recommended by staff not being applicable or enforceable, such as “Class A” office space, “gut rehab,” and other terms of art that mean different things to different market actors. IBEW also agreed with these concerns, as did the utilities, to varying degrees.

We agree with parties that expressed concerns about making too many distinctions that are not easily defined practically in the commercial sector. Thus, we will not adopt the specific categories of commercial sector projects. However, we emphasize the importance of focusing program activity on unlocking stranded potential and not capturing free riders.

Savings by Design (May 4, 2016), Page 7

For this program, new construction includes any one of the following:

- New building projects wherein no structure or site footprint presently exists
- Addition or expansion of an existing building or site footprint



- Construction that involves complete removal, redesign, and replacement of the energy consuming systems of a building or process
- Projects that require design and selection of new systems based upon the needs of new or modified space function(s)
- Major tenant improvements

PG&E Staff Baseline White Paper, Page 22

New construction and major alterations /renovations: Besides providing incentives for new construction projects to exceed code, the current Savings By Design program also provides incentives to existing buildings for major renovation and rebuilding projects. These projects trigger code requirements and require permits, so the energy savings to code are already required to occur. If we were to allow the PAs to provide rebates and claim savings for major renovations already occurring throughout the economy, there could be unintended consequences of diverting ratepayer funds from bolstering truly incremental savings opportunities to subsidizing the cost of construction and renovation projects that will occur regardless (and explicitly whose construction trends already have been accounted for in the state's demand forecast and the associated energy procurement and reliability planning.

Defining major renovations, however, presents a significant challenge for determining appropriate baseline. The Savings by Design program defines new construction as a project that involves complete removal, redesign, and replacement of the energy consuming systems of a building or a process that will certainly involve permitting and code compliance.

However, the most common form of renovations are commercial renovations for replacement tenants, which commonly involve a partial removal and replacement of energy consuming systems—namely lighting, but may include the alteration of other energy consuming systems. Any building alterations that replace energy consuming systems require permits and must comply with building code, for which the recent C&S program impact evaluations found to have high compliance for interior lighting, as discussed in Section IV.C.

The problem to resolve is how to identify or target energy efficiency upgrades in major renovation and alteration projects that were not already planned to occur already. Otherwise, every alteration planned in every building, which must already comply with code, would qualify for incentives for simply following the law. Ideally, program implementers would simply self-report when they convince a customer to adopt a new alteration. However, the financial reward for misrepresenting customer intent is potentially so great that self-reporting would be unreliable. Commission staff does not have a straightforward recommendation to solve this problem. We recommend that the following customer segments apply code baseline and not use existing conditions as baseline, unless they can meet one of the qualifying requirements that follow below:

Customer segments where code baseline would apply:

- New tenant retail: Retail spaces are typically gutted and renovated as commercial tenants turn over.
- Chain commercial: Chain retail, with 5 for or more locations usually perform regularly scheduled capital upgrades, for which they use standardized interior designs.
- Office space: Maintenance of office space can widely vary. "Class A," office space is kept maintained and update; however office space classes are a term of art rather than a binding classification.
- Since the quality of retail and office space and vary significantly the case that below-code savings for retrofits and maintenance is stranded will depend on meeting one of the following qualifications:



Qualifying requirements for exceptions:

- Documentation of program influence: the program can provide documentation—i.e., project design documents -- that show that the project was originally not going to include energy system replacements, and the retrofit was influenced by the program, or photographs that indicate that the building is outdated, or
- Experimental design: program uses experimental design to demonstrate program influence, or
- Hard to reach market: the project occurs in a hard to reach market.

PG&E Staff Baseline White Paper, Page 37

Conclusions. We will need to explore several of these elements more in depth, ideally through comments to this white paper to inform implementation by September, but otherwise we will need to continue to consider them to refine implementation of AB 802 going forward. These issues include:

- A more robust definition of building alterations, and when Title 24 compliance can be reasonably expected to occur.

HOPPs Ruling, Page 10

Issue: Gut Rehab. Parties asked for clarification of the phrase, and were concerned that excluding gut rehab programs/projects is contrary to the legislature's intent.

Response: No longer defined separately, since the gut rehab classification is part of the new construction definition, and is already the subject of "Savings by Design" programs.

POE Guidance Document, Section 2.2.1 and 2.2.2

The New Construction (NC or NEW) category includes new equipment that has been installed in a newly constructed area, in an area that has been subject to a major-renovation involving complete multi-system replacement or area re-construction, or equipment installed to increase the capacity of existing systems due to existing or anticipated new load handling requirements. An approved single baseline energy savings calculation approach and estimate, the incremental measure cost, and a measure EUL with justification is required for this installation type.

Title 24 Building Energy Efficiency Standards 2013

Definitions:

ADDITION is any change to a building that increases conditioned floor area and conditioned volume. See also "newly conditioned space." Addition is also any change that increases the floor area and volume of an unconditioned building of an occupancy group or type regulated by Part 6. Addition is also any change that increases the illuminated area of an outdoor lighting application regulated by Part 6.

ALTERATION is any change to a building's water-heating system, space-conditioning system, lighting system, or envelope that is not an addition. Alteration is also any change that is regulated by Part 6 to an outdoor lighting system that is not an addition. Alteration is also any change that is regulated by Part 6 to signs located either indoors or outdoors.

ALTERED COMPONENT is a component that has undergone an alteration and is subject to all applicable Standards requirements.

SUBCHAPTER 6 NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES—ADDITIONS, ALTERATIONS, AND REPAIRS

(Contains extensive and detailed criteria for cases that are and are not required to meet code.)



NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES— ADDITIONS, ALTERATIONS, AND REPAIRS

(Extensively addresses renovations.)

D.05-04-051 Attachment 3 (Policy Manual V 3 – the basis for existing PM most recently adopted by Decision) Appendix B (Terms and Definitions) as modified by D.09-12-022 in red

Energy Efficiency

Activities or programs that stimulate customers to reduce customer energy use by making investments in more efficient equipment or controls that reduce energy use while maintaining a comparable level of service as perceived by the customer.

Energy Efficiency Measure

An energy using appliance, equipment, control system, or practice whose installation or implementation results in reduced energy use (purchased from the distribution utility) while maintaining a comparable or higher level of energy service as perceived by the customer. In all cases energy efficiency measures decrease the amount of energy used to provide a specific service or to accomplish a specific amount of work (e.g., kWh per cubic foot of a refrigerator held at a specific temperature, therms per gallon of hot water at a specific temperature, etc). For the purpose of these Rules, solar-powered, non-generating technologies are eligible energy efficiency measures.

End Use

- 1) The purpose for which energy is used (e.g. heating, cooling, lighting).
- 2) A class of energy use that an energy efficiency program is concentrating efforts upon. Typically categorized by equipment purpose, equipment energy use intensity, and/or building type.

Decision 09-12-022 Page 4

Equipment that is powered solely by solar energy or other renewable-energy sources resulting in no energy use from the distribution utility (as distinct from reduced energy use) does not fit within the current definition of an energy efficiency measure. This is because total energy usage does not necessarily decrease, although less energy may need to be provided by the utility.

Exceptions have been made to this rule, as the Commission has done for solar water heaters in D.05-04-051 and for solar water circulators in D.07-11-004. D.05-04-051 stated at 29-30: “the effect of solar water heating is indistinguishable from other efficiency measures that reduce natural gas or electricity consumption at the end-user site (such as water heater wraps, pipe insulation, etc.). In contrast, photovoltaic and solar-thermal electric technologies generate electricity and therefore should be considered renewable technologies. In sum, solar water heating reduces end-use energy consumption, while photovoltaic and solar-thermal electric are energy production technologies.” D.07-11-004 stated at 6 that it is reasonable to add stand-alone solar-powered water circulators as an eligible energy efficiency technology because the technology saves energy at the end-use, and does not generate power for the system.

PG&E has shown convincingly that solar-powered crop drying and solar-assisted heat pumps should be included within the definition of energy efficiency measures, because they are similar to solar water heating and solar water circulators approved as energy efficiency measures in D.05-04-051 and D.07-11-004, respectively. These technologies both permanently reduce natural gas load, and also generate electricity outside of the grid for their own usage. While typical energy efficiency measures do not generate power for their own power generation, such is not in and of itself a barrier to being considered as an energy efficiency measure. We also note that it is possible that one or both of the technologies PG&E puts forward may increase electrical use while decreasing natural gas use. As long as the net impact is



reduced usage, there is a positive energy efficiency impact. We will allow inclusion of these technologies as energy efficiency measures.

Public Utilities Code Section 399.4

(a) (1) In order to ensure that prudent investments in energy efficiency continue to be made that produce cost-effective energy savings, reduce customer demand, and contribute to the safe and reliable operation of the electric distribution grid, it is the policy of this state and the intent of the Legislature that the commission shall continue to administer cost-effective energy efficiency programs authorized pursuant to existing statutory authority.

(2) As used in this section, the term "energy efficiency" includes, but is not limited to, cost-effective activities to achieve peak load reduction that improve end-use efficiency, lower customers' bills, and reduce system needs.

(b) (1) Any rebates or incentives offered by a public utility for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances in buildings shall be provided only if the recipient of the rebate or incentive certifies that the improvement or installation has complied with any applicable permitting requirements and, if a contractor performed the installation or improvement, that the contractor holds the appropriate license for the work performed.

(c) The commission, in evaluating energy efficiency investments under its existing statutory authority, shall also ensure that local and regional interests, multifamily dwellings, and energy service industry capabilities are incorporated into program portfolio design and that local governments, community-based organizations, and energy efficiency service providers are encouraged to participate in program implementation where appropriate.

SHELL AND BUILDING SYSTEMS

Decision 16-08-019 classifies Shell and Building Systems as eligible for an existing baseline, indirectly referencing the Staff Baseline White Paper definitions. There are no clear or commonly used definitions for these terms prior to the Staff Baseline White Paper.

In the Staff Baseline White Paper, shell and building equipment is described as equipment that does not burn out, or if they do, the building can function without them.

The existing baselines white paper describes shell and building efficiency measures as measures that do not burn out, or if they do, the building can function without them.

In addition, the white paper describes 16 potential shell and building systems for consideration. In effect, shell and building systems may be identified as a list of building components or systems that may be retrofitted or replaced.

PG&E Staff Baseline White Paper, Page 24, 29, 35

Commercial custom projects with calculated savings estimates.As a custom calculated project uses savings estimates from building simulations as the basis for incentive payments, the appropriate baseline should account for the factors by which specific measures are applied. Building shell and system retrofits and repair eligible equipment, listed in Tables 1 and 2, are changes made to the actual building, for which existing conditions baseline is appropriate.

Types of Programs for Which Baseline Should be Determined on a Case-By-Case Basis



Shell and building system measures: Many energy efficiency measures do not burn out, or if they do, the building can function without them. Thus, these measures often are not installed or replaced unless there is a major building renovation that requires permits and triggers code compliance.

Table B-1: Shell and Building System Measures

Measure	End Use	Sector
Insulation	Building Envelope	Res/Com
Window Film	Building Envelope	Res/Com
Duct Sealing/Repair	HVAC	Res/Com
Ventilation	HVAC	Res/Com
HVAC Controls	HVAC	Res/Com
HVAC Quality Maintenance	HVAC	Res/Com
Energy Management Systems	HVAC	Com
Lighting Fixtures*	Indoor/Outdoor Lighting	Res/Com
Lighting Controls (occupancy, daylight, etc.)	Indoor/Outdoor Lighting	Res/Com
Add On Controllers, VSDs, Doors, ASH, etc.	Refrigeration	Com
Refrigeration Casework	Commercial Refrigeration	Com
Water Fixture Replacements	Service Hot Water	Res/Com
Distribution (Insulation)	Service Hot Water	Res/Com
Boiler Controls	Service Hot Water	Res/Com
Recirculation Pumps	Service Hot Water/Recreation	Res/Com
Pool Covers**	Recreation	Res/Com

*Lighting fixtures are discussed further in Section VI.B.3 below.

**While pool covers are not a building system or shell measure, they share the common characteristic that the energy consuming system, the pool, does not require the pool cover in order to operate.

These measures are appropriate for the application of an existing conditions baseline, though staff notes that the complexity of most of these measures make it very difficult to reliably estimate their savings, and they lend themselves to NMEC approaches. Light fixtures are also an unusual case that is further considered in Section VI.B.3 below.

Recommendations for Measures that Apply Existing Conditions Baseline

Calculation of life-cycle savings primarily depends on the type of measure installed. Certain measures may never be replaced or installed because the building will function normally with the inefficient equipment. But for equipment that will inevitably burn out and the building cannot operate normally without the equipment, then turn-over can be expected to occur and savings over the life of the equipment need to be adjusted to account for the counterfactual.



Shell and building system measures: Since a building can operate without the installation of shell and building system measures, staff recommends that these measures receive existing conditions baseline across their full measure life.

RETROFIT ADD-ON

POE Guidance Document, Section 2.2.5

The Add-on Retrofit (REA) category includes situations where new equipment has been installed onto an existing system as either an integral additional component or a substitution of a pre-existing add-on component whose primary purpose is to improve overall efficiency of the system. Such a component must not be able to operate on its own. Retro-commissioning measures for which no additional equipment is purchased or measures involving the addition of a variable speed drive to an existing motor drive process will fall under this category.

....

(Note: Retro-commissioning audits that result in equipment replacements must be reviewed on a case-by-case basis and classified as either NEW, ROB, NR, ER/RET or REA.)

NORMAL REPLACEMENT

POE Guidance Document, Page 8 & Section 2.2.2

The Normal Replacement (NR) category includes measure installations where the existing equipment is still functional and the available evidence does not support a determination of program-induced early retirement. This type of normal replacement is also referred to as normal/natural turnover. Normal replacement also applies when the new or replacement equipment has been installed due to normal remodeling or upgrading or replacement activities which are expected and undertaken in the normal course of business or ownership. To properly determine the savings claim and cost-effectiveness of NR installations, the same information is required as ROB installations; an approved single baseline energy savings calculation approach and estimate, the incremental measure cost, and a measure EUL with justification. Note: some program administrators include NR as a subset in the ROB category.

The Replace on Burnout (ROB) category includes situations when new or replacement equipment has been installed due to imminent or actual failure of pre-existing equipment. To properly determine the savings claim and cost-effectiveness of ROB installations, the following information is required: an approved single baseline energy savings calculation approach and estimate, the incremental measure cost, and a measure EUL with justification.

Staff Baseline White Paper, Page 27

Measures for Which Code or Standard Practice Baseline is Appropriate

Single measure rebates for equipment replacements with measurable EUL: Rebate programs that target equipment with stable EULs is generally replaced on burnout with measurable frequency, and is subject to Title 20 and/or federal appliance standards. To give credit for savings up to code for these activities would incent nearly 100% free-ridership for the savings up to code and would definitely result in double counting of the savings toward procurement planning and GHG targets. The CPUC's baseline policy prior to AB 802 was based on the type of replacement:



Replace on burnout (ROB) and normal replacement: When a customer is already in the market to replace equipment, whether it is because the equipment failed or because they are just looking to replace their current equipment, the baseline is based on the existing code or standard for the equipment.

EARLY RETIREMENT

Decision 16-08-019, Section 3.8

Industrial and Agricultural Sector Issues, Page 40

One issue appropriate to be discussed by this working group is the definition of “preponderance of the evidence,” a standard applicable in custom review as well as for repair eligible or accelerated replacement treatment for dual baseline treatment for these types of projects (see below in Section 3.13 a discussion about items deferred to working groups).

PG&E Staff Baseline White Paper, Page 17 and 35

Early retirement: When the program induces the customer to replace functioning inefficient equipment, current policy applies a dual baseline treatment. To claim early retirement, an implementer must submit a “preponderance of evidence” to demonstrate that savings over pre-existing equipment for the remaining useful life (RUL) of the equipment being replaced, then savings above code-level for the rest of the EUL. Cost used is the full installed cost minus the net-present-value (discounted) full installed cost of the code-level unit. Program implementers claim that the requirements for claiming early retirement savings are so onerous that they often do not attempt to do so, although significant portions of recent utility claims have used early retirement treatment.

Staff recommends that savings claims be based on these three categories for individual downstream measures. However, staff recommends that the CPUC further clarify the “preponderance of evidence” needed to demonstrate that programs have induced early retirement.

Table B-2: Equipment with Measurable EUL

Measure	End Use	Sector
Refrigeration Chillers, Compressors, Condensers, etc.	Commercial Refrigeration	Com
Cooking Equipment	Food Service Equipment	Com
Furnace/Heating equipment	HVAC	Res/Com
Lamps (without fixture or ballast change outs)	Indoor/Outdoor Lighting	Res/Com
Dishwasher	Plug Loads & Appliances	Res
Laundry	Plug Loads & Appliances	Res/Com
Refrigerator (appliance)	Plug Loads & Appliances	Res/Com
PC/Monitors	Plug Loads & Appliances	Res/Com
Smart Strips	Plug Loads & Appliances	Res/Com
Office Equipment	Plug Loads & Appliances	Com
Pool Pumps	Recreation	Res/Com



Pool Heaters	Recreation	Res/Com
Water Heaters	Service Hot Water	Res/Com

Recommendations for Measures that Apply Existing Conditions Baseline

Calculation of life-cycle savings primarily depends on the type of measure installed. Certain measures may never be replaced or installed because the building will function normally with the inefficient equipment. But for equipment that will inevitably burn out and the building cannot operate normally without the equipment, then turn-over can be expected to occur and savings over the life of the equipment need to be adjusted to account for the counterfactual.

Early Retirement: Staff recommends that while existing conditions is used for first-year savings estimates of early retirement projects, dual baseline is necessary for calculating the lifecycle savings. Currently, all early retirement RULs are set at the default value of 1/3 EUL, which was developed approximately ten years ago based on an examination of various saturation studies (RASS, CLASS, CEUS, etc.) and persistence curves from EUL studies. Staff is not recommending any changes to the early retirement lifecycle impacts calculation at this time, but we recommend that as data is obtained to address the various data gaps identified in this proposal, RULs be adjusted from a default EUL value to reflect the actual persistence of various types of equipment.

POE Guidance Document

The Early Retirement (ER or RET) category includes measure installations where there is a preponderance of evidence (see section 3,4 and 5 below) that an energy efficiency program activity induced or accelerated equipment replacement. Early retirement measures must provide justification that the existing equipment being replaced would have continued to function and perform its original design intent during the proposed RUL in absence of the replacement. Evidence that the equipment could have remained operational is not sufficient; the evidence must indicate that the equipment would have remained in operation. Thus early retirement treatment includes an analysis of what the equipment user or owner intended for the future use or non-use, not just that the equipment was capable of continued use. The period of accelerated retirement is either the DEER default RUL of one-third the EUL, or an evidence-based alternate RUL. In all cases, evidence of viable functionality and continued intent to use the existing equipment must be provided (maintained in the project file); thus, the burden of proof to claim program-induced early retirement is not merely the need to demonstrate possible equipment survival for the proposed RUL but the intent of continued equipment use during the proposed RUL period. Program-induced early retirement claims becomes more difficult to demonstrate as the age of the existing equipment approaches and/or exceeds the equipment EUL.

The period of remaining EUL of the new installation after the RUL of the replaced equipment expires (which has a length of the new equipment EUL minus the pre-existing equipment RUL) is referred to as the 'second baseline' period. The second baseline for early retirement measures is the known code that will be in existence when the second baseline becomes effective. In some cases the second baseline will not become effective until many years from project completion, and in these instances the future governing code may not yet be defined. In these cases, the second baseline calculations should use the latest adopted available code even if it is not yet effective (for example, 2013 Title 24 until a later version is adopted) or the current industry standard practice.

Decision 12-05-015

We note that D.11-07-030 may not reflect our clarification that the compelling evidence standard for the determination of baseline equipment must be applied to both possible outcomes.⁴⁹² Specifically, D.11-



07-030 notes that it is necessary to establish, by a preponderance of evidence, that the program has induced the replacement rather than merely caused an increase in efficiency in a replacement that would have occurred without the program.

We direct Staff to update and distribute to the service list of this proceeding Appendix 1 of Attachment B to D.11-07-030, to incorporate clarifications provided here regarding baseline for gross savings estimates, and to indicate that a preponderance of evidence on the motivation for equipment replacement shall be utilized to determine which of the two baseline alternatives is applied for all gross savings estimates.492 D.11-07-030 at 40.

Not all equipment retired before it burns out is eligible for consideration to be treated as a program induced early retirement. Sometimes, as in the case of new construction, the early retirement baseline is not an option. However, when early retirement is an option the evidence that supports program induced early retirement must be weighed against the evidence supporting a replace-on-burnout or normal replacement baseline or new construction choice.

It is necessary to establish that a preponderance of evidence indicates the program has induced the replacement rather than merely caused an increase in efficiency in a replacement that would have occurred in the absence of the program. Once the preponderance of evidence review has established that the program caused the existing equipment to be replaced earlier than would have happened in the absence of the program, there is a need to establish the period of accelerated retirement. DEER contains values for the effective useful life (EUL) for many technologies and recommends using one-third of the EUL as the remaining useful life (RUL) until further study results are available to establish more accurate values. For the case of program induced early retirement, the RUL of the existing equipment should be used as the starting assumption for the period of accelerated retirement.

Decision 11-07-030

Attachment B at B13

Pre-existing equipment baselines are only used in cases where there is clear evidence the program has induced the replacement rather than merely caused an increase in efficiency in a replacement that would have occurred in the absence of the program.

These early or accelerated retirement cases may require the use of a “dual baseline” analysis that utilizes the pre-existing equipment baseline during an initial RUL period and a code requirement/industry standard practice baseline for the balance of the EUL of the new equipment.

Attachment A at 12

Not all equipment retired before it burns out is eligible for consideration to be treated as a program induced early retirement. Sometimes, as in the case of new construction, the early retirement baseline is not an option. However, when early retirement is an option the evidence that supports program induced early retirement must be weighed against the evidence supporting a replace-on-burnout or normal replacement baseline or new construction choice.

It is necessary to establish that a preponderance of evidence indicates the program has induced the replacement rather than merely caused an increase in efficiency in a replacement that would have occurred in the absence of the program. Once the preponderance of evidence review has established that the program caused the existing equipment to be replaced earlier than would have happened in the absence of the program, there is a need to establish the period of accelerated retirement. DEER contains values for the effective useful life (EUL) for many technologies and recommends using one-third of the EUL as the remaining useful life (RUL) until further study results are available to establish more accurate values. For the case of program induced early retirement, the RUL of the existing equipment should be used as the starting assumption for the period of accelerated retirement.



REPAIR ELIGIBLE

Decision 16-08-019, Page 40

One issue appropriate to be discussed by this working group is the definition of “preponderance of the evidence,” a standard applicable in custom review as well as for repair eligible or accelerated replacement treatment for dual baseline treatment for these types of projects (see below in Section 3.13 a discussion about items deferred to working groups).

PG&E Staff White Paper, Page 26, 29, 35

Repair-eligible equipment: Certain types of equipment are repairable far beyond their expected useful lives, which represents a market barrier to replacing outdated, inefficient equipment with high-efficiency equipment. In their Technical Analysis, Navigant identified a list of equipment where saturation studies indicate a significant percentage remains in use well past its expected useful life. The following list includes this “repair-eligible equipment,” though this list may not be exhaustive.

Table B-3: Repair Eligible Equipment

Measure	End Use	Sector
Split/Package Air Conditioner	HVAC	Res/Com
Split/Package Heat Pump	HVAC	Res/Com
Furnace	HVAC	Res/Com
Chillers	Commercial Refrigeration	Com
Boilers	Process/Service Hot water	Com

“Repair-eligible” equipment may be repairable or may in fact be completely inoperable and require a replacement. This presents a challenge to implementation of this policy: if we allow existing conditions baseline for all installations of each these measure types, even if they are burned out and unable to be repaired, the free-ridership will significantly increase and net-to-gross ratios for projects pursuing this equipment will significantly decrease. This would lead to overstating portfolio net savings and reducing portfolio cost-effectiveness.

For this reason, staff recommends that savings claims for burned-out or highly degraded “repair-eligible” equipment should include documentation to demonstrate that the individual equipment being replaced could otherwise be repaired (i.e., what component broke and how the equipment could be repaired), and that the cost of repair would have been less than 50% of the replacement cost. For equipment to be considered repairable, the relative cost needs to make the repair a reasonable option. Further discussion is necessary to determine what documentation provides sufficient evidence of reparability.

There are two measure groups – light fixtures and HVAC equipment—that must receive closer attention. Assigning baseline for these end uses is particularly challenging due to the significant portion of energy use and efficiency potential they represent, the range of conditions by which they get replaced, and the associated measures that may or may not be implemented along with them. These measures will be included in different types of programs, or may stand alone as deemed measures. The direction in this



section reiterates the direction above, clarifying how these proposed market rules would integrate for these measures.

HVAC Equipment Replacement: Typically, the decision to replace or repair heating or air conditioning equipment occurs on failure, and because heating and air conditioning equipment are integral to a functioning building, the decision is made in a small window of time. Based on saturation survey results, the extent to which HVAC equipment is repaired versus replaced is dependent on the type of equipment. For instance, approximately 25% of air conditioners currently in service are past their EULs (some of which are statistically expected based on the construction of EULs), whereas 75% of boilers currently in service are past their EULs.

However, staff recognizes that the efficiency of heating and air conditioning equipment is highly dependent on the quality of its installation. An equipment replacement that poorly sizes the unit, does not re-seal ducts, or fails to take other retrocommissioning / building system integration actions represents a missed opportunity to capture deeper savings. The Codes and Standards Impact Evaluation documents low permitting and compliance rates for HVAC replacement, indicating that Title 24 for HVAC systems has not been very successful in existing buildings.

Consequently, staff recommends that the baseline for HVAC depends on the type of program delivery, as has been described in the previous sections. For a basic HVAC replacement for burned-equipment that pays incentives on deemed or calculated savings estimates, without comprehensive retrofits, and consumption reduction approaches, a code-minimum baseline is appropriate for determining program-induced savings. Under these conditions, the program implementer will only cause the additional savings that are above and beyond what they were required to do under code.

Staff recommends that an existing conditions baseline be used in a comprehensive retrofit, provided that there is proof of a permit being issued and closed out. Comprehensive retrofit programs could include:

- Repair eligible equipment replacements, in which functioning or broken HVAC equipment can be replaced, or
- Metered approaches that measure the actual consumption reduction, with either experimental design or pay for performance, or
- HVAC replacements performed through a financing program with no utility rebate, in conjunction with our recommendation that the CPUC establish separate savings goals for financing programs.

Light fixtures and ballasts: Light fixtures are frequently replaced during renovation and building alterations, and the fixtures must comply with lighting standards. The C&S Impact Evaluation discussed in Section IV.C found that lighting retrofits have realized 108% of the projected savings. This natural turnover represents many millions in investments and 250 GWh per year of savings that has already been accounted for in the demand forecast and toward our GHG targets. However, light fixtures rarely “burn out,” so outdated lighting systems in old buildings that do not get renovated are an important source of stranded potential, estimated at around 50-75GWh per year in Navigant’s technical analysis.

How do we target the stranded potential while limiting the amount of double counted savings that gets captured? Practically speaking, a certain degree of free-ridership and double counting will be unavoidable, but lighting retrofits may result in as much as 90% or more free-ridership, based on the findings of the C&S Impact Evaluations. Commission staff proposes that lighting retrofits follow the alterations guidance in Section V.A.2.c (retrofits in new commercial tenants, chain retail and Class A office space should be treated like new construction and use code baseline). These categories may not be sufficient to limit the impact of double counting, and may need to be further disaggregated. We invite



comments from parties on how to resolve this challenge.

Recommendations for Measures that Apply Existing Conditions Baseline

Calculation of life-cycle savings primarily depends on the type of measure installed. Certain measures may never be replaced or installed because the building will function normally with the inefficient equipment. But for equipment that will inevitably burn out and the building cannot operate normally without the equipment, then turn-over can be expected to occur and savings over the life of the equipment need to be adjusted to account for the counterfactual.

Repair-eligible Equipment: While these types of equipment are potentially repairable for extended periods of time, significant amounts of this equipment clearly do turn over (that is, not all of this equipment is still in place in perpetuity). As with early retirement, staff recommends that lifecycle savings for repair-eligible equipment initially be calculated using ½ EUL at existing conditions and ½ EUL at code baseline, and is adjusted as better, equipment-specific persistence information is obtained.

HOPPs Ruling, Page 9 & 17

Replace on Burnout

Issue: The white paper proposed a “code baseline”⁵ for measures replaced on burnout that would have to be replaced with at least at-code new equipment. A number of commenters noted that while this might be appropriate for some equipment, other equipment could be repaired indefinitely, or exceeded the calculated “expected useful life” (EUL) for the category of equipment, and so should receive more favorable treatment. **Response:** Allows for replace on burnout measures to qualify for incentives and savings credit where the program or project proponent makes a data supported case that the equipment at issue has a history of being repaired indefinitely or generally lasts longer than the currently adopted EUL.

Some commenters took issue with the white paper’s proposal to exclude “replace on burnout” measures from High Opportunity Programs or Projects. Commission Staff notes that in general when something burns out the only replacement option is at or above code. In that case, continues Commission Staff, there is no reason for ratepayer incentives (or savings credit to PAs) for replacement at a code level, since it would have happened anyway. Commenters counter that in at least some instances, for at least some classes of equipment (e.g., boilers, some electric motors), customers will repair the ostensibly “burnt out” equipment indefinitely. According to these commenters, it is appropriate to incentivize replacement in these instances to drive inefficient but repairable equipment out of use in favor of more efficient equipment. We are not going to be able to resolve the complexities around replace on burnout in this ruling. It is a larger matter best addressed in the Commission’s full decision on AB 802 implementation. For now, we will impose some reasonable limits on claims/incentives for replace on burnout to ensure that the focus is on “high opportunity” measures. If PAs want to provide incentives and/or claim savings for replace on burnout measures, they need to make a data-supported case in their High Opportunity Programs or Projects proposal that a given piece of equipment has a history of being repaired rather than replaced. Parties seem to have specific equipment types and/or building uses in mind, and should bring programs/projects for that equipment and building use to us along with supporting information justifying use of an existing conditions baseline.

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Allows for replace on burnout measures to qualify for incentives and savings credit where the program or project proponent makes a data supported case that the equipment at issue has a history of being repaired indefinitely or generally lasts longer than the currently adopted EUL.

Q1 Name

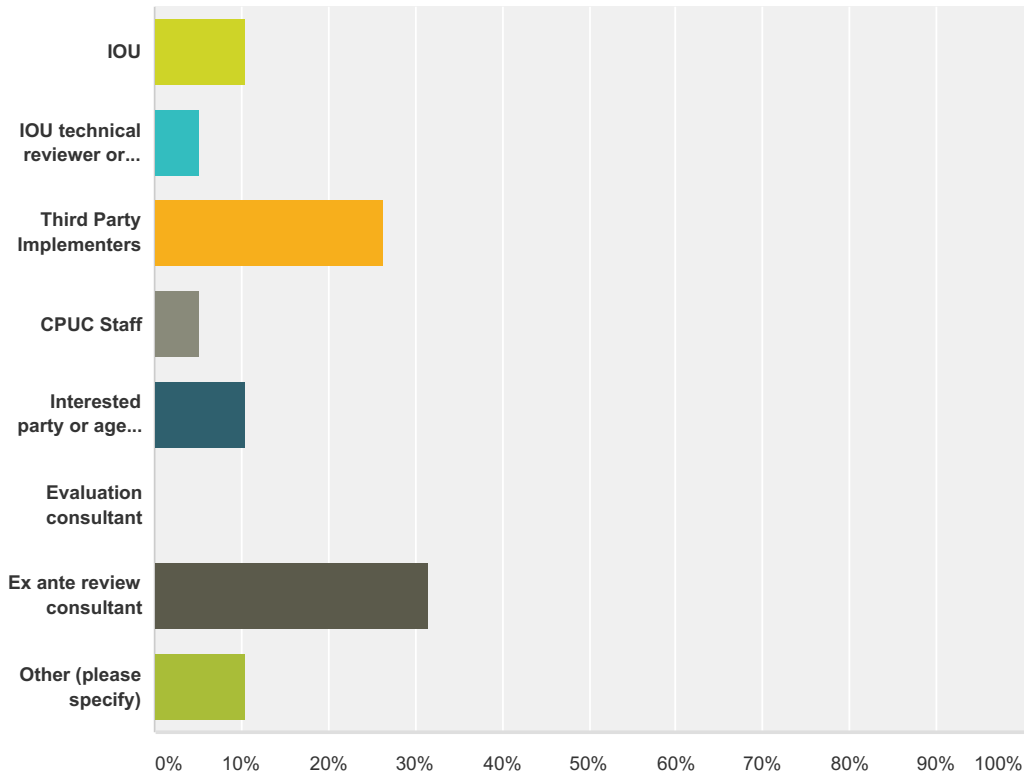
Answered: 19 Skipped: 1

Q2 Organization Name

Answered: 19 Skipped: 1

Q3 Organization type (pick one)

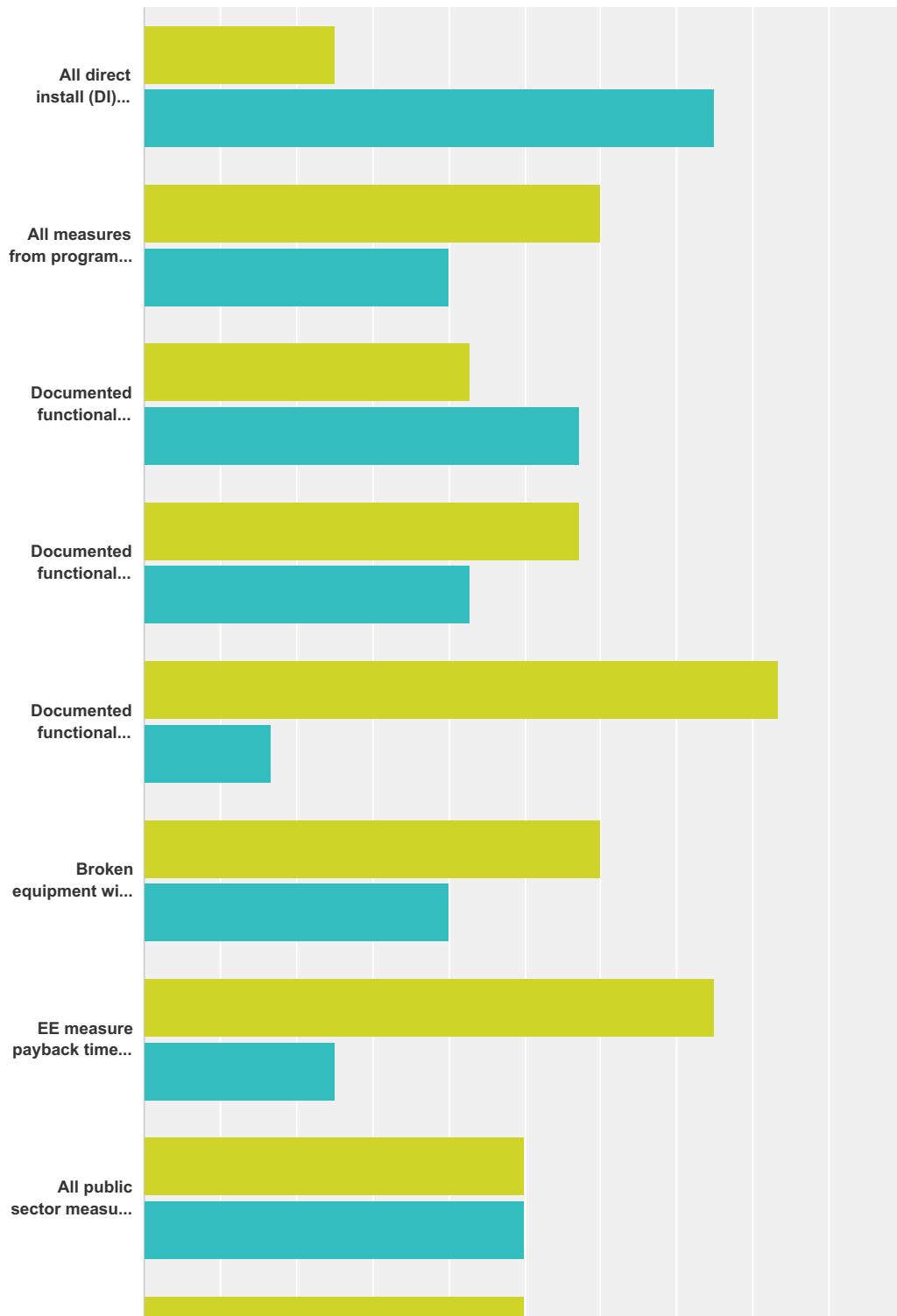
Answered: 19 Skipped: 1



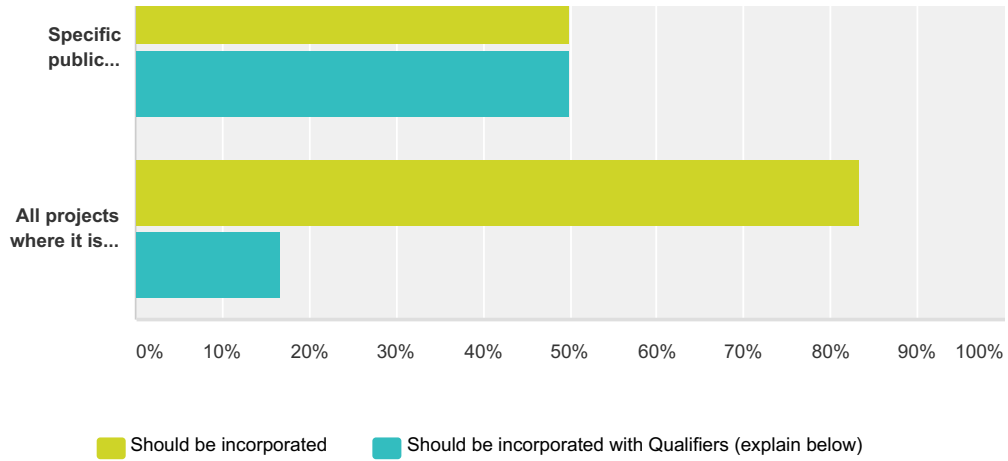
Answer Choices	Responses
IOU	10.53% 2
IOU technical reviewer or other implementation consultant	5.26% 1
Third Party Implementers	26.32% 5
CPUC Staff	5.26% 1
Interested party or agency (e.g. ORA)	10.53% 2
Evaluation consultant	0.00% 0
Ex ante review consultant	31.58% 6
Other (please specify)	10.53% 2
Total	19

Q4 Simple definitive indicators. Which of the following are viable “direct-to-decision” factors that should be incorporated into the Early Retirement / Normal Replacement decision-making guidance? Select all that apply.

Answered: 9 Skipped: 11



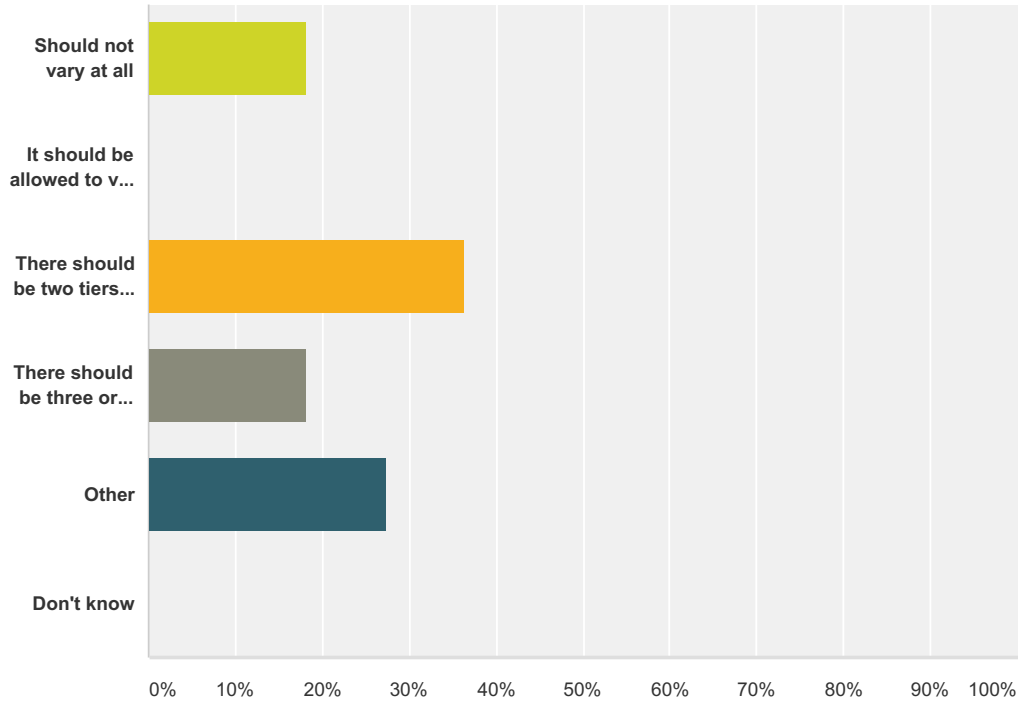
Preponderance of Evidence - Week 2



	Should be incorporated	Should be incorporated with Qualifiers (explain below)	Total
All direct install (DI) program measures are ER	25.00% 1	75.00% 3	4
All measures from programs that meet a particular definition of DI are ER	60.00% 3	40.00% 2	5
Documented functional pre-existing equipment < ½EUL at replacement means ER	42.86% 3	57.14% 4	7
Documented functional pre-existing equipment ID'ed for replacement in a program audit means ER	57.14% 4	42.86% 3	7
Documented functional pre-existing equipment and owner letter on influence means ER	83.33% 5	16.67% 1	6
Broken equipment with repair costs in excess of 50% of replace costs means NR	60.00% 3	40.00% 2	5
EE measure payback time exceeds measure EUL means No Influence	75.00% 3	25.00% 1	4
All public sector measures are ER	50.00% 1	50.00% 1	2
Specific public subsectors or selected technologies in the public sector are NR (describe)	50.00% 1	50.00% 1	2
All projects where it is shown that the program approached the customer would pass the program influence portion of the POE test.	83.33% 5	16.67% 1	6

Q5 Rigor variation. How should the required overall level of rigor for POE evidence vary by project, if at all?

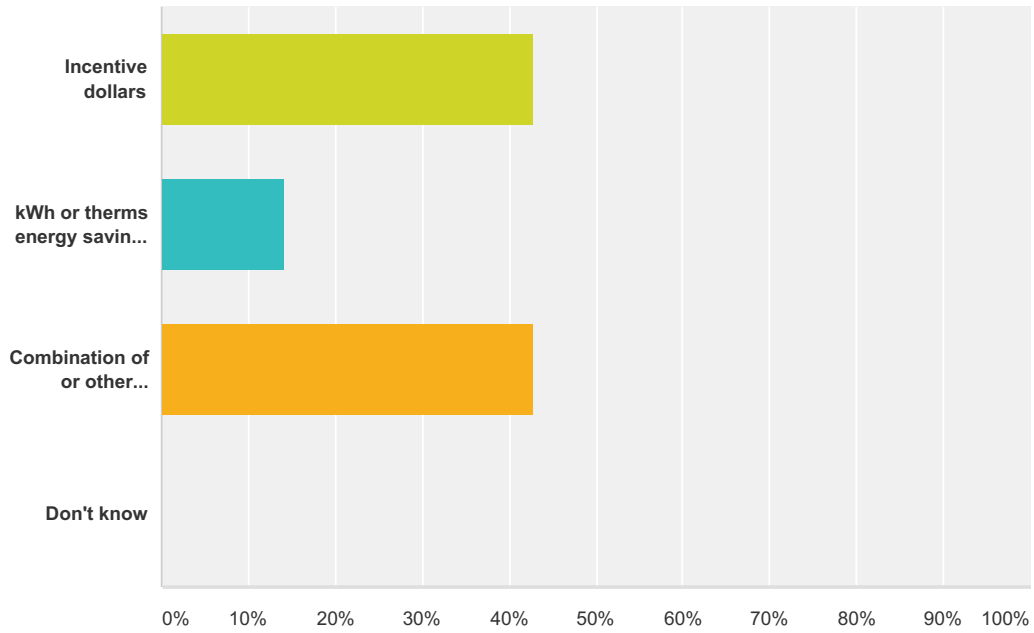
Answered: 11 Skipped: 9



Answer Choices	Responses
Should not vary at all	18.18% 2
It should be allowed to vary based on project-specific considerations but it is not possible to specify criteria in advance that would trigger a lower rigor standard	0.00% 0
There should be two tiers of rigor.	36.36% 4
There should be three or more tiers of rigor	18.18% 2
Other	27.27% 3
Don't know	0.00% 0
Total	11

**Q6 If you answered (c) or (d) to the Q5.
What should define the tiers?**

Answered: 7 Skipped: 13



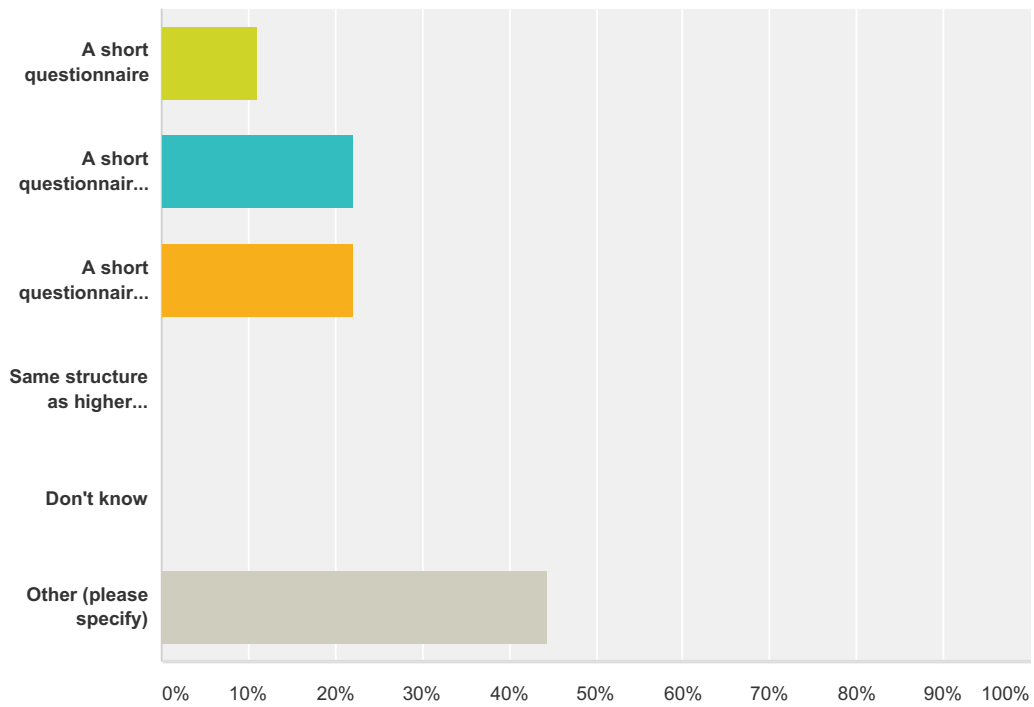
Answer Choices	Responses
Incentive dollars	42.86% 3
kWh or therms energy savings amount	14.29% 1
Combination of or other factors (explain in comments)	42.86% 3
Don't know	0.00% 0
Total	7

**Q7 If you answered (a), (b) or (c) to Q6.
Please specify your recommended
threshold value or plausible range of
values. Please label the values in the field
(\$, kWh, etc).**

Answered: 7 Skipped: 13

Q8 If there is a lower rigor approach, what should be the basis?

Answered: 9 Skipped: 11



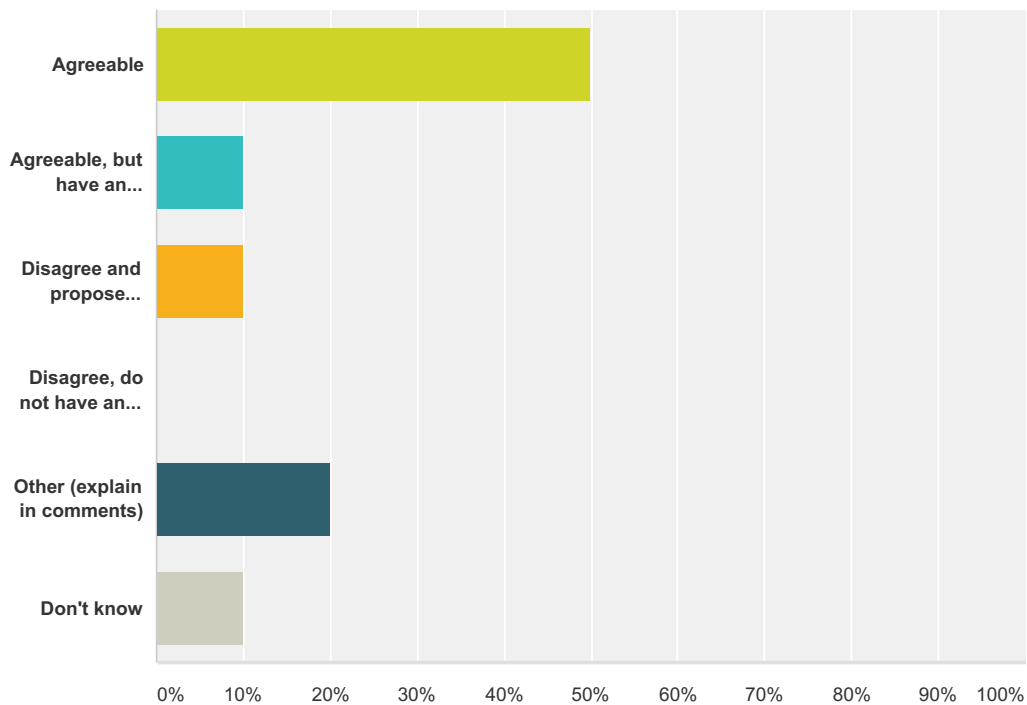
Answer Choices	Responses	
A short questionnaire	11.11%	1
A short questionnaire + authorized signature	22.22%	2
A short questionnaire + authorized signature + 1 piece of evidence showing continued viability	22.22%	2
Same structure as higher rigor, but with a lower "minimum score" or similar requirement	0.00%	0
Don't know	0.00%	0
Other (please specify)	44.44%	4
Total		9

Q9 Explanation or other comments for Q8

Answered: 5 Skipped: 15

Q10 Deemed POE guidance. The group previously came to consensus that for deemed measures with both ER and NR savings, ER demonstration criteria will be project-specific. The straw dog proposed that going forward such evidentiary specification could be incorporated into work papers. If not, the evidentiary specifications will default to those specified in the POE guidance document. A smaller group will identify principles for establishing the POE requirements for deemed measures. Please provide your opinion regarding this approach.

Answered: 10 Skipped: 10



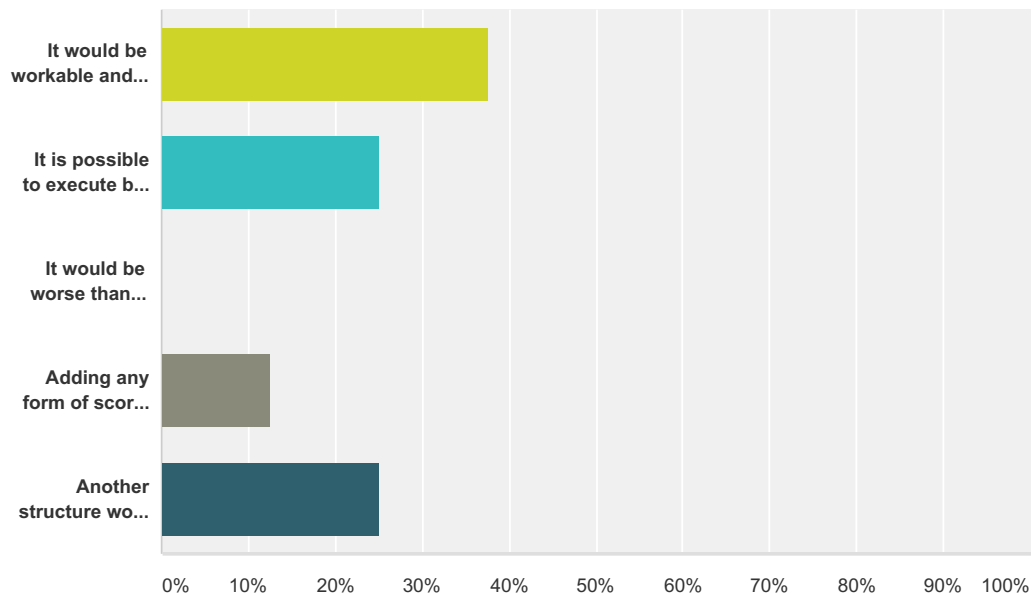
Answer Choices	Responses
Agreeable	50.00% 5
Agreeable, but have an alternate approach (explain in comments)	10.00% 1
Disagree and propose alternate approach (explain in comments)	10.00% 1
Disagree, do not have an alternate approach	0.00% 0
Other (explain in comments)	20.00% 2

Preponderance of Evidence - Week 2

Don't know	10.00%	1
Total		10

Q11 Large custom POE guidance. The straw dog proposal included a 3-point scoring system that specifies the points for each type of evidence, with scores varying by evidence quality and relevance. Regarding the straw dog structure, please select all that apply from among the following statements on the overall concept. Note: If completing on Thursday, refer to the structure in the PPT presentation. The facilitators are constructing a fuller version that we expect to distribute for your consideration by Friday morning 11/11.

Answered: 8 Skipped: 12



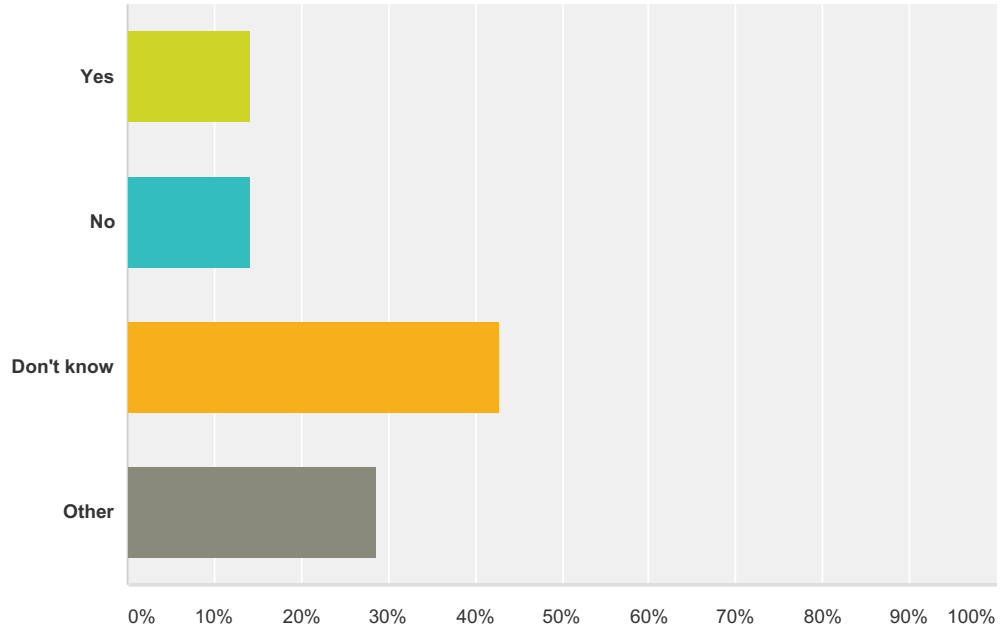
Answer Choices	Responses
It would be workable and improve predictability of outcomes	37.50% 3
It is possible to execute but is not a material improvement	25.00% 2
It would be worse than doing nothing	0.00% 0
Adding any form of scoring is fundamentally flawed	12.50% 1
Another structure would be better (must describe)	25.00% 2
Total Respondents: 8	

Q12 Explanation or other comments. If sending an accompanying email to CPUC@ers-inc.com in support of response to (e), please note that here:

Answered: 6 Skipped: 14

Q13 Would the straw dog structure be flexible enough to accommodate most of the varying POE evidence assembly scenarios you have worked with in the past?

Answered: 7 Skipped: 13



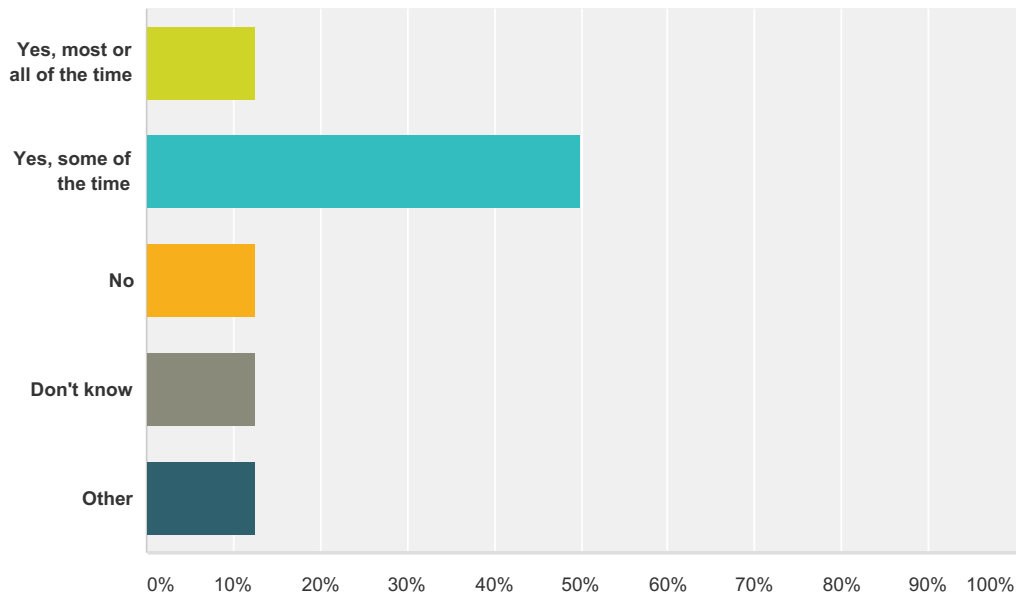
Answer Choices	Responses	
Yes	14.29%	1
No	14.29%	1
Don't know	42.86%	3
Other	28.57%	2
Total		7

Q14 Explanation or other comments. If 13 is (b) or (c), describe any enhancements that would help with flexibility.

Answered: 6 Skipped: 14

Q15 Would such a structure increase predictability of outcomes?

Answered: 8 Skipped: 12



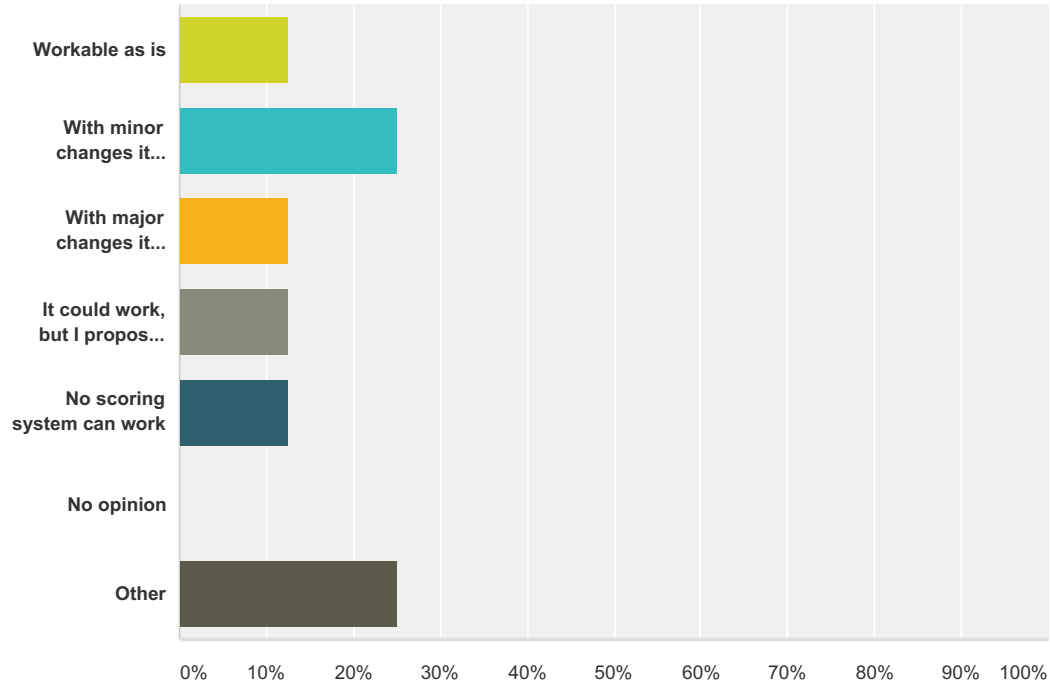
Answer Choices	Responses
Yes, most or all of the time	12.50% 1
Yes, some of the time	50.00% 4
No	12.50% 1
Don't know	12.50% 1
Other	12.50% 1
Total	8

Q16 Explanation or other comments. If 15 is (b) or (c), describe any enhancement that would help with predictive powers.

Answered: 6 Skipped: 14

Q17 The structure was accompanied with a scoring system. Please provide input regarding the straw dog scoring.

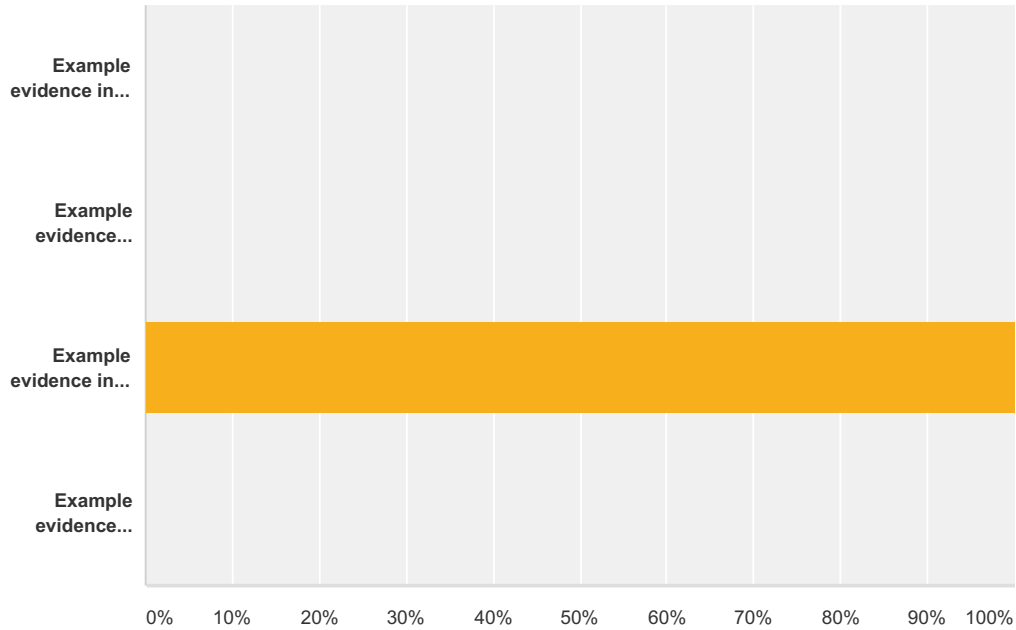
Answered: 8 Skipped: 12



Answer Choices	Responses
Workable as is	12.50% 1
With minor changes it could work (specify)	25.00% 2
With major changes it could work (specify)	12.50% 1
It could work, but I propose an alternate scoring system (specify)	12.50% 1
No scoring system can work	12.50% 1
No opinion	0.00% 0
Other	25.00% 2
Total	8

Q18 As discussed in this week’s conference call, it would add clarity if we can add examples of accepted or rejected evidence to the guide. Please indicate here which types of examples you can supply to CPUC@ers-inc.com. Skip if you do not plan to submit.

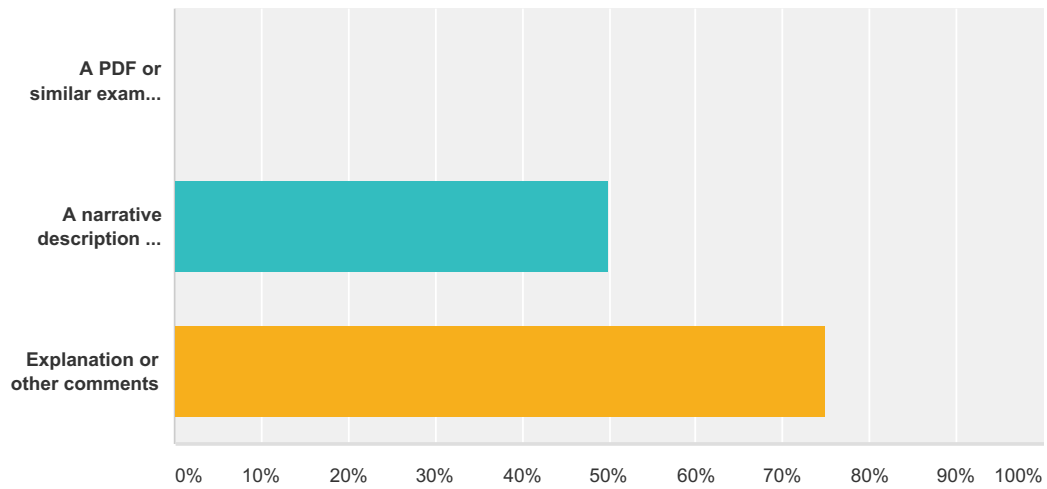
Answered: 1 Skipped: 19



Answer Choices	Responses
Example evidence in support of continued viability	0.00% 0
Example evidence against continued viability	0.00% 0
Example evidence in support of program influence	100.00% 1
Example evidence against program influence	0.00% 0
Total	1

Q19 If you indicated you can send evidence in Q18, What type(s)? Check all that apply.

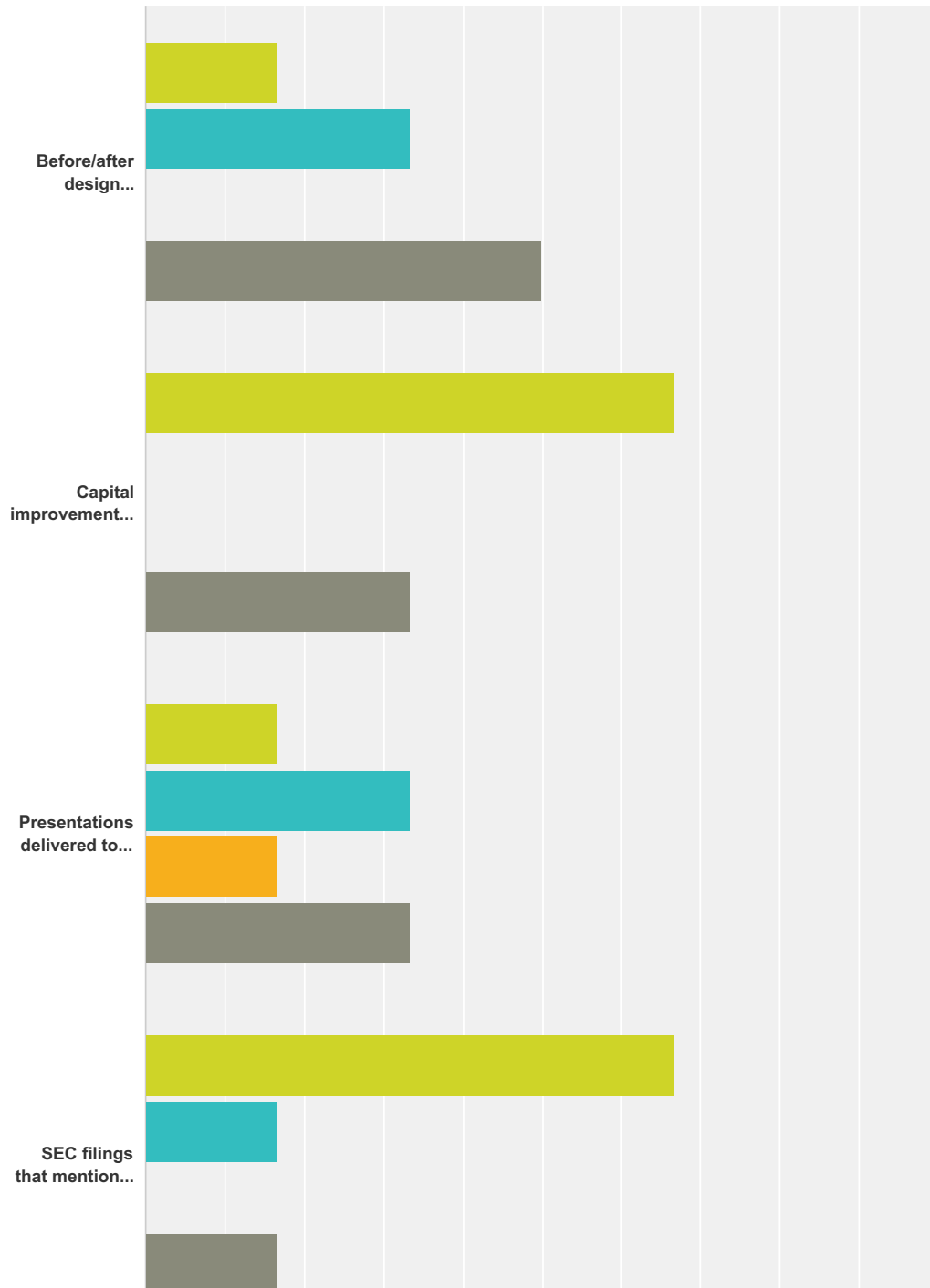
Answered: 4 Skipped: 16



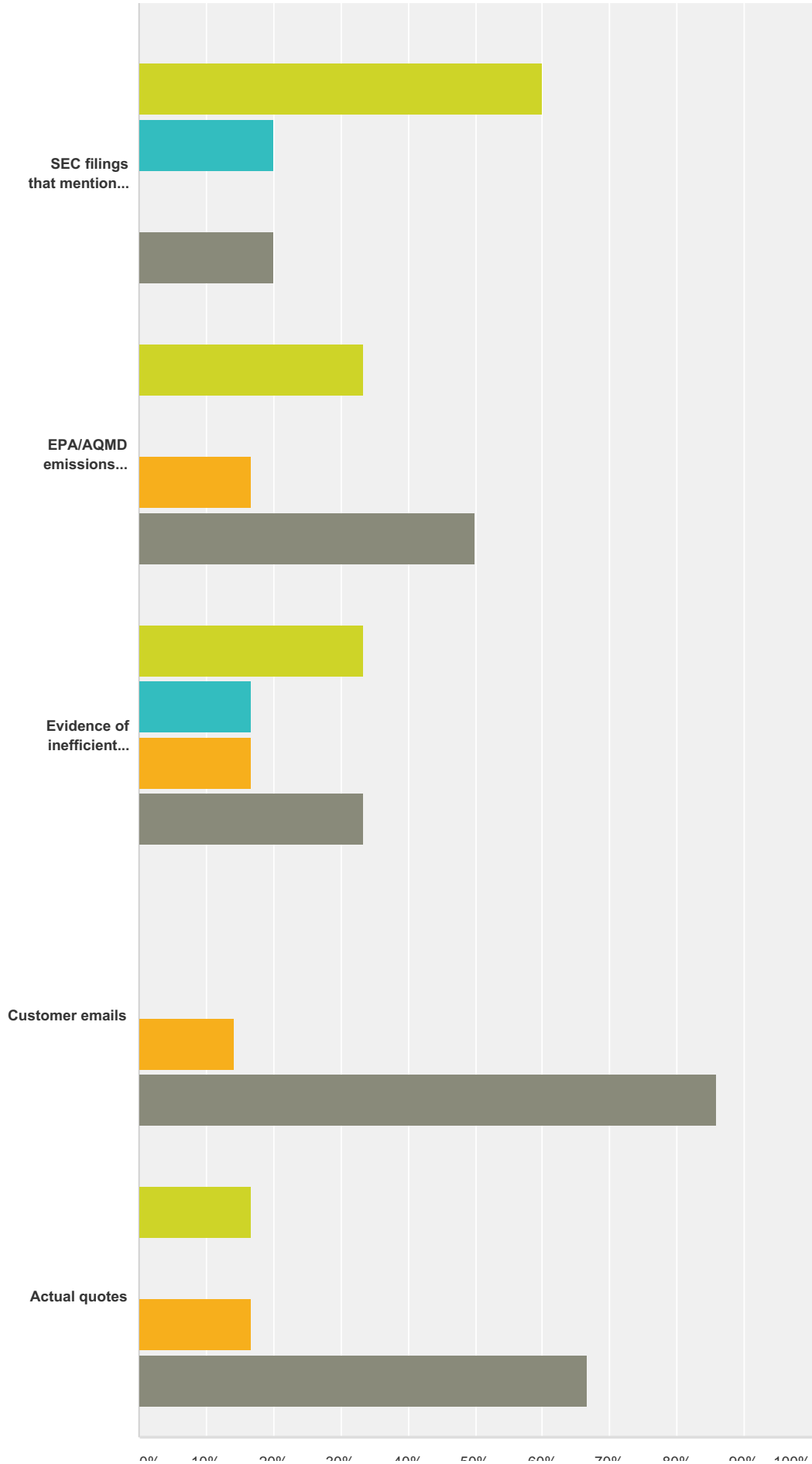
Answer Choices	Responses
A PDF or similar example of accepted or high value or rejected or low value evidence	0.00% 0
A narrative description of accepted or high value or rejected or low value evidence that expands on the current document's "page 11" descriptions.	50.00% 2
Explanation or other comments	75.00% 3
Total Respondents: 4	

Q20 The POE's list of types of evidence is intended to be illustrative, not complete. Other types were suggested for inclusion. Please indicate the number of times your organization either has submitted or reviewed each of the below other types of evidence not explicitly listed in the current POE document.

Answered: 7 Skipped: 13



Preponderance of Evidence - Week 2



Preponderance of Evidence - Week 2

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Never
 1-2
 3-5
 5+

	Never	1-2	3-5	5+	Total
Before/after design documents	16.67% 1	33.33% 2	0.00% 0	50.00% 3	6
Capital improvement budgets	66.67% 4	0.00% 0	0.00% 0	33.33% 2	6
Presentations delivered to persuade management to approve	16.67% 1	33.33% 2	16.67% 1	33.33% 2	6
SEC filings that mention specific planned investments	66.67% 4	16.67% 1	0.00% 0	16.67% 1	6
SEC filings that mention specific planned investments	60.00% 3	20.00% 1	0.00% 0	20.00% 1	5
EPA/AQMD emissions reductions documents	33.33% 2	0.00% 0	16.67% 1	50.00% 3	6
Evidence of inefficient replacement opinions already in house, such as redundant back-ups	33.33% 2	16.67% 1	16.67% 1	33.33% 2	6
Customer emails	0.00% 0	0.00% 0	14.29% 1	85.71% 6	7
Actual quotes	16.67% 1	0.00% 0	16.67% 1	66.67% 4	6

Q21 Any additional related comments

Answered: 4 Skipped: 16