

# California EM&V Framework Refresh Needs Assessment

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Final Report

October 11, 2017



Prepared by

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Final Report

# Evaluation Measurement & Verification Framework Refresh Needs Assessment

October 11, 2017

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## Executive Summary

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This report provides the findings of a needs assessment conducted by Research Into Action and Navigant Consulting (the project team) on behalf of the four California investor-owned utilities (IOUs), including Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), Southern California Gas Company (SCG), and Pacific Gas & Electric Company (PG&E), under oversight from the California Public Utilities Commission (CPUC) staff.

Published in 2004, the Framework was intended to provide a consistent, systemized and cyclic approach for planning and conducting evaluations of California's energy efficiency and resource acquisition programs. In 2013, in Rulemaking: R13-11-005 the CPUC indicated "a broader reexamination of Evaluation Measurement & Verification (EM&V) is in order." This needs assessment was conducted in direct response to that guidance.

The goal of the needs assessment was to identify whether there are ways to improve the usefulness and usability of the California Evaluation Framework (the Framework) and ensure its applicability to meet the energy efficiency evaluation needs of California given the changing policy and industry environments from 2017 forward.

## Conclusions and Recommendations

It is clear from the information collected through many stakeholder interviews in this study that there is a general awareness of the Framework (and the Evaluation Protocols) across all stakeholder groups and that the Framework has been used in the past but has ceased to be commonly used in recent years. The decline in use reflects three factors:

1. Those for whom the Framework is most relevant to their work became comfortable with the content after their first or second reading of the document and tended to use it only as an occasional reference document.
2. Changes in evaluation needs have occurred and either the Framework did not address the new needs, or the evaluation stakeholders sought to develop a solution without referencing the Framework, on the assumption that the Framework would not have a solution.
3. CPUC EM&V-related policy guidance outside of the Framework or Protocols has overshadowed the Framework and Protocols content.

This is not surprising as the Framework was last updated in 2006 and the introduction of new technologies, methodologies, data sources, and program designs in many cases have superseded the relevance of the Framework. In addition, new legislations and policies (e.g., Assembly Bill 802 (AB 802), Senate Bill 350 (SB 350), on-site generation, default baseline) have resulted in needed updates and changes.

The results of this needs assessment are that a process to refresh the Framework should begin as soon as possible, and because of their interconnection, the Evaluation Protocols should be included in that process. Further, given the many new entrants to energy efficiency programs in California including new

program administrators (especially Renewable Energy Networks (RENs), Community Choice Aggregators (CCAs), Local Government Partnerships (LGPs)) and third-party-designed and implemented programs, it is important that the revision process be conducted with considerable engagement by stakeholders to ensure that stakeholders understand the guidance and it is used and followed. Familiarity with the American Evaluation Association (AEA) guiding principles for evaluators can help guide this revision process. An emphasis on transparency, clarity, and stakeholder engagement as well as evaluation competence and integrity on the part of all parties to the evaluation process are key concepts to adhere to.

Below are the recommendation for near-term (2018-2019) initiation for the Framework and Protocol refresh, split into Organizational and Content categories:

### **Organizational:**

1. **The Framework and Protocols be converted into an Internet based document** that is easy access, simple to search, and readily updatable. As part of this process, **a system for tracking and logging changes should be implemented** to ensure that stakeholders know what has changed, when, and for what reason.
2. In addition to the online format and change management system, a **formal process for channeling relevant CPUC EM&V-related policy guidance** through the Evaluation Framework and Protocols in order to ensure these documents stay relevant with technological and regulatory changes.
3. Any changes and additions to both the Framework and Protocols need to be conducted as **transparent stakeholder processes**, with ample opportunity for input and comment. This directly addresses issues of Framework relevance through time.
4. Formal **scope and roles for both the Framework and Protocols** need to be established, communicated, and implemented **in all EM&V-related processes**.

### **Content:**

1. The discussion of **billing analysis** should be rewritten to incorporate new approaches and automated technologies using advanced meter infrastructure data in evaluation.
2. **Experimental design** using Randomized Control Trials (RCTs), Randomized Encouragement Designs (REDs), Quasi-Experimental Designs (QEDs) could be captured in the billing analysis section, but likely warrants a stand-alone section – especially since this topic was raised frequently.
3. We recommend that **behavioral programs** be addressed comprehensively through the development of a new chapter.
4. **Baselines** need to be addressed, as this issue has caused a lot of concern among stakeholders given recent policy concerning existing conditions baselines and discussions of dual baselines.
5. **Net-to-gross and attribution** continue to be paramount issues and concerns a wide range of stakeholders that need to be addressed for changing program environment.
6. **Codes and standards** need to be addressed in the Framework and Protocols.

7. The **cost effectiveness** discussion in the Framework will need to be updated once the current proceedings on the topic are resolved.
8. The **Framework as written is focused on programs**, not portfolios, not measure-based evaluation, and not on an integration of the ex ante process with the ex post evaluation process. Decisions will be needed during the refresh process to ensure that all aspects of California evaluation needs are addressed.
9. There is a high level of interest in improving the timeliness and usefulness of evaluations. Key tools for this are embedded evaluation, real time evaluation, developmental evaluation, and use of pilot programs. Further, the challenge many emerging technologies and new program designs face as they move into the regulatory environment needs to be addressed.

In addition to the recommendations above, the following are longer-term topics that should be addressed as follow-on activities for the EM&V Refresh as 2020 approaches.

1. **Integration with other protocols Uniform Methods Project (UMP), International Performance & Measurement Protocol (IPMVP)**, etc. should be explicitly addressed in terms of alignment in the refreshed California Evaluation Framework and Protocols.
2. **Distributed Energy Resources (DERs)** are increasing across California and there is no guidance on integrated evaluation. EE savings, distributed generation, storage, and demand response, and pricing effects intersect and help determine the value of the EE resource to the grid and California's Greenhouse Gas (GHG) Emission targets.
3. **Sampling and uncertainty** methods have evolved extensively, necessitating new guidance on the subject.
4. Though **market transformation** was addressed initially in the first framework document (Sebold, et al 2001)<sup>1</sup> the growing need for a defined market transformation evaluation process was mentioned multiple times by a number of study respondents.

A version of the Framework providing **specific guidance for implementers** will be welcomed by many stakeholders.

## Key Findings

The project team undertook three main activities in completing this study, including:<sup>2</sup>

- › An industry discussion at the 2017 California Efficiency and Demand Management Council (CEDMC)<sup>3</sup> Spring Symposium,

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<sup>1</sup> Sebold, Fredrick D., Alan Fields, Lisa Skumatz, Shel Fedlman, Miriam Goldberg, Ken Keating, Jane Peters. (2001) *A Framework for Planning and Assessing Publicly Funded Energy Efficiency*. Study ID PG&E-SW040.

<sup>2</sup> In addition to the three research tasks, the project team also presented the study findings at the CPUC EM&V Quarterly Meeting on September 12, 2017. A public comment period was opened and the research team received three comments. The comments and their resolutions are included in Appendix A.

<sup>3</sup> Formerly the California Energy Efficiency Industry Council (CEEIC).

- › A detailed policy review, and
- › Telephone interviews with California energy efficiency evaluation stakeholders.

## Overall Observations

- › The Framework is over a decade old and while new legislation in the State of California, such as AB 802 and SB 350, means updates to the document are warranted, it is apparent that other gaps exist.
- › Though most stakeholders are aware of the Framework and have read at least parts of it, it is also clear that there is confusion between the Framework and the California Evaluation Protocols. It is also clear from this study that the Framework update should not be conducted independent from a Protocols update. The two documents are inexorably linked and many of the needs raised in this study pertain to the Protocols as well.
- › While most stakeholders are familiar with the Framework and have read at least parts of it, not all remember what is in it. Some said they tend to disregard it because they read it once and it seemed to align with what they do, so they do not look at it anymore. Yet many of these same stakeholders asked for new or additional guidance that is already in the document.
- › Multiple stakeholders repeatedly stated that it is not clear whether the Framework is intended to be a prescriptive framework for conducting evaluation in California, or it is simply meant to be guidance. Greater clarity should be provided stating that the Framework is guidance and the Protocols are prescriptive.
- › A number of challenges exist with regards to updating the Framework. The ever-changing policy environment means that any useful Framework needs to be developed in a way that ensures it is easily updated in the future. Given the document's length, the project team recommends converting the Framework and Protocols into internet-based documents that are easier to access, simpler to search, and more readily updatable.
- › Stakeholders had two main opinions on how the Framework relates to other industry documents. One school of thought suggested that stakeholders update the Framework and Protocols with the aim of making them a national standard, not California specific. Alternatively, other respondents stated that California should rely on other national approaches like State and Local Energy Efficiency Action and the Uniform Methods Protocols.

## Detailed Findings on Key Need Areas

### 1. Uses of the Framework

- › The Framework has not kept pace with the changing technological and regulatory landscape. Respondents overwhelmingly feel guidance on newer or complex program types, such as behavior, codes & standards, and training & education warrant attention. Similarly, guidance on programs associated with newer technologies such as DE battery storage, and the water/energy nexus is needed. More traditional programs such as residential, commercial, and industrial

energy efficiency are less problematic, but likely warrant attention in the context of recent policy changes and new approaches to evaluation.

- › Respondents provided a wide range of recommendations for improving the Framework. Examples include making it more accessible (both physically and in terms of content), clarifying its role in the industry (prescriptive or just guidance), addressing new topics (programs, measures, and approaches), and ensuring it can stay timely and relevant in the ever-changing policy landscape.
- › Implementers as a group have prioritized providing timely input and minimizing programmatic and administrative burden compared to other stakeholder groups. Implementers also seem interested in embedded evaluation.
- › All interviewed stakeholders that are familiar with the Framework (especially evaluators) said they often encounter measures, programs, or situations that are not addressed by the framework. None said that this never happens.
- › Embedded evaluation warrants significant attention in any Framework refresh. The vast majority of respondents stated it was “important” or “very important” that the Framework address the topic. Implementers, in particular, noted this could do a lot to mediate expectations and provide more timely input to refine and improve program delivery.
- › Most respondents felt it is very important or important that the Framework be used by both program designers and implementers as well as program evaluators. Most felt the greatest value was in ensuring all parties know what each other are doing. The main concerns arose over the Framework not being used consistently.

## 2. Policy Changes that Affect the Evaluation Environment

What is the current requirement for evaluation, measurement, and verification (EM&V) for various energy efficiency (EE) and distributed energy resource (DER) policies (including AB 802, SB 350, integrated demand-side management (IDSM), baseline, market transformation, and behavior programs policies)?

- › The policy review suggests several recent policy decisions have immediate implications for the Framework. AB 802 and SB 350 will require special attention in a Framework namely due to Normalized Metered Energy Consumption (NMEC). DERs will need to be addressed to ensure integration with evaluation approaches in line with the CPUC Integrated Distributed Energy Resource (IDER) and Distributed Resource Planning (DRP) plans. Assembly Bill 32 (AB 32) and SB 350 mean greenhouse gas (GHG) reductions should also be addressed.
- › Information garnered from the policy review also suggests other topics likely warrant attention. EE and Demand Response (DR) joint programmatic costs and benefits may warrant attention as IOU programmatic efforts ramp up to better understand joint uses and benefits. EE as a DER should be addressed as well as issues related to how to assess their value to the grid as DERs (and EE as a DER) gain ground in the state.
- › With regards to the rolling portfolio, respondents felt that all of the topics currently contained in the Framework will likely require updating. Topics such as timing, a greater need for clarity and

transparency, new actors entering the mix (i.e., third-party implementation), policy shifts, new types of data (i.e., Advanced Metering Infrastructure [AMI]), and a greater call for collaboration are driving these needs.

- › With regards to the High Opportunity Program and Projects (HOPPs) process, few were aware if the Framework was even used in the proposals. None of the respondents were clear on why it was not used. Though some were surprised after revisiting the Framework as they indicated it almost certainly would have been applicable.

Does the Framework allow for or can it allow for new administrators, new program types, or conflicting objectives?

- › Regional Energy Networks (RENs), Community Choice Aggregators (CCAs), Local Government Partnerships (LGPs), and IOUs face mostly the same challenges as other organization types in terms of programs not being covered by the Framework. Most said they do have such programs. However, the REN/CCA/LGP group also raised the belief that they are different enough that they might need to be evaluated somewhat differently, though they did not clarify how. This might reflect that this group is new to evaluation and still trying to understand how evaluation will affect their programs.
- › When asked to rank timeliness, robust quality, and cost, all stakeholder groups ranked the quality of evaluations as most important, timeliness second, cost third.
- › When assessing levels of approval, most respondents (though there were some exceptions) tended to rank “acceptable” (meeting a majority of stakeholders’ requirements) as the most preferred, “good enough” (meeting a minimum set of requirements) second, and “fully vetted” (meeting all relevant stakeholders’ requirements as third). The cost and effort involved with trying to get all California stakeholders to agree was the most cited reason.
- › To address competing objectives, collaboration, mediating decision-making authority, ensuring stability and replicability, and ensuring adequate funding were the main recommendations.
- › Respondents noted some significant gaps in the Framework’s ability to incorporate new methods. Traditional contentious topics such as net-to-gross, attribution, and cost effectiveness top the list. Though methods tied to newer polices such as experimental designs, AMI data analysis, real-time evaluation, and NMEC also rise to the top.
- › Respondents provided a very long list of program types not adequately covered by the Framework. Many of these are newer programs such as behavior, and strategic energy management, but many are older program types, (like DR) that respondents do not feel are adequately addressed.

What information is necessary to meet current EM&V requirements for each policy?

- › When presented a list of 14 terms covering topics currently being discussed in the industry such as existing conditions baselines, measurement and verification (M&V) 2.0, pay for metered performance, energy storage, wind and solar generation, and others, respondents generally felt that all the terms need to be included in any update to the Framework. However, terms more closely associated with issues related to recent policy changes were generally rated as more important than terms associated with DERs.

- › When asked what types of studies need to be included in a Framework update, 9 of 12 listed topics were rated as important by 50% or more of the respondents. Low-income impact and process evaluations topped the list. The three topics ranked lowest were market structure and operations studies, research, development, and deployment (RD&D) program evaluation, and market share tracking studies.
- › New policies will require two main categories of information: (1) GHG and grid level information requirements, and (2) programmatic requirements (primarily related to AB 802), including NMEC, below/to-code, and behavioral requirements.

Does the new regulatory/economic/technical environment provide new opportunities for EM&V that cannot be or would be difficult to recognize within the context of the current Framework?

- › Chapter 5: Umbrella Roadmap will need updating to account for new timelines under the rolling portfolio.
- › Chapter 14: Evaluation and Cost Effectiveness will need updating to account for different evaluation approaches using NMEC as well as updates to account for any revisions to cost-effectiveness by incorporating societal costs such as the GHG adder or reverting to alternative tests. EE as a DER, EE and DR as a DER resource, and EE as a traditional program resource (for locational, temporal, or programmatic reasons) will also likely need to be addressed in revision to the Framework.
- › Though overarching studies have been conducted in California for some time, new materials providing guidance on studies such as measure saturation, market savings potential, and measure life may be needed as NMEC gains ground.

### 3. New and Emerging Methods and Data

Are there available methods for EM&V that were not addressed in the 2004 EM&V Framework and 2006 Protocols and DR Protocols but are important now and are the definitions of these clear?

- › Methods related to new policy decisions such as AMI data, real-time evaluation, M&V 2.0, NMEC, and submetering need to be addressed. Also, respondents are seeking greater clarity or revision to other topics such as net-to-gross, attribution, cost effectiveness, and experimental design.
- › A large number of respondents are seeking more guidance on behavior programs.
- › Similarly, many respondents are also seeking guidance on evaluating codes and standards efforts.
- › Over two-thirds of the respondents felt the definition of M&V 2.0 provided by the interviewers fully or mostly matched their understanding of the concept. However, defining M&V 2.0 will be a challenge for the remaining stakeholders as different individuals have varying ideas on what it means – or want it to mean. There is notable disagreement in areas such as the type of data it should involve and what other metrics might need to be included. Furthermore, some respondents are opposed to the notion of M&V 2.0 in general, as they do not feel it is doing anything to advance the industry.

- › There is significant familiarity with the UMP, but little consistency in how it might apply or be integrated into the Framework. Some people felt it should simply replace the Framework; others felt it should just be cited in the Framework; and yet others pointed out that the UMP is more akin to a set of protocols and has no relation to the Framework.

What data and methods needs emerge from policy/technological environment?

- › While the rolling portfolio will require some revisions to the Framework in the context of evaluation timing and planning (as discussed earlier), the biggest implications may be the need for additional research needed to better understand how the rolling portfolio will interact with other aspects of state policies and goals.
- › There is a large amount of uncertainty around the new default baseline and respondents do not feel the Framework currently provides adequate guidance on selecting different baselines. Further, 92% of respondents felt existing conditions baseline need to be addressed in an update.
- › Few respondents see the Framework as a resource for developing experimental designs or comparison group studies. This was one topic that arose multiple times throughout this study as a specific need.

To what extent should the Framework address evaluation reporting?

- › Few respondents mentioned a need for greater clarity on reporting guidelines anywhere in this study. This is not to say that respondents feel reporting in California is standardized, understood, and done in a consistent manner, but just that it did not arise as an area of concern like many other topics.

# 1. Introduction

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This report presents findings from a needs assessment conducted on behalf of the four California investor-owned utilities (IOUs), including Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), Southern California Gas Company (SCG), and Pacific Gas & Electric Company (PG&E), under oversight from the California Public Utilities Commission (CPUC).

The focus of this needs assessment is *The California Evaluation Framework*<sup>4</sup> (hereafter, the Framework). The goal of the needs assessment is to identify whether there are ways to improve the usefulness and usability of the Framework and ensure its applicability to energy efficiency evaluation given the changing policy and industry environments from 2017 forward.

## 1.1. Background

Evaluation, Measurement, and Verification (EM&V) of Demand Side Management (DSM) programs traditionally have relied on analysis after the fact and report their findings and recommendations after considerable time has passed over program implementation. But the energy landscape is changing, especially in California. Not only are new legislative mandates arising that dramatically increase energy efficiency goals and affect evaluation practices, but the industry and its relationship with customers is also changing.

Senate Bill 350 (SB 350) calls for a doubling of statewide savings in electricity and natural gas final end uses of retail customers by January 1, 2030, but also requires the state to get 50% of their power from renewable sources by 2030. Assembly Bill 802 (AB 802) provides flexibility by enabling the state's IOUs to use Normalized Metered Energy Consumption (NMEC) as the basis for the measurement of energy efficiency savings to bring existing buildings up to code. Together, these mandates will increase focus on energy efficiency and result in more aggressive energy savings goals for existing programs (and likely require new programs), while also allowing for more efficient, accurate, and timely EM&V, which in turn is expected to impact how DSM programs are designed and implemented.

At the same time, the electricity service industry is changing. The industry is transitioning from the traditional vertically integrated utility business model to an open market where the customer is at the forefront and has greater control over his/her interaction with the grid. Distributed energy resources (DERs) are playing a bigger part in the grid infrastructure, providing greater flexibility to customers regarding their choice of generation source, energy storage, participation in the electricity markets, and various DSM programs. While some equipment has the potential to revolutionize the way evaluators collect usage and behavior information and eliminate the need for site visits – thereby reducing study costs – there is little guidance on how to best implement such efforts. At the same time, the rapid pace of progress in information and communication technologies is bound to have a significant impact on EM&V. The increasing availability and use of the Internet of Things (IoT), or the network of smart objects

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<sup>4</sup> TecMarket Works Team. 2006. *The California Evaluation Framework*. Prepared for the California Public Utilities Commission. [http://www.cpuc.ca.gov/uploadedFiles/CPUC\\_Public\\_Website/Content/Utilities\\_and\\_Industries/Energy/Energy\\_Programs/Demand\\_Side\\_Management/EE\\_and\\_Energy\\_Savings\\_Assist/CAEvaluationFramework.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/CAEvaluationFramework.pdf)

that can collect and exchange data and be controlled remotely, is expected to allow for cheaper field data collection and the increased connectivity of such devices will enable near real-time data collection and allow for the measurement of savings as they happen.

As the industry works to adapt to these changes, the fundamental question that needs to be answered prior to any EM&V work is: “What kind of EM&V should be conducted, at what frequency, and at what cost?” However, while it may have been relatively easy to answer these questions in the past, under the new environment with the confluence of new regulations, new program types, and new EM&V methods, it seems that it is becoming increasingly difficult for the various stakeholders to find the information they need, or obtain the guidance necessary, to meet regulatory oversight and provide program administrators with the insights they need to assess and improve programs.

Perhaps a critical take away for EM&V’s continued success in its near to long term future is that the evaluation culture must have its roots deeply embedded in the organizational structure and work in a continual loop for meaningful impact. Such a support structure is also critical for EM&V’s success at the regulatory level.

Evaluation needs for 2018 and beyond are expected to be driven by policy and the changing industry landscape and guidance provided to stakeholders needs to stay apace of these changes. Ultimately, the guidance provided to stakeholders on how EM&V should be done needs to meet regulatory needs, but also needs to ensure evaluation studies are designed, structured, and implemented in ways to maximize their effectiveness and usefulness. In California, the main source of evaluation guidance is the California Evaluation Framework and the Evaluation Protocols.<sup>5</sup> This needs assessment targets the Framework, probing many of these issues and identifying gaps that might need to be addressed moving forward. However, this needs assessment will not develop solutions. Those will be addressed in a second phase of the project.

## 1.2. Research Objectives

The following are summaries of the three primary areas of focus for this needs assessment. The formal research objectives and research questions addressed under each topic are detailed in the respective chapters.

- › Uses of the Framework (Chapter 3)
  - How the Framework is used, who uses it, why it is and is not used and who should use it?
  - Can the Framework be more useful, more relevant, more available, or more user friendly for existing and new users?
- › Policy Changes that Affect Evaluation Environment (Chapter 4)
  - What are the effects of recent policy changes on evaluation? Specifically, SB 350; AB 802; AB 758, default baselines, the rolling portfolio, and the presence of varying types of programs

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<sup>5</sup> The Evaluation Protocols “guide the efforts associated with conducting evaluations of California’s energy efficiency programs and program portfolios launched after December 31, 2005”. pp.1. *TecMarket Works Team. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.* Accessed July 7, 2017. <http://www.calmac.org/publications/EvaluatorsProtocols%5FFinal%5FAdoptedviaRuling%5F06%2D19%2D2006%2Epdf>

administrators and implementers (Regional Energy Networks [RENs], Public-Owned Utilities [POUs], third parties, etc.).

- What are the challenges for doing embedded evaluation under the current Framework and what guidance might be helpful for programs and processes?
- Does the Framework have sufficient flexibility for other types of evaluations?
- Is the Framework sufficiently flexible to allow for changes to cost effectiveness provisions?

### › New and Emerging Methods and Data (Chapter 5)

- Are there useful or emerging methods that the Framework does not address? Such as new measurement and verification technologies or methods, greenhouse gas (GHG) estimation, Uniform Methods protocols (UMP), default baselines, big data predictive modelling, experimental design?
- Are there technologies that are not addressed in the Framework that should be considered for evaluation of energy efficiency (EE)/DSM/integrated demand-side management (IDSM)? Such as Advanced Metering Infrastructure (AMI) data, distributed generation, storage, ancillary services, communicating IoT devices (thermostats, lighting, controls, etc.).

A boundary for the needs assessment is generally energy efficiency evaluation, but in the current and future context, energy efficiency evaluation must include other DERs and integrated demand side management. Further, programs of the future may have different definitions than that used by the Framework. Thus, the needs assessment seeks to be inclusive of the issues that affect energy efficiency program evaluation, without being overly expansive.

## 1.3. Report Organization

The remainder of this report is organized into five chapters. Chapter 2 describes the study methodology, outlining the three main research activities conducted for this needs assessment. Chapter 3 presents the findings associated with the first research topic – use of the framework, Chapter 4 presents findings associated with the second research topic – policy changes that affect the evaluation environment, and Chapter 5 presents the findings associated with the final research topic – new and emerging methods and data. The final chapter, Chapter 6, presents the research team’s conclusions and recommendations.

## 2. Methodology

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The project team undertook three main activities in completing this study, including:<sup>6</sup>

- › An industry discussion at the 2017 California Efficiency and Demand Management Council (CEDMC)<sup>7</sup> Spring Symposium,
- › A detailed policy review, and
- › Telephone interviews with California energy efficiency evaluation stakeholders.

The rest of this section describes each of these activities.

### 2.1. CEDMC Symposium Industry Discussion

The project team led a discussion on April 25, 2017 at CEDMC's Spring Symposium. All attendees were welcome to attend the discussion. The discussion covered a relatively narrow range of high-level issues meant to familiarize the project team with stakeholders' opinions:

- › How aware are stakeholders of the Framework?
- › How effective is the Framework in providing guidance on how to do evaluations in California?
- › Are there any evaluation studies that have been conducted or are now needed that are not defined in the Framework?
- › Are there technologies not addressed in the Framework that should be?

The findings from the symposium discussion are worked into the findings presented throughout this report, where relevant. Notes from the discussion are provided in Appendix B.

### 2.2. Policy Review

The project team conducted a comprehensive review of a wide range of policy documents affecting evaluation in California, including:

- › California AB 802 High Opportunity Program and Projects (HOPPS)
- › Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs and Projects (December 30, 2015) (a.k.a. "HOPPS Ruling")

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<sup>6</sup> In addition to the three research tasks, the project team also presented the study findings at the CPUC EM&V Quarterly Meeting on September 12, 2017. A public comment period was opened and the research team received three comments. The comments and their resolutions are included in Appendix A.

<sup>7</sup> Formerly the California Energy Efficiency Industry Council (CEEIC).

- › “CPUC Staff White Paper on Energy Efficiency Baselines for Implementation of Assembly Bill 802”
- › California SB 350
- › California AB 758
- › CPUC Decision 15-10-029 – Energy Efficiency Goals for 2016 and Beyond and Energy Efficiency Rolling Portfolio Mechanics
- › CPUC Decision 16-08-019 - Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings

The goals of the policy review were to extract key information to answer an array of different research questions related to how current policies are affecting evaluation in California, focusing especially on new policy changes that might create gaps in Framework coverage.

## 2.3. Stakeholder Interviews

In order to collect in-depth stakeholder input, the project team also conducted telephone-based interviews with a range of different stakeholder organizations participating in the California energy efficiency industry. The organization types included in this study are:

- › Regulators
- › Investor-Owned Utilities (IOUs)
- › Community Choice Aggregators (CCAs)
- › Regional Energy Networks (RENs)
- › Local Government Partnerships (LGPs)
- › Evaluation Firms
- › Third-party Implementers
- › Data Analytics Vendors
- › Other Parties

A complete list of participant organizations is included in Appendix C.

### 2.3.1. Sample Frame Development

The sample frame for this needs assessment was developed from a number of sources with the intent of capturing the broadest range of possible stakeholders currently doing work in California or known to have expressed interest in working in California. The project team first requested interested parties to contact that research team during the research plan workshop February 2, 2017, the team compiled population files for stakeholder groups of known entities (IOUs, LGPs, RENs, CCAs, regulators, and other parties), elicited participants from the CEDMC discussion, and collected membership lists from the CEEIC to derive sample frames for other groups (evaluation firms and implementers). One added respondent asked to participate at a later date and their responses to the study were also included. In addition, the project team utilized a list of data analytics vendors developed by Navigant Consulting. The lists were de-duplicated to ensure each organization (the unit of analysis) only appeared once in the sample frame and were assigned to each of the organization types included in the study. Interview respondents were then sampled randomly from each organization type.

### 2.3.2. Interview Development

The intent of the interviews was to collect as much systematic, quantitative information as possible from interviewees while leaving significant opportunity for the informants to provide other, more qualitative input. Thus, the project team designed the interview guide with both closed- and open-ended questions. Also, the design of the interviews allowed interviewees to give free-form comments on any topic discussed, which the project team captured during the interviews.

The project team first developed a draft interview guide, which was submitted to the external project team made up of IOU and CPUC representatives for review. After receiving comments and suggestions from the external team, the project team developed a final interview guide that we programmed into the Qualtrics survey platform to aid in the interview process. The final interview guide is included in Appendix D.

### 2.3.3. Interview Protocols

The project team conducted interview participant recruitment by sending an initial email to randomly selected members from the sample. If no response was received within three days, the email was followed-up with a phone call. The same cycle was repeated up to three times (i.e., three emails and three phone calls) before a potential organization was replaced.

During the recruitment call, the project team worked to make sure we were talking with the person or persons at the organization most familiar with evaluation, especially evaluation in California. After we explained the study to the potential participants we set an appointment to conduct the interview at a later date. Interviews were generally conducted as group interviews to ensure we captured a range of opinions from each organization, thus the initial recruitment call often involved working with a representative from the organization to help with scheduling and logistics.

All but two of the interviews were conducted over the phone. One was conducted in-person; another was completed as an online survey. The shortest interview was about 30 minutes; the longest lasted over 3.5 hours over two separate sessions. No incentives were paid to study participants.

### 2.3.4. Analysis and Reporting

Throughout this report, we summarize findings from the closed-ended interview questions in two main ways. First, when discussing the entire group of respondents or many respondents, we present percentages (e.g., 23 of 40 respondents – or 56%), as there are adequate sample sizes to make such a presentation of a proportion meaningful and insightful. Second, in many other sections, especially when discussing the subgroups of stakeholders, percentages are not given, as the total number of respondents is not large enough to make percentages reliable. Regardless, throughout the reporting of the closed-ended questions, the number of respondents that selected an option out of the valid set (e.g., 3 of 7) is always reported to assist the reader in drawing their own interpretations. Also, because of the overall size of the study (a total of 44 completed interviews), none of the results were subjected to statistical testing as the result of these tests would not be reliable or informative.

When reporting the open-ended responses and the large amount of additional comments that were provided by the interviewees through their free-form contributions, we are generally conversational in tone. Here it is worth noting that the project team collected a very large amount of information (some interviews lasted multiple hours), there was a wide range of topics the interviewees brought up (a great many that were not even related to the questions at hand, but some that we still consider important to report), and we had rather small sample sizes after sorting through open-ended or free-form comments. Thus, to make the report more readable, instead of saying things like “Three of twelve respondents said... we opted for “A few respondents said...” Likewise, instead of “Three of four respondents indicated...” we opted for “Most respondents indicated...”

Finally, throughout this report, we report statements provided by the interviewees. Though some may appear inaccurate, the goal of qualitative research is not to assess the accuracy or legitimacy of what respondents say. Rather, the goal of qualitative research is to report exactly what people say – right or wrong – as these statements reflect peoples’ perceptions, beliefs, and understanding of situations. Failing to take statements into account because they may seem factually inaccurate risks disregarding important insights that need to be considered when planning an effective strategy for moving forward.

### 2.3.5. Interview Dispositions and Response Rate

The project team targeted the completion of 43 telephone interviews across nine different organization types (see Table 2-1). A total of 44 interviews were ultimately completed after contacting 70 potential study recruits. Only two contacts refused to take part; the remaining non-respondents were due to the inability to reach the potential recruit via telephone or email with multiple attempts via each medium. The total response rate for this study was 63%.

**Table 2-1: Interview Dispositions**

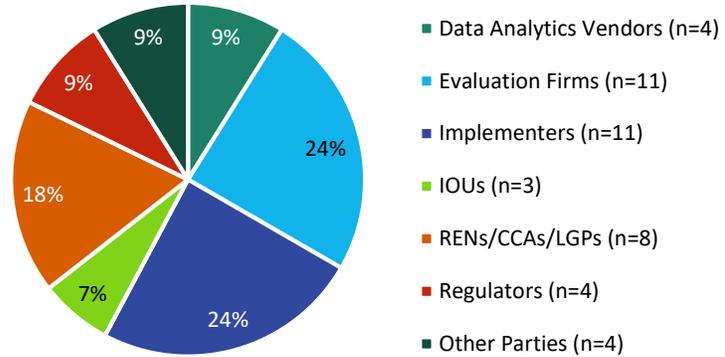
Disposition	Data Analytics Vendors	Evaluation Firms	3rd-Party Implementers	IOUs *	CCAs	RENS	LGPs	Regulators	Other Parties	Total
Contacted	5	14	29	3	3	2	5	5	5	71
Refusal and Break-Off			1					1		2
Non-Contact	1	3	17		1	1			1	24
Targeted	4	10	10	3	1	2	4	5	4	43
<b>Completed</b>	<b>4</b>	<b>11</b>	<b>11</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>45</b>
<b>Response Rate</b>	<b>80%</b>	<b>79%</b>	<b>38%</b>	<b>100%</b>	<b>67%</b>	<b>50%</b>	<b>100%</b>	<b>80%</b>	<b>80%</b>	<b>63%</b>

\* SCG and SDG&E are combined as a single case throughout this study signifying Sempra.

### 2.3.6. Interview Participants

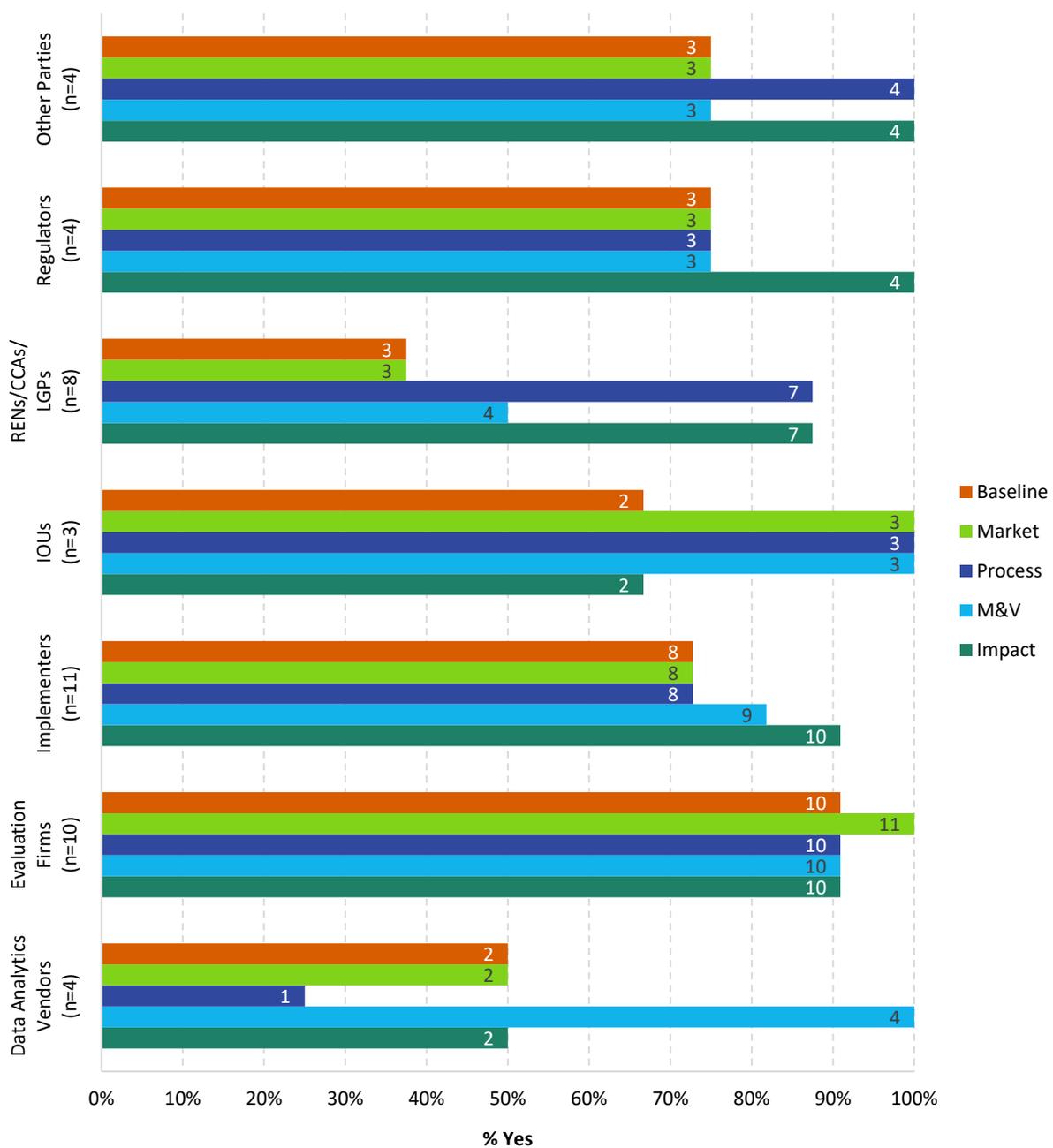
CCAs, RENs, and LGPs are similar in their administration of programs and general experience with evaluation. As such, to reduce the number of reporting groups and bolster subgroup sample sizes, we combined these three organization types into a single organization type – REN/CCA/LGP. Figure 2-1 shows the final distribution of study participants used through the rest of this report.

**Figure 2-1: Study Participants by Organization Type**



The project team included three screening questions to further classify study participants to better understand the respondent pool and ensure everyone received proper questions. Informants were first asked to indicate what evaluation types they had experience with. Figure 2-2 shows that all organization types had at least some experience with each of the evaluation types, though the data analytics vendors and the RENs/CCAs/LGPs tended to have slightly less evaluation experience than the other participants.

Figure 2-2: Respondent Experience with Various Types of Evaluation



S2: Which types of evaluation do you have experience with?

The project team also asked study participants to indicate which program areas they had experience with. Figure 2-3 shows that residential, commercial, and industrial energy efficiency programs were the most common program types, followed closely by behavior programs. Distributed generation and storage as well as the energy/water nexus were the program types the informants had the least experience with.

Figure 2-3: Respondent Experience with Various Types of Programs

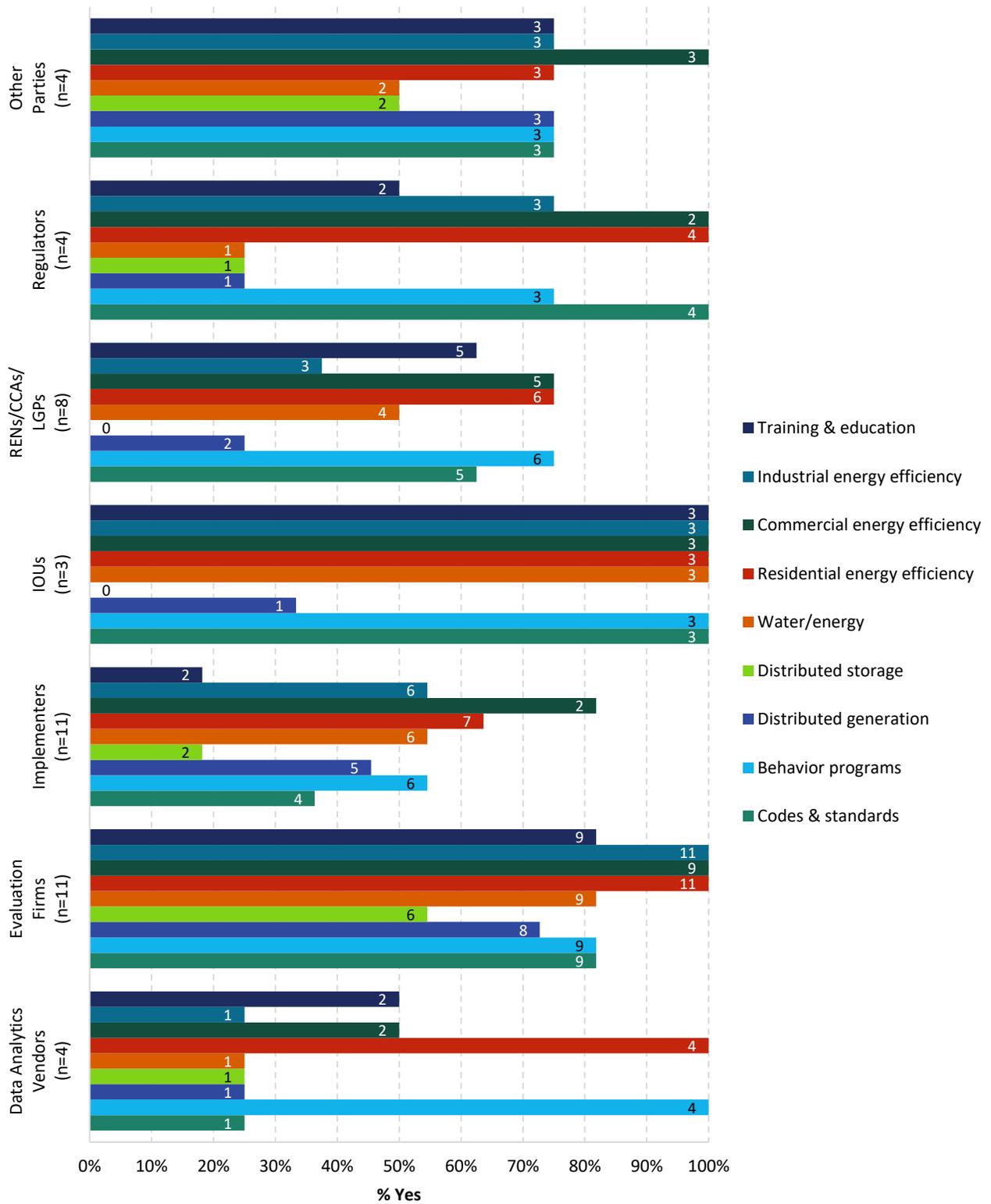
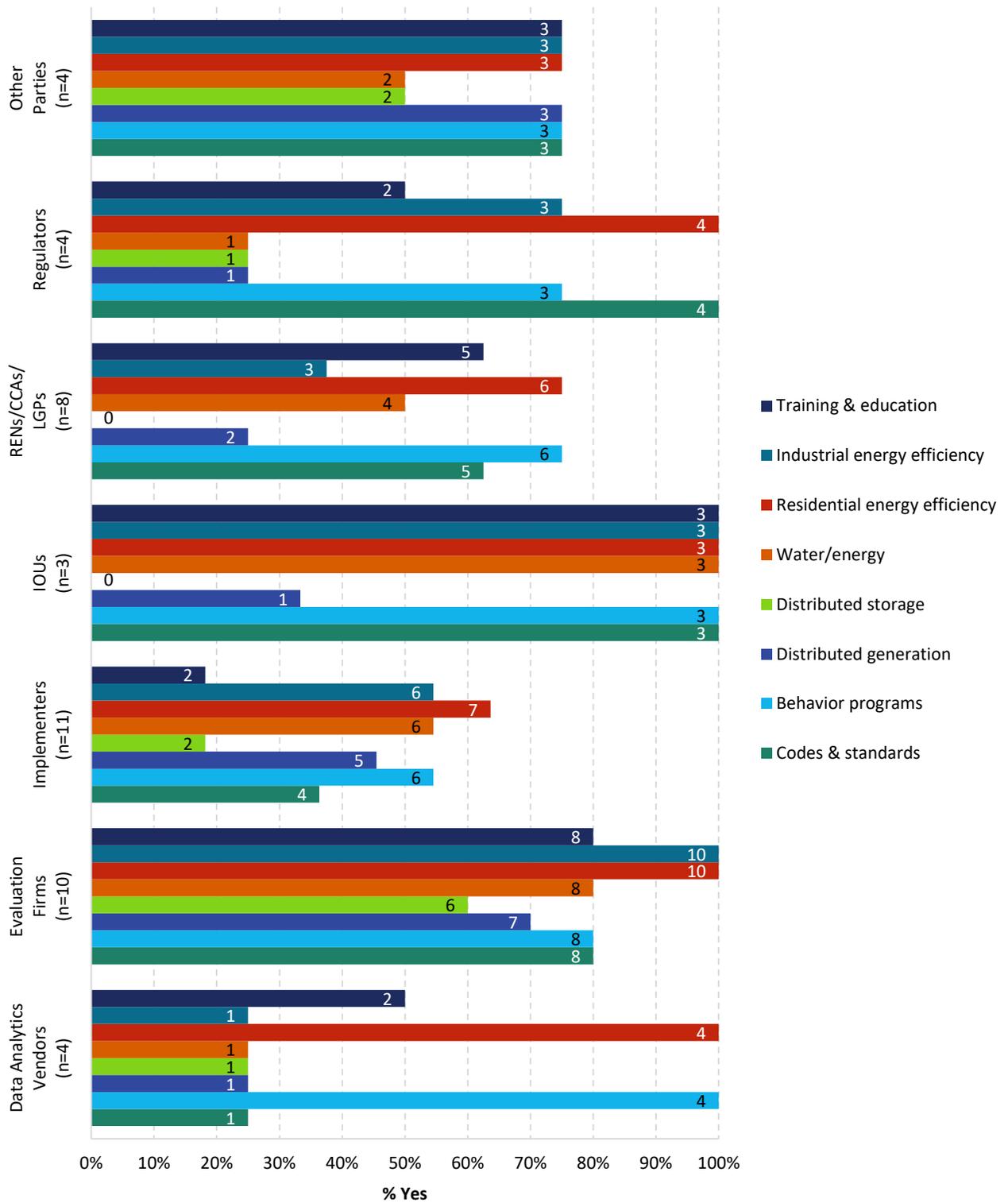


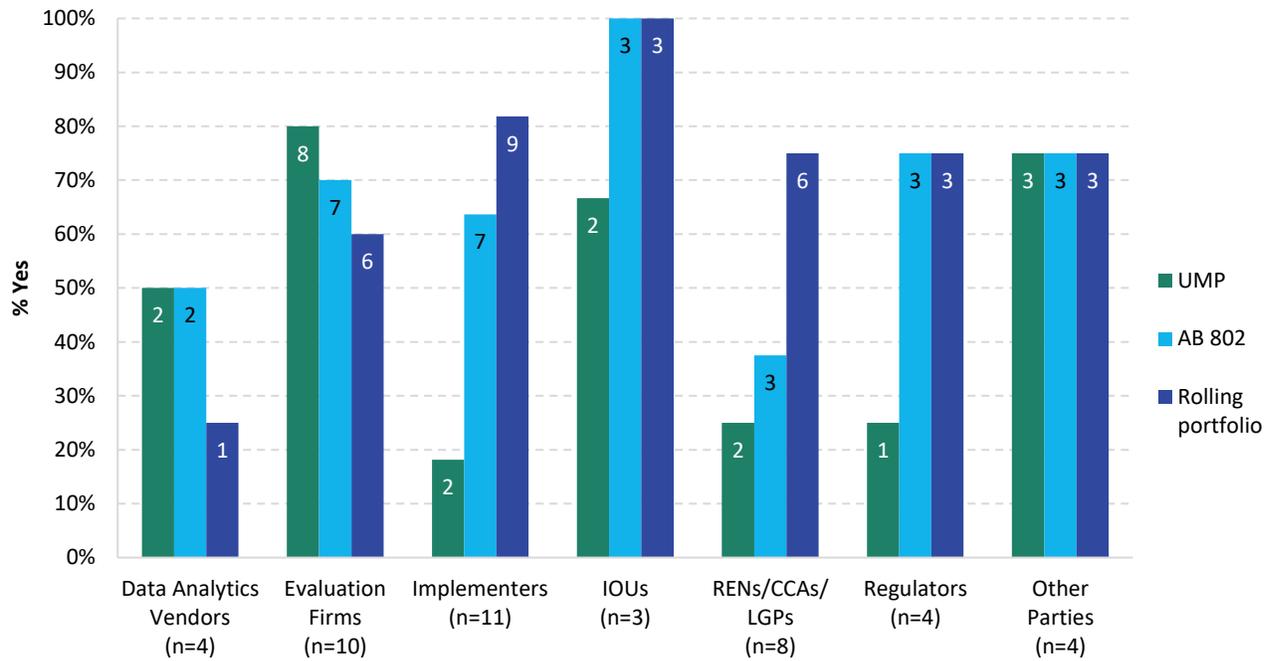
Figure 2-3 Continued



S3: Which of these program areas do you have experience with?

Finally, the project team asked participants to indicate whether they had experience with three key policy areas, including the Uniform Methods Project (UMP), AB 802, and the rolling portfolio. Figure 2-4 shows that members of all groups had at least some experience with each of the topics, with exposure to AB 802 and the rolling portfolio being most common.

**Figure 2-4: Respondent Experience with Various Types of Policy and Evaluation Topics?**



S3: Which of the following policy and evaluation areas have you had recent experience with?

### 3. Findings on Uses of the Framework

This section of the report presents the findings related to how stakeholders use the Framework. Table 3-1 shows the needs assessment research objectives for this topic mapped out to the specific research questions addressed in the report.

**Table 3-1: Uses of the Framework: Research Objectives and Research Questions**

Research Objective	Research Questions
To what extent is the Framework known by those who were the intended audience?	<ul style="list-style-type: none"> <li>• Which organizations are aware of the Framework, how deeply are the organizations aware?</li> </ul>
To what extent is the Framework being used and followed, by whom and under which circumstances?	<ul style="list-style-type: none"> <li>• How do implementers view the Framework when designing programs?</li> <li>• Have evaluators encountered measures/programs/situations that were not addressed by the framework?</li> <li>• What does the Framework suggest to program designers about embedded evaluations?</li> <li>• What approaches under the established and relevant processes might be developed so that the Framework could be better utilized?</li> <li>• What does the Framework say about evaluations helping understand the underlying mechanism of a program’s/measure’s realized impact?</li> <li>• Is it important to improve accessibility or awareness or both?</li> </ul>

#### 3.1. Awareness of and Familiarity with the Framework

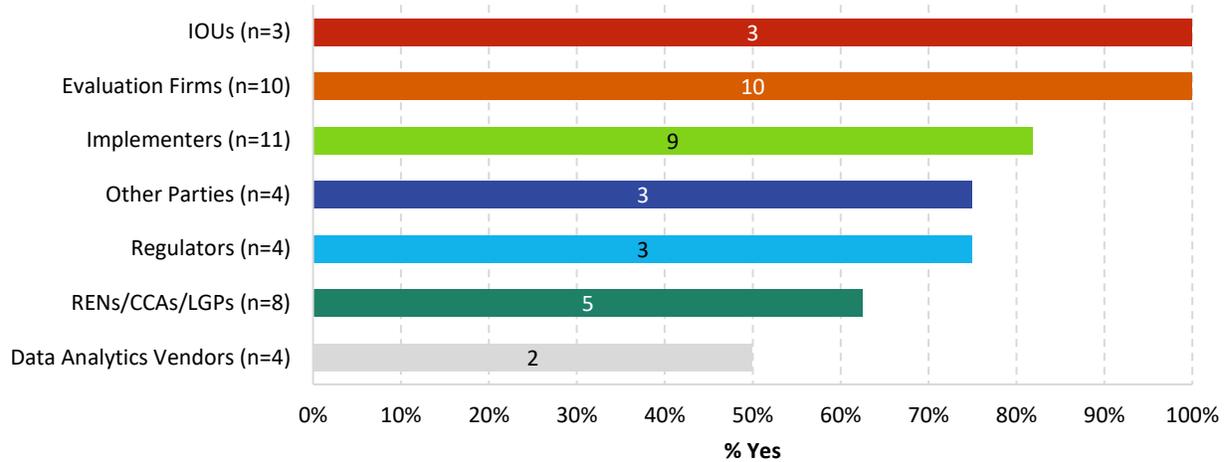
The first research objective addressed was to better understand the extent to which stakeholders were aware of the Framework, and for those that were aware, how deeply were they familiar with it. Key findings from this section include:

- › There is a high degree of *awareness* among stakeholders of the Framework – 35 of 44 total respondents (80%) heard of or have used the Framework.
- › There is a high degree of *familiarity, but only with parts* of the Framework – 22 of 35 (63%) said they have only read parts of the Framework; only 7 of 35 (20%) said they have read all of it.
- › But the Framework *may be losing some of its relevance* – 16 of 28 (57%) of the respondents stated they “rarely” or “never” refer to the Framework; only 12 of 28 (43%) indicated they refer to it “sometimes”; none indicated they refer to it “often.”

The project team first asked respondents if they heard of or used the Framework in their work. Figure 3-1 shows a high degree of awareness of the Framework with 35 of the 44 total organizations (80%) saying that they had heard of or used the Framework. All organization types heard of or used the Framework, with the greatest frequency, as one might expect, among IOUs (3 of 3) and evaluation firms (10 of 10), and the lowest frequencies among data analytics vendors (2 of 4) and the RENs/CCAs/LGPs (5

of 8). In between these two extremes were the third-party implementers (9 of 11), other parties (3 of 4), and the regulators (3 of 4).

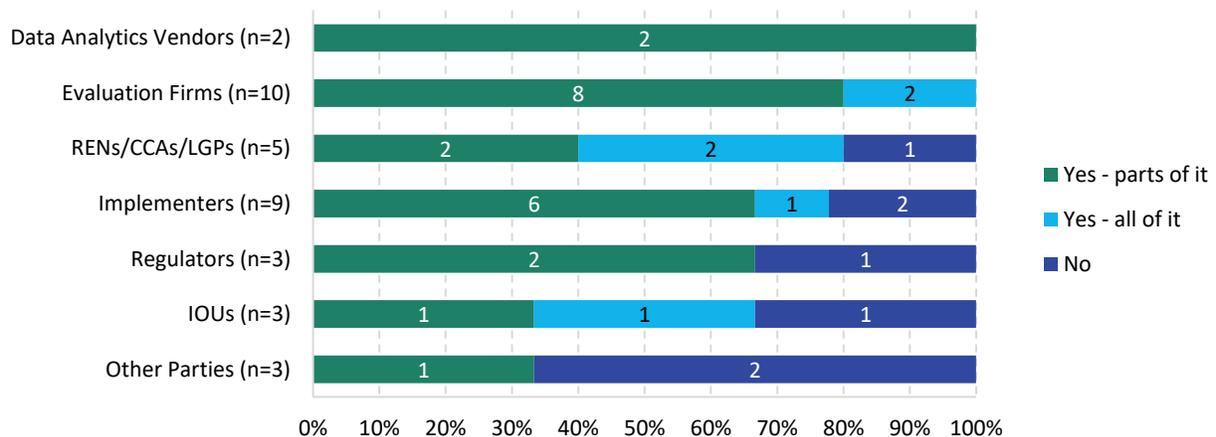
**Figure 3-1: Heard of or Used the Framework**



Q1: Have you heard of or used the California Evaluation Framework for evaluation, program design, or program implementation?

Respondents that were familiar with the Framework were next asked if they had read or referred to the Framework, and if so, *all* the document or just *parts of it*. Figure 3-2 shows that the majority of the respondents that were familiar with the Framework (22 of 35, or 63%) read or referred only to parts of the document. Only 6 of 35 (17%) indicated they have read or referred to all of the document. The remaining 7 of 35 (20%) indicated they have not read or referred to any of the Framework.

**Figure 3-2: Read or Referred to the Framework**

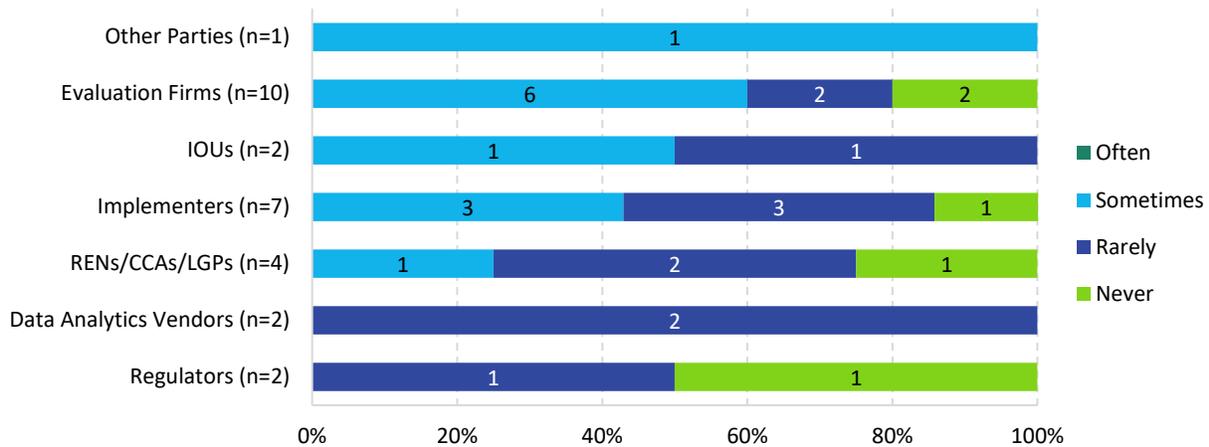


Q2: Have you read or referred to the California Evaluation Framework?

Finally, the project team asked the respondents that have read or referred to the Framework, how often they refer to it. Figure 3-3 reveals that none of the 28 respondents said they refer to it “often.” The

majority (16 of 28, or 57%) indicated they “rarely” or “never” refer to the Framework. Only 12 of 28 (43%) indicated they refer to it “sometimes.”

**Figure 3-3: How Often Refer to Framework**



Q3: Would you say you often, sometimes, rarely, or never refer to the California Evaluation Framework for your evaluation or program design and implementation work?

A few of the open-ended responses from this section of the interview revealed that organizations had greater familiarity with the Evaluation Protocols than with the Framework – and for some there was confusion between the two documents that seemed to carry through the entire interview. Many informants stated that while they had read at least parts of the Framework in years past, they have not even looked at the document in recent years. Some of these respondents indicated that they felt that they knew what was in it and their knowledge and evaluation practices aligned with what they knew to be in the Framework, so there was no need refer to it on an ongoing basis. However, it also became clear throughout the interviews that even though many people thought they were aware of the Framework contents, many were unaware that certain topics were covered in it. Thus, strategies for keeping the document relevant and ensuring stakeholders re-engage with it periodically should be considered moving ahead.

Table 3-2 somewhat confirms the lack of use of the Framework and the associated California Evaluation Protocols in recent year, we conducted a search of CALMAC.org using the term “protocol” (August 17, 2017). The search found 64 documents, of these, most reports (33) were referencing the DSM evaluation protocols adopted by the CPUC in D.93-05-063 in 1993. See sidebar. The failure to reference the California Evaluation Protocols of 2006 across the vast majority of evaluations conducted since 2010 is striking.

**Table 3-2: Disposition of 64 documents responding to search term “protocols” August 17, 2017)**

Protocol Referenced	Pre 2006	2006-2010	Post 2010
Not referencing an M&V protocol	2		3
DSM 1993 Protocols	33	2	
EM&V 2004/06 Protocols		8	1
IPMVP	10		
Evaluation Framework, EM&V Protocols, or DR protocols	1	3	
<b>Total</b>	<b>47</b>	<b>13</b>	<b>4</b>

## 3.2. Stakeholder Groups Use of Framework

In this section, we discuss to what extent the Framework is used and followed, by whom, and under which circumstances. More specifically, we address: (1) how implementers view the Framework when designing programs, (2) whether evaluators encounter measures, programs, or situations that are not addressed in the Framework, (3) embedded evaluation, (4) what approaches might be developed to improve the Framework, (5) whether the Framework helps stakeholders understand the underlying mechanisms to improve impacts, and (6) improving accessibility and awareness of the Framework. Key findings from this section include:

- › Implementers do not tend to use the framework differently than other stakeholders, however, when it comes to requested changes to the Framework, they tend to emphasize providing timely input and minimizing programmatic and administrative burden more than other stakeholders. Implementers also seem keenly interested in embedded evaluation.
- › All interviewed stakeholders with a high degree of familiarity with the Framework – and especially evaluators – said they encounter measures, programs, or situations “often” (4 of 9, or 44%) or “sometimes” (5 of 9, or 56%) that are not addressed by the framework; none said “rarely” or “never.”
- › Embedded evaluation warrants significant attention in any Framework refresh. The majority of respondents (36 of 40, or 90%) stated it was “important” or “very important” that the Framework address the topic. Implementers especially reflected positively on the notion, feeling it could do a lot to mediate expectations and provide more timely input to refine and improve program delivery.
- › Respondents provided a wide range of recommendations for improving the Framework. Examples include making it more accessible (both physically and in terms of content), clarifying its role in the industry (prescriptive or just guidance), addressing new topics (programs, measures, and approaches), and ensuring it can stay timely and relevant in the ever-changing policy landscape.
- › Neither the Framework nor the industry at large seem to be keeping pace with the changing industry. Respondents overwhelmingly feel guidance on newer or complex program types, such as behavior, codes & standards, and training & education warrant attention. Similarly, guidance on programs associated with newer technologies such as DE battery storage, and the water/energy nexus are underserved. More traditional programs such as residential, commercial, and industrial energy efficiency are less problematic, but likely warrant attention in the context of recent policy changes and new approaches to evaluation.
- › Most respondents felt it is very important (64%) or important (9%) that the Framework be used by both program designers and implementers as well as program evaluators. Most felt the greatest value was in ensuring all parties know what each other are doing.
- › Some respondents voiced concern over the fact that certain common processes are not addressed in the Framework. This came up several times during the interviews, especially in the context of commercial programs, where the custom project review process was cited as an area that presents significant uncertainty. Respondents felt the process and rules are not applied transparently or consistently. Since the custom project review process is not currently discussed

in the Framework, providing codified guidance on issues such as how baselines should be developed and used, as well as issues around attribution and net-to-gross, could do a lot to alleviate some of these concerns.

### 3.2.1. Implementers View of the Framework when Designing Programs

As noted above, implementers were generally aware of the Framework (9 of 11), have read all of it (1 of 9) or parts of it (6 of 9), but like most other stakeholder groups, do not commonly refer to it or cite it (only 3 of 7 said “sometimes”). In general, implementers’ use of the Framework does not differ dramatically from others’ use of the Framework. However, they tend to emphasize more than some other groups topics such as needing timely input to inform program delivery and ensuring evaluations are not so burdensome that they prohibit programs from reaching their full potential.

What implementers would like to see in terms of updates were often focused on preserving their interests. This is not meant to imply that they are focused on gaming the system or only advancing their personal interests, but rather, they want potential strategies for better addressing some contentious issues such as timeliness, cost effectiveness, net-to-gross and other issues commonly debated in the industry (though this is also the case for some other groups such as IOUs and evaluation firms).

A notable finding is that many implementers were rather positive about the notion of embedded evaluation as they felt that such a process can help alleviate a lot of the uncertainty they suffer as they wait (often years) for evaluation results of their programs to come out. They especially liked the idea that with embedded evaluation evaluators can provide early feedback to help implementers improve programs midstream to ensure continual improvement and hopefully avoid poor evaluation outcomes down the road.

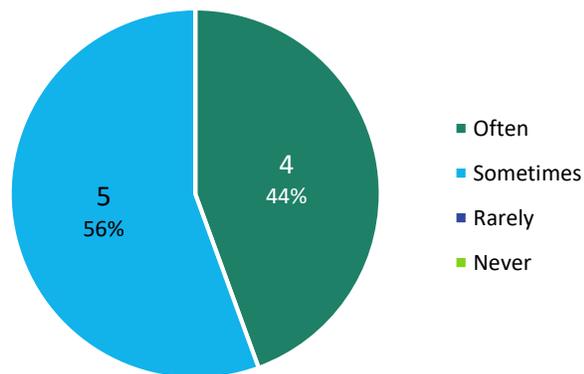
### 3.2.2. Measures, Programs, or Situations Not Addressed by Framework

The project team asked respondents that showed a high degree of familiarity with the Framework (those that said they use or refer to it “often” or “sometimes”) how often they have encountered measures, programs, or situations that were not addressed by the Framework. Figure 3-4 shows that of the nine respondents that could answer this question, all said they encounter such issues “often” (4 of 9, or 44%) or “sometimes” (5 of 9, or 56%). None of the informants said “rarely” or “never.”

When probed further about what specific measures, programs, or situations they face that the Framework does not address, respondents gave a wide range of

responses. Most organizations gave more than one response. Also incorporated here are comments provided by participants of the CEDMC discussion. It is worth noting that several of the items provided

**Figure 3-4: How Often a Measure/Program/Situation Not Addressed by the Framework? (valid n=9)**



Q7: In your work doing program design or evaluation, have you often, sometimes, rarely, or Never encountered a measure/program/situation that was not addressed by the Framework?

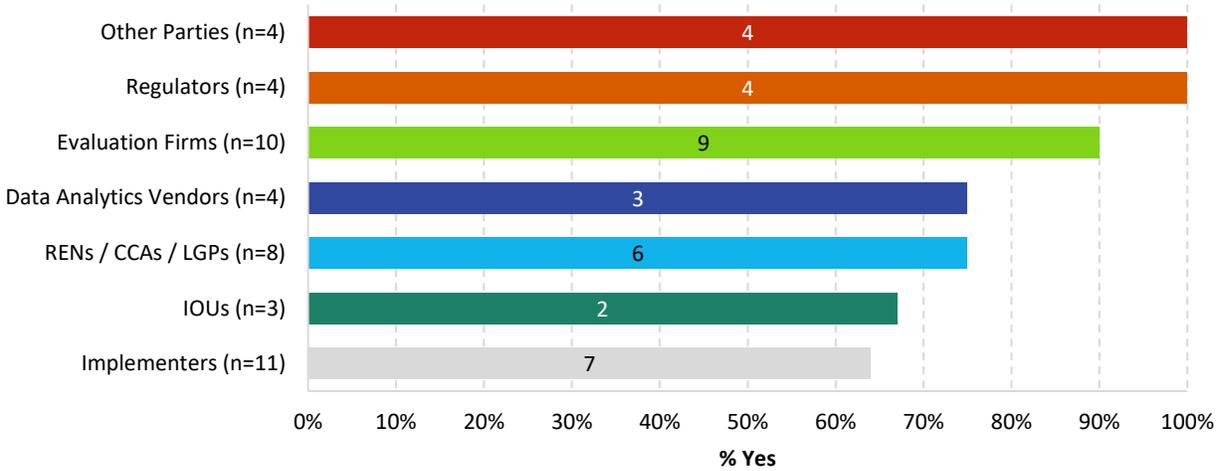
by respondents are actually addressed in the Framework; however, respondents either did not feel they were addressed adequately or were unaware that they were covered. The full list of items mentioned includes:

- > Programs
  - Behavioral
  - Commercial whole building
  - Emerging technology
  - IDSM/Integrated Distributed Energy Resource (IDER)
  - Market transformation
  - Non-resource
- > Measures
  - Custom
  - Strategic energy management
  - Distributed generation
  - Retro-commissioning
- > Methods
  - Billing analysis
  - Randomized control trials and quasi-experimental design
- > Other Issues or Topics
  - Incomplete data
  - Embedded evaluation
  - Multivariate sampling
  - Cost effectiveness
  - Peak load reduction
  - Market effects and spillover
  - Non-energy impacts
  - Net-to-gross

### 3.2.3. Embedded Evaluation

The project team asked respondents if they were familiar with the concept of embedded evaluation. Figure 3-5 shows that the majority of organizations that participated in the interviews (25 of 44, or 80%) were familiar with the concept, though most indicated in free-form comments that they had no personal experience with it. The highest rates of awareness were among the other parties (4 of 4), regulators (4 of 4), and evaluation firms (9 of 10). Interestingly, the lowest rate of awareness was among the third-part implementers (7 of 11), likely reflecting the traditional “arms-length” relationship that has existed between implementation and evaluation, much of which embedded evaluation is focused on overcoming.

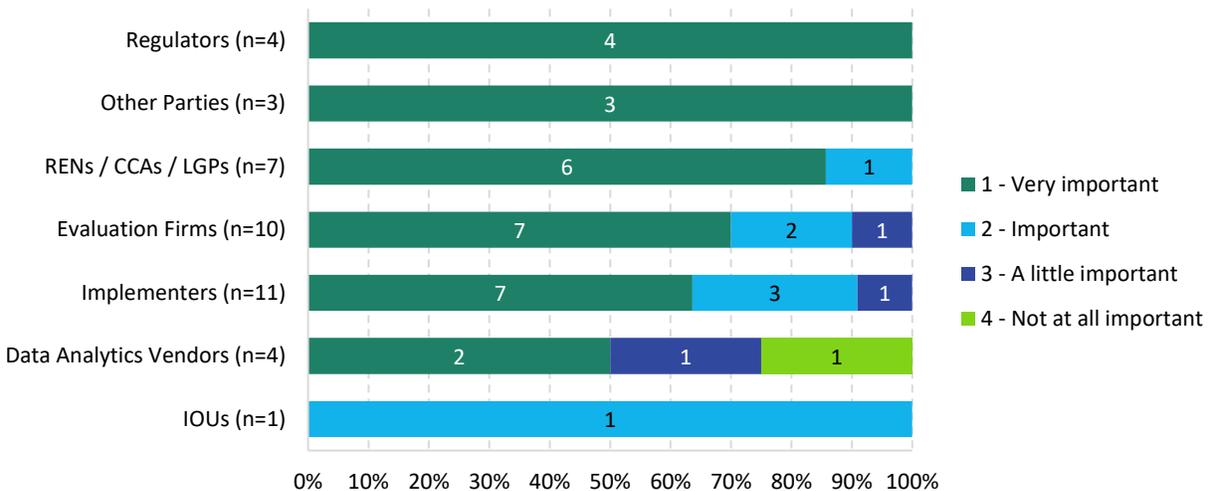
**Figure 3-5: Are you familiar with the term embedded evaluation?**



Q5: Are you familiar with the term “embedded evaluation”?

To further probe this issue, the project team asked respondents how important they felt it was to their organization that the Framework provide guidance on embedded evaluation. Figure 3-6 shows that the vast majority of respondents said it was “very important” (29 of 40, or 73%) or “important” (7 of 40, or 18%) that the Framework address embedded evaluation; only 4 of the 40 respondents stated, “a little important” (3 of 40, or 8%) or “not at all important” (1 of 40, or 3%).<sup>8</sup>

**Figure 3-6: Importance that the Framework Provide Guidance on Embedded Evaluations**



Q5b: Would you say it is very important, important, a little important, or not at all important to your organization that the Framework provide guidance on embedded evaluations?

<sup>8</sup> Note that Q5b was added to the interview after four interviews had already been completed, thus only 40 total responses to this question are available.

Some of the respondents provided additional input on this topic as shown below.

- › Interestingly, implementers in particular seemed to like the idea of embedded evaluation, as they felt it offered the opportunity to “set a level playing field up front” and “clarify expectations” so that they did not have to wait until a year or more after a program is implemented to find out what degree of savings they are going to be able to claim – a recurring concern that came up in several parts of the study.
- › One implementer also stated: “The overarching goal is to be assured that the program implementers and evaluators have the same objective and goal in mind which is to get the best value out of the program, so early involvement by the evaluator will be very critical and it allows the implementers know what information is needed for properly evaluating the program.”
- › Some implementers and program administrators (including IOUs and RENS/CCAs/LGPs) also seemed to emphasize the potential value embedded evaluation could offer in being “important for program managers to be able to improve programs midstream.”
- › Though many respondents found the notion of the Framework addressing embedded evaluation as appealing, there was also some concern that it should not be too prescriptive.

### 3.2.4. Making a Better Framework

Respondents were asked, in an open-ended format, what they thought would make the Framework a more valuable resource. This question was also asked as part of the CEDMC Symposium discussion. Respondents provided a very wide range of responses across a wide range of topical areas, which are summarized below.

- › One issue mentioned by several respondents in both the interviews and the CEDMC discussion was how it is **challenging to maintain a document that can stay relevant with the ever-changing policy landscape**. Unfortunately, there were few substantive recommendations on how to address this paramount issue. That said, a couple of respondents did suggest converting the Framework into an Internet-based document to facilitate accessibility while also making it easier to update in the future.
- › Multiple organizations commented on how the **size and complexity of the document make it unapproachable**. Just a sampling of the descriptors arising in the interviews include “massive,” “a behemoth,” and “challenging.” There were only a few suggestions for how to deal with this, including offering it as a searchable online resource, developing a quick-guide to the Framework that pulls out important material in a more succinct manner, and possibly splitting it into two documents: one for evaluators and one for implementers. One respondent indicated that some of the complexity seems to arise from inconsistency when he stated that it “reads like 15 different chapters written by 15 different authors,” so some basic re-writing to align language and voice may be beneficial.
- › Several respondents thought the **value and use of the Framework could be improved by clarifying its role in the industry**. They emphasized how it seems unclear to many organizations whether the Framework is intended to be a prescriptive document or just a guidance document. While some felt it was the former, they also indicated that their perception was that it was not

used this way. They felt complexity of the document – and some of the approaches discussed in the Framework – may contribute to this. One respondent observed that “when you design something that is so complicated, it is really hard to implement in the field. Budgets do not allow for what is included.”

- › Some felt the framework should **focus more on formative evaluation and promote greater collaboration between implementers and evaluators**. One respondent stated that “we need to find ways to build in continuous improvement – there’s more interaction in other states between program delivery and evaluators.” Here too, one discussion participant stated: “I think we put too much focus on impact evaluations and would like to see the framework speak to formative research... so that we know where we are headed and rather than look backwards all the time. I think we have put too much focus looking backward.”
- › One respondent stated that **evaluation reporting is not covered, but probably should be** as there is a great degree of variability in the content and quality of evaluation reports.
- › Some respondents suggested that the Framework should **provide greater latitude in how to apply approaches, and maybe offer options**. One respondent stated that “it seems like there is guidance on the correct or best way to do things, but not as much guidance as to what is the next best option. If there is a lack of data available or schedule constraints, what are the options for doing a ‘pretty good job’ and maybe not doing a ‘perfect job.’?” Some respondents also felt having discussion of advantages and disadvantages of different methods would be valuable.
- › A number of respondents mentioned the need to **address newer methods** such as billing analysis, multivariate sampling, measurement and verification (M&V) 2.0 and other topics mentioned throughout this report.
- › One respondent highlighted their perception that emerging technologies in general seem to be a big challenge. They suggested the Framework **include an emerging technology chapter that draws connections and distinctions between traditional evaluation and emerging technologies evaluation**, recognizing that not all new technologies can be addressed with the methods included in the Framework.
- › One respondent suggested that stakeholders **update the Framework and Protocols with the aim of making them a national standard, not California specific**. Alternatively, other respondents stated how they felt **California should start to rely on other national approaches like SEE Action and the UMP**, as these are receiving significant industry attention and are more current. Following this recommendation, one respondent suggested developing a much shorter document that points readers to the larger, national efforts, and then focuses on clarifying topics or areas in which California differs from the national approaches.

### 3.2.5. Guidance on Mechanisms of Program or Measure Realized Impact

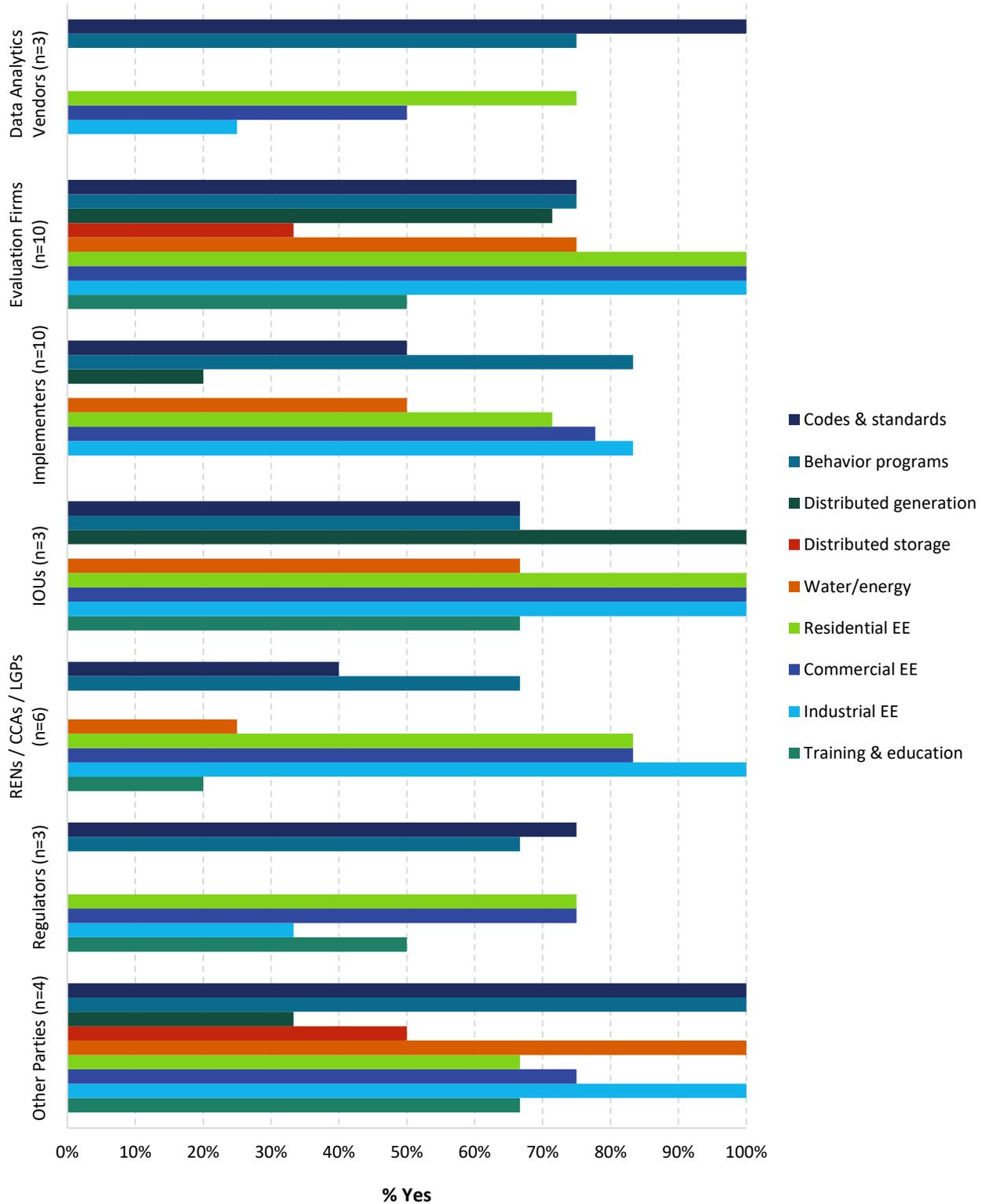
To probe this issue, the research team posed a number of questions aimed at: (1) understanding how familiar respondents were with the evaluation processes associated with different program types, (2) assessing the perceived effectiveness of the Framework or current industry evaluation practices in addressing evaluation for the different program types, (3) eliciting suggested recommendations for improving such guidance, and (4) inquiring about how effective respondents feel the Framework is in

providing guidelines for designing evaluations to identify program, measure, or goal improvement. In general, each of these areas likely warrant attention moving ahead.

First, the project team asked the respondents how familiar they were with the evaluation processes for a number of different program types. Figure 3-7 shows that the levels of familiarity with program evaluation processes varied greatly across organization type. In general, the highest level of familiarity with evaluation processes were associated with residential, commercial, and industrial energy efficiency programs, while water/energy, distributed storage, and distributed generation were the programs with the lowest. All organizations had at least some familiarity with evaluation processes associated with codes & standards, behavior, and residential, industrial, and commercial energy efficiency programs. Five organizations had no familiarity with the evaluation processes for at least one of the program types:

- › Regulators had no familiarity with evaluation processes for water/energy, distributed storage, or generation programs.
- › RENS/CCAs/LGPs had no familiarity with evaluation processes for distributed storage or generation programs.
- › The IOUs had no familiarity with evaluation processes for distributed storage programs.
- › Implementers had no familiarity with evaluation processes for distributed storage programs.
- › Data analytics vendors had no familiarity with evaluation processes for training & education, water/energy, distributed storage, or generation programs.

Figure 3-7: Familiarity with EM&V Processes for Different Program Types

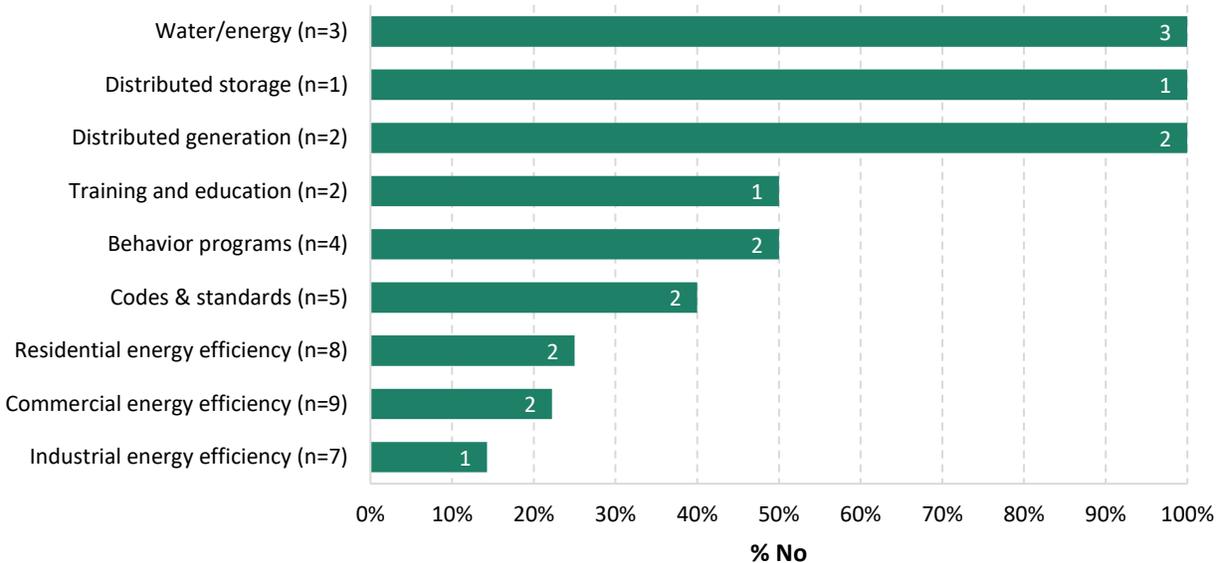


Q11: Are you familiar with EM&V processes for [PROGRAM TYPE]?

Respondents that indicated they had good familiarity with the Framework (i.e., said they refer to the Framework “often” or “sometimes”) and were familiar with the evaluation processes for the individual programs were next asked if they thought the Framework provides sufficient guidance on evaluation of the named programs (note that the sample sizes for this question are quite small as most respondents did not meet the criteria mentioned above). Figure 3-8 shows that there is general consensus that the newer technologies or less traditional program types lack adequate guidance, while feelings are split on the other program types.

All respondents indicated that the newer technologies/less traditional programs types of water/energy (3 of 3), distributed storage (1 of 1), and distributed generation (2 of 2) lacked adequate guidance in the Framework. Also, training and education (1 of 2), behavior (2 of 4), and codes and standards (2 of 5) formed a central cluster where roughly half of the respondents felt the Framework did not provide adequate guidance. The traditional residential (2 of 8), industrial (1 of 7), and commercial (2 of 9) energy efficiency programs were less concerning.

**Figure 3-8: Framework Provides Sufficient Evaluation Guidance by Program Types**

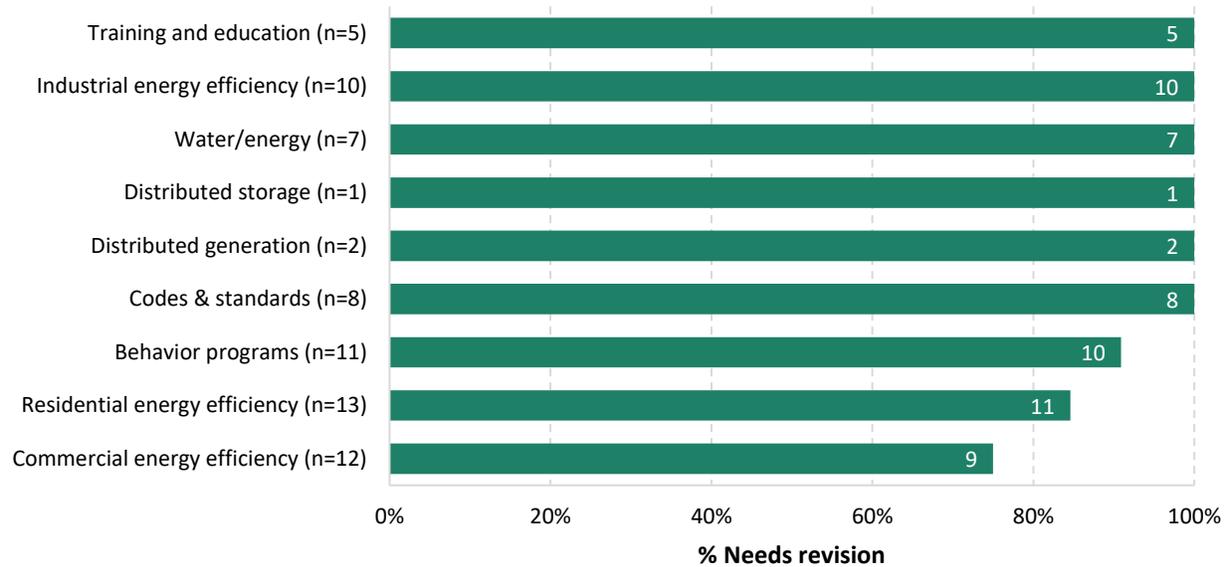


Q12: Would you say the Framework provides sufficient guidance for EM&V processes for [PROGRAM TYPE]?

Interestingly, however, the Framework may not be the only resource that lacks adequate evaluation guidance in the industry. Those respondents that were less familiar with the Framework (i.e., said they only refer to the Framework “rarely” or “never”) but were familiar with the evaluation processes for the individual programs were asked more generally if they thought the current industry evaluation practices for the different program types were “effective ‘as is’” or “needed improvement.” Figure 3-9 shows that, in general, respondents felt that all program types are not adequately addressed.

All the respondents indicated that that training and education (5 of 5), industrial energy efficiency (10 of 10), water/energy (7 of 7), distributed storage (1 of 1), distributed generation (2 of 2), and codes and standards (8 of 9) are not adequately addressed. The vast majority of respondents felt that evaluation guidance for behavior (10 of 11), residential energy efficiency (11 of 13), and commercial energy efficiency (9 of 12) programs need improvement.

**Figure 3-9: Program Types Needing Revision**



Q13: Would you say the current evaluation approach for [PROGRAM TYPE] is effective “as is” or needs a revision to be more effective?

As a follow up, the project team also asked respondents what types of revisions they felt were needed to improve evaluation guidance. These are summarized below.

- › A recurring theme throughout multiple sections of this needs assessment, but especially in this section, is that there **needs to be much more focus on ensuring timeliness of evaluations**. Evaluations that occur a year, two, or even three years after a program was in the field are not helpful, especially for providing feedback on program improvement. Further, some question the validity and accuracy of evaluation results that are collected so temporally distant from the actual event, especially when it comes to topics such as self-reported approaches to net-to-gross. Respondents simply want evaluations to provide input on program changes or gaps sooner (i.e., months versus years).
- › A number of stakeholders felt **guidance is too complicated**. Some recommended going back to the basics and asking questions like: What is success? What are we trying to accomplish? Some felt that revisions to the Framework are needed because the goals of evaluation seem to have changed over time: “now evaluation should provide a feedback loop to advise design and implementation more than assess overall program success.”
- › One respondent shared the observation **that things today have moved to a level of specificity and complexity that is not captured in a 12-year-old document**: “the Framework is old news, never specific enough, and has no practical, recent applications – such as within the last decade.” In this context, some respondents recommended that a living document is needed - not just a check-in every 10 years.
- › Another theme that percolated to the top throughout this study – both in the interviews and the CEDMC discussion – was **the importance of better integrating AMI data** given its availability. Some respondents tied this directly to recent legislation: “especially with AB 802 and availability of AMI data, a lot needs to change.” But several also raised the point that there is a lot of

valuable information embedded in this data (e.g., like when sub-metered), and wonder how this can be used to more accurately predict what is happening in buildings (homes and businesses) to provide guidance on what improvements can be made. One astute discussion participant also pointed out the risk of emphasizing smart meters at the expense of smart devices – they are concerned if we focus too much on AMI we will not be prepared for the next wave of data, which will almost certainly be smart devices, and the Framework will be setting itself up to become dated again very quickly.

- › A few respondents were concerned about the apparent **disconnect between evaluation and program design and implementation**. One respondent felt that “the Framework needs to be more aligned with the way in which programs are implemented.” The problem, some viewed, was that “the whole EM&V process is siloed,” and implementers are not typically allowed to directly communicate with – let alone work with – evaluators in the design stage, or during implementation to improve program real-time. Likewise, evaluators are often prohibited from communicating directly with implementers during evaluation. As such, some felt that evaluation has the ability to constrain or limit program potential: “There is a constant fear that EM&V hampers the effectiveness of programs. The one message should be that EM&V should not obstruct programs. It should supplement them.” Some also felt that evaluators have too much decision-making authority.
- › In a related manner, several respondents alluded to the **need for more embedded evaluation**. They observed that without embedded evaluation, there is a lot of waste and a lot “is lost in translation” as program staff and implementers try to get an evaluator up to speed on the program. This is exacerbated even more when the evaluation comes years after the program, where it becomes burdensome to the participants, and results become questionable.
- › Though several recommendations were provided for how to potentially improve the Framework, there was also an underlying **feeling shared by respondents that they do not want the Framework to be entirely prescriptive**. Nevertheless, as noted elsewhere in this report, there was also a lot of disagreement among the respondents as to whether the Framework is intended to be prescriptive or just guidance.
- › In general, respondents are interested in **much greater guidance and clarity on how to develop and evaluate baselines**. Here, AB 802 was raised and the project team sensed a lot of uncertainty and nervousness among the various stakeholders in this area and recommend it be one of the first areas of attention given to any revisions to the Framework.
- › Multiple respondents wanted **updates for net-to-gross (NTG) approaches and attribution**. Many were unsatisfied with the self-report approaches to NTG analyses. Some noted they would like a more data driven method for NTG, which would require the utilities to make more use of interval data. They recommended more statistically based evaluation approaches, which would rely on methods such as randomized control trials that can account for net. One participant in the CEDMC discussion also emphasized their belief that attribution should be broader than just what we can attribute to a program today. They highlighted the notion of incorporating much more of a market transformation perspective when stating: “what impact on the market has caused the long-term savings and long-term shifts that make the market more efficient on its own and if that \$2 million that was expended to get 500 megawatt hours

leads to another 27 or 47 megawatt hours coming into the market, that should be attributed properly.”

- › Some felt that **sampling needs to be better addressed** as the Framework seems to focus on ideal situations that are not always feasible. For example, one voiced the position that “it is often hard to define a representative pool of buildings, because of permitting and access issues, so how can we still do effective, accurate, and reliable evaluations?” Others mentioned that the Framework only discusses relatively simple sampling approaches, and does not address more complex topics, like sampling across multiple variables.
- › **Revision to the cost effectiveness framework** was another topic that arose in multiple areas of this study as an area of concern. Some felt that the participant project costs tend to make the total resource cost test ineffective. Also, many felt that in the residential arena (though this could apply to other sectors as well), failure to take into account non-energy benefits such as health, safety, comfort, convenience, etc. does not paint a fair picture of overall project/program value to society. Reliable methods for estimating reductions in greenhouse gas emissions was another issue that was raised in the context of better defining cost effectiveness.
- › **Several program types are simply not addressed in the Framework** because the Framework predated the mainstream development of these topics and/or programs, but need to be. The examples that percolated to the top were behavior programs, water/energy, distributed storage, and distributed generation. If these are to be areas of focus in the State moving ahead, then greater guidance is likely needed.
- › **For behavior programs, some felt that policy needs to be updated more than the Framework.** One felt that the guidance in the Framework was generally adequate for evaluating behavior programs, but the policy guidance is too general. They felt it needs to allow for more options.
- › Also **with regards to behavior programs, a few felt the current definition is extremely limited, and hope it will change, especially with meter-based programs:** “without an expanded definition related to AB 802, I feel output is limited to feedback.” One specifically wanted clarity on whether strategic energy management is behavioral or whether the paradigm is only limited to home energy reports.
- › **With regards to water/energy, respondents felt that there is a need to better acknowledge the interactions of the two.** Also, one respondent astutely pointed out that in many ways water/energy is influenced by the same issues as codes and standards, so it may not be too different. However, this same respondent also pointed out that baseline assumptions need to be reconsidered. For example, they felt that the assumption that people already use low flow technology and minimize leaks because of code is generally unfounded, especially in commercial applications. If a measure can be delivered because it is not in use – regardless of code – and savings can be attained, they felt they should be able to claim these savings – especially because they tend to make these improvements regardless on larger projects.
- › **For commercial programs, a few felt that some guidance is there, but the issue is that some users disagree with the process and pursue a different course.** They felt that the custom project review process is an example of where there is some guidance, but stakeholders are not consistent in how this is done – and notably, they felt that regulators often ask for or expect approaches or a level of rigor that are not included in the Framework. “The EM&V for custom

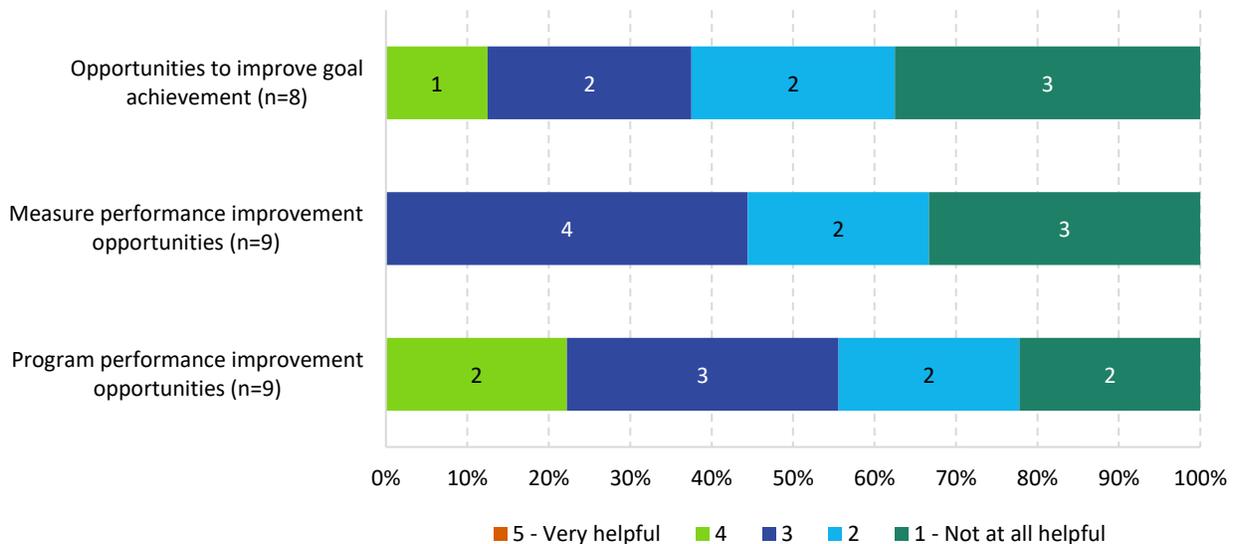
programs is also in need of revision as these programs are becoming more and more essential. The rules aren't clear and they are constantly changing and are subject to interpretation.” Notably, several respondents indicated concern over how the CPUC reviews custom projects – not always consistent and sometimes unpredictable, which creates risks for programs.

- › **With regards to training and education, one non-IOU program administrator felt the concept should be reconceived as a non-resource offering.** They would like to see evaluation apply some type of hard-to-reach perspective as they are challenged in getting training and education services in their area. They feel that because they serve a small service territory, they do not have adequate headcount to attract resources. They feel that the CPUC has created a structure that the program administrators and IOUs need to adhere to which limits services to rural and marginalized communities. They feel that there is a fear of evaluation that limits programs types to those that will produce savings but marginalizes large sections of the population.

The project team asked respondents that were generally familiar with the Framework (those that said they refer to it “often” or “sometimes”) how helpful the Framework is in providing guidelines for designing evaluation to identify several types of program improvements, including goal achievement, measure performance, and program performance. Figure 3-10 shows these results, indicating improvements can be made in this area.

On a five-point scale, where 1 was “not at all helpful” and 5 was “very helpful,” no respondents indicated that the Framework is “very helpful” for any of these topics, and only 3 of 26 total respondents (or 12%) scored these items a 4. When it comes specifically to opportunities to improve goal attainment, 5 of 8 respondents scored the question 1 or 2; for measure performance improvement opportunities, 5 of 9 respondents scored the question 1 or 2; for program performance improvement opportunities, 4 of 9 respondents scored the question 1 or 2.

**Figure 3-10: Helpfulness of Framework in Providing Guidelines for Designing Evaluations**



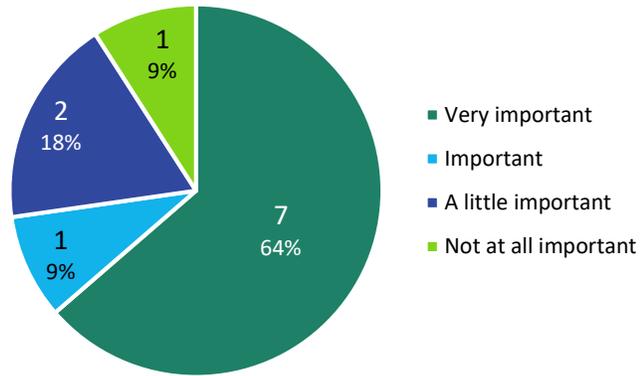
Q15: How helpful do you think the Framework is in providing guidelines for designing evaluations to identify...?

### 3.2.6. Improving Accessibility and Awareness

The project team asked how important respondents felt it was that the Framework be used by program designers and implementers as well as evaluators. Figure 3-11 shows that the vast majority of respondents asked this question felt that it was “very important” (7 of 11) or “important” (1 of 11) for program designers and implementers to also use the Framework. Only 1 of 11 respondents indicated it was “not at all important.”

When asked to clarify their answers, the general theme was that it is important for all parties to be aware of what others are doing and the Framework is supposed to serve as the basis for determining whether a program will meet standards. One implementer indicated they “cannot know what is going on in the minds of policymakers, but if there is guidance in writing, at least they know how to structure and target programs.” This respondent also stated that they constantly go back to the framework for “reality checking” and to understand the structure that they are living in.

**Figure 3-11: Importance that Framework is Used by Program Designers and Implementers (n=11)**



Q16: How important would you say it is that the Framework be used by program designers and implementers, as well as program evaluators?

A few respondents raised concerns that the Framework is not used consistently among the various stakeholders. One stated they were unaware of whether the Framework is fully blessed and used by the Energy Division and evaluators, but if so, then program designers and implementers should use the Framework; if not, then there should be other methodologies and approaches that should be employed.

In answering this question some respondents focused more on what can go wrong when the various parties are not attuned to the Framework. For example, one respondent stated that if program designers and/or implementers are not connected with those doing the evaluation, when data is assessed, it is sometimes difficult to understand the data or tie it to the program goals and objectives. Another respondent highlighted how if there is no common practice, the various parties cannot assure things are being measured in the same way.

## 4. Findings on Policy Changes that Affect Evaluation Environment

This section of the report presents the findings related to policy changes that affect the evaluation environment. Table 4-1 shows the needs assessment research objectives mapped to specific research questions.

**Table 4-1: Policy Changes that Affect the Evaluation Environment: Research Objectives and Research Questions**

Research Objective	Research Questions
What is the current requirement for EM&V for various EE and DER policies (including AB 802, SB 350, IDSM, Baseline, market transformation, and behavior programs policies)	<ul style="list-style-type: none"> <li>• What policies require evaluation and which require measurement and verification, and which require both?</li> <li>• Are there EE or DER policies for which evaluation is not required but could be beneficial?</li> <li>• What DER policies have an effect on EE projects and thus those effects need to be accounted for in EE EM&amp;V activities?</li> <li>• The rolling portfolio and ‘bus stops’ suggest that the definition of a program in the Framework may not fit. Is this the case?</li> <li>• Did the HOPPS proposals use the Evaluation Framework, if not why not?</li> </ul>
Does the Framework allow for or can it allow for new administrators, new program types, or conflicting objectives?	<ul style="list-style-type: none"> <li>• Are there considerations for evaluation methodologies given different Administrator types?</li> <li>• How can the Framework be used to balance the sometimes-conflicting objectives of timely, robust, and well-vetted EM&amp;V results?</li> <li>• Does the Framework sufficiently allow for the incorporation of evaluation methods into program design and implementation?</li> <li>• Are there types of evaluation that are being done or planned that are not covered by the Framework?</li> </ul>
What information is necessary to meet current EM&V requirements for each policy?	<ul style="list-style-type: none"> <li>• Importance/definition of baseline, net effects, savings, etc. for each policy?</li> <li>• Are excluded types of research in the Framework (page 17) important in the context of new policies?</li> <li>• Savings information required by each policy: first year, lifecycle, grid level, building level, net, GHG, IDSM, any other?</li> </ul>
Does the new regulatory/economic/technical environment provide new opportunities for EM&V that cannot be or would be difficult to recognize within the context of the current Framework?	<ul style="list-style-type: none"> <li>• Chapter 5: Umbrella Roadmap – Types of Evaluations and Evaluation Components.</li> <li>• Chapter 14: Evaluation and Cost Effectiveness - Cost-effectiveness Metrics Changes – i.e. in the event that a Societal Cost Test or other new or revised cost effectiveness test (apart from Total Resource Cost [TRC], etc.) is applied to EE.</li> <li>• Chapter 15: Overarching Evaluation Studies – The Framework excludes several types of studies that fall under this rubric. Should this be reconsidered given the current evaluation environment?</li> </ul>

## 4.1. Current Requirements for EM&V for Various Recent EE and DER Policies

The first research objective for this section was to assess the current requirements for evaluation for various EE and DER policies (including AB 802, SB 350, IDSM, Baseline, market transformation, and behavior programs policies). In this section, we include an assessment of: (1) what policies require evaluation and which require measurement and verification, and which require both, (2) whether there are EE or DER policies for which evaluation is not required but could be beneficial, (3) what DER policies have an effect on EE projects, and thus, need to be accounted for in EE EM&V activities, (4) the rolling portfolio, and (5) whether the HOPPS proposals used the Evaluation Framework. High level findings from this section include:

- › The policy review suggests several recent policy decisions have immediate implications for the Framework. AB 802 and SB 350 will require special attention in a Framework namely due to NMEC. DERs will need to be addressed to ensure integration with evaluation approaches in line with the CPUC IDER and Distributed Resource Planning (DRP) plans. AB32 and SB 350 mean GHG reductions should also be addressed.
- › Information garnered from the policy review also suggest other topics likely warrant attention. EE and DR joint programmatic costs and benefits may warrant attention as IOU programmatic efforts ramp up to better understand joint uses and benefits. EE as a DER should be addressed as well as how to assess their value to the grid as DERs (and EE as a DER) gain ground in the state.
- › With regards to the rolling portfolio, respondents felt that all of the topics currently contained in the Framework will likely require updating Topics such as timing, a greater need for clarity and transparency, new actors entering the mix (i.e., third-party implementation), policy shifts, new types of data (i.e., AMI), and a greater call for collaboration are driving these needs.
- › With regards to the HOPPs process, few were aware if the Framework was even used in the proposals (29% said “no”; 61% said “don’t know”). None of the respondents were clear on why it was not used. Though some were surprised after revisiting the Framework as they indicated it almost certainly would have been applicable.

### 4.1.1. New Policies – Evaluation, M&V, or Both

As part of the policy analysis, the project team assessed which policies require evaluation, which require measurement and verification, and which require both. In this discussion, we emphasize which areas will likely require updates to the Framework (and Protocols).

- › **AB 802, SB 350, NMEC** – Measure and verification related to baseline issues associated with AB 802 and SB 350 will require a deep focus on ensuring that NMEC M&V approaches are well delineated in a Framework and Protocols refresh. Depending on the scope and type of program evaluation, timing and detail varies but all policies regarding AB 802 and SB 350 require detailed M&V. For any project that is using normalized billing data this evaluation will occur after one year of post data has been collected and will continue to be evaluated in year two. Both years of post savings will be considered when reporting the final savings for these programs. Some

ex-ante savings M&V approaches will remain for particular types of interventions.<sup>9</sup> For NMEC, all programs will likely be subject to CPUC led independent evaluation (beyond the program evaluation) that will review savings methods, ex-post claimed savings, and conduct additional evaluations as needed. These requirements will need to be captured in the Framework refresh and related Protocols.

- › **Big Data** -- While not a specific policy, the issue of the appropriate use of AMI data and related issues of whole building IoT data requirements will likely need to be incorporated into a Framework and Protocol refresh. Data issues of this nature did not exist at the time of the development of the current documents and will require guidance from the CPUC on how best to incorporate these data into M&V evaluations, as well as assessment of the approach to evaluating these data.
- › **Whole Building** – Whole building evaluation is currently adequately covered in the Framework and Protocols through reference to International Performance Measurement and Verification Protocol (IPMVP) approaches. However, new program/protocol designs related to NMEC M&V needs, as well as EM&V requirements and guidance for these applications, will likely need to be incorporated into the Framework refresh.
- › **Behavioral, Retro-commissioning, and Operations and Maintenance (O&M) (BROs):** BROs approaches will need to be addressed in the Framework refresh. New industrial strategic energy management evaluation approaches, as well as approaches to other behavior, retro-commissioning, and operations intervention will likely require refreshes within the current framework as current guidelines for these were not fully addressed.
- › **Market Transformation (MT):** MT issues are currently adequately identified in the Framework (Chapter 10) at a high-level. Approaches there may prove adequate, but a CPUC decision to establish a greater focus on “dynamic” baselines and allowance of MT market effects evaluations, per the existing Framework, may require additional guidance and direction on baselines, calculated approaches to program and market effect savings (impact), and sector structural and consumer behavior market (process) evaluation
- › **DER Interactions** – Energy efficiency is a DER as well as a standalone program resource. As such, new policies in the CPUC’s Integrated Distributed Energy Resource (IDER) (R14-10-003) and the Distributed Resource Planning (DRP) (R14-08-013) rulemakings will need to be integrated into the Framework refresh to ensure that any M&V issues arising from the state’s continued adoption of DER technologies (including energy efficiency) will result in integrated and viable M&V approaches – which have not currently been codified.
- › **Greenhouse Gases (GHG) As a Policy Framework** – State AB32 goals will continue in importance going forward as utility Integrated Resource Planning requirements, driven by SB 350, will focus on GHG emission reductions, potentially requiring a re-framing of utility/program administrator requirements that may be driven by GHG reductions. Because of this, the Framework refresh should consider how best to address this potential issue, which does not currently impact EM&V Protocol requirements, but may do so in the future.

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<sup>9</sup> See CPUC Resolution E-4818 (February 9, 2017).

#### 4.1.2. New Policies Not Requiring Evaluation – But Might Benefit from It

This section addresses the EE or DER policies for which evaluation is not required but could be beneficial. This information came from the policy analysis conducted as part of this needs assessment.

- › **Energy Efficiency and Demand Response Joint Programmatic Benefits and Costs Issues:** There will be a need to evaluate the relationship between the benefits of EE and Demand Response (DR) in terms of their value to the system in both residential and nonresidential settings. Current efforts, as of June 2017, are underway to integrate IOU programmatic efforts in understanding to joint uses and benefits of EE and DR. The Framework refresh, will need to address evaluation issues associated with these joint benefits and costs.
- › **Incrementality and Double Counting of EE Resource for Traditional Resource Acquisition and Locational/Temporal Issues:** The issue of how best to address energy efficiency programs being used and evaluated in *traditional programmatic approaches* versus the potential for double counting the same savings from these efforts in locational, temporal, or other grid related Request for Offer (RFO) solicitations is still being debated and worked out in several utility pilots. The key issue is whether new RFO proposed EE savings are incremental or new savings above traditional program savings that may be garnered in the RFO area, or are they simply a double counting of existing EE program savings efforts. This issue will need to be addressed in the Framework to ensure effective EE and DER savings evaluation in the future.
- › **Energy Efficiency as a DER Resource:** As CPUC DRP and IDER policy matures, the question of how best to value the benefits and costs of EE (and other DERs) to the grid (at the substation, circuit, feeder level) will need to be addressed in the framework. Costs and benefits for *locational use of EE* (and even related EE/DR resources) will need to address the varying benefits/costs of these resource related to: (1) potential transmission upgrades, and (2) locational capacity needs, and/or reliability needs. Costs and benefits of EE related to *temporal duck-curve steep ramp issues*, will also need to be assessed and addressed in the Framework refresh.

#### 4.1.3. DER Policies Affecting EE Projects

The way in which DER-related policies can affect EE projects, and, thus have effects that need to be accounted for in EE evaluation activities, is a complex issue that can impact the current use and value of energy efficiency in California.

- › **Optimal Benefits of EE to the Grid System:** At base, this complexity relates to which of the DERs deployed in a specific circuit or feeder area (including EE) provides optimal benefits at the locational and temporal feeder level to meet current and future grid needs. As utilities plan on meeting distribution needs with EE and other DERs at the feeder level, EE's value will vary depending on the profile of customer usage and system needs at that level. Evaluation of the benefits and costs of EE will need to assess the EE (and other technology) benefits and costs not necessarily against current CPUC Policy Rules and Standard Practice Manual approaches, but more specifically against system needs in certain places and times of day. Evaluation in this way, may move from evaluating the measure's savings and realization rate in a static fashion (e.g., use of fairly predictable TRC test inputs), to one in which EE – alone, or in tandem with DR – will be evaluated for savings and realization rates against the backdrop of the needs of the grid *at*

*these locations and at particular times of day.* Thus, the Framework refresh will not only have to address these issues, but also provide cogent and as-yet-non-universally-accepted procedures for evaluators to use to assess EE's usefulness to the system -- in terms of costs, benefits, and the value of the program savings. Traditional Framework evaluation approaches may be used, but will need to be refreshed – especially in relationship to the use of NMEC type approaches at the grid level rather than ex-ante approaches – in terms of the savings values of the EE resource, as well as (noted previously) the system benefits and costs related to the optimum system-wide deployment benefits of EE as a grid resource.

- › **Resource Cost Tests -- Societal Cost Test Inputs for GHG/Program Administrator Test (PAC):** A recent staff White Paper on approaches to valuing GHGs will likely effect the costs and benefits – and perhaps other evaluation effects of EE in the future. Debate on both: (1) the addition of a GHG societal “adder” to the TRC test (i.e., creating a Societal Cost Test to value savings from EE), and (2) the actual value of that adder (with CPUC and stakeholders proposing different values), currently provides the backdrop for potential refresh needs for the Framework. In addition, the recent draft of the CPUC’s 2018 Potentials and Goals study included a scenario in which the PAC test could be used to assess the benefits and costs of EE, but other proposals may prevail. Changes at the policy level in regard to the above, will need to be addressed in the refresh to provide evaluators clear guidance on EM&V approaches.

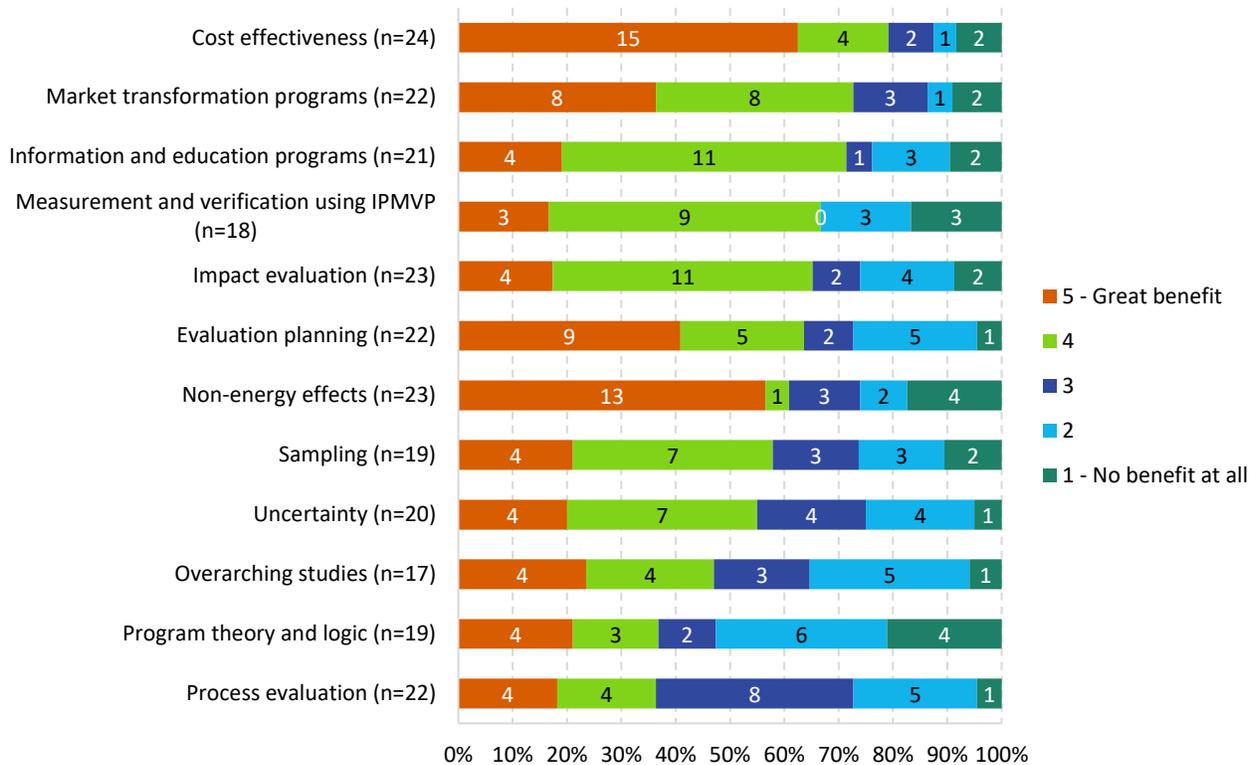
### 4.1.4. The Rolling Portfolio

Because of the current salience of the rolling portfolio to program design, planning, implementation, and evaluation, the interviews also included several questions aimed at better understanding stakeholder perspectives on the rolling portfolio.

The first question involved providing respondents with a list of topics currently covered in the Framework and asking them to indicate, for each, to what extent they thought the topic would benefit from modification to specifically address evaluation in the context of the rolling portfolio. Respondents scored each topic on a five-point scale where 1 meant “no benefit at all” and 5 meant “great benefit.” Figure 4-1 shows these responses revealing that most respondents felt such updates are warranted.

The topics where more than half the respondents indicated 5 or 4 include cost effectiveness (19 of 24, or 79%), market transformation (16 of 22, or 73%), information and education (15 of 21, or 71%), measurement and verification using IPMVP (12 of 18, or 67%), impact evaluation (15 of 23, or 65%), evaluation planning (14 of 22, or 64%), non-energy effects (14 of 23, or 61%), sampling (11 of 19, or 58%), and uncertainty (11 of 20, or 55%). The topics respondents felt warranted less modification in the context of the rolling portfolio included overarching studies (8 of 17, or 47%), program theory and logic (7 of 19, or 37%), and process evaluation (6 of 22, or 27%). Interestingly, one respondent indicated they have read all the rolling portfolio decisions and has attended all the meetings, but “has not yet heard the Framework mentioned, so there is probably no need for it.”

**Figure 4-1: Extent to Which Topics Would Benefit from Modification to Address Evaluation in the Context of the Rolling Portfolio**



Q18: To what extent do you think these topics would benefit from modification in order to specifically address evaluation in the context of the rolling portfolio?

- › When asked to clarify why they thought these topics need to be modified, most respondents felt that **with the rolling portfolio, timing is the key**. Implementers and evaluators will need to know what needs to be done to get on the bus stop, and while most things will not likely change, scheduling will certainly need to be revised.
- › A couple of respondents reflected on the fact that things seem to be **getting more complex and the move to third-party implementation will make guidance and clarity in the context of the rolling portfolio even more crucial**.
- › Respondents were also **concerned about transparency and clarity** – “seems like a bit of a black box” – and there is a lot of uncertainty about what the rolling portfolio will mean for the industry. In this context, a couple of respondents asked for greater clarity around the definition of the rolling portfolio and a discussion of the implications it will have, not only for evaluation, but also program design and implementation. One respondent recognized that one of the key issues with the rolling portfolio is that evaluation cycles will need to align much better with program and planning cycles, and did not feel there is much guidance on this topic. For example, guidance on what needs to be evaluated, at what time, for each program, would help them to figure out what to do and when it should be done.

- Other respondents brought up **broader shifts in the industry** as the reasons for why the Framework needs to be updated in the context of the rolling portfolio. “The whole idea of the rolling portfolio and issue of real-time data is really shaking things up. However, it is not that the Framework suddenly doesn't work, but since everything is being shaken up, the Framework needs to be also shaken up.” Similarly, as stated elsewhere in this study, others pointed out that the rapidity of regulatory changes has made the framework out of date, and this seems to be continuing. Others wondered how the rolling portfolio will be affected by specific legislation such as SB 350.

Respondents were next asked if they thought there were additional topics that needed to be addressed because of the rolling portfolio. Most respondents (17 of 24, or 71%) thought there were additional topics that should be addressed.

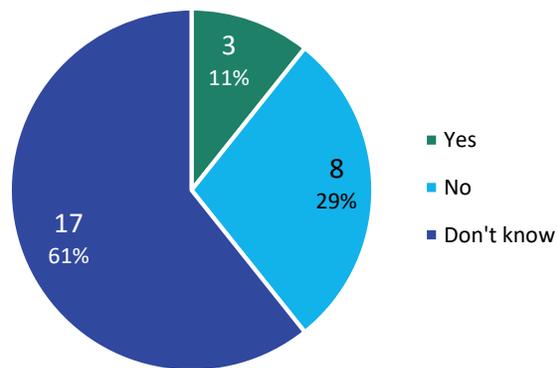
- One topic that came up especially with the REN/CCA/LGP group was the **desire for greater collaboration**. This group largely recognizes that they will be accountable in similar ways to other program administrators, but they are concerned that their unique circumstances are not being considered. From their perspective, when it comes to the rolling portfolio – or any program for that matter – smaller programs, unique populations, urban/rural distinctions, and overlapping territories are all topics that warrant more attention.
- Other respondents raised an array of additional topics and issues such as **greater reliance on AMI/metered data, refining cost effectiveness, clarifying market transformation, revising net-to-gross approaches, sampling, and uncertainty**. However, these are just mentioned here as they are covered in more detail elsewhere in this report and it was not always clear how respondents thought these topics needed to be addressed specifically in the context of the rolling portfolio.

#### 4.1.5. HOPPs

The project team first asked respondents if they thought the HOPPs proposals used the Evaluation Framework, and if not, why not. Figure 4-2 shows that only 3 of 28 respondents (11%) thought the Framework was used in the HOPPs process, 8 of 28 (29%) responded “no,” and the majority (17 of 28, or 61%) did not know.

When those who said “no” were asked why they thought the Framework was not used, respondents were unable to answer the question and provided little insight into why they thought it was not used. Interestingly, some who were part of the HOPPs process and were perusing the Framework during the interview calls were even a bit surprised the Framework was not used, as they felt it could have been a valuable resource once they refamiliarized themselves with the content. Notably, this – and other information gathered through the interviews – points to a challenge

Figure 4-2: Did the HOPPs process use the Evaluation Framework? (n=28)



Q9: Did the HOPPs process use the Evaluation Framework?

for a document like the Framework in that even though people have read it and are generally aware of its contents, people do not tend to refer to it very frequently and can forget what is actually in it. This came up multiple times throughout this study where respondents stated certain topics need to be added to the Framework, when in fact many of these topics are already in there.

## 4.2. Flexibility of the Framework in the Context of New Administrators, Program Types, and Conflicting Objectives

The next topic addressed was whether the Framework allows for or can it allow for new administrators, new program types, or conflicting objectives. The project team probed this topic by assessing: (1) whether there are considerations for evaluation methodologies given different Administrator types, (2) how the Framework can be used to balance the sometimes-conflicting objectives of timely, robust, and well-vetted EM&V results, (3) whether the Framework sufficiently allow for the incorporation of evaluation methods into program design and implementation, and (4) whether there are there types of evaluation that are being done or planned that are not covered by the Framework. High-level findings from this section include:

- › RENs, CCAs, LGPs, and IOUs face mostly the same challenges as other organization types in terms of programs not being covered by the Framework. Most (80%) said they do have such programs. However, the REN/CCA/LGP group also raised the belief that they are different enough that they might need to be evaluated somewhat differently, though they did not clarify how. This might reflect that this group is new to evaluation and still trying to understand how evaluation will affect their programs.
- › When asked to rank timeliness, robust quality, and cost, all stakeholder groups ranked the quality of evaluations as most important, timeliness second, cost third.
- › When assessing levels of approval, most respondents (though there were some exceptions) tended to rank “acceptable” (meeting a majority of stakeholders’ requirements) as the most preferred, “good enough” (meeting a minimum set of requirements) second, and “fully vetted” (meeting all relevant stakeholders’ requirements as third). The cost and effort involved with trying to get all California stakeholders to agree was the most cited reason
- › To address competing objectives, collaboration, mediating decision-making authority, ensuring stability and replicability, and ensuring adequate funding were the main recommendations.
- › Respondents noted some significant gaps in the Framework’s ability to incorporate new methods. Traditional contentious topics such as net-to-gross, attribution, and cost effectiveness top the list. Though methods tied to newer polices such as experimental designs, AMI data analysis, real-time evaluation, and NMEC also rise to the top.
- › Respondents provided a very long list of program types not adequately covered by the Framework. Many of these are newer programs such as behavior, and strategic energy management, but many are older program types, (like DR) that respondents do not feel are adequately addressed.

### 4.2.1. Methodologies Under Different Administrators

The project team asked program administrators (IOUs, CCAs, RENs, LGPs) and third-party implementers whether they have any programs that are difficult to evaluate based on what evaluators tell them or that they feel do not fit the Evaluation Framework guidance. The majority (16 of 20, or 80%) indicated they do have such programs.

The list of programs mentioned generally covers many of the same programs mentioned elsewhere in this study, but is an abbreviated list, emphasizing the special areas these stakeholders tend to focus on:

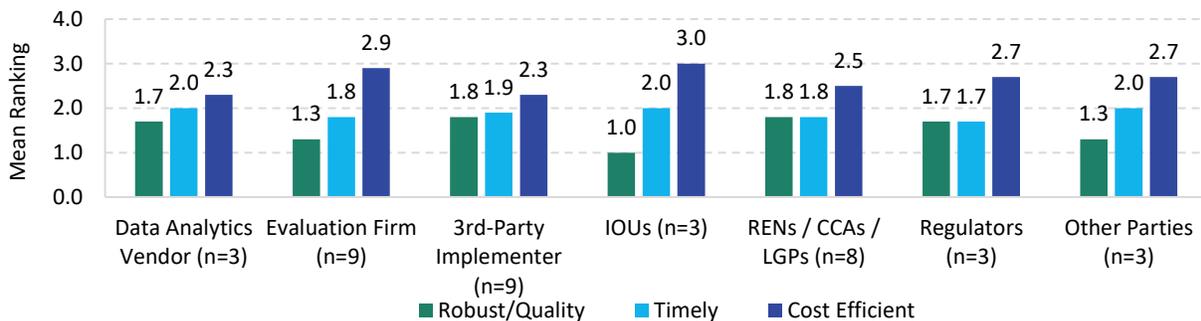
- › Custom programs (implementers)
- › Upstream programs (IOUs)
- › Midstream programs (IOUs)
- › Behavior programs (IOUs and implementers)
- › Workforce education & training programs (RENs/CCAs/LGPs)
- › Codes & standards programs (IOUs and RENs/CCAs/LGPs)
- › Finance programs (IOUs)
- › Emerging technologies (IOUs and implementers)
- › Low income programs (RENs/CCAs/LGPs)

It is also worth noting that some within the REN/CCA/LGP group raised the belief that they are different enough that they might need to be evaluated somewhat differently. Yet they also indicated that they do not yet have a solid framework for how this might be done. But it was also clear to the interviewers that this group as a whole does not yet have a lot of experience with evaluation (though there are exceptions) and are in search of guidance that will address their unique circumstances.

### 4.2.2. Balancing Sometimes-Conflicting Objectives

Respondents were first asked to rank-order the three criteria where the most important criterion was first (a value of 1), the least important criterion was last (a value of 3). Figure 4-3 provides the results, showing the mean scores for each item by stakeholder group. Stakeholders ranked the robustness or quality as the most important criterion, the timeliness of the evaluation second, and the cost efficiency of the work last; the only minor exceptions were with the REN/CCA/LGP and regulator groups, where the robustness/quality and timeliness were tied for first and second.

**Figure 4-3: Mean Scores of Rank-Order Preference for Evaluation Criteria**

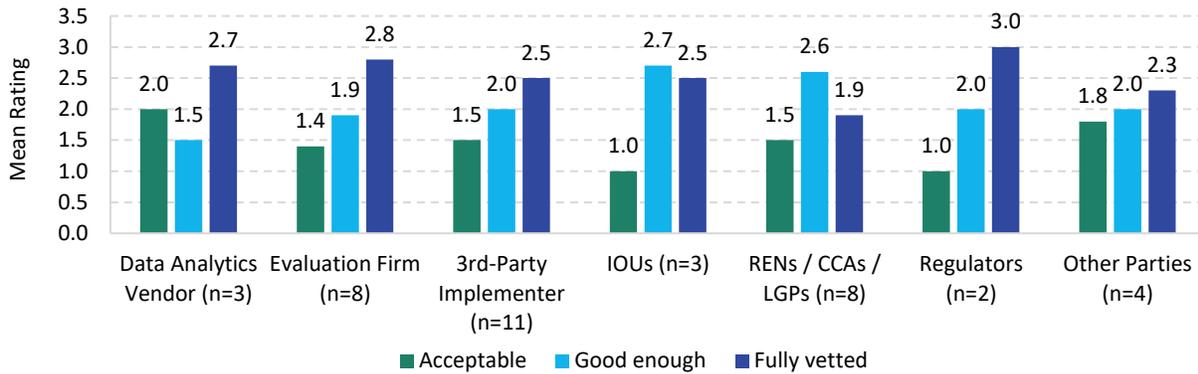


Q26: Please rank in order your organization’s preference for which requirement should be met for most evaluations.

Next, the project team asked respondents to consider three levels of review that evaluation-related reports might take in California, which include (1) *fully vetted*, where all relevant stakeholders’ requirements are met, (2) *acceptable*, where a majority of stakeholders’ requirements are met, and (3) *good enough*, where a minimum set of requirements are met. Respondents were then asked to rank-order their preference for the three levels of review that should be associated with three different report types, including (1) program performance evaluation reports, such as impact, process, or M&V reports, (2) policy and planning reports, such as potential studies and goal setting, and (3) market study reports, such as saturation studies or market assessments. The results for these questions are shown, by stakeholder group, in Figure 4-4, Figure 4-5, and Figure 4-6, respectively.

Figure 4-4 shows that for program performance and evaluation reports, most respondents preferred the “acceptable” level of review most, the “good enough” level second, and “fully vetted” level last. Exceptions were that the data analytics groups scored “good enough” first and “acceptable” second, while the IOUs and RENS/CCAs/LGPs scored “fully vetted” second and “good enough” third. Comments emphasized respondents’ belief that attaining the “fully vetted” level is difficult, costly, and often infeasible given the positions of various stakeholders involved in the process. Though many respondents questioned the rigor of “good enough,” they still generally rated it higher than “fully vetted,” likely because of these obstacles.

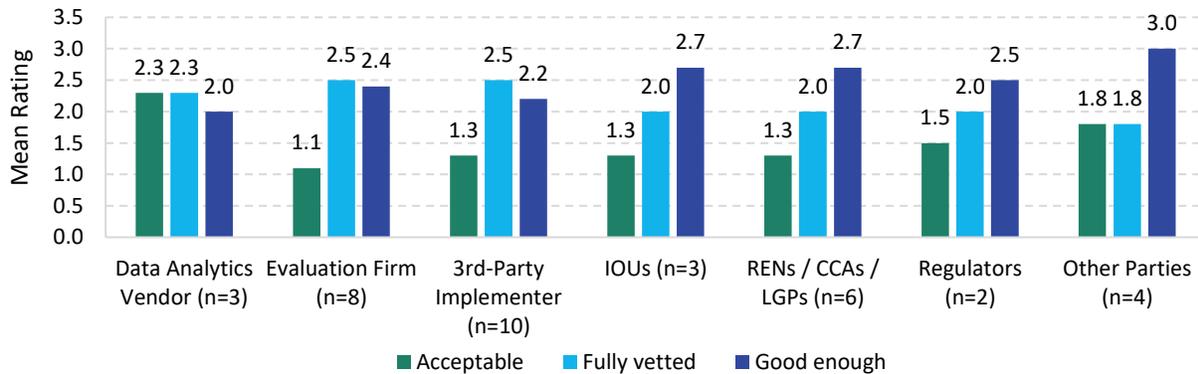
**Figure 4-4: Mean Scores of Rank-Order Preference for Level of Review that Should be Applied to Most Program Performance Evaluation Reports**



Q27: Please rank in order, your organization’s preference for the level of review that should be applied to *most program performance evaluation reports*.

In contrast, Figure 4-5 shows that with regards to policy and planning reports, most stakeholder groups ranked “acceptable” first, but “fully vetted” was second, and “good enough” was third. Here, the exceptions were the data analytics vendors who ranked “good enough” first, while “fully vetted” and “acceptable” were tied for second; the evaluation and implementer groups ranked “good enough” second and “fully vetted” third. In general, respondents tended to note that policy and planning reports tend to be less contentious than evaluation reports, thus, likely resulting in “fully vetted” ranking higher here than “good enough,” which did not seem very rigorous to some.

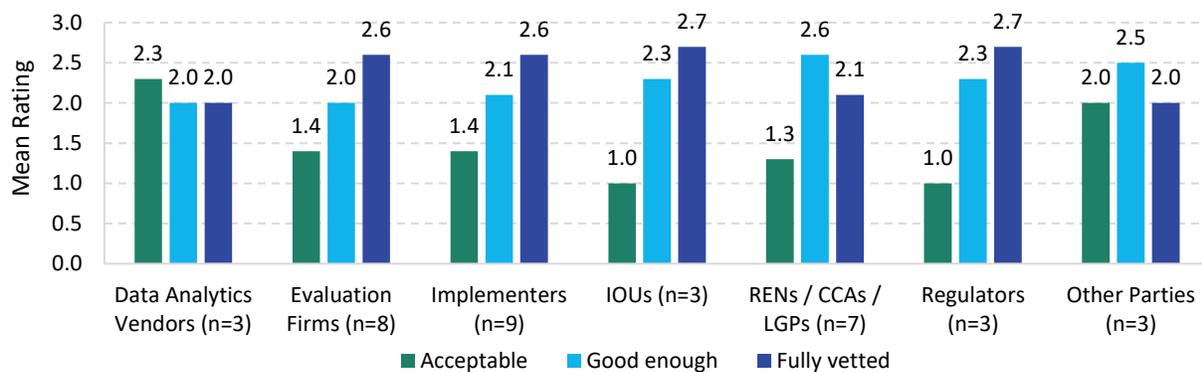
**Figure 4-5: Mean Scores of Rank-Order Preference for Level of Review that Should be Applied to Policy and Planning Reports**



Q28: Please rank in order, your organization’s preference for the level of review that should be applied to *policy and planning reports*.

Finally, Figure 4-6 shows that when it comes to market study reports, most stakeholder groups ranked “acceptable” first, “good enough” second, and “fully vetted” third. The exceptions include the data analytic vendors, who tied “good enough” and “fully vetted” for second, and the REN/CCA/LGP and other parties who ranked “fully vetted” higher than “good enough.” Many respondents pointed out the importance that market studies play in design and planning, but also noted that, like evaluation studies, these studies can be contentious and attaining the “fully vetted” level can be difficult – thus, “fully vetted” ranked lower than “good enough.” However, some other respondents felt that market studies just do not need to be as rigorous as evaluation studies, thus ranking “good enough” higher than “fully vetted.”

**Figure 4-6: Mean Scores of Rank-Order Preference for Level of Review that Should be Applied to Market Study Reports**



Q29: Please rank in order, your organization’s preference for the level of review that should be applied to *market study reports*.

To wrap up this section, the project team asked respondents to provide suggestions on how to best address competing objectives given the balance that needs to occur between requirements and levels of review. A wide array of responses were provided. Here we provide brief discussions of some of the more prevalent and salient issues, and then provide a paraphrased list of additional comments.

- › Much was said about collaboration. Some felt with a **higher degree of full-faith collaboration and ensuring the involvement of all relevant stakeholders** would make it easier to attain the fully vetted level of review. Others felt that clarity and transparency are also key. However, some others were less optimistic and did not feel that striving for fully vetted review was realistic or a good use of ratepayer funds given the time and resources needed to get to consensus. Some felt there are often too many stakeholders involved. Ultimately, some wondered if the State will even be able to attain the energy savings doubling goal mandated under SB 350 given the obstacles that exist in attaining a fully vetted level of approval.
- › The issue of power imbalances were highlighted by several respondents, mainly the perception that **single individuals or organizations with more decision making authority can sometimes stall progress** – and ultimately drive up evaluation costs. One respondent posited that if the ex-ante process were fully vetted, that would present many risks for programs and measures. They noted how in their experience, critical stakeholders at some organizations (namely the CPUC and Office of Ratepayer Advocates [ORA]) demanded outcomes beyond what other important stakeholders could live with. Thus, fully vetted was a burden. In their opinion, acceptable or good enough would also better address the doubling of efficiency and fill the pipeline. In short, they felt that minimum requirements need to be set that are clear, transparent, easy to apply, and used to vet results to help mediate power imbalances in the decision-making process. Thus, maybe good enough is suitable, but there was little clarity among respondents as to what criteria would define this level of approval.
- › The **need for stability and replicability** in implementing processes also came up. Many felt there is a wide variance in how different stakeholders do things. For example, implementers may do some internal assessment to estimate expected energy savings from one of their program offerings, but then the evaluators come in and derive very different results, often using different approaches. Then, when the report comes out, they feel that a standard and transparent process for vetting the results does not exist. Overall, Implementers (and to some degree the IOUs) bemoaned the uncertainty they have to operate under and do not feel that their interests are always served given the array of stakeholder interests that enter the equation.
- › **Adequate funding for evaluation** also came up as an issue that some felt hindered progress, and at times stymied the collaborative efforts. Some evaluators and implementers felt that the resources allocated to evaluation cannot provide the level of rigor, quality of results, and timeliness that many expect. But respondents also noted that challenges exist in this area. One insightful respondent noted that “there is no way that we can approximate success with the limited dollars invested in EM&V right now in California. But we can't ask ratepayers to fund more and we can't get outside investors to be successful... Our problem is not EM&V but is related to markets.”

- › A litany of additional individual comments were also provided, which are summarized below.
- A couple respondents felt that new programs, or those with specific or problematic barriers, likely require greater stakeholder vetting.
  - One respondent felt that low-income family assistance needs to be better vetted with the appropriate state/owner agencies included in the process.
  - “Not just any stakeholder, but *informed* stakeholders are needed.” One respondent felt that with informed stakeholders, a less vetted process can move forward without things becoming a political showdown. They felt program performance in particular could be better addressed with the right informed expertise, even with a set of minimum requirements
  - One respondent noted that they actually like the process they have seen -- especially with regards to comments being visible to all parties.
  - Embedded evaluation can probably help address a lot of the issues. Namely, “it can help provide better alignment on expectations.”
  - A respondent pointed out that working groups can be a good instrument, but only with the right leadership. They can also be dysfunctional with the wrong leaders.
  - “You want the research to be of value to rate payers - so cost and timeliness are both important.”
  - A couple respondents noted that the vetting process should probably depend on how big a piece of the portfolio it accounts for. Uncertainty of savings would also drive the need for more public vetting.
  - “Don't let it be a political exercise. Satisfying *all* stakeholders is a policy issue.”
  - One respondent bemoaned the high level of (sometimes) false precision they perceive in the industry: “Need to focus on being generally right more than be exactly wrong.”
  - “We should use the acceptable standard because some stakeholders are asking for things that are far too costly and impractical.”
  - “Rather than stakeholder review (which is about agenda setting), I'd rather have: (1) true evaluation expert review (as in U.S. Department of Energy Technical Advisory Group committees) and (2) make sure evaluators specify in advance their hypothesis, data, research design, key research questions, segments, statistical power and margin of error, analysis technique, model specification, how to deal with attrition and outliers, etc. All the testing should be done up front and leave little to no room for after the fact, ad hoc decisions.”
  - Finally, one respondent provided the insight that even with lower standards of approval, it will not necessarily be simple: “There are so many diverse players there needs to be representation from all categories of stakeholders to know if it is good enough or acceptable.”

### 4.2.3. Ability to Incorporate New Methods

The next research question addressed through this needs assessment was: Does the Framework sufficiently allow for the incorporation of evaluation methods into program design and implementation? Based on a synthesis of several interview questions, the project team found that the current Framework does not sufficiently allow for the incorporation of new evaluation methods. However, this is mostly for newer program types or topics that have been contentious for some time. Nevertheless, embedded evaluation may provide a means of overcoming some of this. The most dominant methods or issues mentioned include:

- › Random control trials (RCTs) and experimental design
- › Quasi-experimental designs
- › Net-to-gross
- › Attribution
- › Cost effectiveness
- › AMI data statistical methods
- › Real-time evaluation
- › NMEC

Notably, many of these, such as AMI data, real-time, evaluation, and NMEC are tied to new legislative considerations under AB 802, and undoubtedly warrant attention moving forward as respondents revealed a high degree of uncertainty around these issues. Other items such as net-to-gross estimation, attribution, and cost effectiveness have long been contentious issues and likely warrant further efforts to refine or change as there appears to be a relatively high degree of dissatisfaction with current practices. RCTs and quasi-experimental designs generally arose in the context of behavioral programs as well as newer metered data approaches – both areas that arose frequently throughout different parts of the study.

However, here it is also worth emphasizing the appeal and promise that embedded evaluation seemed to hold for most respondents, regardless of which stakeholder group they represented. Effectively incorporating evaluation methods into program design and implementation will likely require evaluators being onboard early in the process, but also involved throughout implementation. Many felt this could provide the opportunity to better address evaluation needs throughout the entire program lifecycle. Implementers in particular seemed to like the idea of embedded evaluation as they indicated it can help clarify expectations and provide greater predictability for their programs. But notably, respondents felt embedded evaluation can also provide implementers the information they need in a *timely manner* to improve programs midstream to help improve program delivery and avoid potentially poor evaluation outcomes.

#### 4.2.4. Types of Evaluations Not Covered

When asked: “Are there specific programs types that you are familiar with that require evaluation methods that differ from the traditional evaluation methods discussed in The Framework?” Most respondents (26 of 33, or 79%) indicated that there are such program types. These included:

- › Multiple measure programs like whole building programs (both residential and commercial)
- › Market transformation programs
- › Strategic energy management programs
- › Integrated distributed Energy resource programs
- › Non-resource programs
- › Behavior programs
- › Finance programs
- › Upstream programs
- › Midstream programs
- › Codes & standards
- › Education and information programs
- › Marketing programs
- › Emerging technology
- › Pilot programs
- › Low income programs
- › Hybrid resource/non-resource program
- › REN- or CCA-specific programs
- › Demand response programs
- › Renewables programs

#### 4.3. Information Necessary to Meet EM&V Requirements from Recent EE and DER Policies

The section includes the assessment of what information is necessary to meet current evaluation requirements for new policies. To address this topic we cover: (1) new concepts used in the industry, (2) new types of research, (3) a discussion of savings information required by new policies. High level findings from this section include:

- › When presented a list of 14 terms covering topics currently being discussed in the industry such as existing conditions baselines, M&V 2.0, pay for metered performance, energy storage, wind and solar generation, and others, respondents generally felt that all the terms need to be included in any update to the Framework. However, terms more closely associated with issues related to recent policy changes were generally rated as more important than terms associated with DERs.
- › When asked what types of studies need to be included in a Framework update, 9 of 12 listed topics were rated as important by 50% or more of the respondents. Low-income impact and process evaluations topped the list. The three topics ranked lowest were market structure and operations studies, research, development, and deployment (RD&D) program evaluation, and market share tracking studies.

- › New policies will require two main categories of information: (1) GHG and grid level information requirements, and (2) programmatic requirements (primarily related to AB 802), including NMEC, below/to-code, and behavioral requirements.

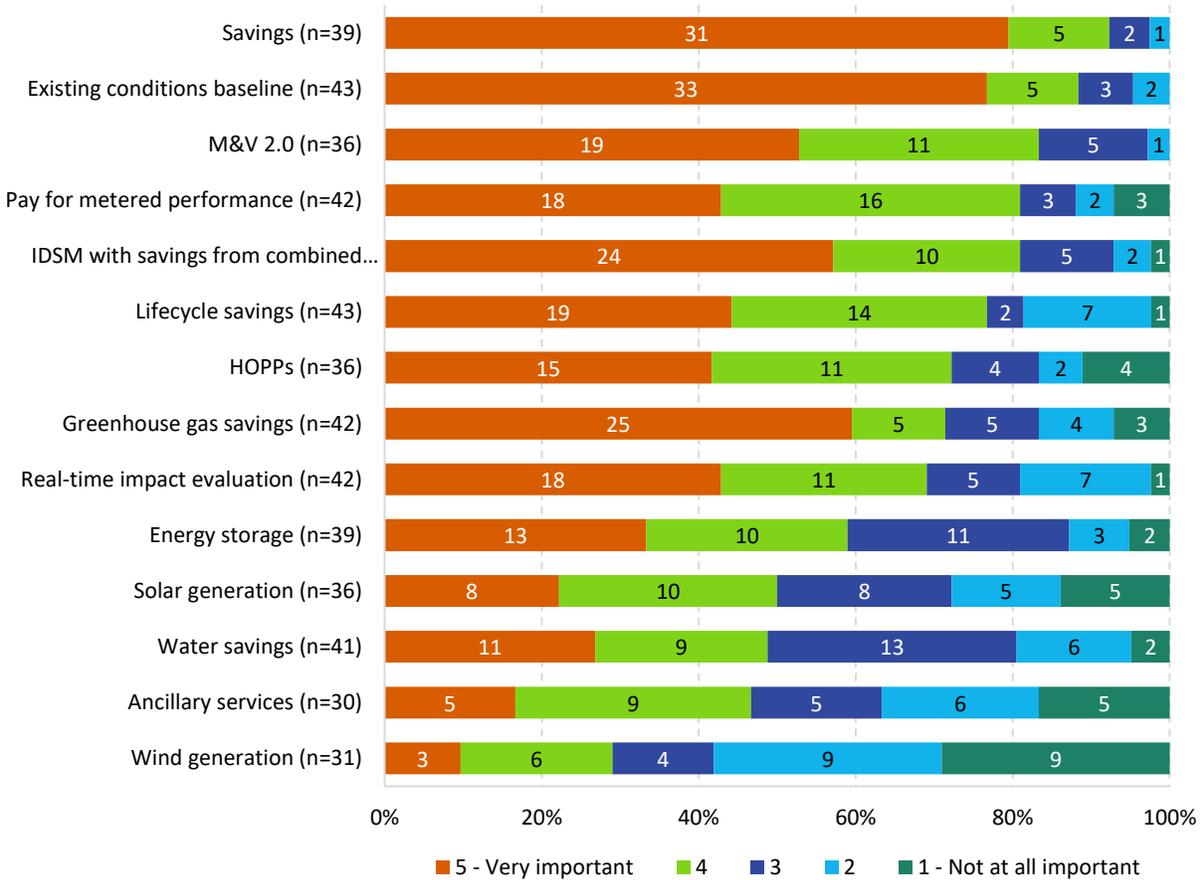
### 4.3.1. New Concepts

To address this issue, the project team provided respondents with a list of 14 topics currently receiving attention in the industry, and asked them to rate (on a five-point scale, where 1 meant “not at all important” and 5 meant “very important”) how important it is that each term be addressed in the Framework. Figure 4-7 presents these results.

Overall, respondents felt that most terms warrant attention – more than half of the respondents scored 12 of 14 topics as “very important” or “important.” In general, topics driven by current policy changes (e.g., savings, existing conditions baselines, pay for metered performance, HOPPs, greenhouse gas savings, real-time impact evaluation) tended to be the ones respondents scored most important; topics associated with DERs (energy storage, solar generation, solar generation) and less-common topics (e.g., water savings, ancillary services) scored lowest.

It is interesting to note that the DER-related terms scoring lowest may seem to represent a disconnect with other information collected through this study, such as the findings showing that many of these were the same topics that respondents indicated were not adequately addressed in the Framework or the industry at large (see Section 3.2.5). However, it is more likely that these results point to the respondent pool’s relative inexperience with some of these topics (see Figure 2-3 in Section 2.3.6), so should probably not be taken to mean these topics do not warrant attention, as it is very likely that DERs will take on a bigger role in California in coming years.

**Figure 4-7: Importance that Terms be Addressed in the Evaluation Framework**



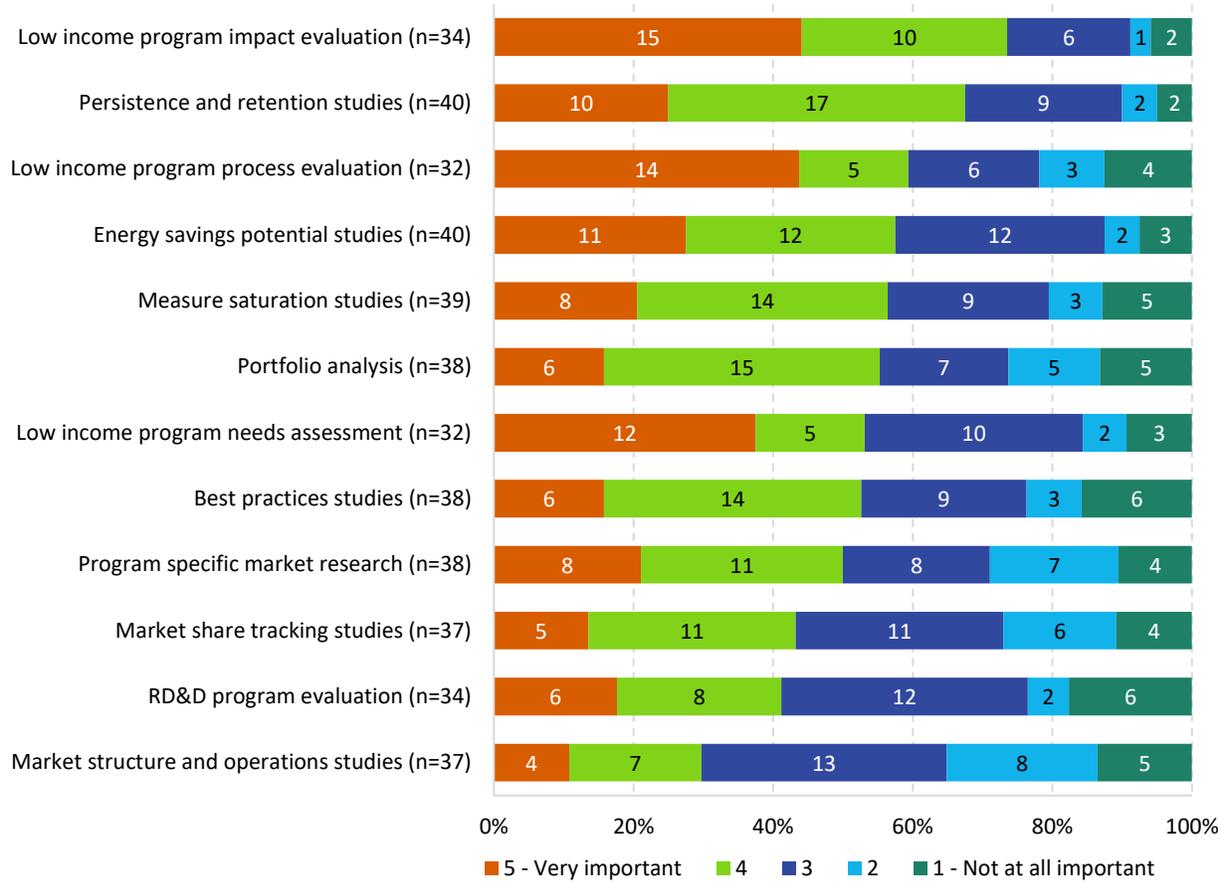
Q31: Please indicate how important you think it is that the term be addressed in the Evaluation Framework.

### 4.3.2. New Types of Research

To address this issue, the project team provided respondents with a list of 12 study types and asked them to indicate how important they felt each was, on a five-point scale where 1 was “not at all important” and 5 was “very important,” that the Framework address each study type. The results are shown in Figure 4-8.

Low-income program impact evaluations (25 of 34, or 74%), persistence and retention studies (27 of 40, or 68%), and low-income process evaluation studies (19 of 32, 59%) were the three with the highest importance. Market share tracking studies (16 of 37, or 43%), RD&D program evaluations (14 of 34, or 41%), and market structure and operations studies (11 of 37, or 30%) scored the lowest. However, it is worth noting that all but three of the study types were rated 5 or 4 by at least half of the respondents; only one was rated a 5 or 4 by less than one-third of respondents. Thus, addressing all of these study types in a Framework update – or at least pointing readers to places they can go to get useful guidance – would likely be worthwhile.

**Figure 4-8: Importance that an Update to the Framework to Address Study Types**



Q44: How important it would be for an update to the Framework to include guidance on how to conduct the following types of studies?

### 4.3.3. Savings Information

This section discusses savings information that is required by new policies. These findings are taken from the policy review.

In general, information needs fall into two categories:

- › GHG and grid level information requirements, and
- › Programmatic requirements (primarily related to AB 802) including NMEC, below/to-code, and behavioral requirements.

**GHG and Grid Level Requirements:** Both SB 350 and the related CPUC Integrated Resource Planning Proceeding’s White Paper require the state to use *GHG savings* resulting from EE programs as a major criterion for success. This is consistent with AB32, the state’s GHG reduction legislation. Basing energy efficiency evaluation activities on GHG reductions will require a refresh of existing Framework approaches, which are currently based on energy and demand savings as the major evaluative criteria.

*Grid level* information needs will vary, but inevitably will be based on actual recorded meter savings. DERs are being used by grid planners to fill the need for grid operations and deferral of alternative investments. For this reason, the major criteria and information need for DERs and grid level operations will be the actual reductions in usage needed by grid operators to: (1) meet load needs, and (2) offset alternative “wires” solutions to meet feeder level resource needs.

**Programmatic Information Requirements:** Major evaluation related operational requirements of new policies related to:

- › NMEC (HOPPS rulings and filings) and related
- › AB 802 below code/to-code evaluation
- › Behavioral changes

*Normalized Meter Energy Consumption:* In each case, key criteria will be that each project must reasonably be expected to produce multi-year savings. To evaluate savings based on normalized billing data, NMEC approaches will likely need to be clearly defined. A minimum of one year of post data will be required to calculate savings for these projects. The M&V period must be a minimum of a two years and annualized savings will be calculated based on this period. Maintenance measures are now allowed under current policy, but sites must commit to the maintenance plan to be included in the programs. Savings calculations must be backed up by pre- and post-intervention data and in most cases deemed or pre-defined savings will not be accepted.

*Below Code and To-Code Programs:* In regard to the new code baseline policy, savings can now be claimed for above existing condition for measures of certain types. All baseline and EE models must be normalized using policies adopted temporarily in the HOPPS Ruling, but expected to be revisited and adopted permanently in future rulings. For program evaluation, baseline assumptions, information regarding actual baselines, and how normalization meter accounts are taken assessed must be required.

*Behavior, Retro-commissioning, and Operations Intervention (BRO):* For behavior type programs, evaluation for BRO measures will be one year for High Opportunity and related Programs for the purpose of lifecycle savings estimates for the CPUC Efficiency Savings and Performance Incentive (ESPI) mechanism and for GHG reduction analyses. The programs must be trued up after 3rd year to demonstrate persistence. Programs or projects that are capturing effects from such changes must include: (1) continuous feedback for the building operator (or home owner) to sustain savings; (2) use of appropriate analytical methods by which potentially small changes in consumption can be attributed to operational effects, versus other effects; (3) detailed documentation of the operational interventions; and (4) a detailed data tracking plan, including requirements that participants sign-up for a maintenance plan for at least three years. For evaluation, all changes in energy use must be contributing to operation effects and other program interventions or identified as outside effects. For BROs and NMEC related projects, all simulation models (and related analyses) will need to be backed up with pre- and post-intervention meter data and be subject to CPUC-led ex post evaluation prior to being eligible for ESPI *payment claims*. BROs interventions create multiyear savings claims for savings. These are to be made after demonstrated metered persistence (2 year) of post data. Program Administrators are required to submit annual first year claims for a minimum of 2 years, and can continue claiming savings as long as they demonstrate persistence. Effective Useful Life (EUL) for behavioral retro-commissioning, and operational measures is 1 year.

## 4.4. EE and DER Policies and New Opportunities for EM&V Not Currently in the Framework

In this section, we provide a discussion of whether the new regulatory/economic/technical environment provides new opportunities for EM&V that are not recognized within the context of the current Framework. More specifically, we provide discussions around content from three key chapters of the Framework in the context of how they might need to be adapted. These chapters and topics include:

- › Chapter 5: Umbrella Roadmap – Types of evaluations and evaluation components
- › Chapter 14: Evaluation and Cost Effectiveness – Cost effectiveness metric changes
- › Chapter 15: Overarching Evaluation Studies – Excluded study types

Key findings from this section include:

- › Chapter 5: Umbrella Roadmap will need updating to account for new timelines under the rolling portfolio.
- › Chapter 14: Evaluation and Cost Effectiveness will need updating to account for different evaluation approaches using NMEC as well as updates to account for any revisions to cost-effectiveness by incorporating societal costs such as the GHG adder or reverting to alternative tests. EE as a DER, EE and DR as a DER resource, and EE as a traditional program resource (for locational, temporal, or programmatic reasons) will also likely need to be addressed in revision to the Framework.
- › Though overarching studies have been conducted in California for some time, new materials providing guidance on studies such as measure saturation, market savings potential, and measure life may be needed as NMEC gains ground.

### 4.4.1. Umbrella Roadmap – Types of Evaluation and Evaluation Components

The “Umbrella EM&V Roadmap” described in Chapter 5, and the related Chapter 5 Appendix provide a solid foundational framework for EM&V planning related primarily to “traditional” M&V approaches based on a three-year cycle for portfolio development and implementation. New approaches requiring new timelines for evaluation and new customer payment schedules, as well as the relatively newly created 10-year rolling portfolio cycle, provide an opportunity and a need to refresh Chapter 5 – based on these and other new additions to the program evaluation planning (including potential “crossover” issues where EE and DER meet in the IDER and DRP rulemakings).

Key changes related to AB 802 and SB 350 requirements for below code savings analyses and custom program review using NMEC as a key evaluation approach, for instance, will require review of the timing of the Chapter 5 and Appendix 5 planning processes. Additional issues related to the varying timing and planning frameworks for EE as a DER resources versus EE as traditional resource will also require review and refresh of Framework M&V planning.

For these reasons, and other noted in previous section, revisions to the current planning cycles will need to be updated based on new CPUC and state policies on EE. The areas affecting the planning cycle relate to:

- › The two-year NMEC M&V timeframe will affect evaluation planning cycles and approaches in ways different than the current planning framework encompasses.
- › Baseline assessment will be more important with these types of projects due to the potential for claiming as-found savings – and may warrant special discussion in the planning chapter
- › Opportunity may exist for the evaluation staff to provide valuable input mid-program before final ex post is claimed as part of the planning process, as savings can be claimed in year one but final ex post will not be claimed until year two of M&V.
- › Due to the nature of the data that will now be provided and the long-term evaluation requirements, there may be opportunity to evaluate measure life in a much more efficacious manner than has been possible in the past for most programs.
- › Addressing unique NMEC issues related to final evaluation results occurring in year two when the program is claiming year one savings will also need to be reviewed as part of the planning cycle activities.
- › Integrated DER EE planning issues will need to be identified and addressed in the Chapter 5 refresh.

### 4.4.2. Evaluation and Cost Effectiveness – Cost Effectiveness Metric Changes

As stated in the Commission’s HOPPs Ruling, "The expected useful life of these measures should be tied to how long the program administrator will measure savings. The M&V period should be a minimum of two years." Measure life directly influences cost-effectiveness and so a certain length of measurement time may be required to achieve cost effectiveness. In addition, new AB 802 NMEC related evaluations of programs may require longer monitoring and other long-term tasks that will need to be included in the cost benefit assessment, as appropriate. Additionally, data from NMEC related evaluation programs will be normalized annual data and may be used to accurately assess peak savings. This is important as avoided electric energy costs vary with load level at different times of day (peak savings is more valuable).

The issues noted above relate primarily to cost-effectiveness issues and metrics related directly to the use of normalized billing data to assess energy savings. With increased use of NMEC, M&V activities will become more closely aligned with actual costs and benefits of providing the energy efficiency services. This will also be the case based on enhanced AMI and related big data assessments – whether in residential or nonresidential sectors – which will provide on-site data that will likely clarify technology impacts in much more accurate fashion than in the past. For these reasons, cost-benefits analysis within the current Framework will likely need to be refreshed in terms of references to new programmatic inputs and findings.

In addition to these programmatic changes in cost-benefit assessments, the primary test that is currently used by the Commission to evaluate energy efficiency savings (i.e., the TRC test), may also change as new proposed approaches that include “societal costs,” for instance, for GHG emissions

reductions, may now come to the fore to account for the mandates in SB 350 and related IRP deliberations. Should GHG become a dominant assessment factor for energy efficiency portfolios, this will need to be part of a Framework refresh. Current proposals to use, for instance, the Societal Cost Test (SCT) or even the Program Administrator Cost (PAC) test, if adopted will require not only review of the Framework, but of the key cost-effectiveness manual for evaluators, the *Standard Practice Manual (SPM): Economic Analysis of Demand-Side Management Programs* (2001 and updated periodically since that time), referred to as the Standard Practice Manual.

Lastly, beyond direct programmatic and cost-effectiveness test issues, ones related to the ability of evaluators to assess the varying system costs and benefits of, for instance, EE as a DER, EE and DR as a DER resource, and EE as a traditional program resource (for locational, temporal or programmatic reasons) -- as well as variants on these -- will need to be addressed in the Framework, as these issues will also likely need to be addressed in the *Standard Practices Manual* and future form of the *EE Policy Manual*.

### 4.4.3. Overarching Studies

Chapter 14 of the current Framework notes the need, at times, for overarching studies that include:

- › Measure saturation studies
- › Energy-savings potential studies (technical, economic, achievable-market)
- › Portfolio analyses (including “best practices” and “lessons learned” studies)
- › Market and market operations analysis (beyond program level)
- › Studies that update key parameters that influence multiple programs (e.g., measure life, avoided costs)
- › Development of improved methodologies for evaluating programs

While the current Framework does not devote specific chapters to these many of these overarching studies are regularly conducted. Chief amongst these is the ongoing CPUC IOU potentials and goals studies. Other studies related to key measure life parameters (e.g., in the lighting technology realm), have also been performed. DEER update studies have also regularly been performed since the early 2000s.

Other overarching studies related to, for instance, market and market operations analysis will likely become more important as market transformation (MT) programmatic structures, such as the Energy Star Retail Products Platform effort and Strategic Energy Management programs become more important in the overall portfolio of EE programs.

Key issues related to NMEC and new M&V approaches needed for overarching studies include:

- › Measure saturation studies may need to be done in a different way to account for as-found baseline.
- › Market savings potential has increased with as-found baseline but this will need to be studied to be well understood.

- › Measure life is key to these programs and the data that is available can be used to calculate this factor. Overarching studies based on new information from NMEC evaluations may prove valuable.
- › Methodologies for evaluating these programs have been initially defined in some way but will need further refinement over time to meet the unique structure of the data and delivery of these programs. Overarching studies related to new evaluation approaches will be needed.

Lastly, overarching studies that capture the needs of particular prototypical market situations, for evaluation and other purposes (e.g., market based incentives), will likely need to be undertaken so that portfolio managers (the IOUs and other program administrators) will be able to best understand the variety of situations in which EE must be evaluated – based on varying usages, benefits, and costs. As such, it will likely be prudent to consider the future need and value of each overarching study type and consider including these as part of the Framework refresh.

## 5. Findings on New and Emerging Methods and Data

Research Objective	Research Questions
<p>Are there available methods for EM&amp;V that were not addressed in the 2004 EM&amp;V Framework and 2006 Protocols and DR Protocols but are important now and are the definitions of these clear?</p>	<ul style="list-style-type: none"> <li>• Are there new measurement and verification methods or technologies that need to be included in the Framework?</li> <li>• Can we distinguish between program types that would be more likely to benefit from such emerging methods and those that are more conducive to more traditional evaluation approaches?</li> <li>• Is there general guidance that could help integrate new methods into the Framework over time?</li> <li>• Does the Framework provide sufficient guidance around codes and standards?</li> <li>• Does the Framework sufficient guidance around behavior programs?</li> <li>• Is there a sufficiently vetted and generally accepted definition or understanding of “M&amp;V 2.0” such that this terminology would be useful in a revised Framework document?</li> <li>• How applicable is the UMP to the Framework?</li> </ul>
<p>What data and methods needs emerge from policy/technological environment?</p>	<ul style="list-style-type: none"> <li>• Is there guidance that needs to be reviewed in the context of the Rolling Portfolio?</li> <li>• Does a change in default baseline create risks associated with new programs/measures that would justify a review of study methodology, uncertainty threshold and sample design?</li> <li>• Are there implications of the “existing baseline” environment as required under AB 802/ SB 350 and implemented by D. 16-08-019 and other guiding regulatory documents?</li> <li>• Does the current Framework provide opportunities to utilize experimental design, comparison groups, and the like, especially about net-to-gross (or “free-rider) estimation methodologies?</li> </ul>
<p>To what extent should the Framework address evaluation reporting?</p>	<ul style="list-style-type: none"> <li>• To what degree should evaluation reporting guidelines or requirements be contained in the Framework?</li> </ul>

## 5.1. New EM&V Methods Not Addressed in the Framework or the EE and DR Protocols

This section discusses whether there are available methods for evaluation that were not addressed in the 2004 EM&V Framework and 2006 Protocols and DR Protocols<sup>10</sup> but are important now and are the definitions of these clear. To address this objective we cover several topics including: (1) assessing whether there are new measurement and verification methods or technologies that need to be included in the Framework, (2) distinguishing program types that would be more likely to benefit from emerging methods and those that are more conducive to more traditional evaluation approaches, along with general guidance that could help integrate new methods into the Framework, (3) assessing whether the Framework provide sufficient guidance around codes and standards, (4) assessing whether the Framework provides sufficient guidance around behavior programs, (5) assessing if there is a sufficiently vetted and generally accepted definition or understanding of “M&V 2.0” such that this terminology would be useful in a revised Framework document, and (6) assessing how applicable the UMP might be to the Framework. Summaries of key findings from this section include:

- › Methods related to new policy decisions such as AMI data, real-time evaluation, M&V 2.0, NMEC, and submetering need to be addressed. Also, respondents are seeking greater clarity or revision to other topics such as net-to-gross, attribution, cost effectiveness, and experimental design.
- › Some recommended program revisions can likely be handled through updates or expansion of existing content. Some other program types will likely require new materials.
- › A large number of respondents are seeking more guidance on behavior programs.
- › Similarly, many respondents are also seeking guidance on evaluating codes and standards efforts.
- › Over two-thirds (68%) of the respondents felt the definition of M&V 2.0 provided by the interviewers fully matched (27%) or mostly matched (41%) their understanding of the concept. However, defining M&V 2.0 will be a challenge for the remaining stakeholders as different individuals have varying ideas on what it means – or want it to mean. There is notable disagreement in areas such as the type of data it should involve and what other metrics might need to be included. Furthermore, some respondents are opposed to the notion of M&V 2.0 in general, as they do not feel it is doing anything to advance the industry.
- › There is significant familiarity with the UMP, but little consistency in how it might apply or be integrated into the Framework. Some people felt it should simply replace the Framework; others felt it should just be cited in the Framework; and yet others pointed out that the UMP is more akin to a set of protocols and has no relation to the Framework.

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<sup>10</sup> Though the interviews did not inquire about the two protocol documents specifically, respondents did provide significant input around new methods and new program types for which they are seeking improved guidance.

### 5.1.1. New Methods

As noted throughout this report, respondents emphasized a wide range of new methods that they felt were not adequately covered by the Framework – or elsewhere in the industry for that matter. The recurring methods include:

- › AMI and whole building analysis
- › Real-time evaluation
- › M&V 2.0
- › NMEC
- › IoT sensing and submetering
- › Macro consumption
- › Embedded evaluation
- › Non-energy effects
- › Cost effectiveness
- › Attribution
- › Net-to-gross
- › Quasi-experimental designs
- › Experimental designs (RCTs) including random encouragement designs

Many of these (e.g., AMI data analysis, real-time evaluation, M&V 2.0, IoT sensing and submetering, NMEC), are related to recent legislative mandates and respondents want clarity, transparency, and direction to help alleviate the high degree of uncertainty around these topics. Other methods are ones that have been used in the industry for some time (e.g., RCTs, quasi-experimental design, assessing attribution, estimating non-energy effects, cost effectiveness, net-to-gross), but respondents are seeking greater consistency and clarity on how these approaches are to be used.

One other topic of interest gleaned from the respondents was a focus on customer insights, satisfaction, and education. Here the focus was on approaches for obtaining information on what customers like and do not like about programs, how to increase participation and barriers to participation, and how to better deliver the energy education customers need to make wise choices – that is, typical process evaluation content. While none of these topics are new, what stood out was respondents' desire to obtain this information *in near real-time* to ensure the information is useful and timely for revising program delivery before a program year or cycle ends and before the formal evaluation is completed. It is likely a greater emphasis on embedded evaluation will help resolve some of this.

### 5.1.2. New Program Types

Throughout this study the interviews probed issues around what types of programs are not adequately addressed by the Framework and could warrant revisiting or new material. While many of these can likely be addressed through updates to existing materials, others will likely need entirely new sections.

The project team identified these program types as those that can likely be addressed through updating existing materials:

- › Multiple measure programs like whole building programs (both residential and commercial)
- › Marketing programs
- › Pilot programs
- › Non-resource programs
- › Hybrid resource/non-resource program

- › Renewables programs
- › REN- or CCA-specific programs
- › Education and training programs
- › Low income programs

The project team identified these as the new program types that will likely need to be addressed with new materials:

- › Finance programs
- › Behavioral programs
- › Demand response programs
- › Midstream or upstream market transformation programs
- › Emerging technology programs
- › Codes & standards
- › IDER programs

Respondents were also asked how they thought new methods and programs might be best integrated into the Framework. The following summarizes some of these key findings.

- › Many respondents across a wide range of stakeholder groups emphasized their desire for **updates to the current cost effectiveness approaches**. Several respondents recommended greater guidance on approaches like estimating GHG emissions and assessing economic benefits. Others more generally called for an expanded definition of societal benefits. “It is incredibly important that non-energy benefits be included in EM&V – in part this is accomplished with the societal cost adder, this is about more than savings and we want to provide the more robust services to the community the societal test will permit.”
- › Throughout this study, there were two general schools of thought regarding **the level of detail the Framework should present**. One seemed to be seeking a much higher level of specificity and direction; the other proposed a “KISS (kiss it simple, stupid) model.” One respondent pointed out how there is continued differentiation, if not discord, of EM&V and program design that complicates the implementation ecosystem. They felt that program complexity and design is driven by EM&V – and more specifically, the *fear* of EM&V. “We are often spending more time reporting on what we are doing than doing what we want to be doing, and it’s really accelerated since 2013.” They argue for the simplest, least complex approach to provide value to the implementers and the ratepayers. “These new solutions at the core need to begin with simple and then grow from that perspective and not diminish the benefits to the ratepayers and pushing program administrators into spots where they can’t implement.”
- › **Embedded evaluation** was noted by several respondents – either directly or indirectly. One asked that the Framework “define how it would work, focus on how to provide short and fast feedback to provide real-time info.” But this respondent also weighed the value and the risks by pointing out there is also an explicit need “to balance this against the risk of having the evaluator too close to the implementation. Still needs to be third party. Still need integrity.” Some recommended that embedded evaluation be covered as a specific chapter, while others made statements like “it would be great if utilities and regulators started exploring innovative methods for evaluating continuously operating programs.” This too came up when other respondents asked for ways to increase the speed of evaluation: “any sort of standardization of M&V so it is less dependent on custom M&V for each program by evaluators is desirable. I

would like to have results during the program cycle, not having to wait for the end of the program cycle.”

- › Several respondents stated **that NMEC needs to be addressed**, “especially with recent policy decisions, there needs to be a discussion of methods and what this entails.” One respondent recommended a simple table or graphic that clarifies what type of programs need to be evaluated at the measure level or at the whole program/building level.
- › One respondent emphasized the growing use in other fields of **machine learning** and recommended this approach be incorporated into the Framework in some way so that energy efficiency can stay apace with other fields.
- › One respondent pointed out that **innovation in sampling methods can help reduce uncertainty**. They felt that much of that is missing in the current Framework because they felt “this topic was never properly addressed in the first place.” They felt this was especially salient for evaluating or modeling code versus existing conditions baselines.
- › Others felt **M&V 2.0 warranted specific attention**. “M&V 2.0 is generally a weather normalization method using billing data that essentially updates, brings forward, prior M&V engineering billing analysis. It’s a good start, but certainly not all that is needed. In using billing data to determine efficiency and demand response changes, occupancy changes and changes in building use, and non-routine adjustments are also important to track and understand. This requires greater explanation and clarity.”
- › Other respondents seemed more focused on the future. “**Integrated resources need to be considered now**. Programs need to be responsive to demands on the grid - geographically or temporally demand based.”
- › Some respondents simply asked for **new chapters** such as behavioral programs, customer knowledge acquisition, emerging technologies, and experimental design including more complex topics like random encouragement designs.
- › Many respondents emphasized their belief that **California should not reinvent the wheel**. Some of the needed material already exists and likely just needs some updating to make it more contemporary. A couple of respondents pointed out that some of these approaches are in the UMP, and the UMP should be referenced where applicable. Similarly, some respondents pointed out that there is a lot of literature that exists in this industry, and any update to the Framework should rely heavily on what has already been done and include more references.
- › As a final caution, it is also worth noting that a large number of respondents were skeptical of any update process. Based probably on the increasingly frequent legislative and policy decisions affecting energy efficiency and evaluation in California, some wonder how any document can be kept relevant. “The problem is that as soon as it is developed, it is outdated.” Thus, any effort to update the Framework will need to incorporate in its design the **ability to be flexible and updatable periodically**.

### 5.1.3. Behavior Programs

It is abundantly clear that behavior programs will need to be addressed in any update to the Framework. Though the Framework does contain a chapter on billing analyses, respondents did not seem to see the connection and behavioral programs should be called out specifically in any update. Throughout this study, the lack of guidance, clarity, consistency, and understanding around behavioral programs arose as key findings – for nearly all questions asking about existing gaps or materials that need to be covered moving ahead, behavioral programs arose as one of the most frequently stated topics.

### 5.1.4. Codes and Standards

Like behavior programs, codes and standards programs will also warrant attention in any update to the Framework. Though not mentioned quite as often as some other topics, many respondents revealed frustration over the lack of direction and clarity in evaluating codes and standards programs. A couple of respondents indicated either directly or indirectly that evaluating codes and standards has become more commonplace in recent years as many programs or measures have been pushed to be evaluated under a codes and standards umbrella, but without clearer guidance, this is often challenging.

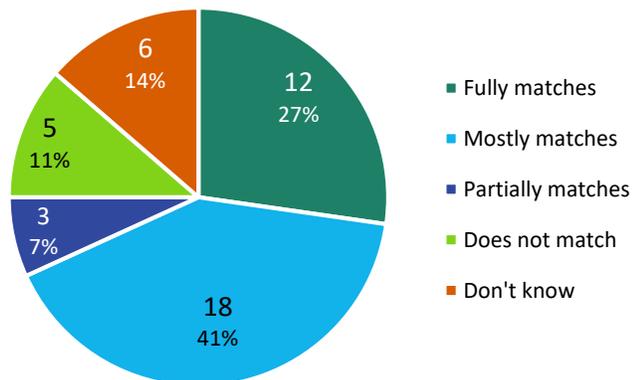
### 5.1.5. Defining M&V 2.0

Given its prevalence in the industry right now, the next research question addressed was to assess if there is a sufficiently vetted and generally accepted definition or understanding of “M&V 2.0” such that this terminology would be useful in a revised Framework document. To probe this issue, the project team provided all respondents with following definition of M&V 2.0:

- › *M&V 2.0 is defined as the ability to remotely determine energy consumption changes using high-frequency (hourly or sub-hourly) energy consumption readings, data analytics, and utility program detail.*

Respondents were then asked how much this definition agreed with their understanding of M&V 2.0. Figure 5-1 shows that more than a quarter of respondents (27%) felt the definition fully matched their understanding. Almost half (48%) indicated that the definition mostly (41%) or partially (7%) matched their understanding. Only 11% said the definition did not match, while 14% did not know or were unsure.

**Figure 5-1: Agreement with Definition of M&V 2.0 (n=44)**



Q35: M&V 2.0 is defined as the ability to remotely determine energy consumption changes using high-frequency (hourly or sub-hourly) energy consumption readings, data analytics, and utility program detail. How much would you say this matches your understanding of M&V 2.0?

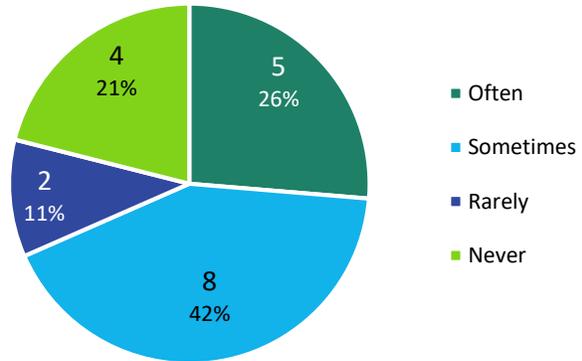
Those who did not feel the definition fully matched their understanding were asked how the definition might be modified to better align with their perspective.

- › Several respondents felt that **the notion of M&V 2.0 was meaningless**. They were not interested in altering the definition as they felt it was just a buzz-term that had no real place in the industry.
- › One issue raised by several respondents focused on the **type of data that is used**, and pointed out that there are other means of obtaining better, more granular data than just smart meters (though notably, the definition does not state that the data needs to be smart meter data). Some exemplified how we need to focus more on granular data (e.g., smart *devices* and sub-metering) instead of whole-house or whole-building, which they felt is of limited value.
- › In contrast, others felt that M&V 2.0 should not just be about more granular data, but about **better methods** that can be used to provide frequently updated, live estimates.
- › One respondent revealed that he felt **M&V 2.0 was actually moving backwards** as pre-post comparisons are much weaker than more sophisticated approaches such as control groups.
- › Multiple respondents mentioned that the definition only covered one aspect of evaluation, which is the data, or more specifically, the automated measurement of the data. They were concerned that **the definition fails to capture any means of describing any detected changes** and wanted to include other data that could be used to help describe change.
- › Others wanted greater clarity on what data goes into the **“black box.”**
- › Other comments provide by only single respondents included:
  - Should incorporate impacts from IDERs.
  - Need guidance on when the approach is suitable and effective, and criteria under which standardized adjustments or variations might be made.
  - Needs to include some statement about it being after-the-fact (e.g., one year out) so that it does not imply that it needs to be done in real time.
  - Does not necessarily require connection to a utility program.
  - The frequency does not need to be sub-hourly; it can be coarser.
  - The underlying model and validation approach need to be described.
  - Change the definition to focus on any monitored resource – it does not need to be restricted to load data.
  - The definition seems to imply that M&V 2.0 is supposed to be automated, but not sure that is the case.

### 5.1.6. The Role of the Uniform Methods Project

Uniform Methods Project (UMP), developed by the Department of Energy and collaborators throughout the industry, has been receiving significant attention over the past few years. One objective of this needs assessment was to gauge current use of the UMP and to assess if respondents thought it could or should be integrated into the Framework. Figure 5-2 shows respondents' use of the UMP is fairly high, with 13 of the 20 respondents who answered this question (68%) saying the "often" or "sometimes" use it. Nevertheless, about one-fifth (4 of 19, or 21%) indicated they "never" use it.

**Figure 5-2: Use of the Uniform Methods Project (n=19)**

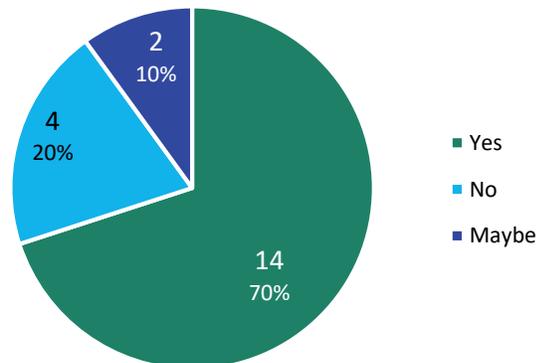


Q32: Does your organization use the UMP Often, Sometimes, Rarely, or Never?

Respondents were next asked whether they felt the UMP could be integrated into the Framework. Figure 5-3 shows that almost three-quarters (14 of 20, or 70%) thought it can and another 2 of 20 (10%) said maybe.

The project team then asked the respondents why they thought the UMP applied to the Framework, or why it did not.<sup>11</sup> Interestingly, even though the majority of respondents indicated it could be of use, they provided relatively few rationales for why. These tended to focus on how it could help standardize evaluation across the country and it should be of value simply because a lot of stakeholders have been involved in the UMP.

**Figure 5-3: Integrate the Uniform Methods Project into the Framework (n=20)**



Q33: Do you think the UMP can be integrated into the Framework?

In contrast, though only 20% of the respondents stated the UMP should not be integrated into the Framework, they also provided many more and a much wider variety of reasons. The following are some of the comments that were collected.

- > "Problem is that UMP started by looking at project and not programs."
- > "It has never been empirically tested and is super high-level."

<sup>11</sup> One reviewer knowledgeable about the UMP indicated that some statements provided by interviewees in this section are factually inaccurate. The statements do reflect interviewee perceptions, which should be taken into account when considering the role that the UMP may serve in a Framework refresh. More information on the UMP are available at: <https://energy.gov/eere/about-us/ump-home>.

- › “Its value will likely diminish over time. If scope was broader it would be more applicable more frequently.”
- › “UMP is designed for states that have significantly fewer resources for EM&V. Incorporating this would be a step backward for evaluation given that the Framework is far more advanced.”
- › “UMP is also a little out of date for midstream programs.”
- › “Does not capture many topics (HOPPs midstream, etc.).”

Because so many respondents indicated they thought the UMP can be integrated into the Framework, the project team asked these respondents how they thought this could best be done.

- › Most respondents indicated it should probably just be cited as a general reference and when more applicable to specific topics, it can possibly be brought in in more detail.
- › A couple of the respondents suggested that the UMP should just replace the Framework entirely as they seemed to take the positions that the UMP could serve to standardize evaluation across the country and so many people have provided input that it must be “right” and valuable.
- › A couple of others were a bit more cautious. One stated that “the UMP is somewhere in between a protocol and a guidance. Seems a bit more prescriptive. Maybe the UMP is a floor for the industry.” However, one of the studies few respondents that seemed to distinguish between the Framework and protocols stated “The Framework is not protocols. The UMP should be integrated into a set of protocols, not necessarily the Framework.”

## 5.2. Data and Methods Needs Emerging from Policy and Technology Environment

This section covers the objective of assessing what data and methods needs emerge from the policy/technological environment. Several specific topics were probed including: (1) guidance that needs to be reviewed in the context of the Rolling Portfolio, (2) whether the default baseline create risks associated with new programs/measures that would justify a review of study methodology, uncertainty threshold and sample design, (3) assessing if there are implications of the “existing baseline” environment, and (4) probing if the current Framework provide opportunities to utilize experimental design, comparison groups. The following summarizes key findings from this topic:

- › While the rolling portfolio will require some revisions to the Framework in the context of evaluation timing and planning (as discussed earlier), the biggest implications may be the need for additional research needed to better understand how the rolling portfolio will interact with other aspects of state policies and goals.
- › There is a large amount of uncertainty around the new default baseline and respondents do not feel the Framework currently provides adequate guidance on selecting different baselines. Further, 92% of respondents felt existing conditions baseline need to be addressed in an update.
- › Few respondents see the Framework as a resource for developing experimental designs or comparison group studies. This was one topic that arose multiple times throughout this study as a specific need.

### 5.2.1. The Rolling Portfolio

The ten-year rolling portfolio decision and related rulemaking presents a unique opportunity to evaluate the overall target of energy efficiency as a resource, as a market transformation technology, and as an integral and integrated component of DER deployment strategies, uses, and values. Energy efficiency has played a key role in the state’s energy policy for many years. The passage of SB 350, with its focus on the doubling of energy efficiency in coming years ensures that EE will continue to play a key role in state energy policy.

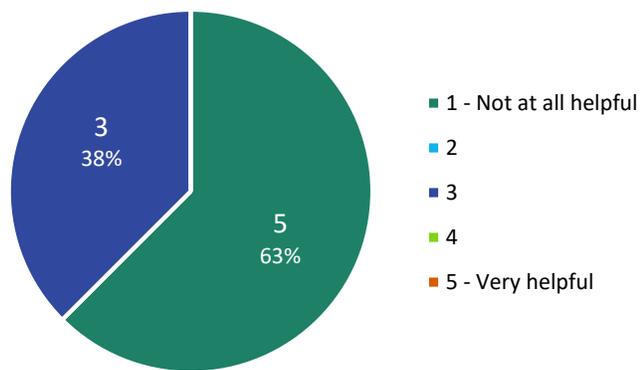
This said, competing priorities of the state related to a focus on an upward of 100 percent Renewable Portfolio Standard, provide challenges to issues of GHG and energy efficiency cost competitiveness. Overarching studies to assess the potential short- mid- and long-term usage and role of EE in relationship to the state’s overall DER policy are prime subjects for future studies within the Rolling Portfolio rulemaking.

Key issues related to AB 802, SB 350, the advance of Big Data usage in evaluations and attendant cyber security issues also are prime subjects for overarching research within the Rulemaking. Lastly, it is important to note that as markets change and move forward, the CPUC, within the Rolling Portfolio rulemaking may wish to seriously consider a set-aside for market transformation programs that aim to change market structures and consumer behavior all the while savings energy through direct program benefits and implementation and the attendant market effects that those programs have on overall EE benefits towards SB 350 goals. This latter approach may prove to be an important component of filling the gap between current EE potential and future potential.

### 5.2.2. Baselines

The next two research questions were related to baselines. The first was aimed at determining whether a change in default baseline create risks associated with new programs/measures that would justify a review of study methodology, uncertainty threshold, and sample design? To answer these questions, the project team asked respondents to indicate on a five-point scale where 1 meant “not at all helpful” and 5 meant “very helpful,” how helpful they think the Framework is in providing guidelines for designing evaluations to identify different types of baseline conditions. Figure 5-4 shows that none of the eight respondents that were asked this question scored it higher than a 3 (3 of 8) and most respondents (5 of 8) scored it a 1 (“not at all helpful”).

**Figure 5-4: Helpfulness of Framework in Providing Guidelines for Designing Evaluations to Identify Different Types of Baseline Conditions (n=8)**



Q15: How helpful do you think the Framework is in providing guidelines for designing evaluations to identify different types of baseline conditions, such as existing conditions, standard practice, or code?

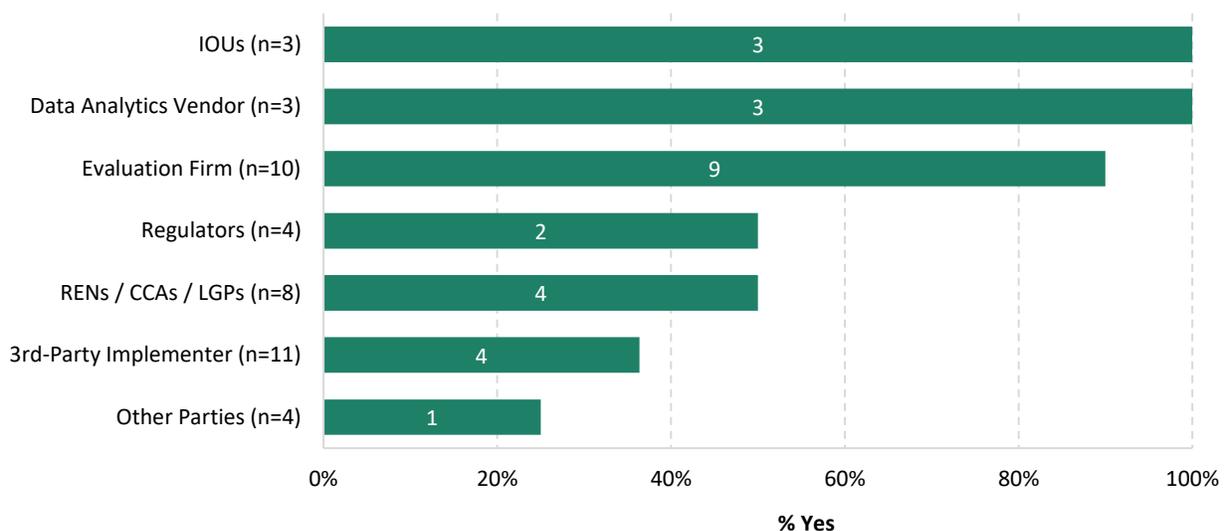
Also, though not asked directly in the interview, a number of respondents revealed concern about the baseline issue. As noted earlier in this report when discussing potential improvements to the Framework, one respondent pointed out that innovation in sampling methods can help reduce uncertainty. They felt that much of that is missing in the current Framework because they felt “this topic was never properly addressed in the first place.” They felt this was especially salient for evaluating or modeling code versus existing conditions baselines.

The second research question was to assess if there are there implications of the “existing baseline” environment as required under AB 802/SB 350 and implemented by D. 16-08-019 and other guiding regulatory documents? As reported earlier, when asked about terms that need to be addressed in the Framework, existing conditions baselines was the second-highest scoring item, with 36 of 39 respondents (92%) scoring it a 4 or a 5 on a five-point scale where 5 meant “very important.” Also reported earlier, it quickly became obvious to the project team that respondents are interested in much greater guidance and clarity on how to develop and evaluate baselines. AB 802 was raised multiple times in this context and the project team sensed a lot of uncertainty and nervousness among the various stakeholders in this area. We recommend it be one of the first areas of attention given to any revisions to the Framework.

### 5.2.3. Experimental Design

The next research question was aimed at assessing whether the current Framework provides opportunities to utilize experimental design, comparison groups, and the like, especially about net-to-gross (or “free-rider) estimation methodologies? The project team began by asking respondents if they have used experimental designs or comparison groups in their research. Figure 5-5 shows that nearly all IOUs (3 of 3), data analytics vendors (3 of 3), and evaluation firms (9 of 10) have done so. Such approaches were less common for the other organization types: regulators (2 of 4), RENs/CCAs/LGPs (4 of 8), implementers (3 of 11), and (other parties (1 of 4).

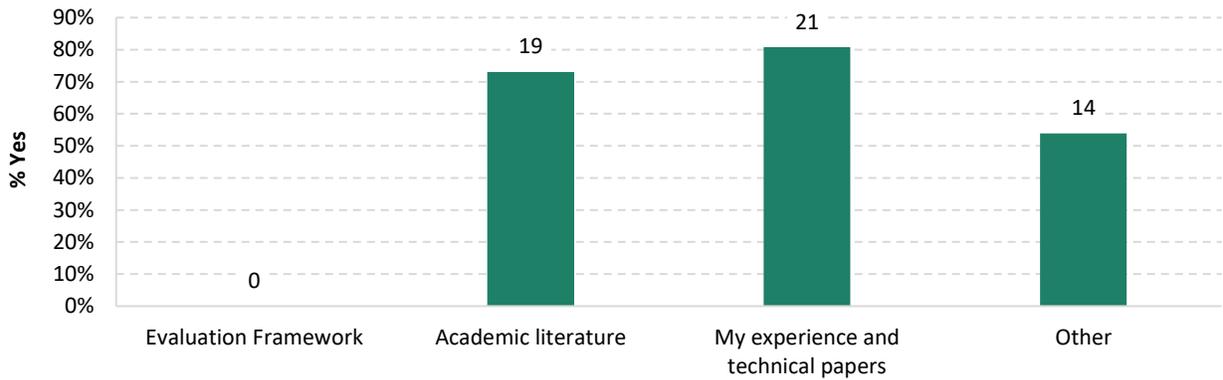
**Figure 5-5: Use of Experimental Design or Comparison Groups**



Q40: Has your organization sought to design an experiment or use comparison groups in your evaluation or program design and implementation work?

When asked what sources of information organizations use when developing such studies, Figure 5-6 shows that the most common sources are researchers own personal experience or technical papers (21 of X) or academic literature. Several respondents mentioned “other” sources, which were mainly in-house expertise, other consultants, or other study plans and reports. As one might expect, probably because of its relative lack of guidance in this area, none of the respondents indicated that they see the Framework as a source of information on developing studies using experimental designs of comparison groups. However, one should not ignore the fact that this was one area respondents repeatedly brought up throughout this study as an area that warrants attention moving ahead.

**Figure 5-6: Sources of Information on Experimental Design or Comparisons Groups (n=26 for each)**

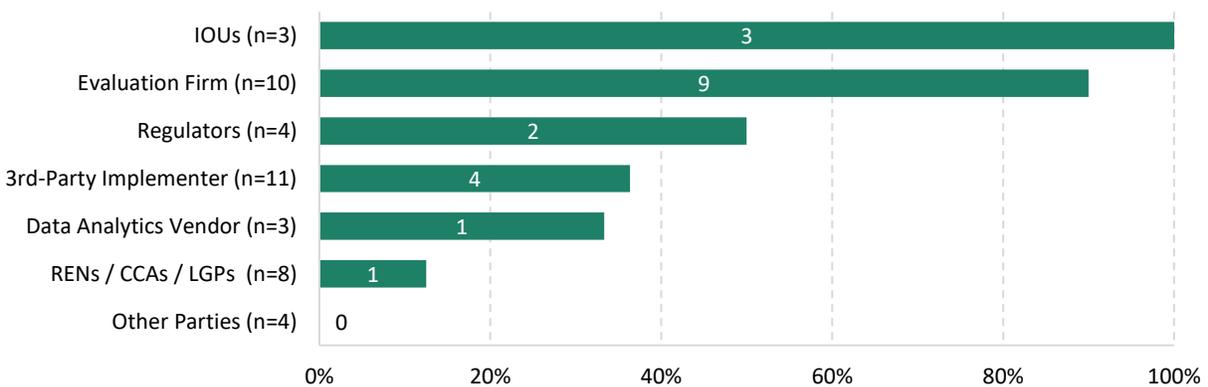


Q41: Which of the following sources did you consider for guidance for designing the experiment(s) or using comparison groups?

### 5.3. Needs for Reporting Guidance

The final research objective addressed through this study was to assess to what extent respondents felt the Framework should address evaluation reporting. The project team first asked how many respondents have prepared or overseen an evaluation report for a California program administrator or the CPUC. Figure 5-7 shows that just under half (20 of 43, or 47%) indicated they have, with as one might suspect, IOUs (3 of 3) and evaluation firms (9 of 10) being the most common.

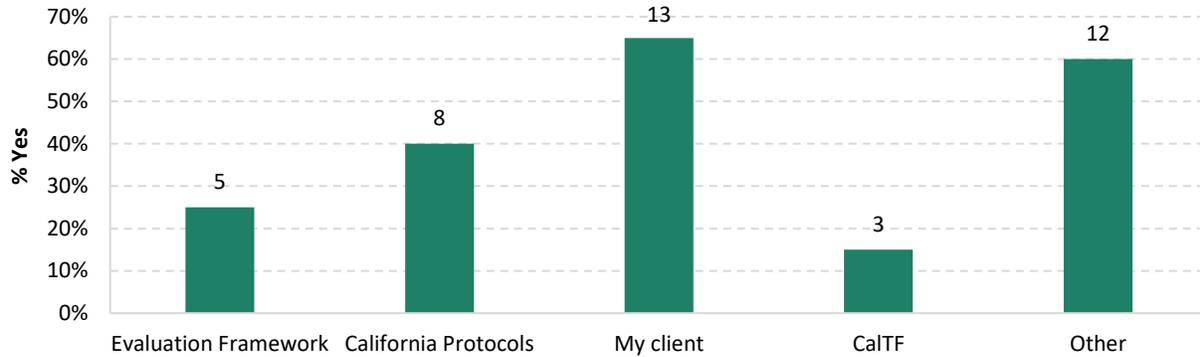
**Figure 5-7: Prepared or Overseen an Evaluation Report**



Q42: Have you prepared or overseen an evaluation report for a California program administrator or the CPUC?

When asked what sources they tend to go to for guidance on evaluation reporting, most (13 of 20) indicated their client, which in most cases were IOUs. Figure 5-8 shows relatively few respondents stated that they go to the Framework (5 of 20), the Protocols (8 of 20), or the CalTF (3 of 20) for reporting guidance. A large proportion of respondents indicated they rely on other sources, where their organization’s own internal guidance and CPUC guidance (mostly from comments in past reports), were the most common.

**Figure 5-8: Sources of Reporting Guidelines (n=20 for each)**



Q43: Which of the following sources do you look to for guidance on reporting guidelines for California evaluation reports?

It is worth noting that few respondents mentioned a need for greater clarity on reporting guidelines anywhere in this study. This is not to say that respondents feel reporting in California is standardized, understood, and done in a consistent manner, but just that it did not arise as an area of concern like many other topics covered – and not covered – in the questions asked of respondents as part of this needs assessment.

## 6. Conclusions and Recommendations

### 6.1. 2017 Next Steps

It is clear from this study that there is awareness of the Framework (and Protocols) across all stakeholder groups and that the Framework has been used in the past but has ceased to be commonly used in recent years. The decline in use reflects three factors:

1. Those for whom the Framework is most relevant to their work became comfortable with the content after their first or second reading of the document and tended to use it only as an occasional reference document.
2. Changes in evaluation needs have occurred and either the Framework did not address the new needs, or the evaluation team sought to develop a solution without referencing the Framework, on the assumption that the Framework would not have a solution.
3. CPUC EM&V-related policy guidance outside of the Framework or Protocols has overshadowed the Framework and Protocols content when conducting evaluations.

This is not entirely surprising as the Framework was last updated in 2006 and the introduction of innovative technologies, methodologies, data sources, and program designs in many cases have superseded the relevance of the Framework. In addition, new legislations and policies (e.g., AB 802, SB 350, on-site generation, default baseline) have resulted in needed updates and changes.

A further issue that we observed was confusion over the role of the Framework and the Protocols — and especially confusion over how policy guidance and decisions from the CPUC over the past 10 years should be treated relative to the documents. The Framework and Protocols themselves clearly define their role in the evaluation process, as noted in the side bar. However, respondents to the survey were less certain and some specifically noted the need for greater clarity and direction in any update.

Respondents noted that the CPUC EM&V-guidance over the past decade has sometimes been inconsistent with the Framework or Protocols and some important and contentious topics have never been integrated into the Framework or Protocols, since no updates exist. This was especially the case as it relates to procedures such as the ex ante process and related issues around topics such as dual baselines, net-to-gross, attribution and Industry Standard Practice.

The Framework “*provides a consistent, systemized, cyclic approach for planning and conducting evaluations of California’s energy efficiency and resource acquisition programs.*”  
(TecMarket Works, 2004 pp.1).

“*The Protocols are significantly grounded in the California Evaluation Framework of June 2004<sup>1</sup> (Evaluation Framework). The Protocols reference the Evaluation Framework and other documents that provide examples of applicable methods. The requirements for conducting evaluation studies, however, are always those stated in the Protocols, which take precedence over other evaluation guidance documents, unless otherwise approved or required by the CPUC.*”  
(TecMarket Works Team, 2006 pp.1).

Since the Framework and Protocols are inexorably linked (as noted in the sidebar above) we believe that the update of the two documents should be concurrent and completed in a manner that ensures they will be more readily available to practitioners, more easily updated in the future as continued policy, technology, program, and data changes occur, and that they be updated in an open and collaborative stakeholder process.

The following near-term priorities emerge as issues to be addressed with an update to the Framework and the Protocols:

1. The ever-changing policy environment means that the Framework and Protocols need to be developed in a way that ensures they are easily updated in the future. Also, the documents are long, and many stakeholders indicated they are too large to be manageable or accessible. Given both of these issues, the project team – as well as some respondents – recommend that **the Framework and Protocols be converted into Internet based documents that are** easy access, simple to search, and readily updatable. As part of this process, **a system for tracking and logging changes should be implemented** to ensure that stakeholders know what has changed, when, and for what reason.
2. The discussion of **billing analysis** should be rewritten to incorporate new approaches and technologies. Issues such as AMI data, NMEC, M&V 2.0, real-time evaluation, whole building analysis, IoT sensing and submetering, and macro consumption should be addressed.
4. **Experimental design** using RCTs/REDs/QEDs could all be captured in the billing analysis section, but likely warrant a stand-alone section – especially since this topic was raised frequently and the Framework, while it touches on experimental and quasi-experimental design, does not provide the depth of guidance for distinct types of designs and sampling issues that have evolved in recent years.
5. Addressing evaluation for **behavioral programs** was one of the most often mentioned issues. Though some issues might be addressed in the billing analysis chapter, other aspects of some behavioral programs cannot be wholly addressed in the context of billing analysis. Thus, we recommend that behavioral programs be addressed comprehensively through the development of a new chapter.
6. **Baselines** need to be addressed as this issue has caused a lot of concern among respondents given recent policy about using existing conditions baseline and discussion of considering dual baselines. The discussion of baselines currently in the Framework is insufficient given multiple processes need to address this measurement (ex ante, ex post, goals, and potential). Policy guidelines that emerge from the *CPUC Staff White Paper on Energy Efficiency Baselines for Implementation for AB802* (see Appendix E), for instance, should be reviewed and codified as part of this process.
7. **Net-to-gross and attribution** continue to be paramount issues and concerns across a wide range of stakeholders. For instance, the NTG battery used by the CPUC impact evaluation consultants was developed after the Framework and Protocols, and has never been integrated into the documents. As noted in comments from stakeholders: “The EM&V for custom programs is also in need of revision as these programs are becoming increasingly essential. The rules aren't clear and they are constantly changing and are subject to interpretation.” The shift between ex post

and ex ante treatment of NTG is something that needs resolution and clarity within and Framework and Protocols so that it is a transparent process.

8. **Codes and standards** are another area in need of attention. They were not addressed in the Framework, are of concern to some of the new entrants to program administration roles, and while addressed in the Protocols, warrant attention in the Framework refresh to ensure the approaches are well known to stakeholders.
9. The **cost effectiveness** discussion in the Framework will need to be updated once the current proceedings on the topic are resolved.

Given new entrants in the energy efficiency programs in California including new program administrators (especially RENS, CCAs, and LGPs) and third-party-designed and implemented programs, it is important that the revision process be conducted with considerable engagement by stakeholders to ensure that stakeholders understand the guidance and that the guidance is able to be used and followed. Familiarity with the American Evaluation Association (AEA) guiding principles for evaluators can help guide this process. An emphasis on transparency, clarity, and stakeholder engagement as well as evaluation competence and integrity on the part of all parties to the evaluation process are key concepts to adhere to.

## 6.2. 2020 Next Steps and What Might be Required to Accomplish These Changes

The refresh process is likely to be challenging, and yet after the initial steps noted above, there remain several topics that should be considered as follow-on activities for the EM&V Refresh as California moves closer to 2020.

1. **Integration with other protocols UMP, IPMVP, etc.** The existence of other protocols should be explicitly addressed in the refreshed California Evaluation Framework and Protocols, in some cases these may be integrated or adopted, in other cases discussion of specific California conditions should be noted as to why a UMP or IPMVP may not be appropriate.
2. There is a high level of interest in **improving the timeliness and usefulness** of evaluations. Key tools for this are embedded evaluation, real time evaluation, developmental evaluation, and use of pilot programs – none of which are addressed in the Framework. Further, the challenge many **emerging technologies and new program designs** face as they move into the regulatory environment needs to be addressed with a process that resembles the stage gate process of RD&D so they do not have to immediately meet the full evaluation requirements.
3. **Distributed Energy Resources (DERs)** are increasing across California and there is no guidance on evaluation where EE savings, distributed generation, storage, and demand response, pricing effects intersect and affect the value of the EE resource to the grid. Nor is there guidance on evaluation of non-EE related DER measures and programs, and yet many policy requirements ensure there will be increasing intersection of DERs and EE programs.
4. While **sampling and uncertainty** is addressed extensively in the Framework and the Protocols, over the intervening 10 years sampling methods and options have evolved extensively and refreshing the sampling and uncertainty guidance will be important especially in light of other

topics: billing analysis, experimental design, behavior programs, and efforts to improve the timeliness and usefulness of evaluation with embedded and real-time evaluation.

5. **Market transformation** was addressed initially in the first framework document (Sebold, et al 2001)<sup>12</sup> and was minimally addressed in the Framework but not in the Protocols, where market effects were addressed instead. The growing need for a defined market transformation evaluation process was mentioned multiple times by a number of study respondents.
6. The **Framework as written is focused on programs**, not portfolios, not measure-based evaluation, and not on an integration of the ex ante process with the ex post evaluation process. Yet these other topics have come to dominate evaluation in California without a systematic process in place to ensure all stakeholders know what is expected. Decisions will be needed during the refreshment process to ensure that all aspects of California evaluation needs are addressed.
7. A version of the Framework providing **specific guidance for implementers** will be welcomed by many stakeholders. The complexity and rigor of the Framework is important for evaluators within consulting firms, program administrators, and regulators involved in evaluation, but much could be done to make the needs of evaluation more transparent and accessible to implementers, especially as California moves to expand third party implementation and the program administrators include RENs, CCAs, LGPs, and other parties less familiar with the utility regulatory structure.

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<sup>12</sup> Sebold, Fredrick D., Alan Fields, Lisa Skumatz, Shel Fedlman, Miriam Goldberg, Ken Keating, Jane Peters. (2001) *A Framework for Planning and Assessing Publicly Funded Energy Efficiency*. Study ID PG&E-SW040.

# Appendix A. CPUC EM&V Quarterly Meeting Comments

Comment	Resolution
<p>On the Needs Assessment, thanks for sharing and I scanned the Executive Summary. Looks like some really good observations and feedback.</p> <p>My sense is that, as you point out, there is confusion between Framework and Protocol. I would think the Framework should be shorter and more to the general direction and guidance of the role, objective, and key elements of EE (or DER) evaluation for CPUC (or California). This is the theme of the Framework Guide draft - so in some ways my feedback would be to hit the topics listed in the Framework Guide with a focus on the 'Fundamental Topics and Issues' and, as you recommend, engagement of stakeholders in preparing the next version (perhaps the strongest recommendation in the Framework Guide draft). My outside observation of EM&amp;V in California is that it is a mess - and some focus on why we do evaluation and use that to direct decisions from schedules to NTG to custom review would be very helpful. And, leave the details to the California Evaluation Protocols.</p>	<p>NA</p>
<p>I was reading the California EM&amp;V be fresh draft report and I wanted to reach out to you both about the uniform methods project section.</p> <p>I was wondering if you are going to leave the survey responses the way they are currently included. My concern is that there are some quotes that are in the section that are factually inaccurate. The quotes are seemingly the result of a lack of knowledge and not an accurate reflection of the uniform methods project. However, I'm concerned that if we don't note those instances some readers might think that the quotations are accurate and reflective.</p> <p>Have you thought about this issue?</p>	<p>Added last paragraph to Section 2.3.4 Analysis and Reporting (p. 7) clarifying the goals of qualitative research.</p> <p>Added a footnote was added on p.60 stating that some of the UMP-related comments may not be factually accurate, but still reflect respondent perceptions. We also included a link to the UMP.</p>
<p>I have read the Exec Summary so far and you have done an excellent job on summarizing stakeholder views on the CA EM&amp;V Framework, how policies have evolved and implications for the framework, linkages between Framework and EM&amp;V protocols, and applicability to new administrators (e.g. CCAs, RENs) and recommended changes for a refresh process etc.</p>	<p>NA</p>

## Appendix B. CEDMC Discussion Notes

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### B.1. Audience Assessment Notes

1. How many folks are aware of the Framework: 50 (out of ~100). When asked about whether they use the Framework, about half kept their hands up.
2. How many folks are program implementers: ~ 10
3. How many folks are consultants doing implementation: ~ 20
4. How many folks are consultants doing EM&V: ~ 25
5. How many folks represent regulators: ~8

### B.2. Q-A Notes

1. Policy shifts are happening now. Before, the Framework worked well but because of market transformation the Framework is changing.
2. The framework was helpful. But was changing by CPUC policy and guidance and now really needs to look at things in a different way.
3. The Framework does not address all aspects of DER and it needs to.
4. Framework needs to be more tactical.
5. It needs to do more than just measuring the impacts (e.g., process, market, etc.).
6. The availability of new data streams necessitates the updating of the Framework.
7. With the baseline conditions now being front and center per AB 802, there are lots of new questions that aren't being addressed or answered due to limitations of the current Framework construct.
8. We shouldn't stop at having a Framework using AMI data – there is a wider spectrum of data that needs to be addressed in the new Framework to support better accuracy of the information.
9. The Framework needs to take into account what is happening more broadly than just a program.
10. Need to establish appropriate comparison groups, and that whole process needs to be set up properly.
11. More emphasis needs to be placed on market transformation. What is the real impact of the program and how is it changing contractor/installer behavior?

12. Need to take into account the business planning process being put into place... something that is not directly measurable in kWh reductions.
13. EE needs to be looked at as load shifting and not just reductions in demand.
14. Analytics: Need to capture the new analytical approaches to assess savings.
15. The Framework needs to address GHG reductions.
16. There needs to be methods to assess the impact of TOU rates on EE and some of the market transformation methods and attribution-related issues... how do you develop attribution to market transformation goals?
17. The current Framework bleeds into project-specific analysis and this is NOT appropriate to use in real-time with real customers.

### B.3. Q-B Notes

1. Not enough attention is being paid to the secondary impacts resulting from EE (e.g., long-term shifts in the market). We really need these types of studies.
2. Workforce issues: The EM&V process doesn't tell you if a measure is achieving its goals so it's impossible to develop labor standards and worker return on investment.
3. The time to figure out attribution is done and we need to understand the overall goal.
4. Too much focus on impact. We need to go more toward formative research and not focus as much on what happened but look forward.
5. EE measures that are installed to serve other purposes but have EE savings as a byproduct. The Framework doesn't work in this context.
6. Advances in behavior, work force energy and training and zero net energy... these issues all have unique approaches to measurement that are not properly addressed in the Framework.
7. The process evaluation was supposed to tell you why things weren't working and fix things a lot faster.
8. Split E from M&V as those are two very different functions.
9. There are EM&V challenges when moving from widgets to systems. There needs to be a mindset of how can evaluation serve the best goal.
10. How do you go about evaluating complex issues and then how do you go about making changes? The Framework needs to make a decision as to which way it wants to go.... Tactical or process?
11. Codes and Standards represent about half the savings in the potential study. That portion of the Framework needs to be revisited and updated. California is unique in this regard.

12. Where is the line? What aspects of EM&V truly need to be independent and which can be supplied by the same parties that actually implement?
13. There needs to be more implementer involvement in the EM&V steps.

#### B.4. Q-C Notes

1. We need to set a boundary condition that will help define how to measure. What are the boundaries? The meter, the program, the sector?
2. Net savings have to take into account the full impact and be accurate about attribution.
3. Net vs. gross necessitates different evaluation methods.
4. Program-level approach to evaluation is not really applicable anymore.
5. Uniform methods project might be a Framework to adapt to for California.
6. Performance improvement is important and should be emphasized.
7. The Framework misses how you present to different audiences.
8. Performance: We need a study that looks at functional deficiencies and how we implement stuff... at a very broad level in terms of how we deploy capital.
9. The performance of the portfolio is all that matters. How do we look at long-term performance and how we engage customers in new ways?
10. How do we acquire customers, how do we deploy capital? These are questions that need to be asked as part of the evaluation, and are not being asked right now.

## Appendix C. Interview Participants

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### Data Analytics Vendors

- › Apogee
- › Bidgely
- › Home Energy Analytics
- › Open Energy Efficiency

### Evaluation Firms

- › Applied Energy Group, Inc.
- › Cadmus Group, Inc.
- › Evergreen Economics
- › Itron
- › Lincus, Inc.
- › Livingston Energy Innovations
- › Nexant
- › NMR Group
- › SBW Consulting
- › Tierra Resource Consultants

### Third-Party Implementers

- › Build It Green
- › Cascade Energy
- › Embertec USA
- › Energy Solutions
- › Enovity, Inc.
- › Nest
- › Resource Innovations
- › Staples & Associates

- › Tendril, Inc.
- › TRC
- › Wildan Energy Solutions

**Investor-Owned Utilities**

- › Pacific Gas and Electric Company
- › Sempra Energy (includes Southern California Gas Company and San Diego Gas and Electric)
- › Southern California Edison

**RENs/CCAs/LGPs**

- › AMBAG Energy Watch
- › BayREN
- › Community Energy Partnership
- › Lancaster Community Choice Aggregation
- › Marin Clean Energy
- › Redwood Coast Energy Watch
- › San Luis Obispo Energy Watch
- › Valley Innovative Energy Watch

**Regulators**

- › California Air Resources Board (CARB)
- › California Energy Commission (CEC)
- › California Public Utilities Commission – Energy Division (CPUC-ED)
- › Office of Ratepayer Advocates (ORA)

**Other Parties**

- › Lawrence Berkeley National Laboratory (LBNL)
- › Natural Resources Defense Council (NRDC)
- › Northeast energy Efficiency Partnerships, Inc. (NEEP)
- › The Utility Reform Network (TURN)

## Appendix D. Interview Guide

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### D.1. Introduction

Thank you for agreeing to participate in this interview. We are talking with people who are stakeholders of evaluation of energy efficiency programs in California. Your input will help assess areas in the evaluation guidance that need to be addressed going forward, especially in light of policy decisions from the CPUC and the legislature over the past five years.

### D.2. Screening [ASK ALL]

S1. I would like to confirm that you work for a:

1. Program administrator – IOU
2. Program administrator – POU, CCA, REN,
3. Third Party implementer
4. Data Analytics Vendor
5. Evaluator/M&V
6. Regulatory Agency
7. Intervenor – ORA, TURN, NRDC

S2. Which types of evaluation do you have experience with: (check all that apply)

1. impact,
2. M&V
3. process,
4. market,
5. baseline
6. cost effectiveness,
7. other, (please specify-----)
97. Not applicable
98. Don't know
99. Refused

S3. Which of these program areas do you have experience with: (check all that apply)

1. codes and standards
2. behavior programs
3. distributed generation (solar, wind)
4. distributed storage
5. water/energy
6. energy efficiency residential
7. energy efficiency commercial
8. energy efficiency industrial
9. training and education

- S4. Which of the following policy and evaluation areas have you had recent experience with: (check all that apply)
1. Uniform Methods Project (UMP)
  2. AB802 High Opportunity Projects and Programs (HOPPs) and Normalized Metered Energy Consumption (NMEC)
  3. The rolling portfolio [CPUC D. 15-10-029]

### D.3. Framework Use [ASK ALL]

Q1. [Ask All] The California Evaluation Framework was released by the California Public Utilities Commission and last revised in January 2006. Have you heard of or used the California Evaluation Framework for evaluation, program design, or program implementation?

1. Yes
2. No
97. Not applicable
98. Don't know
99. Refused

Q2. [Ask if Q1=1] Have you read or referred to the California Evaluation Framework?

1. Yes – parts of it
2. Yes – most or all of it
3. No
97. Not applicable
98. Don't know
99. Refused

Q3. [Ask if Q1=1] Would you say you Often, Sometimes, Rarely, or Never refer to the California Evaluation Framework for your evaluation or program design and implementation work?

1. Often,
2. Sometimes,
3. Rarely, or
4. Never
97. Not applicable
98. Don't know
99. Refused

Q4. [Ask if Q3=2 or 1] What do you think would make the Evaluation Framework a more valuable resource for you? [OPEN-ENDED RESPONSE] [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q5. [Ask All] Embedded evaluation is where the evaluator is involved early in a program, may participate as the evaluation expert in program design and planning discussions, and conducts evaluation and measurement activities as the program is implemented to provide information to improve the program. Are you familiar with the term embedded evaluation?

1. Yes
2. No
98. Don't know
99. Refused

Q5b. [ASK All] Given the definition on embedded evaluation I just read, would you say it is very important, important, a little important, or not at all important to your organization that the Framework provide guidance on embedded evaluations? [Interviewer: if respondent says they don't know, enter "DK"]

1. Very important
2. Important
3. A little important
4. Not at all important
98. Don't know
99. Refused

Q7. [Ask if Q3=2 or 1] In your work doing program design or evaluation, have you Often, Sometimes, Rarely, or Never encountered a measure/program/situation that was not addressed by the Framework?

1. Often,
2. Sometimes,
3. Rarely, or
4. Never
97. Not applicable
98. Don't know
99. Refused

Q8. [Ask if Q7=1 or 2] Can you tell me more about what measures/program/or situations you encountered were not addressed by the Framework? [OPEN-ENDED RESPONSE] [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q9. [If S4=2 HOPPS] Did the HOPPS process use the Evaluation Framework?

1. Yes
2. No
98. Don't know
99. Refused

Q10. [If S4=2 and Q9= 2 NO] Why do you think the HOPPS process did not use the Evaluation Framework? [OPEN-ENDED RESPONSE] [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q11. [Ask for each category checked in S3] You noted that you were familiar with [insert program type from S3], are you familiar with EM&V processes for [insert program type from S3]?

1. Yes
2. No
98. Don't know
99. Refused

Q12. [Ask if Q3=2 or 1] [Ask for each category checked in S3 if Q12 = 1 Yes] would you say the Evaluation Framework provides sufficient guidance for EM&V processes for [insert program type from S3]?

1. Yes
2. No
98. Don't know
99. Refused

Q13. [Ask if Q3=3 or 4] [Ask for each category checked in S3 if Q12= 1 Yes] You indicated that you have little familiarity with the California Evaluation Framework and you are experienced with the evaluation process for [insert program type from S3]. Would you say the current evaluation approach for [insert program type from S3] is effective "as is" or needs a revision to be more effective?

1. Effective "as is"
2. Needs revision
98. Don't know
99. Refused

Q14. [Ask if Q13=2] What type of revision do you think is needed? [OPEN-ENDED RESPONSE]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

**[Questions Q11 - Q13 repeat for each category checked in S3.]**

[DISPLAY LOGIC]

Q15. [Ask if Q3=2 or 1] On a scale of 1-5 with one meaning not at all helpful and five meaning very helpful, how helpful do you think the Framework is in providing guidelines for designing evaluations to identify... Interviewer: do not read 97-99

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1	2	3	4	5	97 NA	98 DK	99 RF
program performance improvement opportunities								
measure performance improvement opportunities								
opportunities to improve goal achievement								
different type of baseline conditions, such as existing conditions, standard practice, or code baseline?								

Q16. [Ask if Q3=2 or 1] Would you say it is very important, important, a little important, or not at all important that the Framework be used by program designers and implementers, as well as program evaluators?

- 1. Very important
- 2. Important
- 3. A little important
- 4. Not at all important
- 98. Don't know
- 99. Refused

Q17. [Ask if Q3=2 or 1 AND Q16 <> 98 or 99] Why do you say it is [Q16 response] for program designers and implementers as well as evaluators to use the Framework? [OPEN-ENDED RESPONSE] [Interviewer: if respondent says they don't know, enter "DK"]

- 1. [OPEN-ENDED RESPONSE]

[Do not read:]

- 98. Don't know
- 99. Refused

## D.4. Policy Topics [ASK ALL]

[DISPLAY LOGIC]

Q18. [if S4=rolling portfolio] You said you are familiar with the rolling portfolio. The Evaluation Framework defines how energy efficiency programs and portfolios of energy efficiency programs of various types should be evaluated. The Framework includes discussions about what should be addressed in key evaluation areas such as: evaluation planning, program theory and logic models, impact evaluation, measurement and verification (M&V) using IPMVP, process evaluation, information and education programs, market transformation programs, non-energy effects, uncertainty, sampling, evaluation and cost effectiveness, and overarching evaluation studies

On a scale of one to five, with one being no benefit at all and 5 being great benefit, to what extent do you think these topics would benefit from modification in order to specifically address evaluation in the context of the rolling portfolio. Interviewer: do not read 97-99

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1	2	3	4	5	97 NA	98 DK	99 RF
Evaluation planning								
Program theory and logic								
Impact evaluation								
Measurement and verification (using IPMVP)								
Process evaluation								
Information and education programs								
Market transformation programs								
Non-energy effects								
Uncertainty								
Sampling								
Cost effectiveness								
Overarching studies								

Q19. [if S4=rolling portfolio If any Q18=4 or 5] Why do you think these topics need to be modified in the context in the rolling portfolio? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know

99. Refused

Q20. [if S4=rolling portfolio] Are there additional topics that the Framework should address because of the rolling portfolio?

1. Yes
2. No
98. Don't know
99. Refused

Q21. [if S4=rolling portfolio and If Q20=1 yes] Why do you think these topics apply to the rolling portfolio? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q22. [Ask All] Are there specific programs types that you are familiar with that require evaluation methods that differ from the traditional evaluation methods discussed in The Framework?

1. Yes
2. No
98. Don't know
99. Refused

Q23. [If Q22=1 yes] Please describe the program types that you think require different evaluation methods? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q24. [If S1=1,2, or 3 program administrators and third-party implementers] Do you have any programs that are difficult to evaluate based on what evaluators tell you or that don't fit the Evaluation Framework guidance?

1. Yes
2. No
98. Don't know
99. Refused

Q25. [If S1=1,2, or 3 and Q24=1 yes] Please describe the specific evaluation needs your programs have that you think should be addressed? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know

99. Refused

Q26. [Ask All] Different stakeholders place different requirements on evaluations. The challenge is to balance between cost efficient, robust quality, and timeliness.

Please rank in order your organization's preference for which requirement should be met for most evaluations: [Interviewer: if respondent says they don't know, move "Don't know" response to rank #1 - otherwise, leave "Don't know" response in #4]

1. Timely

2. Cost efficient

3. Robust/Quality

98. Don't know

99. Refused

Q27. [Ask All] Along the same vein, stakeholders have three levels of approval options for evaluation reports, policy and planning reports, and market study reports. These range from fully vetted that meets all stakeholders' requirements, to acceptable to a majority of stakeholders, and finally good enough as it meets a minimum requirement.

Please rank in order, your organization's preference for the level of review that should be applied to most program performance evaluation reports. (such as program impact, process, and M&V reports) [Interviewer: if respondent says they don't know, move "Don't know" response to rank #1 - otherwise, leave "Don't know" response in #4]

1. Fully Vetted (meets relevant stakeholder's requirements)

2. Acceptable (meets a majority of stakeholder requirements)

3. Good enough (meets minimum requirement)

98. Don't know

99. Refused

Q28. [Ask All] Please rank in order, your organization's preference for the level of review that should be applied to policy and planning reports. (such as potential studies and goal setting)

[Interviewer: if respondent says they don't know, move "Don't know" response to rank #1 - otherwise, leave "Don't know" response in #4]

1. Fully Vetted (meets relevant stakeholder's requirements)

2. Acceptable (meets a majority of stakeholder requirements)

3. Good enough (meets minimum requirement)

98. Don't know

99. Refused

Q29. [Ask All] Please rank in order, your organization’s preference for the level of review that should be applied to market study reports. (such as saturation studies, market assessments)  
 [Interviewer: if respondent says they don't know, move "Don't know" response to rank #1 - otherwise, leave "Don't know" response in #4]

- 1. Fully Vetted (meets all stakeholder’s requirements)
- 2. Acceptable (meets a majority of stakeholder requirements)
- 3. Good enough (meets minimum requirement)
- 98. Don't know
- 99. Refused

Q30. [Ask All] Given these competing requirements and approval options, what suggestions do you have to address these competing objectives? [Interviewer: if respondent says they don't know, enter "DK"]

- 1. [OPEN-ENDED RESPONSE]

[Do not read:]

- 98. Don't know
- 99. Refused

## D.5. Data Methods and Reporting [ASK ALL]

[DISPLAY LOGIC]

Q31. [Ask All] The following are some terms currently being discussed in evaluation. Using a scale of 1-5, with 1 being not at all important and 5 being very important, please indicate how important you think it is that the term be addressed in the Evaluation Framework? Interviewer: do not read 97-99

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1	2	3	4	5	97 NA	98 DK	99 RF
Existing Conditions Baseline								
High Opportunity Projects and Programs (HOPPs)								
Savings								
Lifecycle savings								
Greenhouse Gas Savings								
Integrated Demand Side Management (IDSM) with savings from combined EE/DR/DG								
Pay for metered performance								
Real time impact evaluation								
M&V 2.0								

[LOGIC] Item	1	2	3	4	5	97 NA	98 DK	99 RF
Water savings								
Solar generation								
Wind generation								
Energy Storage								
Ancillary services								

Q32. [Ask if S4 = 1 UMP] The Uniform Method Protocols developed by US DOE were prepared since the Framework was written. Does your organization use the UMP Often, Sometimes, Rarely, or Never?

1. Often
2. Sometimes
3. Rarely, or
4. Never
98. Don't know
99. Refused

Q33. [Ask if S4 = 1 UMP] Do you think the UMP can be integrated into the Framework?

1. Yes
2. No
98. Don't know
99. Refused

Q34. [If Q33=1 yes] Please describe how you think the UMP can be integrated into the Framework?  
[Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q35. [Ask All] Consider this definition of M&V 2.0 ("M&V 2.0 is defined as the ability to remotely determine energy consumption changes using high-frequency (hourly or sub-hourly) energy consumption readings, data analytics, and utility program detail."). Would you say that this fully matches, mostly matches, partially matches, or does not match your understanding of M&V 2.0?

1. Fully matches
2. Mostly matches
3. Partially matches
4. Does not match
98. Don't know
99. Refused

Q36. [Ask if Q35=2,3,4] How would you change or modify the definition? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q37. [Ask All] Are there new evaluation methods that you think should be included, along with the traditional methods in the Evaluation Framework?

1. Yes
2. No
98. Don't know
99. Refused

Q38. [If Q37=1 yes] Please describe what some of these methods are. [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q39. [If Q37=1 yes] Please describe how you think these new methods should be integrated into the Framework? [Interviewer: if respondent says they don't know, enter "DK"]

1. [OPEN-ENDED RESPONSE]

[Do not read:]

98. Don't know
99. Refused

Q40. [Ask All] Has your organization sought to design an experiment or use comparison groups in your evaluation or program design and implementation work?

1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY LOGIC]

Q41. [if Q40=1 yes] Which of the following sources did you consider for guidance for designing the experiment(s) or using comparison groups? *Interviewer: prompt with responses for each, do not read 97-99*

[MATRIX QUESTION]

[LOGIC] Item	Yes	No	Maybe	97 NA	98 DK	99 RF
The Evaluation Framework						
Academic literature						
My experience and technical papers						
Other Source? Specify?						

Q42. [Ask All] Have you prepared or overseen an evaluation report for a California program administrator or the CPUC?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[DISPLAY LOGIC]

Q43. [if Q42=1 yes] Which of the following sources do you look to for guidance on reporting guidelines for California evaluation reports? *Interviewer: prompt with responses for each, do not read 97-99*

[MATRIX QUESTION]

[LOGIC] Item	Yes	No	Maybe	97 NA	98 DK	99 RF
The Evaluation Framework						
The California Protocols						
My client						
CalTF						
Some Other source, Specify						

[DISPLAY LOGIC]

Q44. [Ask All] Finally, there are several types of studies that the Framework does not address with guidance on how to conduct the study. For each one please note on a scale from 1-5, where 1 means not at all important and 5 means very important, how important it would be for an update to the Framework to include guidance on how to conduct the type of study. *Interviewer: do not read 97-99*

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1	2	3	4	5	97 NA	98 DK	99 RF
Low income program process evaluation								
Low income program needs assessment								
Low income program impact evaluation								
Program specific market research								
Research, development, and Deployment (RD&D) program evaluation								
Energy Savings Potential studies								
Measure Saturation studies								
Persistence and retention studies								
Portfolio analysis								
Market structure and operations studies								
Market share tracking studies								
Best Practice studies								
Others, Please specify								

Q45. [Ask All] Do you have any last comments about the Evaluation Framework and guidance on evaluation in light of recent policy decisions from the California Public Utility Commission (CPUC) and the legislature on behalf of the California investor owned utilities (IOUs) and the CPUC?

1. [OPEN-ENDED RESPONSE]

[Do not read:]

- 98. Don't know
- 99. Refused

## Appendix E. Policy Review

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This appendix contains findings from the policy review. The review below is arranged by policy document. The Policy documents are listed in the left hand column and related analysis listed to the right as either “explicitly” impacting the current version of the California Evaluation Framework, or implicitly impacting the Framework.

### E.1. Navigant Review of Select Policy Documents for Relevance to California EM&V Refresh Project

#### E.1.1. Overview of the Policy Goals and Objectives (General and Related to EM&V)

This document reviews AB802 information, including:

- A summary of the AB802 bill (as follows);
- 6. The Related Ruling Regarding High Opportunity EE Programs and Projects (HOPPS); and
- 7. The Associated CPUC's Staff White Paper on EE Baseline Policy and Related Issues.

*\*\* Document authors acknowledge that final CPUC rules for implementing AB802 existing buildings approaches and standards -- including CPUC identified exceptions, are part of the draft Commission Resolution E-4818 (December 22, 2016), which is currently in the stakeholder comments period at the time of creation of this document -- and will be an important document for review as part of the refresh.*

#### Assembly Bill 802 (AB802) -- October 8, 2015

**AB802 General Summary of Bill:** Requires the CPUC to authorize an electrical or gas corporation to recover in rates financial incentives and support given to customers to increase the energy efficiency of existing buildings based on all energy savings and use reductions, even those measures that bring an existing building into conformity with Title 24 building code standards for new buildings.

**AB802 Purpose:** (1) Allows for program administrators to capture what is known as “stranded potential” related to “below code savings due to non-compliance,” and retrofits that have been deferred but may still be captured; (2) Enables interval AMI/smart-meter data to be used to measure energy savings; (3) Authorized “High Opportunity Projects or Programs” (HOPPs) be developed and funded.

**Specific Focus:** Directs the CPUC to: a) base savings for existing buildings on reductions in normalized metered energy consumption; b) use existing conditions baseline to measure energy usage savings; c) authorize programs to bring existing buildings into conformity with or exceed Title 24; d) use CPUC discretion to determine exceptions to the existing conditions baseline; e) focus on “buildings” -- with no specific mention of industrial or agricultural processes; f) authorize “High Opportunity Projects or Programs” (HOPPs).

### HOPPS Ruling

This ruling adopts substantive standards and an expedited Commission review process for “high opportunity programs and projects” pursuant to Assembly Bill 802.

Ruling defines HOPPS and addresses related issues related to: 1) preliminary interpretation of phrase “estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized energy consumption as a measure of energy savings” (NMEC); 2) How to determine the cost-effectiveness of NMEC programs; 3) Incentive levels and timing to customers; 4) How to evaluate, measure, and verify savings from NMEC programs and project ex post; 5) How to set shareholders incentives for such programs.

### CPUC Staff White Paper

**White Paper Purpose:** The purpose of this white paper is to provide staff recommendations on how an “existing conditions” baseline should be applied in estimating utility energy efficiency program savings, as required by AB 802.

Key staff recommendations in this paper include:

- › The appropriate baseline (i.e., existing condition or code) can be identified and applied broadly for certain programs, while for other programs the appropriate baseline depends on the measure or other situation-specific conditions.
- › To reduce the amount of savings, claim complexity and controversy CPUC policy and program administrator portfolio design efforts should focus on transitioning significant portions of the EE portfolios to the programs directed in AB 802.
- › To reduce the potential for utility staff or contractors to engage in wasteful or fraudulent conduct now that legally-required activities are eligible for utility energy efficiency savings credit, portfolio goals should be set as net of free-ridership.

**Table E-1: AB802 HOPPS Baseline White Paper**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	<p>"HOPPS RULING" Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs and Projects (December 30, 2015)</p>	<p>HOPPS ruling lays out key principles for HOPPS projects (p.6 para #2) and addresses key issues related to stakeholder comments on staff White Paper (Table p.7-10). Issues addresses:</p> <ul style="list-style-type: none"> <li>a) Repair and maintenance; b) Replace on burnout single measure; c) Deemed measures; d)10% threshold for savings; e) Project/program proposal review; f) Submetering; g) RFP required or not; h) 1-year customer data prior to claiming savings for programs/projects where savings are based on NMEC; i) 3-year for BROS savings reporting; j) Industrial process Improvements; k) Gut rehab; l.) Existing programs</li> </ul>	<p>Section 3.1 Summary of Responses to Comments on HOPPS Project Rules p.6-10</p>		
	<p>Establishes framework for HOPPS project with focus on cost-effectiveness (i.e., full measure cost for NMEC projects); savings claims (ex post for NMEC and ex ante for deemed savings); EM&amp;V (CPUC to lead NMEC project evaluations -- models, methods, and results -- field evaluation in some cases); ESPI -- establishes parameters for "uncertain" classification on an ex post basis and EUL of 1 yr. (later changed in D,16-08-019.</p>	<p>Section 3.3 p.13</p>			<p>Identifies key framework issues for HOPPS projects and provides direction in areas identified</p>

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Allows a limited inclusion of deemed measures in HOPPS and provides guidance (para #2)	Section 3.4.2 p.14			
HOPPS program not to include New Construction per SBD manual Para #2)	Section 3.4.3.1 p.16			Good discussion on whole building issues related to whole building, ROB, and NC issues HOPPS projects and single measures	
Discussion of replace on burnout and the conclusion that these issues will not be resolved in the HOPPS ruling -- punts to AB802 future ruling. (para #2)	Section 3.4.3.1 p.17			Good discussion on whole building issues related to whole building, ROB, and NC issues HOPPS projects and single measures	
			Provides discussion of incentives and financing structures the provides accuracy guidelines on risk, NMEC projects, etc. (para. #1)	Section 3.4.3.3 p.19	Structure for payment is a design issue, but may have relevance to evaluation of NMEC projects in the future
BROs EUL established at 1 yr. for HOPPS projects (para #1); EUL should be no more than 30 yrs. for measures. M&V should be at least for 2 years (para #2); tradition EM&V will occur, but "points of intervention and nature of review" may differ from current practice.	Section 3.4.4 p.21				Relates to savings claims, but has broader impact and relevance to CEF related to NMEC and/or measures

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Addresses PA guidelines for paying for maintenance for customers (para #4).	Section 3.4.5 p.22			
Maintenance payment not based on deemed savings (para #1).	Section 3.4.5 p.23			CEF issue related to "maintenance"	
Attachment A tables establishes a) definitions of what NMEC should include, should not mean, and PA requirements. Key issues: "normalized"; "meter"; "energy consumption" (BROS reference);	Attachment A p.1-5			Review for CEF relevance based on subsequent finalization of the issues identified in Attachment A	
Attachment A tables establishes b) program design issues related to 1) types of programs; threshold for expected savings; ex post claims and evaluation; baseline adjustments, application to BROs	Attachment A p.6-11			Review for CEF relevance based on subsequent finalization of the issues identified in Attachment A	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	<p>"CPUC Staff White Paper on Energy Efficiency Baselines for Implementation of Assembly Bill 802"</p> <p>Administrative Law Judge's Ruling Seeking Comments on Energy Efficiency Baseline Policy and Related Issues (4/21/2016)</p>			<p>Provides background and definitions of AB802 (para #2; #3 and #4); notes that CPUC has discretion to identify exceptions to use of existing conditions baseline and also notes that the bill does not mention use in industrial situations.</p>	
			<p>Identifies "additional" savings from AB802 (from Navigant AB802 Report) as coming from three potential sources:                      1. additional above code incentives due to paying for measures that where below code and now can be incentivized; 2. below code savings that have been "stranded" and would not have occurred otherwise; and, 3. BROS</p>		<p>Provides the framework for evaluation to identify eligible savings</p>
	<p>Makes explicit note of potential for double counting already counted in code replacement on burnout rather than "stranded" savings from equipment that would not have otherwise been counted for savings without below code incentives (para #1)</p>	Section IV B p.10			<p>CEF will likely need to address evaluation of codes and standards programs in new regime.</p>

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				Discussion of CEC codes and standards and whether credit should be given in evaluation for giving support to IOUs for their goals for codes and standards programs -- which are now affected by the changing below code baseline. (para #2)	
			Section on C&S Impact Evaluation studies as related to compliance and treatment of Lighting Retrofits (para #2) and HVAC (para #3)	Section IV C p.11	Codes and standards evaluation related to compliance
	Stakeholders Identified attribution issues as needing to explore alternative methods for determining attribution from below code savings (at Commission January 6th workshop 2016) (bullet #5)	Section IV E p.14			New methods for CEF to consider?
	Stakeholders identified a number of issues that may need to be reviewed in relationship to implementing Existing Condition Baselines related to NMEC, including NTG issues, data needs, etc.	Section V E p.16			Key issues listed that should be compared to CEF for potential inclusion
	Identifies staff framework with reference to ensuring that actual savings is new for replaced equipment and possible problems with this (para #3)	Section IV E p.16			May or may not currently be addressed in CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Identifies staff recommendation for below code or not for programs and measures in Table at top of page --1. programs and existing condition baselines; 2. programs with baselines based on measure; 3. programs with code baseline; 4. existing conditions baseline measures; 5. code baseline measures	Section V p.17			
Provide staff program level recommendations for below code applications-- divided into those programs that should be eligible and those that should remain code based	Section V A p.17-21			Staff recommendations that may have relevance in CEF	
Provides staff recommendations on types of measure eligible and not eligible for below code: 1. shell and building measures; 2. repair eligible equipment; 3. equipment with measurable EULs.	Section V B p.21-28			Staff recommendations that may have relevance in CEF	
Staff <u>recommendations for counting savings</u> : (para #2 and #3) discuss challenges related to attribution	Section V C p.28			This issues of how to count savings related to approaches to free-ridership the will impact CEF, likely	
Recommendation 1. Set goals as net of free-ridership after accounting for spillover (para #4) -- Provides rationale for staff recommendation for a net savings approach for existing condition baselines	Section V C p.29			This issues of how to count savings related to approaches to free-ridership the will impact CEF, likely	

## Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	2. Use alternate methods to account for attribution where possible; strongly points to need for timely evaluation data and recommends incorporation of evaluation methods into program design.	Section V C p.31			
			Data collection comments on the need for data about equipment being replaced, (para #2 -1); and the need for aggregate populations studies to understand the potential for existing conditions baselines. (para #3-2)	Section V C p.34	May or may not impact current CEF related to types and functions of market and/or process studies needed to support evaluation re: aggregate customer data on specific measures

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

This document reviews SB350, including:

1. A summary of the SB 350 Clean Energy and Pollution Reduction Act of 215;
2. CEC Staff Framework for Establishing the Senate Bill 350 Energy Efficiency Savings Doublings Targets

### SB350 Chapter 547

**Legislative Intent Re EE:** This bill requires the CEC to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030. The bill requires the PUC to establish efficiency targets for electrical and gas corporations consistent with this goal. The bill

would require local publicly owned electric utilities to establish annual targets for energy efficiency savings and demand reduction consistent with this goal. {Legislative Counsel's Digest (1); Section 2, (2); Section 6, 25310 (c) (1).}

**CEC Staff -- Intent of Framework Report and Workshop 1 Focus**

This report aims to describe the foundational issues and to provide staff recommendations to implement the portions of SB 350 related to doubling energy efficiency, based on stakeholder comments, etc., from a previous CEC workshop (July 2016).

Describes the legislation in terms of CEC required to set targets to double EE savings in electric and natural gas by 2030, if feasible, c-e, and does not adversely impact public health and safety.

**Table E-2: SB350 CEC Staff White Paper**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Senate Bill 350 Clean Energy and Pollution Reduction Act of 2015 (SB350) (October 7, 2015)			SB 350 definition includes: (3) In establishing the targets pursuant to paragraph (1), the commission shall assess the hourly and seasonal impact on statewide and local electricity demand	Section 6, 25310 (c 1) (3)	This implicitly requires CEF to look at 8760 impacts of EE
			4) In assessing the feasibility and cost-effectiveness of energy efficiency savings for the purposes of paragraph (1), the commission and the Public Utilities Commission shall consider the results of energy efficiency potential studies that are not restricted by previous levels of utility energy efficiency savings.	Section 6, 25310 (c 1) (4)	SB 350 related to cost-effectiveness for "new" measures like CVR and BROS (perhaps even DERs) that may require cross-over understandings or review in CEF the IDER proceeding societal resource cost test that includes EE within the purview of the definition of the SRT
			SB 350 definition includes: (5) ... for the purposes of achieving the targets savings ... (1) shall be measured taking into consideration the overall reduction in normalized metered electricity and	Section 6, 25310 (c 1) (5)	NMEC a major piece of SB350 evaluation -- likely impact on CEF related to attribution of savings and in perhaps impacts and M&V sections

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			natural gas consumption where these measurement techniques are feasible and cost effective.		
			SB 350 definition includes: (8) Programs of electrical or gas corporations, local publicly owned electric utilities, or community choice aggregators, that achieve energy efficiency savings through operational, behavioral, and retrocommissioning activities.	Section 6, 25310 (d) (8)	May impact CEF related to BROS and any other related
			SB 350 definition includes: (9) Programs that save energy in final end uses by reducing distribution feeder service voltage, known as conservation voltage reduction	Section 6, 25310 (d) (9)	CVR not previously included in CEF
			SB 350 definition includes: (11) Property Assessed Clean Energy (PACE) programs	Section 6, 25310 (d) (11)	PACE type evaluations not included in CEF
CEC SB350 Workshop 1 and Document: Framework for Establishing the Senate Bill 350 Energy Efficiency Savings Doubling of			Staff focuses on SB350 language regarding "cumulative savings" and provides a definition @ (para #3)	Chapter 2 p.5	This definition, if implemented may need to be reviewed in relevant section of the CEF
			Staff suggests way to portray electric and natural gas savings in quad BTUs (para #4)	Chapter 2 p.5	BTU approach may require mention or adjustment in CEF
			Staff proposes to use energy savings as primary metric for tracking and reporting implementation SB350, although other GHG, per capita, or energy per dollar of state product may be stated, but not primary	Chapter 2 p.6	Not likely to impact CEF, except if other metrics are required by CPUC, others -- in which case CEF should be reviewed

## Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Targets (January 2017)			Staff further defines "cumulative savings" relating to setting targets towards 2030 @ (para #1 and #2)	Chapter 3 p.12	This definition, if implemented may need to be reviewed in relevant section of the CEF
			Staff proposal for aggregating gas and electric saving (para #1) provides metrics proposal on how to report energy savings and GHG emissions savings -- uses site energy	Chapter 3 p.14	Use of site versus source for EM&V in CEF may need to be clarified

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

This document reviews SB758, including:

1. A summary of the AB 758;
3. CEC Staff Developed California Existing Buildings Energy Efficiency (EBEE) Action Plan Draft 2016 Update (CEC) Draft 2016 Update (October 2016 update)

### California Assembly Bill 758 (AB758)

Greater Savings in Existing Residential and Nonresidential Building Stock

**AB 758 (Chapter 470, Statutes 2009 -- Adds Section 25943 Code to PU Section 381.2 and 385.2):** This bill requires the Energy Commission, by March 1, 2010, to establish a regulatory proceeding to develop a comprehensive program to achieve greater energy savings in the state's existing residential and nonresidential building stock. (1) The commission (CEC) shall establish a regulatory proceeding to develop and implement a comprehensive program to achieve greater energy savings in California's existing residential and nonresidential building stock. This program shall comprise a complementary portfolio of techniques, applications, and practices that will achieve greater energy efficiency in

existing residential and nonresidential structures that fall significantly below the current standards in Title 24 of the California Code of Regulations, as determined by the commission; (2) The comprehensive program may include, but need not be limited to, a broad range of energy assessments, building benchmarking, energy rating, cost-effective energy efficiency improvements, public and private sector energy efficiency financing options, public outreach and education efforts, and green workforce training.

**EBEE Action Plan Draft 2016 Update (CEC)**

The CEC adopted the EBEE Action Plan in September 2015. The plan provides a 10-year roadmap to activate market forces and transform California’s existing residential, commercial, and public building stock into high-performing and energy efficient buildings. The law lists various programs and strategies that may be deployed to achieve this goal, including the existing buildings energy efficiency programs established by Assembly Bill AB758. SB 350 requires that by or before January 1, 2017, the Energy Commission adopt an update to the program to achieve a cumulative doubling of statewide energy efficiency savings. This document (2016 Plan Update) is the first update to the EBEE Action Plan in response to the requirement of SB 350.

**Table E-3: California AB758**

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
California Assembly Bill 758 CEC Existing Buildings Energy Efficiency Action Plan Draft 2016 Update (October 2016)	Notes that AB802 encourages the CPUC to oversee the design and evaluation of efficiency using meter-based savings approaches. Historically the dominant form of efficiency savings determinations has been pre-calculated estimates derived from engineering models. AB 802 articulates the value of mining the recently available AMI data to measure savings directly from the meter. (para #3)	Chapter I p. 4			CEF issue not likely addressed in original Evaluation Framework

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				Strategy Table for Benchmarking (Sec. 1.2.4 & 1.2.5) EBEE strategy proposes to establish clear metrics to evaluate the effectiveness of Commercial building/MF benchmarking; and also establish the criteria and performance metrics needed for mandatory upgrade programs, based on AB802	
	Strategy 1.3 -- Minimum Standards for Smart Meter Data Analytics CEC to establish minimum eligibility criteria and evaluation methods for products that deliver energy efficiency data analytics. This "AMI data analytics test bed" is limited to the residential sector. In 2017 a plan will be complete for a residential data analytics test bed. (para #2)	Chapter II Strategy 1.3 p.15			Requirements resulting from this work will likely need to be incorporated into the CEF update
	Establishes minimum qualifications standards and protocols for eligible low- and no-touch home energy assessment tools	Chapter II Strategy 1.3.2 Strategy Table p.16			Standards and protocols resulting from this work will likely need to be incorporated into the CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			On April 1, 2015, Executive Order B-29-15, authorized CEC to adopt Water End-use savings: Emergency regulations establishing standards that improve the efficiency of water appliances for sale and installation in new and existing buildings were adopted.	Chapter II Strategy 1.5 p.21	These water savings standards will need to be reviewed and updated in the CEF along with other water-energy approaches that may not be addressed in the original document
			Strategy 1.8 focuses on EE as a Clean Distribution Energy Resource and discusses issues related to the CPUC's Competitive solicitation framework -- with specific reference to currently unresolved issues related to incrementality, targeting of resources, ability to pay EE providers the full cost of avoided generation and transmission resources based on current business model, etc.	Chapter II Strategy 1.8 p.30	Issue related to EE as a DER -- as they are resolved in appropriate rulemakings -- will need to be fully incorporated into the CEF to ensure proper and coordinated evaluation.
			Reference to Market Transformation program portfolios and desire to evolve the energy efficiency program portfolios to focus more explicitly on market	Chapter II Strategy 1.8.2 p.31	Focus on MT moves towards dynamic baselines, that will need to be discussed in CEF, or updated, if present.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				transformation activities in the upgrade	
			Focuses on use of advanced analytics using consumption data for long-term forecast/resource plans	Chapter II Strategy 1.9.5 p.34	This focus points to evaluations increased use of NMEC and RCT approaches for program evaluation to inform longer term forecasts
			Focus on "Statewide Building Identification" to create unique building identifiers.	Chapter II Strategy 2.1 p.35-36 call out box	If created and implemented, the CEF will likely need to reference this.
			Reference to standardized databases in EE in California (CEDARS); and utility rates (DOE/NREL) nationally	Chapter II Strategy 2.1 p.36-37	If created might be added to reference documents in the CEF
	Energy Consumption Baselines -- CEC intends to develop macro consumption models based on the previous work with data sponsored by the CPUC. The macro consumption models will be used to estimate the reductions in energy use attributable to California's energy efficiency policies. The usage data obtained from the CPUC will be used along with weather, econometric, demographic, and efficiency	Chapter II Strategy Table at 2.1.1 p.39			This information, once published will clearly impact CEF evaluation approach in California and will likely need to be included in the CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	<p>program participation data to develop statistical models of energy consumption. These models will then be used to establish baselines, track energy savings over time and, to the extent possible, attribute these savings to energy efficiency policies. CEC also intends to publish weather normalized distributions of electricity and natural gas usage by customer segment and geography. For example, not just average (50 percent quartile) usage, but also 25 percent and 75 percent quartiles, or 10 to 90 percent deciles.</p>				
<p>Data use and exchange protocols-- CEC intends to research and adopt standard protocols using real-time AMI data for EM&amp;V</p>	Chapter II Strategy 2.1 p.38			These protocols will influence approaches to AMI data use and will need to be incorporated or reference in the upgrade of the CEF	
<p>References working with business cohorts on SEM type programs and the CEC reference needed to evaluate this type of effort.</p>	Chapter II Strategy Table at 2.2.4 p.43			Reference to SEM C&I evaluations will need to be incorporated into the updated framework	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Reference to Pay for Performance (P4P) programs related to HOPPS offerings. Makes EM&V reference "Integrating measurement and verification into the program delivery can enable customer, contractor, and program implementer feedback to ongoing program effectiveness. As HOPPS efforts expand and transition to existing baselines, more feedback approaches and methods will help identify best practices and potentially lead to more real-time feedback and/or automation of some M&V activities, where feasible."	Chapter II Section 3.2 p.46			Reference to P4P HOPPS programs and "real time" evaluations will likely need to be incorporated into the updated framework
			References Open EE Meter (OEEEM), an open sources public tool for use in providing meter based tool. PG&E is using this for its residential P4P pilot and it has other uses.	Chapter II Section 3.2 p.47	Likely this tool and others like them may need to be referenced...or at least addressed as to use in EM&V in the CEF
	References the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) establishment of an approach to evaluating pilot loan programs relate to single-family targeting	Chapter II Goal 5 p.61			Evaluating PACE programs as part of the California PA portfolios may need reference and approaches in the updated CEF at some point, based on stakeholder discussions of it.

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	low to moderate income households using the Residential Energy Efficiency Loan (REEL) Assistance Program as compared to PACE financed on. As directed by the Legislature, CAEATFA, together with the CPUC and a formal advisory board, prepared a recommended evaluation approach in 2016 to compare the results of the pilots with PACE and traditional utility on-bill financing methods of supplying capital for efficiency improvements.				

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

### Decision Re Energy Efficiency Goals for 2016 and Beyond and Energy Efficiency Rolling Portfolio Mechanics

**General:** This Decision identifies many implicit and some explicit processes that may impact original CEF as well as references EM&V in specific situational areas:

1. Revises and adopts energy savings goals for 2016 and beyond;
4. Establishes the “Rolling Portfolio” review process;
5. Provides initial guidance on 2016 portfolio changes
6. Updates DEER and ESPI metrics

**Table E-4: CPUC D. 15-10-029**

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment	
	Identified Item	Location	Identified Item	Location		
CPUC DECISION 15-10-029 (October 22, 2015)			Reference to use of smart meter data in the potentials model (para #1)	Section 3.1.4.3 p.25	This kind of issue won't matter this time around, but AMI data and its use will play a role going forward with NMEC usage	
			CPUC decision reference to using traditional EM&V (para #3) might have relevance			
		The "annual" "Bus stop" approach (para #2) adopted in the decision has stated implications for EM&V updates...when they are done and how they relate to the schedule for the bus stop	Section 3.1.4.5 p.29			This will have impacts on the protocols related to when new EM&V updates are available for evaluators...will need at least to likely mentioned in CEF
		Reference to AB802 language specific to NMEC (para #2) has direct implications for EM&V	Section 3.1.4.5 p.30	References to need to establish below code AB802 baseline (para #4) in 9/2016 has implicit issues for CEF	Section 3.1.4.5 p.30	These issues are flushed out in far more detail in the AB802 spreadsheet....as mostly explicit issues
				Discussion of Temporal and Locational Aspects of Savings (para #4) has CEF implications	Section 3.1.4.6 p.31	These issues are at play in both the EE and IDER proceedings and will no doubt impact the CEF
			SCG makes reference to future "lumpy" changes in savings resulting in greater savings than modelled prediction.	Section 3.1.4.7 p.34	Need to see if this kind of situation is covered in CEF	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Discussion of PA Business Plan metrics releasing PAs from MTIs and PPMs, etc. -- with explicit reference to EM&V experts providing ongoing expertise on process and impact evaluations to help develop metrics (para #2.3 p.54); reference also to EM&V's role related to PA objective (para #1 p.55)	Section 3.2.2.2 p.54; p.55	This may or may not have relevance to CEF; but might well need to be referenced in the "situation where PA business plans do XYZ in terms of metrics
	References EM&V schedule issues related to EM&V ex ante relationship to the ESPI schedule - therefore tying EM&V study updates to the bus stop discussion at C5 above	Section 3.2.3 p.82			This relates primarily to the use of updated bus stop established data from EM&V studies each year
	Direct Reference to EM&V --Notes that even though bus stop exists, the results used in a given year will be "gathered and built over a longer period of time...consistent with expectations for updating "uncertain measures" in the ESPI process.	Section 3.2.3.1 pp.85-86			May be a Commission measurement issue, but might be relevant to discussion of schedule that should be followed by EM&V "based on Commission decisions" or something like that.
	Decision made to undertake a broader re-examination of the EM&V framework in Phase III of the proceeding.	Section 3.2.3.1 p.86 para #1			FYI -- no broad EM&V discussion here.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Documents Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Reference Custom Program need for stakeholders, PA, etc. coming to agreement on how to measure savings from custom programs related to usability and transparency of ex ante data.	Section 3.2.3.4 p.97	
		Discussion of schedule for ex ante updates	Finding of fact #21	May or not impact custom measurement section -- likely not.	

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Source: Navigant analysis

Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings

**General:** This Decision is a key one related to the CEF baselines. It sets the EM&V focus for baselines, NMEC and references EM&V in specific situational areas:

Specific issues addressed include:

1. RENS
2. AB802 default baseline modified to be based on existing conditions, with a number of exceptions as further outlined in this decision.
3. The term “statewide” is defined; third-party programs addressed: 20% now and at least 60 percent of the total portfolio budget going to third-party programs by 2020, in the business plans.
4. Evaluation priorities are expanded to include portfolio and sector optimization.

5. Evaluation budgets remain at 4 percent of the total portfolio, with at least 60 percent reserved for Commission staff evaluation efforts and up to 40 percent for program administrators.
6. Modifies weighting of Energy Savings Performance Incentive (ESPI) mechanism scores.
7. Says that Evaluation and ESPI processes may be modified further in the future.

**Table E-5: CPUC D. 16-08-019**

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
CPUC DECISION D. 16-08-019 (August 18, 2016)	Summary focus includes: AB802 Baselines, EM&V priorities etc., listed in cell B5	Summary p.3 Section 1 p.5 bullet 1			Provides an overview of Decision focus... not all relates to EM&V Framework, but most do as they related to AB802 legislation, Staff AB802 White Paper, and Rolling Portfolio definitions of programs related to AB802 and traditional framework and associated EM&V issues
	Explicit reference to previous decisions and legislative PU code background for addressing AB802 baseline issues	Section 3 Baseline policy p.12-14			This provides background which might be referenced in a California Evaluation Framework (CEF) update
	NTG discussion on maintaining goals based on gross savings or moving to net. (para #4)	Section 3.1 p.16-17			Discussion provides the basis for moving back to Net savings analysis (NTG) and may or may not need to be referenced in CEF... many new approaches to customer interviews, etc. have been done since original framework...may need to include these or in a new NTG chapter

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Discussion of attribution and analysis of program influence related to NTG -- notes comparison groups, dynamic baselines and concludes NTG discussion with adoption of net as policy and encourages " PA's to consider alternative methods to evaluating free ridership"	Section 3.1 pp.18-19			This will likely need to be addressed in CEF related to dynamic baselines and alternative methods
	Adopts 802 as default CPUC policy (para #2)	Section 3.5 p.32			Reference to existing conditions baseline now applicable in IOU Portfolios
			Directs commission staff to undertake existing baseline evaluation studies in 2017/18 toward policy changes in 2020 (para #1)	Section 3.5 p.36	The focus of these studies will likely be new or expanded additions to the CEF...or at minimum reference existing sections with new evaluation focus or connections to AB802
	Defines exceptions to existing condition baselines e.g., New Construction (para #4)	Section 3.6 p.33			Part of existing conditions that may be included in CEF refresh
	major alternations treated as part of existing building category (para #3)	Section 3.6 p.34			Part of existing conditions that may be included in CEF refresh
	Allows industrial use of existing conditions baseline for SEM (para #3)	Section 3.8 p.38			Part of existing conditions that may be included in CEF refresh

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Industrial project may include dynamic baseline (para #1)	Section 3.8 p.39			Part of existing conditions that may be included in CEF refresh
	Requires the custom review process to use ex ante, ex post and NTG evaluation approach; but creates working groups to go over this issue that might change this approach (para #2)	Section 3.8 p.39			May not have impact on existing CEF related sections
			Identifies custom review group issue related to "preponderance of evidence" and review of "repair eligible" or "accelerated replacement" for dual baseline treatment. Also wants collaborative to address issues of ISP for industrial (para #1)	Section 3.8 p.42	May have implicit issues in discussions that will impact CEF refresh
	Discusses SEM as a program that uses NMEC of dynamic baseline; allows a default use of NTG of 1.0 for SEM (para #3)	Section 3.8 p.41			SEM, its applicability and evaluation approaches will likely need to be included in CEF refresh
	Allows for custom project timing to be flexible, with perhaps early review and EM&V that would change the ex ante, ex post paradigm (para #1)	Section 3.8 p.42			Likely included in CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	NMEC on agricultural projects is fine -- i.e., existing condition baseline; but custom Ag projects remain ex ante ex post (para #2)	Section 3.8 p.43			Likely included in CEF update
	Finance programs baselines are considered the same as underlying program, sector, or measure activity (para #3)	Section 3.9 p.44			Definition likely included in CEF refresh
	Upstream and Mid-stream use same baseline as code or standard (para #2)	Section 3.10 p.45			Definition likely included in CEF update
	BROs identified as existing condition baseline and NMEC or RCT evaluation approaches (para #3)	Section 3.11 p.45			Likely included in CEF update
	Move expected UL for BROs from White Paper suggested 1-2 years for behavioral and 3 years for RCx and Operational programs (para #4)	Section 3.11 p.46			Likely included in CEF update
	Does not apply 10 percent portfolio limit on NMEC or RCT evaluations from Staff White Paper recommendation that was imposed in HOPPS ruling (December 30, 2015). No limit to apply (para #1)	Section 3.12 p.47			Likely included in CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Establishes initial table Summary of Baseline policy showing which programs apply, which are code and which are dual (...this has been modified in recent CPUC draft resolution E-4818 (December 22, 2016)	Section 3.14 p.49			Revised table based on E-4818
	Clarifies the definition for midstream statewide programs that does not include contractors and installers; clarifies the POS rebates are considered midstream. Points to the entity with whom the PA is partnering as key to definition of mid/up/downstream (para #3/4-p.58)/(para #1 p.59)	Section 4.5 pp.58-57			Definition likely included in CEF update
	Formal adopted definition of Statewide and clarifies that upstream (manufacturer level) and midstream (distributor and retail, but not contractor and installer) are appropriate for statewide programs (para #6)	Section 4.9.1 p.59			Definition likely included in CEF update
			Notes that shift to statewide implementation does not change existing ex ante and ex post evaluation of portfolio savings. (para #4)	Section 4.9.2 p.65	Reference to this not changing as guide for CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Provides definition of "third party" in business plan context-- must be designed, implemented, and delivered by non-utility personnel under contract to PA (para #4)	Section 5 p.67			Definition likely included in CEF update
			Addresses comments on all-source solicitations and punts for now to the IDER rulemaking (footnote 27)	Section 5.2 p.70	IDER will likely play an increasingly important role in the future and should be referenced at a minimum in the evaluation overview and issues section or perhaps in a new chapter
			Discussion on all-source solicitations that will likely have relevance in the future	Section 5.2 p.71	Same as above
			Provide guidance on utility portfolios including EM&V budget allocations for third-party (60% of portfolio) designed and delivered programs (para #1)	Section 5.2 p.76	May have no relevance except maybe as a reference in some way
			Discussed Pay for Performance programs	Section 5.3 p.75	Check existing CEF against current multiple approaches to PfP
	Identifies EM&V Issues in new EM&V section (para #1)	Section 6 p.76			Some issues may have relevance to CEF update
	Initial discussion of EM&V priorities (para #2)	Section 6.1 p.76			Some issues may have relevance to CEF update

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Identifies addition of portfolio and sector optimization as a new EM&V priority (para #3)	Section 6.1 p.76			Likely included in CEF update
	Talks about a relook at CEF and decision focus on "evaluation needs specific to programs and sectors rather than a wholesale Framework revisit (para #1); acknowledges need for update but focuses this for business plans to look at evaluation needs for savings estimates; ex ante needs and high priority market studies. (para #4)	Section 6.1 pp.77-78			Regulatory guidance on update
	Review of 2004 Ca Evaluation Framework to be done concurrently and collaboratively led by CPUC staff to incorporate AB 802 new methods. (para #1/2)	Section 6.1 p.78			Regulatory guidance on update
	Specific reference and discussion related to which entities are responsible for each EM&V priority with, e.g., the advent of more NMEC. (para #2) (para #3)	Section 6.2 p.78			May or may not be referenced in CEF refresh
	Discusses shifts in responsibilities and approaches - retains current approach to responsibilities of evaluation priorities. (para #2)	Section 6.2 p.79			May or may not be referenced in CEF refresh

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Retains EM&V budgets at 4% of portfolio. (para #1)	Section 6.2 p.80			May or may not be referenced in CEF refresh
	Increases EM&V planning split for PA from 27.5 to up to 40%. (para #1)	Section 6.2 p.81			May or may not be referenced in CEF refresh
	Provides a schedule and timing for ex post evaluations to inform ESPI and custom evaluations that do not inform ESPI. (para #2)	Section 6.5 p.83			If a consistent process over the 10-year rolling cycle, this might be included in CEF update to the umbrella framework section
	Discusses Advisory Structures for EM&V -- no changes at the current time. (para #2)	Section 6.6 p.84			May or may not be referenced in CEF refresh
			Discusses Staff White Paper proposal to weight deemed and custom in each utility portfolio for ESPI evaluations. Decides in favor of weighting of each based on PA portfolio (para #1)	Section 7.2 p.87	May need to be addressed/included in CEF update
			Includes new NMEC savings in the "custom" category for Portfolio evaluation weighting purposes until 10% and then will reconsider a new category. (para #1)	Section 7.2 p.88	Likely included in CEF refresh

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
	Findings of Fact -- Summarizes many EM&V related decision issues	10. Findings of Fact p.95-108			Summarizes many issue relevant for review related to Framework update

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Source: Navigant analysis

Tier 1 Advice Letter

**Summary:** On March 25, 2016 PG&E proposed the On-Bill Financing Alternative Pathway (OBF Alternative path) as a HOPP. PG&E proposes to pair the opportunity to use metered energy data, with an alternative on-bill financing option to test whether financing alone without an incentive can support high energy efficiency projects.

**Purpose:** This lays out the reasons and the details that this proposal is approved (OBF Alt Path).

**Specific Focus:** This discusses in detail: 1) Principles of HOPPS and General Program Description; 2) Measure Treatment; 3) Savings Calculation Methods; 4) Incentive Design; 5) Normalized Metered Energy Consumption and Type of Program; 6) Threshold for Expected Savings; 7) Baseline Adjustments; 8) Application of Behavioral, Operational, and Retro-commissioning activities (BROs)

PG&E comments to the HOPPs Proposals of On Bill Financing

**Summary of Concerns:** The nature of this program to allow several measures to be calculated using a single calculation methodology leads to a number of potential EM&V issues:

1. It is unclear what level of data needs will be required for these projects if the impact of individual measures is required. There are two very different approaches within this program Normalized Billing and engineering models. Although the engineering model are used for "back up" all data required by the EM&V framework will need to be available in case this method is required.

8. The mixture of project types (ROB, NC, and so on) can lead to a number of baseline issues that need to be clearly addressed within the EM&V framework.
9. It is unclear if normalized billing calculations is appropriate for calculating demand savings and what other options should be considered within the EM&V framework.

#### Supplement to Submission of High Opportunity EE Programs and Projects (HOPPS) Proposal- On-Bill Financing Alternative Pathway Program

**Summary:** In this supplemental to the Advice Letter, PG&E provides additional information in support of its proposal to operate an On-Bill Financing (OBF) Alternative Pathway program as a High Opportunity Projects and Programs (HOPPS) sub-program under PG&E's existing OBF Program.

#### Attachment A: Detailed Proposal for High Opportunity EE Programs and Projects (HOPPS) Proposal- On-Bill Financing Alternative Pathway Program

**Summary:** Attachment A goes into the full details of how the OBF financing program will be implemented by both the programs and other supporting staff.

#### Attachment B: Evaluation, Measurement, and Verification Plan for PG&E On-Bill Financing Alternative Pathway Program

**Summary:** EM&V plan for PG&E OBF alt pathway.

**Table E-6: PG&E ELEC 4812-E-A (2)**

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Summary of Tier 1 Advice Letter			EDF also notes that the proposal will reduce transaction costs and while maintaining quality by relying on industry standards and best practices.	Background I p.2 para #2	Allows sites to determine what is standard practice to them. Danger of site understating standard practice and may not fit with in the requirements of M&V framework.
			Project developers will select appropriate protocols, and accordingly conduct steps for baselining usage and predicting savings.	Background I p.2 para #2	Difficulty in ensuring due diligence of participating customer calculations. Must make sure protocols are each appropriate for EM&V Review.
	Appropriate use of a back-up EM&V method.	3. Savings Calculation Methods p.4 para #2			Concerns about alternative method for M&V. Without clear definition of measures need to ensure that every method falls within the appropriate EM&V framework/ appropriate baseline consideration.
	PG&E explained that activities that would have been categorized as early retirement (RET), replace on burnout (ROB), normal planned replacement (NR), or retrofit add-on (REA) under the Energy Efficiency Policy Manual V5.0 framework, are	2. Measure Treatment p.3 para #3			Important to note category of measure and which EM&V protocols will be appropriate for this program. The framework may need to be clearly define what measures

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	allowable in the alternative pathway.				categories are appropriate for using whole building analysis.
	We also advised the utility to either skip the billing analysis for projects identified as replace on burnout and instead use engineering/on-sites/metering, or prohibit replace on burnout projects all together... PG&E indicated that it will collect data so that the EM&V contractor can identify projects as early retirement versus replace on burnout... PG&E proposes a threshold for savings from replace on burnout components to be limited to 25% for a single project.	3. Savings Calculation Methods p.4 para #4, para #5, para #6			Framework may need to be adjusted to calculate the impact of ROB on burnout measure, as these should likely not be considered existing condition baseline.
			While this still may allow for significant free ridership, Commission staff agrees that this requirement would contain the free ridership by directing the program toward comprehensive projects.	3. Savings Calculation Methods p.4	Comprehensive projects may allow for measures that are not valid within the same EM&V method. Issues such as baseline considerations may need to be addressed if individual measure impact need to be removed from this whole building analysis.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	It is doubtful that PG&E will be able to find adequate comparison groups that would enable a meaningful net savings regression analysis, and hence will also plan to use a self-report survey for net attribution analysis.	3. Savings Calculation Methods p.4 para #4			Limits EM&V methods to verify savings for this program. Perhaps the additional methods need to be addressed for this very likely scenario.
	Proposals must document the methods for normalizing data. The models to normalize the data should use recognized, transparent tools, and methods that are repeatable, and reviewable. Additionally, proposals for non-residential programs must explain the link between the meter or meters and building that is acceptable for projects in the program. Programs must include a minimum of 1 year of post-intervention data for retrofits, and a minimum 3 years of post-intervention data for behavioral, retrofit, or operations projects.	5. Normalized Metered Energy Consumption and Type of Programs p.5 para #1			Clear definition of methods, tools, collected data and links between savings and activates. Any requirements by the EM&V framework need to be collected by the program.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
'The PG&E Review of the High Opportunity EE Programs and Projects (HOPPS) Proposals'			Alternative Pathway OBF participants may install a similar measure mix.- This pathway will lead to many measures being installed and evaluated as one package using normalized billing data.	Principles of HOPPS PG&E comment p.8 para #8	A mix of measures can be especially difficult to evaluate cost effectively. It should be clear what methods of EM&V should be used to evaluate these programs and what specific data needs may be required to independently evaluate projects outside of simple normalized billing calculations (if needed).
	What changes will be made to the existing PG&E information systems to link loans with project-specific data... will also retain the full amount of project data required under the Program Framework with the project.	2. Provides specifics on the terms of the program structure p.11 para #4			Data needs should be made clear, but will depend on the types and number of projects installed under each OFF contract. Program Framework need to be checked against EM&V requirements for the large variety of projects completed under this program.
			Use of Deemed savings values for parts or the whole of these projects	Measure Treatment p.12	Understand specific EM&V guidelines for deemed energy savings calculations and use. Deemed measures should likely considered over equipment baseline and not existing condition.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	The proposal allows all measures that reduce energy usage as eligible.	Measure Treatment p.12 para #3			Although all measures are allowable savings may need to be calculated in different manners depending on measure type. Measure that are deemed or ROB may need to be calculated separately to remove the impact of above existing savings.
	Baseline types allowable in this program. (RET, ROB, NC, REA, NR)	Measure Treatment p.13 para #6			General concern about different EM&V requirements for different measure types all run under the same program.
	Data provided and collected for evaluation: PG&E: Customers will authorize to share energy data leveraging the PG&E Share My Data Functionality. This data will be available for evaluation.	Savings Calculation Methods p.13 para #2			Some measures may have more stringent data requirements needed for evaluation. What is included in the "Share My Data Functionality" must be well understood and compared to EM&V requirements.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Creation and design of a comparison group. Difficulty of getting a non-participant sample	Savings Calculation Methods pp.13-14 para #3/9			General concerns about the correct design of this comparison group and if it is feasible to get an appropriate comparison group. This should be carefully looked at compared to EM&V requirements. It should be well understood what EM&V options should be used if getting a non-participant sample is not possible.
	Use of IPMVP Option D or A for "back up" calculation methodology	Savings Calculation Methods p.14 para #7			It is unclear when these "back up" calculations would be needed. Data collection requirements and responsibility needs to be made clear for these projects as defined by the EM&V framework.
	Handling of ROB projects	Savings Calculation Methods p.15 para #11			General concerns of mixed measure projects with measures that required EM&V methods of different types (ROB vs NC and so on).
	Persistence of BRO type measures.	Strategy for tracking persistence p.18			Need to check how the EM&V plan addresses persistence and what data will be required

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Use of Normalized Metered Energy consumption to calculate demand savings.	Normalized Metered Energy Consumption p.19			It is unclear if using normalized metered data is appropriate for calculating demand savings. Methods of calculating demand savings in this way may need to be addressed within the EM&V plan.
	How to discern individual projects from a combination of projects.	2. Site level results will be discernable at building level for verification purposes. p.20			It must be made clear when certain data will be required for EM&V and what data will be required. This will be especially true for when multiple measures are being installed at a given site.
	Data requirements for EM&V baseline identification	1. Documentation of the baseline assumptions and strategy for collecting necessary information p.21			Lays out potential requirements that will be needed for baseline identification and adjustment during the EM&V process.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Supplement to Submission of High Opportunity EE Programs and Projects (HOPPS) Proposal- On-Bill Financing Alternative Pathway Program			Measure allow ability under OBF. "considering all energy achievements"	II. Background p 2 Point (3)	Although all measures are allowable savings may need to be calculated in different manners depending on measure type. Measure that are deemed or ROB may need to be calculated separately to remove the impact of above existing savings.
			OBF Alternative Pathway employs two features of AB 802...OBF Alternative Pathway... will be offered for all energy saving measures, not just measures that are eligible for rebates and incentives.	2. Responsive to Recent Legislation p.4 para #2	Although all measures are allowable savings may need to be calculated in different manners depending on measure type. Measure that are deemed or ROB may need to be calculated separately to remove the impact of above existing savings.
			Contractors to provide M&V plans as a part of their submittal for approval	C. Program Operation p.6 para #2	Careful guidelines should be provided to the contractors to ensure the sufficient data is collected to meet EM&V guidelines.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
'Attachment A: Detailed Proposal for High Opportunity EE Programs and Projects (HOPPS) Proposal- On-Bill Financing Alternative Pathway Program			Timing of energy savings calculation 1 year after loan has been issued	B. A New Program Framework to Support Contractor Participation p.2	Due to the length of time from the loan to the calculation of energy savings (1 year) special consideration must be made to collect pre-condition data that match what is required by the EM&V framework.
			Project documentation- "documented in accordance with the Program Framework, and that the calculations, data, and project documentation are complete and accurate."	B. A New Program Framework to Support Contractor Participation p.2	Due to the complex nature of this program (wide variety of measures and potential for multiple measure being completed at once) the potential required data for these programs for proper EM&V may be very large. Data needs should be carefully considered and compared to the potential EM&V activates that may be required to verify savings
	EM&V method of control groups vs participating sites	C. Transition from Widget-based Savings to Savings for Existing Buildings p.5 para #6			It is unclear if this is the proper EM&V methodology to evaluate these projects (sites vs a control group). -It may be difficult to find "control group" sites that are of a similar makeup -If this group cannot be developed or is otherwise deemed inappropriate other

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
					data requirements or methods may be necessary to properly evaluate these projects
	Project designed in a way to require M&V	1. Creating Opportunities for Greater Energy Savings p.7 para #3			Required M&V should align with framework for potential EM&V that will be completed during the potential evaluation of these projects in the future.
			Pre-installation review will not be required	a. Contractors OBF_AP Solution p.8 para #3	Pre-installation review may be required by the EM&V framework. If this is not collected it may need to be addressed within the EM&V framework.
	Ongoing M&V over expected useful life of a given project	a. Contractors OBF_AP Solution p.8 para #7			There may be unique requirements/ opportunities of a continues M&V process. It is unclear if this is properly addressed within the EM&V framework.
			Measures not currently eligible for a rebate or incentive.	B. Customers p.9 para #4	General concern about how these nonstandard measures should be evaluated and what considerations must be taken in terms of baseline/standard practice/NTG.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Concern of double counting of measure	C. Best Practices and Lessons Learned p.11 para #2	Methods may need to be developed to separate the savings from this program from other overarching programs such as codes and standards.
			Ability to claim metered savings	C. Program Data Objectives p.13 para #4	There may be cases where "back up " calculations will be required because savings is not high enough or not clearly shown on the metered data. All data required (by the EM&V framework) for these projects will need to be collected.
	Use of two approaches to calculate net savings. Plus, engineering estimates for failed equipment	C. Savings Calculation Method p.16 para #3			Engineering estimates is really a third approach and should be called out and addressed separately due the potential data requirement difference from the other two approaches. Each approach will have different requirements as defined within the EM&V framework.
			Comparison of current OBF offer and OBF alternative pathway	Table B-2 p.23	Very good summary of a variety aspects of this program including verification requirements.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
'Attachment B: Evaluation, Measurement, and Verification Plan for PG&E On-Bill Financing Alternative Pathway Program			"Because the appropriate EM&V approaches depend somewhat on the type of measures and projects installed, PG&E proposes to modify this document to create a more detailed EM&V plan (in coordination with the Energy Division – ED) once the program has launched."	1. Executive Summary p.1 para #1	Interesting to note that this M&V plan is subject to change.
	General EM&V approach- "Evaluator uses weather normalized billing analysis"	1. Executive Summary p.1 para #2			It is unclear when these "back up" calculations would be needed. Data collection requirements and responsibility needs to be made clear for these projects as defined by the EM&V framework.
	General EM&V approach Cont.- "Use of engineering approaches"	1. Executive Summary p.2 para #8			This approach will require different data collection requirements and approaches than the normalized billing method. Data requirements for this method should be checked against the EM&V guidelines

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Received	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Changes in site operation can make models invalid	2. Evaluation, Measurement and Verification (EM&V) Overview p.5 para #11	Major changes at the site should be collected (as they state they will) as this can invalidate this kind of model. The EM&V plans should clearly define what changes could result in the method being invalid. Requirements may need to be added to ensure the impact of outliers or other potential issues is checked and addressed.
	Data requirements	8. Establishing Evaluation Data Requirements p.20			The data requirements should be informed by the EM&V framework of what is potentially required

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Source: Navigant analysis

Attachment 1: Background, Discussion, and Conclusions

**Summary:** Attachment 1 contains a detailed discussion of the comments, reviewer feedback, and the Commission Staff’s determination that the Advice Letter is compliant with the December 2015 Assigned Commissioner and Administrative Law Judge’s Ruling Regarding High Opportunity Energy Efficiency Programs or Projects.

**Supplement: Southern California Gas Company High Opportunity Projects and Programs (HOPPs) - Commercial Restaurant Retrofit (CRR) Program**

**Summary:** Details of -The SoCalGas CRR Program, which is a whole building retrofit program that proposes to address stranded opportunities within the commercial food service sector.

**Attachment A: Advice No. 4948-A Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Commercial Restaurant Retrofit (CRR) Program**

**Summary:** Detailed discussion of the CRR program.

**Attachment B: Advice No. 4948-A Evaluation, Measurement & Verification (EM&V) Plan**

**Summary:** While there are no predefined standards or procedures for evaluating this type of program, the EM&V plan below proposes to align with recent efforts in California to better conceptualize this area of evaluation methodology, specifically normalized metered energy consumption which is the current Commission requirement of HOPPs proposals including SoCalGas' proposed CRR Program.

**Table E-7: SCG 4948**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1 Background, Discussion, and Conclusions			Saving to at or above code	I. Background p.1 para #1	Must be clear if there are different data requirements for EM&V of at or above code measures. The framework should provide guidance that is appropriate to the kind of measures installed and that measures appropriate baseline.
	Water savings and gas savings	I. Background p.1 para #1			How does the EM&V framework address water savings and will it need to be adjusted for this program? Is it treated the same as electric and is this appropriate?
			CRR Program	1. Principles of HOPPS and General Program Description p.3 para #2	Need to understand the special data need of this sector. In many cases baseline is not well defined and there may be special cases where the normalized billing data will not work. What are the potential data need of the program as defined by the EM&V framework?

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Significant changes that occur at the site	5. Normalized Metered Energy Consumption and Type of Program p.5 para #3	If significant changes do occur at the site what methods may be available within the EM&V framework to evaluate savings at these sites? It would be helpful to have a clear definition of what a "significant change" is and how to account for it using whole building analysis.
			Data required for the EM&V	5. Normalized Metered Energy Consumption and Type of Program p.6 para #6	What data is required may need to be clearly addressed within the EM&V framework if it is not already definite. There may be potential for models be created with data they have, not data they need. Also, sites may not achieve the % of savings needed to use a given EM&V method- Each method should have guidance around when a given method is appropriate and when another method should be used.
			This proposal does not address these activates	8. Application of Behavioral, Operational, and Retro-commissioning activities (BROs)	If these activates (or other specific activities) are not allowed to be analyzed using specific EM&V methods, this should clearly be addressed within the EM&V framework.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Supplement: Southern California Gas Company High Opportunity Projects and Programs (HOPPs) - Commercial Restaurant Retrofit (CRR) Program			Saving to at or above code	
			Evaluate and implement at the same time	Program Overview p.2 para #3	Due to the structure of this program there may be opportunity to collect more detailed data to better fit within the EM&V framework. There is opportunity for the framework include potential additional data that would be preferred for these type of whole building calculations.
			15% reduction in site usage	Program Overview p.2 para #4	It must be clear what EM&V options should be considered if they do/ do not achieve 15% savings and it must be made clear within the framework what % of savings is required for certain methodologies.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	ATTACHMENT A Advice No. 4948-A Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Commercial Restaurant Retrofit (CRR) Program			Saving to at or above code	
			Evaluate and implement at the same time	B. General Program Description p.4 para #3	Same as above- Due to the structure of this program there may be opportunity to collect more detailed data to better fit within the EM&V framework. There is opportunity for the framework be altered to include additional data that would be preferred for these type of whole building calculations.
	EM&V responsibilities	Table 2. Summary of Program Responsibilities p.7			All required data for these types of programs must be informed by the EM&V framework. In addition, data must be collected in case back up calculation, engineering analysis, must be employed due to the site not being qualified for whole building analysis. Requirements for whole building calculation should to be clearly laid out in the EM&V framework as well as any data needs to account for up to baseline type measures.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Details of M&V for each measure type	Table 3. Measure Treatment by Measure Category p.11	Lessor occupied building	iv. Lessor Occupied Buildings Incentive p.10	<p>Concerns about having multiple measure installed at the same time and evaluated together. Unclear if the framework addresses how to access individual measures that are calculated as a group using whole building calculations. This may not be a concern of the program but individual measures may need to be investigated further for a variety of reasons.</p>

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	ATTACHMENT B Advice No. 4948-A Evaluation, Measurement & Verification (EM&V) Plan	Use of IPMVP C	C. Savings Calculations General Method p.2 para #1	Required billing data pre/post	
		Acceptable levels of savings uncertainty- "To be discernable for each restaurant, the savings uncertainty should not exceed half of the estimated savings amount, expressed as a percentage of annual energy use."	E. Calculations, Regression Models, and Description of Normalization p.7 para #7	Does the EM&V framework address acceptable levels of savings uncertainty? Should this be added to the framework or is this outside of the scope of the framework?	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Min requirement of annual savings	F. Threshold for Expected Savings p.13			<p>State that 10%-15% is rule of thumb. The framework could lay out specifically what are acceptable levels of savings for a given methodology of EM&amp;V.</p>

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Source: Navigant analysis

Attachment 1: University of California Protest to SDG&E Advice Letter 2864-E

**Summary:** Summarizes the University of California’s protest (to this HOPP), how SDG&E responded to each concern raised in the protest, and Staff’s assessment of the resolution of each concern

Attachment 2: Background, Discussion, and Conclusions

**Summary:** Provides a summary of the requirements for all HOPPs proposals and the review team’s dialogue with SDG&E regarding the Supplemental Advice Letter

**Attachment 3: Review Sheet for 2016 HOPPs Proposals**

**Summary:** Review summary sheet of commission staff and ADG&E in regard to their retrocommissioning HOPP proposal.

**San Diego Gas & Electric Advice Letter 2864-E-A – Attachment A: HOPP Retro-Commissioning Program**

**Summary:** Program details for HOPP RCx program provided by SDG&E for review. The majority of issues to be discussed in this attachment were addressed in the attachments above but a quick review was still complete to account for any other potential impacts on the EM&V framework.

**Attachment B: Review Sheet for 2016 HOPPs Proposals and Attachment A: HOPP Retro-Commissioning Program**

**Summary:** This is the same review sheet that was examined in attachment 3; no further review is required.

**Table E-8: SDG&E 2864-E-A**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1 – University of California Protest to SDG&E Advice Letter 2864-E			Program requires installation of measures that may have negative energy impact.	2.4. Conclusion p.2	If such measures are required the correct EM&V methods should be followed. It is unclear is using a whole building approach is appropriate with these kinds of measures and how their impact should be accounted for.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 2 – Background, Discussion, and Conclusions	Use of IPMVP options	4. Savings Calculation Methods p.2 para #1			It would be helpful if clear expectations (above x% of savings) are laid out in the EM&V framework to guide programs into which evaluation options they chose (if it is not already laid out). Other qualifiers such as available data and measure types should also be called out to make it clear what is expected for these types of whole building programs.
			Mix of deemed and custom measures	4. Savings Calculation Methods p.3 para #2	Understand specific EM&V guidelines for deemed energy savings calculations and use. Deemed measures should likely be considered over equipment baseline and not existing condition. There is a potential need to include methods of evaluating baseline issues within EM&V framework.
			Non-Routine adjustments	9. Baseline Adjustments p.5	The EM&V framework should consider how these non-routine adjustments should be handled for normalized whole building analysis.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 3 REVIEW SHEET FOR 2016 HOPPs PROPOSALS			General discussion of the RCx proposal	Principles of HOPPs p.1	Concern about 10% being main qualification for using while building EM&V without considering other factors that may exclude this methodology. Concern about a mixture of measures all being evaluated at existing baseline where this may not be appropriate.
			States- "General discussion of the RCx proposal whole building metered savings, the payback and savings of individual measures will not be distinguishable"	2. Provides specifics on the terms of the program structure p.2	Steps should be considered to be able to identify savings from a mix of measures if there are issues that require individual measures to be evaluated.
	States "The proposal states that IPMVP Options A or B are used if energy savings <5%, and Option C is used if energy savings >10%. Savings between 5% and 10% are unaddressed."	1. For normalized metered energy consumption, detailed ... p.3			The framework may consider specific qualification criteria for using different EM&V methodologies
	Discussion of variables used for analysis	1. Programs and projects must document the method for p.6			Additions may be needed to the framework regarding how to identify variables and what are acceptable variables for a normalized whole building model.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Estimating uncertainty of models.	2. Literature or field performance data demonstrating...p.9			It was noted that no agreed upon method exists for calculating model uncertainty. This might be worth exploring in the EM&V framework.
	Non-routine adjustments.	3. Description of the methods that will be used to adjust... p.10			There is potential for adding guidance on how to account for non-routine changes occurring at a site using whole building normalized models.
San Diego Gas & Electric Advice Letter 2864-E-A ATTACHMENT A HOPP Retro-Commissioning Program	Allowance of existing condition for RCx activities	ATTACHMENT A – HOPP RETRO-COMMISSIONING PROGRAM p.2 para #1			States that existing condition are now allowed according to AB 802, this should be check and these allowances should be made clear in the EM&V framework.

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Source: Navigant analysis

### Attachment 1: Background, Discussion, and Conclusions for 2865-E-C

**Summary:** Provides a summary of the requirements and the review team’s feedback to SDG&E’s final supplemented proposal. This is for the SDG&E MF HOPP program will be formally called the SDG&E multifamily Direct Install program.

#### Advice Letter 2865-E-C

**Summary:** The purpose of this supplemental Advice Letter (AL) is to incorporate Energy Division’s feedback received on July 13, 2016 and SDG&E’s responses to feedback and update the program budget.

There were no issues discuss in this letter that impacted the Framework in a significant way.

#### San Diego Gas & Electric Advice Letter 2865-E-C Attachment A: Multifamily HOPP

**Summary:** Detailed proposal of the SDG&E multifamily HOPP.

#### San Diego Gas & Electric Advice Letter 2865-E-C Attachment B: Review Sheet for 2016 HOPPs Proposals

**Summary:** CPUC review sheet of SDG&E multifamily proposal.

**Table E-9: SDG&E 2865-E-C**

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1: Background, Discussion, and Conclusions for 2865-E-C			This program will target older building so that they have a higher EUI	4. Normalized Metered Energy Consumption p.3	Concerns about finding an appropriate control group for this normalized meter approach. The program is specifically targeting outlier building making this kind of approach questionable. The framework may need to address requirements that allow for the use of this kind of methodology.
	SDG&E purposes using deemed measure level calculations that account for code as well as whole building analysis.	5. Savings Calculation Methods p.4			It is unclear which methods SDG&E purposes to calculate savings for these sites. Whole building may not be appropriate due to the variety of measures that need to be calculated at above code. The state that they will target sits with equipment beyond there useful life meaning replacements will be ROB. This may require a different baseline than existing. It would be helpful if within the framework it was made clear which kind of measure require certain baseline consideration. Also, the framework may want to include methods for using a combination of approaches where mixed baselines are occurring.
San Diego Gas & Electric Advice Letter 2865-E-C			Approaches to account for preexisting savings (below code savings)	Savings Methodology p.11	It is unclear if this below code method is acceptable for all measures included in the program. If possible, this should be made clear within the EM&V framework.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
ATTACHMENT A Multifamily HOPP			States-"SDG&E is not conducting a final impact (EM&V) study for this program; rather, the study is designed to provide useful information that can be shared with Commission Staff for the formal evaluation of the program."	F. Measurement and Verification (M&V) Plan p.14	The framework should lay out the data requirements for analysis of different EM&V methodologies to provide guidance to utilities that are able to collect data for evaluation.
San Diego Gas & Electric Advice Letter 2865-E-C ATTACHMENT B Review Sheet for 2016 HOPPs Proposals	Potential concern of using normalized billing calculations were non-existing baseline may be needed.	9. If proposal deviates from Attachment A, PA must provide clear rationale. p.8			It must be made clear when the programs can claim existing and when they can claim above code. Using normalized billing data will result in above existing savings and if adjustments need to be made they should be clarified in the EM&V framework.

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

**Attachment 1: Background, Discussion, and Conclusions for 4965-A SoCalGas Central Water Heater Multifamily Building Solution (CWHMBS) Program**

**Summary:** Provides a summary of the requirements and the review team's feedback to SoCalGas' final supplemented proposal.

**Attachment 2: Review Sheet for 2016 HOPPS Proposals SoCalGas Central Water Heater Multifamily Building Solution (CWHMBS) Program**

**Summary:** Provides a summary of the requirements and verifies that a Commission Staff review team determined that the resubmitted proposal meets each requirement.

**Advice No. 4965-A**

**Summary:** This supplemental filing replaces in its entirety Advice No. 4965, filed on May 18, 2016. Advice No. 4965-A includes clarifications to the CWHMBS Program as a result of the Energy Division Review Team's assessment.

**Attachment A: Advice No. 4965-A Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Central Water Heater Multifamily Building Solution (CWHMBS) Program**

**Summary:** Detailed summary of the SCG Central Water Heater MF Building Solutions Program.

**Attachment B: Advice No. 4965-A Evaluation, Measurement & Verification (EM&V) Plan**

**Summary:** M&V Details for the SCG Central Water Heater MF Building Solutions Program.

**Attachment C: Advice No. 4965-A Review Sheet Reference Matrix for SoCalGas' Central Water Heater Multifamily Building Solution Program**

**Summary:** Same review sheet as attachment 2 above no further review required

**Table E-10: SCG 4965-A**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1: Background, Discussion, and Conclusions for 4965-A  SoCalGas Central Water Heater Multifamily Building Solution (CWHMBS) Program			Outdated systems	2. Principles of HOPPs p.3	Repairs, upgrades, and replacement of these systems may fall under the category of ROB measures. In this case these measures may need to be treated with a code baseline or some other above existing baseline.  A true baseline should be established and compared to the baseline estimated in the codes and standards program or some other overlapping program. Savings must be established for above code savings, above existing savings and above codes and standards estimated baseline savings.
	Non-routine adjustments	5. Savings Calculation Methods p.4			It would be very helpful for the M&V plan to clearly lay out how to handle non-routine adjustments.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	ATTACHMENT 2: REVIEW SHEET FOR 2016 HOPPs PROPOSALS SoCalGas Central Water Heater Multifamily Building Solution (CWHMBS) Program	implemented and evaluated “simultaneously.”	3. Explains how the project/proposal addresses past challenges that have arisen with the business model being employed? p.1		
Use of deemed measures with non-deemed measures		3. Explains how the project/proposal addresses past challenges that have arisen with the business model being employed? p.2			General concern about a mixture of measures types when using whole building data to collect energy savings. It may be that baseline issues may need to be accounted for specific measures and the impact removed from the whole building savings.
			Whole boiler replaced up to or above code	3. Proposal demonstrates.... p.5	Existing system efficiency must be well understood. This kind of replacement would fall under ROB and savings may be accounted for in other programs such as Codes and Standards. Due to the nature of the equipment found in this program it is likely that savings beyond the codes and standards could be achieved and claimed.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Non-routine events	2. Site level results will be discernable at building level for verification purposes. p.11	The EM&V framework should consider methods to account for non-routine events while using normalized whole building calculation methodologies
Advice No. 4965-A			Bundled measure program	Program Overview p.2 para #1	General concern about a mixture of measure with multiple baseline considerations. The method of normalized billing calculation does not account for above measure or above code baseline as it will only calculate above existing savings.
	implemented and evaluated "simultaneously."	Program Overview p.2 para 3			See comments above
ATTACHMENT A Advice No. 4965-A Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Central			Bundled measure program	B. General Program Description p.A-3	See comments above
	implemented and evaluated "simultaneously."	B. General Program Description p.A-4			See comments above

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Water Heater Multifamily Building Solution (CWHMBS) Program			Implementer and EM&V responsibilities	Table 4 p.A-8	It should be clear when a certain option can be used (IMPV C vs A or B) and what data needs to be collected by the implementer. Since data collection and evaluation can be done at the same time it should be clear when data collection needs should change and what needs to be collected as soon as possible.
	Source of savings is listed in this table as well as intervention strategy	Table 5 Measure Treatment by Measure Category p.A-10			For any measure that is ROB or otherwise require baseline consideration care must be taken when using normalized billing data to not double count savings with other programs such as codes and standards.
ATTACHMENT B Advice No. 4965-A Evaluation, Measurement & Verification (EM&V) Plan	Source of savings is listed in this table as well as intervention strategy	Table 4. Measure Treatment by Measure Category p.B-1			See comment above for attachment A
	Use of option C	C. Savings Calculations General Methodology & Background p.B-2			It should be clear when option C is appropriate, how to account for multiple measures with different baseline considerations, how to account for non-routine adjustments and when other options should be considered. Data requirements for option C and other options should be clearly defined.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
		Data issues to allow for using option C	Data Quality p.B-3		
	Lay out when non-Routine adjustments will be done and states that IMPV A will be used to calculate this	Non-Routine Adjustments p.B-11			It's unclear how IMPV A and Normalized billing data will be used together to account for these kinds of issues. The use of multiple methods may need to be address in the framework.

Source: Navigant analysis

Attachment 1: Background, Discussion, and Conclusions for 4813-E-A PG&E Residential pay for Performance Program

**Summary:** Contains a detailed discussion of the comments, reviewer feedback, and the Commission Staff’s determination that the Advice Letter is compliant with the December 2015 Assigned Commissioner and Administrative Law Judge’s Ruling Regarding High Opportunity Energy Efficiency Programs or Projects.

**Attachment A: Detailed Proposal for High Opportunity Program – Residential Pay for Performance SoCalGas Central Water Heater Multifamily Building Solution (CWHMBS) Program**

**Summary:** Contains descriptions and details regarding the PG&E Pay for Performance (P4P) residential program.

**Attachment B: Evaluation, Measurement, and Verification Plan for the PG&E Residential Pay-for-Performance Program: Claimed Savings**

**Summary:** Detailed proposal of the SDG&E multifamily HOPP.

**Table E-11: PGE 4813-E-A**

Document Reviewed	Explicit		Implicit		Comment
	Content That May Impact California Evaluation Framework (CEF)		Content That May Impact California Evaluation Framework (CEF)		
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1: Background, Discussion, and Conclusions for 4813-E-A PG&E Residential pay for Performance Program	Normalized Meter energy consumption approach	3. Savings Calculation Methods p.2			<p>Issues regarding this approach have been identified in the other review but as follow:</p> <ul style="list-style-type: none"> <li>-These often lead to a mixture of measure so details of how to handle and individual measure issues within the framework of this methodology should be addressed.</li> <li>-Baseline issues should be considered for measure of certain types such as ROB as they may overlap with other programs such as codes and standards. This should be clearly understood and methods to deal with these issues should be identified.</li> <li>-Qualifiers of when this method should be used and when it should not should be addressed in the framework. This could be based on the savings as a % of building usage, outlier issues, major changes occurring at the site or other issues.</li> </ul>

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
					-It should be clear when this method is invalid and what data should be required by the implementer to evaluate these programs as implementation and evaluation will often be occurring "simultaneously"
	Issues that may occur due to ROB or behavior changes	Risks Associated with the Proposed Incentive Design and Evaluation of Savings p.4			These were noted in the comment above but is highlighted in detail in this section. Sites details may be required that allow for the EM&V to account for issues such as these.
	3-6% electric savings and 16% gas savings	Threshold for Expected Savings p.5			As noted above it should be made clear within the framework when certain methodologies are appropriate and when the potential error makes a given method invalid. As noted by the CPUC, in this case, this low savings may mean that using whole building savings may be inappropriate for this program.
Attachment A: Detailed Proposal for High Opportunity Program – Residential Pay for Performance			State- "To help mitigate the potential low savings risk, PG&E is allowing Aggregators to achieve savings from all BROs"	Aggregators p.3	It should be clearly defined how the baseline for BRO's measures should be definite. Down in the measure treatment section it states, "This program will not include retro-commissioning" these two statements seem to clash and should be resolved.
SoCalGas Central Water Heater Multifamily Building Solution			No list of eligible measures	Measure Treatment p.5	Concern about a mix of measures and potential baseline issues. All measures completed should be identified and appropriate baselines should be chosen.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
(CWHMBS) Program					
Attachment B: Evaluation, Measurement, and Verification Plan for the PG&E Residential Pay-for-Performance Program: Claimed Savings			General Framework-detailed plan can be developed later	1. Evaluation, Measurement, and Verification (EM&V) Overview p.1	To note that this M&V plan is subject to change
	Measuring net energy savings using normalized billing data.	1. Evaluation, Measurement, and Verification (EM&V) Overview p.1			Same issues as noted above. Baseline consideration should be made clear in the framework and proper identified when calculating net energy savings at these sites.
	Existing condition Baseline	3.1.1. Estimation of Short-Term Gross Savings p.7			Depending on the type of measure being installed an appropriate baseline should be selected that does not overlap with other programs such as codes and standards. There is opportunity for existing in many cases but some measure may need other baselines.
			State- "since P4P assumes that all installations will be early replacement". They note though that ROB will occur and that they will apply the appropriate baseline as needed. Full quote "It is	3.1.3. Normalization p.12	This lays out a method to account for baseline issues but the program must take to care to account for this issues as many projects will include a mixture of measures and it may be difficult to ID ROB measures.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				possible that some of the installations in some of the households might include measures that are replaced on burnout thereby making any applicable efficiency code/standard or common practice the appropriate baseline for these measures. If this occurs, we will draw a random sample of these households and estimate gross savings using engineering methods that can more reliably take the appropriate baselines into account."	
			Interviews with program participants	7.4. P4P Participants p.17	Interviews with participants could be used to account for non-routine issues seen in the normalized billing data.

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Adjustment made during program implementation	8. Early EM&V p.18	Clear expectation of what data needs are and what qualifications for each M&V option should be laid out so that information can be collected as needed for proper EM&V.

Source: Navigant analysis

**Attachment 1: Background, Discussion, and Conclusions for 4956-A SoCalGas Metered and Performance Based Program**

**Summary:** Provides a summary of the requirements and the review team's feedback to SoCalGas's initial proposal.

**Attachment A: Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Metered and Performance-Based Retrofits (MPBR) Program**

**Summary:** Contains descriptions and details regarding the SCG MPBR Program.

**Attachment B: Advice No. 4965-A Evaluation, Measurement & Verification (EM&V) Plan**

**Summary:** Summary: M&V Details for the SCG MPBR Program.

**Table E-12: SCG 4956-A**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT 1: Background, Discussion, and Conclusions for 4956-A			Mixture of measure (Retro fit and RCX)	2. Principle of HOPPs p.2	Each measure will need to be identified and any baseline adjustments should be identified. If any measure needs a baseline consideration, saving will need to be adjusted outside the whole building analysis.
SoCalGas Metered and Performance Based Program			20% savings	8. Threshold for Expected Savings p.4	Qualifications for using the whole building analysis may need to be made clear in case the sites are unable to achieve the targets savings thresholds. Alternative methods of M&V should be understood with all required data requirements.
			Pre and post regression	9. Baseline adjustment p.4	This does not address the concern of measures that will need baseline adjustments due to their type or interaction with other programs such as codes and standards. See mixture of measures comment above.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
ATTACHMENT A: Detailed High Opportunity Projects and Programs (HOPPs) Proposal for SoCalGas' Metered and Performance-Based Retrofits (MPBR) Program			10 years of measures at these sites	SECTION 1: HOPPS PRINCIPLES AND PROGRAM RATIONALE p.1 para #4	Concern about pre-existing measure in the baseline as well as the % of savings (of building usage) that is achievable through this program. The framework should clearly lay out how to handle preexisting energy savings conditions in the ore condition and what level of savings is required to use normalized whole building M&V.
			Continually identify new measures	SECTION 1: HOPPS PRINCIPLES AND PROGRAM RATIONALE p.3 para #1 (on this page)	The framework needs to clearly define how a pre and post period should be established if the site is continually install measures over time.
			Non-routine activities	SECTION 1: HOPPS PRINCIPLES AND PROGRAM RATIONALE p.5	It should be clear in the framework how non-routine adjustments should be made to whole building models.
			Alignment with AB 802.	SECTION 1: HOPPS PRINCIPLES AND PROGRAM	Measures baseline issues should be considered for all upgrades to ensure no double counting or other issues are occurring when claiming above existing condition.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				RATIONALE p.5	
			Maintenance practices	Maintenance Plan p.10	The baseline for these activities should be carefully considered.
			"Staff White Paper on Energy Efficiency Baselines" Id'ed NMEC and BRO programs as having existing condition baselines	SECTION 6: MEASURE TREATMENT p.13	It should be clear in the framework what measures need what baseline and how to handle a mixture of measures with differing baselines. They stat that individual measure accounting is not required, but it may be that some measure will need to be accounted for and the programs should be made aware of this. This is especially true with the addition of the retrofit program.
ATTACHMENT B Advice No. 4965-A Evaluation, Measurement & Verification (EM&V) Plan	List of project characteristics	A. Savings Calculations General Method p.1			The framework should provide qualifications of when a given EM&V protocol is appropriate, how to deal site changes and non-routine adjustments.
			Ensure data is continuous and accurate	Data Quality p.3	There may be need for other checks such as outlier data, non-routine effects, or other qualifiers to ensure the baseline represents typical operation.
	One time changes	Non-Routine Adjustments p.7			The framework may want to address how to account for these changes using the whole building M&V.
ATTACHMENT C Review Sheet Reference Matrix for SoCalGas			Used of deemed values and measure installation	Measure Treatment p.2	All measure should be identified and compared to how each baseline condition should be treated.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Metered and Performance-Based Retrofits Program				

Source: Navigant analysis

Attachment A: General Program Description Southern California Edison (SCE) Advice Letter 3460-E High-Opportunity Program Proposal – Public Sector Performance-Based Retrofit

**Summary:** Provides a summary of the requirements and the review team's feedback to SoCalGas's initial proposal.

Attachment B: Measurement & Verification (M&V) Plan Southern California Edison (SCE) Advice Letter 3460-E High-Opportunity Program Proposal – Public Sector Performance-Based Retrofit

**Summary:** Contains descriptions and details regarding the SCG MPBR Program.

**Table E-13: SCE 3460-E**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Attachment A: General Program Description Southern			States" SCE will target buildings in the public sector that are susceptible to delayed improvements and	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
California Edison (SCE) Advice Letter 3460-E High-Opportunity Program Proposal – Public Sector Performance-Based Retrofit			indefinitely repaired equipment."		
			Capture measures all at once with normalized billing calculations. - This would include retrofits, tuning, and any behavioral measures identified through the meter-based performance approach.	Reduced complexity for multi-measure projects in existing buildings. P 5	A mixture of measure could have a mixture of baseline issues that may need to be considered. Also, clear cause and effect should be established for the measures installed at the site.
			It is clearly state that "Developing measure baselines is difficult and costly." and that normalized billing data will solve this issue	3.2 HOPPS Savings Opportunities	Interaction of this program with other programs such as codes and standards must be clearly understood so that any baseline adjustments can be done quickly and easily.
Attachment B – Measurement & Verification (M&V) Plan Southern California Edison (SCE) Advice Letter 3460-E High-Opportunity Program Proposal – Public Sector	Lays out qualifiers of when using Option C or B is appropriate	4. Savings Calculation Method p 19 para 3 (on this page)			These qualifiers should likely be addressed in the framework and there should be suggestion of what to do when these qualifications can't be met. What is the minimum and what should happen if the min cannot be met?
	Lay out the data that will be required to complete this M&V.	5. Data Collection Strategy			These data requirements should likely be clearly addressed in the EM&V framework and include

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Performance-Based Retrofit					information for cause and effect especially with a mixture of measures (like these programs)
	Non-routine adjustments	8. Baseline Adjustments p 27			Guidance may be needed in the framework on how to handle these changes that occur in either the baseline or EE data.

Source: Navigant analysis

### Southern California Edison Business Plan 2018-26

**Summary:** SCE Business Plan for 2018-25 is organized into nine chapters. Chapter I, provides 22 backgrounds on the business plan concept and describes the organization of SCE’s plan. Chapter II presents SCE’s vision of EE in California, including discussion of important policy issues for the 2 Commission’s consideration. Chapter III provides a summary of SCE’s proposed EE portfolio for the 2018-2025 timeframe, including: SCE’s vision and goals for its portfolio; drivers of EE; high-level strategies SCE will use to achieve its vision; descriptions of how SCE will comply with the requirements for statewide administration and third-party solicitations; key portfolio data such as budget, forecast energy and demand savings, cost-effectiveness; and proposed metrics. Chapters IV through IX provide similar information for each of the six sectors: Commercial, Industrial, Agricultural, Residential, Public, and Cross-Cutting.

**Table E-14: SCE Business Plan 2018-25**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
Southern California Edison Business Plan 2018-26	SCE vision notes that (para 4) they plan to maximize the use for Meter Based Measurement with ex-post plans and early EM&V plans at project onset	Vision Section p.5			These NMEC related issues will need to be addressed in the update of CEF
	Recommends that written EM&V requirements be established and kept static for all projects pursuing existing condition baselines through NMEC; i.e., do not establish requirements on a case-by-case basis	Vision Section p.6			These NMEC related issues will need to be addressed in the update of CEF
	Recommends that no ex ante review be undertaken as incentives will be paid/claimed after the EM&V evaluation -- so such is not necessary -- similar to behavioral programs	Vision Section p.7			These NMEC related issues will need to be addressed in the update of CEF
			Notes D.16-11-022 directive for extensive coordination with other proceedings include better integration of ESA program with on-bill financings and on-bill payment	Section J.5 p.37	May warrant an approach mention that is not in the current CEF
			...makes reference to existing condition baselines and allowing to code measures and BROs opportunities and P4P in EE res potential sector	Section B.2 p.47	These issues will likely need to be addressed in the CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			Mentions number of participants using self-service tools to drive continuous improvement in the residential sector	Table 18 p.72	These tools may require specific evaluation reference in the CEF
			Mentions 10-10-10+ behavioral MF pilot using RCTf for industry adopted behavior interventions	Section 5a p.73	These issues will likely need to be addressed in the CEF
			Mentions pilot using RCT using comparative analytics	Section 6 p.73	May or may not need anything in CEF; maybe not if RCT is well defined
	Notes performance based programs will become increasingly feasible (para #2) as advance M&V methods are developed-- in ETP section on EVs	Section 6 p.81			This issue will likely need to be addressed in the CEF
			Mentions EVs and the need to evaluate EV charging stations (para #3)	Section 6 p.81	This issue will likely need to be addressed in the CEF
	Makes note of a requirement for early M&V on Advanced Lighting Control Systems (ALCS)	Section b p.106			This issue will likely need to be addressed in the CEF
			Talks about developing a methodology to enable "real-time" review of vendor performance, with agreed standards and milestones for Savings By Design (last bullet in table and footnote 208)	Table 30 P.111	This issue will likely need to be addressed in the CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Notes early feedback and M&V evaluations for actions related to Codes and Standards future pilots	Section 4 p.116			This issue will likely need to be addressed in the CEF
			Focus on industrial EMS pilot that will start with a meter based approach to documenting savings and performance based true-up and incentives -- rather than using existing behavioral protocol i.e., experimental design, comparative energy usage, ex post (para #1-2)	Section 5. p.132	This issue will need to be addressed in the CEF in the context of ISP etc.
			Makes reference to C&I rapid response pilots (e.g., Aliso Cyn, PRP)	Section e p.137	Evaluation of this type of program may need special reference and approaches in CEF
			ETP looking at advanced meter based M&V protocols for verification approaches	Section c p.133	Evaluation protocols of this type would need special reference and approaches in CEF
	ETP references explicit focus on early feedback and M&V evaluations for implementation of future pilots (last bullet on page)	Section 4 p.138			This issue will likely need to be addressed in the CEF
			Notes agricultural programs based in on-bill financing, on-bill repayment, DR, and dynamic pricing (para #1)	Section 2 p.148	Dynamic pricing evaluation may need to be addressed in CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
				ETP investigating advanced meter-based verification approaches that directly measure the savings of facility upgrades (para #4)	
	Recommends special evaluation consideration be given to quantifying spillover in public buildings as these will likely have higher rates than are seen in other commercial sector EE projects (para #2)	Section d p.176			This issue should be looked into as a change in the CEF as the likelihood of public sector spillover being higher than in other commercial projects seems plausible
	Specifically suggests that if ex post impacts evaluations of public sector programs do not account for the prevalence of unfunded mandates and the role that utility funds play in these project, then the Public sector may not be viable under traditional metrics of cost-effectiveness (para #1)	Section d p.177			May be considered in policy rulemaking and roll into the CEF
			Mentions SCE water programs (para #3) Explanation of water-energy nexus (footnote 285)	Section a p.181 also p.185	Need to confirm the status of water and water-energy inclusion in CEF
	Notes use of NMEC for HOPPS pilots	Table 50 p.186			This issue will likely need to be addressed in the CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
	Confirms NMEC and smart meter use in measuring M&V in public sector buildings (para #2) - for public sector retrofit program (NMEC - para #2); Also, references AB802 and performance based M&V (para #3)	Section a p.188	References whole building project and quarterly energy savings results requirement to receive incentive	Table 55 p.194	
		References whole buildings retrofits (bullet two sub-bullet 1)	Table 55 p.195	This issue will likely need to be addressed in the CEF	
		Describes statewide WISE water program	Table 56 p.196	Need to confirm the status of water and water-energy inclusion in CEF	
Notes need for public sector market studies to document ISPs for this sector, especially in relationship to "indefinite repair" practices (para #3)	Section 4 p.205			This issue will likely need to be addressed in the CEF, in terms of incorporating notation of ISP and how it is used in evaluations	
References IOU exploration of using AMI data to show NMEC at the meter (para #1)	Section 4 p.204			The issue of use of AMI in evaluations will likely need to be addressed in the CEF	

Evaluation Measurement & Verification Framework Refresh Needs Assessment

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
			EM&V for C&S compliance mentioned here (para #2)	Section 10 p.238	The approach to C&S was developed after the CEF and may be a protocol -- which knowledge may need to be incorporated into CEF
			Mention new role of EE in IDER proceedings related to DG, DR, and ES	Section b p.243	This issue will likely need to be addressed in the CEF
	Mention data analytics and "big data" that now needs to be taken into account for ET evaluation and other (para #2)	Section b p.244			This issue will likely need to be addressed in the CEF
			Figure shows WHOLE Buildings approaches to integrating energy solutions (top of page)	Figure 31 p.246	Whole building evaluation approaches may need to be updated in CEF to account for AMI and other IoT impacts

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

Southern California Gas Company (SoCalGas) Energy Efficiency Business Plan

**Summary:** SoCalGas EE Business Plan -- SoCalGas’ mission is to offer a suite of energy efficiency (or EE) solutions that incorporates the best available technologies and services valued by customers, contributes to achievement of energy efficiency goals, and that ultimately aligns with

the State’s energy efficiency policies - including a doubling of energy efficiency in California by 2030.<sup>1</sup> SoCalGas’ vision integrates the ideals of innovation, partnership, and customer-centric approaches to influence customers and their energy efficiency decisions.

**Table E-15: SCG Business Plan 2018-25**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment	
	Identified Item	Location	Identified Item	Location		
	Southern California Gas Company (SoCalGas) Energy Efficiency Business Plan			Notes market transformation as key strategy (para #2)		p.13
	Table on Program Intervention strategies mentions key SEM ones that related to Pay for Performance (P4P). This element is key components of SCG strategy mentioned throughout the plan			p.14 P4P p. 68 Table 6 references P4P p.90 notes P4P as incentive payment strategy p.116; p. 135; p.137---SEM commercial strategy mentions P4P p.160; p.180; p.182 P4P noted in Industrial SEM strategies in relevant tables p.207 Table 6 Agricultural strategies mention SEM and P4P pp.227-229 Agricultural strategy mentions P4P p.274 addresses P4P as strategy for Public Bldgs. p.276 SEM tactic table notes P4P in Public Bldgs.		P4P evaluation elements will likely need to be updated in the CEF

Evaluation Measurement & Verification Framework Refresh Needs Assessment

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	Identified Item	Location	Identified Item	Location	
		Table on Program Intervention strategies mentions key SEM ones that related to MI data analytics. This element is key components of SCG strategy mentioned throughout the plan		<p>p.14 AMI (Table)</p> <p>p. 86 (para #2) references AMI and smart meters</p> <p>p.110 notes AMI usage for commercial goal achievement</p> <p>p.116 and p. 135 - SEM commercial strategy mentions AMI</p> <p>p.126 - goal 1 strategy mentions (commercial) data analytics use</p> <p>p.160 AMI noted in Industrial SEM strategies in table 6</p> <p>p.177; p.183 notes Data Analytics/AMI to support industrial intervention strategy</p> <p>p.207 Table 6 Agricultural strategies mention SEM and AMI data use</p> <p>p.271 Public bldgs. intervention strategy focuses on AMI use for intelligent outreach</p> <p>p.277 notes SEM strategy use of AMI data</p>	

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	Identified Item	Location	Identified Item	Location	
		Whole building savings and bundled measures are mention in above Table related to incentives		p.14 whole bldgs. and bundled measures p.48 whole bldgs. p.113 mention whole blogs for commercial sector approach p.137 notes whole building commercial strategy p.275 notes whole building intervention strategy for Public bldgs.	
		Reference here to the Water Infrastructure Systems Efficiency Program (WISE) (para #3)	p. 49 (section 5)		Water efficiency evaluation in CEF may need to be addressed along with water-energy programs
		Notes water conservation as major new component in residential new construction program (para #2)	p. 50 (section 1)		Water efficiency evaluation in CEF may need to be addressed along with water-energy programs
	EM&V residential section mentions need for baseline studies due to existing condition baseline changes (para #3)	Section 1 p.106			Will need to be addressed in CEF update

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		Focus on NMEC for impact evaluation of behavioral program @ bullet 2 (para #2)	Section 1 p.107		
	References AB802 and Baseline's usage of NMEC (table 8-commercial sector)	Table 8 p.125			Will need to be addressed in CEF update
			Alternative Fuel Vehicles focuses on reducing petroleum use for air quality etc. (para #5)	p.149	This area of evaluation i.e., transportation sector, may need to be reviewed in CEF
	EM&V commercial section mentions to-code baselines and expanded HOPPS programs and load impacts evaluation based on NMEC (para #3 & #4- bullets)	Section I p.151			Will need to be addressed in CEF update
			NMEC baseline noted in industrial strategy from AB802	Table 8 p.170	Will need to be addressed in CEF update
			Notes SCG long-term partnership with CAEATFA on alternative transportation		This area of evaluation i.e., transportation sector, may need to be reviewed in CEF

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	Identified Item	Location	Identified Item	Location	
				Mentions ISP at Para #6 in relationship to unique public bldgs. issues	
			Mentions growing Energy Management Technology Industry and usage (EMT) alongside AMI data for customer friendly communication		This could result in behavioral programs that would need to be addressed in updated CEF
	EM&V section on Public Bldgs. identifies NMEC for load impact analysis	Load Impact Section p.295			NMEC will need to be addressed in update CEF
			AB802 issues of stranded potential and existing conditions baselines and notes use of AMI data as powerful tool for identifying stranded potential (para #1 and para #2) for cross cutting programs	p.318	Usage of AMI in conjunction with AB802 program designs and NMEC will likely need to be addressed holistically in the CEF update

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	Using C&S program funding and approaches to gather baseline data rather than EM&V is a key issue is considered here as a key function of C&S programs (bullets 1, 2 and 3)	EM&V within C&S Section p.323			
Cross Cutting ETs: ET program mentions IDER, Data Analytics for M&V and bundled measures as ET program issues	ET section p.335				The CEF could have a section on the IoT as well as sections addressing crossover IDER, AMI, and bundled measures (some AB802 and some not) evaluations
Cross Cutting ETs: Mentions SB350; AB 793; and AB 802 related to to-code improvements to underperforming buildings and DER as focus	ET section p.339				Issues associated with these pieces of legislation and DERs will likely need to be included in some way in an update to CEF
EM&V discussion on ETs notes that ET measures should be evaluated differently than "regular" measures due to their update timelines...etc.	ET EM&V pp.352-353				CEF will likely need to clarify or address EM&V approaches to ET if different than
Mentions NMEC and P4P related to Whole bldgs. seen as the "Gold Standard" for EE evaluation	Appendix B EM&V p.406				Needs to be included, per previous references, in CEF update

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		Notes that until AB802 rules regarding implementation, measurement and reporting are clarified, there still existing uncertainty on EM&V related issues	Appendix B EM&V p.411		

Note: Identified content (explicit/implicit) on this page may have or may not have relevance to potential revisions or additions to the California Evaluation Framework. Where questions existed, Navigant has erred on the side of conservatism by adding this content, though it may be found to be not relevant in future stages of this research.

Source: Navigant analysis

California Policy EM&V Refresh Southern California Edison Business Plan 2018-26

**Summary:** SDG&E Business Plan for 2018-25 is organized is organized into 10 chapters. SDG&E developed the business plan to chart a course towards ZNE and doubling of EE savings. The plan details the market, regulatory climate, and legislative environment that informed the goals, strategies and tactics described herein. Evidenced by the statistics presented in the plan, SDG&E is considerably smaller than other CA IOUs. SDG&E's customers are primarily residential and small commercial, with very few industrial or agricultural customers.

**Table E-16: SDG&E Business Plan 2017-25**

Document Reviewed	Explicit Content That May Impact California Evaluation Framework (CEF)		Implicit Content That May Impact California Evaluation Framework (CEF)		Comment
	Identified Item	Location	Identified Item	Location	
California Policy EM&V Refresh  Southern California Edison Business Plan 2018-26			Discusses resource integration between EE and DERs (para #1)	Resource Integration Section p.16	Evaluation of these resources together or individually will likely need to be addressed in the CEF update
			Notes electric vehicles as future market consideration for EE	Infographic p.33	EV's will need to be considered in CEF update
			Notes AMI related to evaluation of AB793 savings and NMEC related to baselines and AB802	Figurer 2.14 p.47	These elements will likely need to be considered in CEF update
			Whole building design noted in commercial sector infographic	Infographic p.63	This has NMEC issues that will need to be addressed in the CEF update
			Not broad PV and EV trends	Future Trends p.75	DER issues will likely need to be addressed in the CEF
			Identifies AB802 issues related to existing conditions baselines	p.78 (commercial) p.115 (public)	Existing conditions baselines will need to be addressed in the CEF
			Notes locational EE program issues	p.87	This will need to be addressed in the CEF
			Notes Pay for Performance P4P issues as part of EE strategy	p.87 Table 5-18 p.153	This will need to be addressed in the CEF related to NMEC
			Notes including whole building approaches and NMEC	p.87 (commercial) p.122 (public)	This will need to be addressed in the CEF related to NMEC

Evaluation Measurement & Verification Framework Refresh Needs Assessment

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	Explicit reference to NMEC in the EM&V section for commercial buildings	EM&V section for commercial p.90			This will need to be addressed in the CEF related to NMEC
			Whole building design noted in public sector approaches including NMEC	p.112	This will need to be addressed in the CEF related to NMEC
			Notes AB802 in relationship to SEM in industrial sector	p.152; p.155	This will need to be addressed in the CEF related to NMEC
			Notes baselines AB802 issues for industrial sector	Table 5-18 p.153	Ex ante and ex post evaluation approaches will need to be addressed in relationship to use of engineering simulations versus NMEC
	Explicit reference to NMEC in the EM&V section for industrial sector; noting that current model relies heavily on simulation and engineering and new on NMEC and how to resolve issues between ex ante and ex post evaluation "gap"	EM&V section for Industrial p.157			This will need to be addressed in the CEF related to NMEC
			Agricultural section mentions locational EE	p.165	This will need to be incorporated in some way into CEF update...if only an explanation, but likely more.

Evaluation Measurement & Verification Framework Refresh Needs Assessment

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	Identified Item	Location	Identified Item	Location	
			Notes SEM in agricultural sector as a strategy	Figure 6-4 p.166	SEM evaluation and in particular potential use of dynamic baselines will likely need to be addressed in CEF
			Water conservation programs are mentioned in future trends section	p.176	These programs may need to be addressed in the CEF update
			Notes baselines AB802 issues for agricultural sector	p.177	This will need to be addressed in the CEF related to NMEC
	Evaluation Appendix notes NMEC, P4P and Whole Buildings as NMEC related evaluation issues.	p.234			This will need to be addressed in the CEF related to NMEC
	Mentions IPMVP Option C potential usage for NMEC	p.235			This will need to be addressed in the CEF related to NMEC

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Source: Navigant analysis