RTR Appendix

Southern California Edison, Pacific Gas and Electric, Southern California Gas, and San Diego Gas and Electric ("Joint Utilities" or "Joint IOUs") developed Responses to Recommendations (RTR) contained in the evaluation studies of the 2013-2014 Energy Efficiency Program Cycle. This Appendix contains the Responses to Recommendations in the report:

RTR for the California HVAC Contractor and Technician Behavior Study, Phase II
(EMI, ED Work Order #2017, Calmac ID #SCE0375.01)

The RTR reports demonstrate the Joint Utilities' plans and activities to incorporate EM&V evaluation recommendations into programs to improve performance and operations, where applicable. The Joint IOUs' approach is consistent with the 2013-2016 Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan[1] and CPUC Decision (D.) 07-09-043[2].

Individual RTR reports consist of a spreadsheet for each evaluation study. Recommendations were copied verbatim from each evaluation's "Recommendations" section.[3] In cases where reports do not contain a section for recommendations, the Joint IOUs attempted to identify recommendations contained within the evaluation. Responses to the recommendations were made on a statewide basis when possible, and when that was not appropriate (e.g., due to utility-specific recommendations), the Joint IOUs responded individually and clearly indicated the authorship of the response.

The Joint IOUs are proud of this opportunity to publicly demonstrate how programs are taking advantage of evaluation recommendations, while providing transparency to stakeholders on the "positive feedback loop" between program design, implementation, and evaluation. This feedback loop can also provide guidance to the evaluation community on the types and structure of recommendations that are most relevant and helpful to program managers. The Joint IOUs believe this feedback will help improve both programs and future evaluation reports.

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1 Page 336, "Within 60 days of public release of a final report, the program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings. The IOU responses will be posted on the public document website." The Plan is available at http://www.energydataweb.com/cpuc.

2 Attachment 7, page 4, "Within 60 days of public release, program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings as they relate to potential changes to the programs. Energy Division can choose to extend the 60 day limit if the administrator presents a compelling case that more time is needed and the delay will not cause any problems in the implementation schedule, and may shorten the time on a case-by-case basis if necessary to avoid delays in the schedule."

3 Recommendations may have also been made to the CPUC, the CEC, and evaluators. Responses to these recommendations will be made by Energy Division at a later time and posted separately.

EM&V Impact, Process, Market Assessment Study Recommendations
Study Title: California HVAC Contractor and Technician Behavior Study, Phase II
Program: California HVAC
Author: EMI
Calmac ID: SCE0375.01
ED Work Order: 2017
Link to Report: http://calmac.org/publications/HVAC_C%26T_Behavior_Phase2_FINAL_REPORT.pdf

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1	17, 57, 61, 64	Although a sizeable minority of technicians stated that they use most or all of the specifications on the job in prompted questions (pp. 61, 64), very few (9%) spontaneously reported using the standards when asked in an open-ended question. (p. 57) This may not be that surprising, as the ACCA/ASHRAE industry standards were developed from best practices in the field. Furthermore, while the majority of technicians indicated they complete most of the maintenance or installation tasks specified in the standards on a typical job, it is unclear exactly *how* technicians are performing these tasks. (p. 17)	Include guidelines for how to enact the standards when training technicians and contractors on the specifics of the ACCA/ASHRAE installation and maintenance standards. Specifically, the IOUs should incorporate industry how-to manuals into program trainings. For instance, ACCA publishes a "Technician's Guide for Quality Installation" that equips practitioners with the knowledge to properly implement all the measurement procedures required in ACCA Standard 5. As of the writing of this report, there is discussion and collaboration among the California IOUs, the industry group Western HVAC Performance Alliance (WHPA), and ASHRAE to create a user's manual for Standard 180. This manual will serve to address the performance aspect of the specified maintenance tasks for commercial systems in a manner that will optimize energy efficiency. We also recommend undertaking a similar collaboration with industry organizations to develop how-to manuals where they do not yet exist, such as a user's manual for Standard 4. Together, these manuals will provide a necessary foundation for education and training of contractors and technicians.	All IOUs	Rejected	The IOUs will consider incorporating industry developed "how to" guides into program material, but does not feel it is appropriate for the IOUs to develop the associated content. The program trainings, requirements, and inspections require that participating technicians implement the standards correctly. The IOUs agree that lack of awareness and adherence to industry standards is a broad problem across the industry, as is clearly evidenced by the EMI studies, and would support the development of guides, especially for dissemination among program nonparticipants. Where needed, the IOU's will continue to participate in collaborative processes to create and vet technical manuals. However, the IOU programs should limit their roles as designers and enforcers of voluntary industry standards, and instead support the adoption of industry-approved practices.
2	66	See #1 above. While QA/QC is performed with contractors and technicians participating in the QI/QM programs, we have no insight into how technicians are performing these tasks outside of the programs. (p. 66)	Conduct case studies with technicians to better understand how the standards are currently enacted in the broader marketplace. These case studies could involve either shadowing technicians in their work or conducting covert field observations as in the Phase I study. The advantage of conducting covert observations is that the IOUs will learn how the tasks are typically carried out, without risking changes in	All IOUs	Rejected	The IOUs agree that it would be beneficial to better understand how technicians perform tasks outside of the programs and would welcome an EM&V study to develop common practice baselines for maintenance service. If patterns emerged we would consider them when implementing program training requirements. One practical route to get information on program effectiveness on technician behavior would be to evaluate technicans before training them on the program protocols and again after. The SCE program is currently researching the addition of a technician

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			behavior due to knowledge of the study (i.e., the Hawthorne effect). Conducting field observations of technicians working outside the programs will provide an in-depth understanding not just of what steps are taken to complete an installation or maintenance job, but also how the tasks are conducted, which tools were used (if any), and how much time and attention is allotted to each task. Understanding the standard "baseline" practice will help inform where to focus training efforts.			mentorship component to the CQM program. This will help to inform the SCE program of the habits of technicians when they first enter the program. This information can be used to build a more robust training curriculum and it will provide a more in-depth view into typical technician typical behavior pre-program. However, it is difficult to conduct covert case studies that eliminate the possibility that the presence of an evaluator would change technician behavior on site. Also, it is especially difficult to get agreement from non-participating contractors to allow for observation of their technicians.
3	58, 61-62, 65, 110	Technicians generally do not associate the terms "quality installation" and "quality maintenance" with the standards or with utility programs. When asked to define "quality maintenance" or "quality installation," technicians generally think of completing a job "the right way" or having a clean or neat system. (p. 58) Only 1% of respondents associated ACCA Standard 5 with "quality installation" and 1% of respondents associated utility programs with "quality installation." (p. 62) None associated "quality maintenance" with the standards and less than 1% associated "quality maintenance" with utility programs. (p. 65) The association of quality installation or quality maintenance with work that is "clean" or "neat" is very similar to the associations that customers make. (pp. 61, 110) As identified in the Customer and Decision-Making Study, part of the issue appears to be that it is simply difficult to differentiate the term "quality" from the colloquial term meaning "good." (see reference to right). When prompted, less than five percent of technicians associate the standards with a specific QI or QM program. Out of all respondents, only 3% were aware of the installation standard, ACCA 5, and associated it with a specific utility program name that they could correctly recall. (p. 62) For the maintenance standards, ACCA 4 and ACCA/ASHRAE 180, only 2% were aware of one of these standards and associated it with a specific utility program name that they could correctly recall. (p. 65)	Develop a proactive branding strategy. As recommended in the Phase I study, determine how the programs should be branded, and what the primary message should be based upon. To do this, we recommend that the IOUs develop several potential branding strategies and test these with contractors, technicians, and customers before adopting a strategy. We recommend using program names that can be differentiated from "good" installation or maintenance. The programs may choose to leverage the recognition of existing brands such as ENERGY STAR, but again, multiple possibilities should be tested before adopting a strategy. The IOUs should leverage their marketing departments' resources where they exist (e.g., PG&E has a Customer Insights team) in developing and testing the strategies. The strategy should be consistent across the IOUs, as mentioned in the Energy Efficiency Strategic Plan. A proactive branding strategy will help increase customer and contractor/technician awareness of standards-based installation and maintenance. Marketing focused specifically on customers will help increase demand for these services; results of the Customer Decision-Making Study can be used to inform effective marketing messages. Contractors and technicians may also be more likely to recall branding that is distinguishable from "good" maintenance and installation.	IOUs and CPUC	Accepted	The IOUs agree that the use of the term "quality" in the ACCA standards makes it difficult for technicians and homeowners to recognize any difference between regular work and standards based work. ACCA should consider this and explore renaming the standards. PG&E has restructured and renamed HVAC maintenance program offerings to bring our offerings into better alignment with statewide efforts. In the 2013 – 2014 cycle the programs were named Commercial Quality Maintenance and AirCare Plus with the former run through the Core program channel and the latter run through the Third Party channel. Beginning next year, these separate programs will be renamed 'Gold' and 'Silver' and merged under PG&E's Core program. By moving the Silver (formerly AirCare Plus) from the Third Party delivery channel and combining this one-time maintenance package with the long-term Gold plan, the customer is presented a choice and the contractor is given greater flexibility to enroll participants. SCE has increased efforts in RQI to brand the program as an ENERGY STAR program, based on ACCA Standard 5. The SCE CQM, CQR, and Early Retirement programs have been marketed under the umbrella of "HVAC Optimization" as an uniquely holistic and technically comprehensive set of energy efficiency programs for commercial HVAC systems. In 2013-2014, SDG&E also offered a "platinum" package to further differentiate and provide customers the opportunity to buy in to support deeper maintenance and repair. This should be reinstated as a non-resource activity since no savings can be claimed for activities such as major repairs or evacuating and recharging the system to cure restrictions or noncondensables.

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4	27, 43, 67-70	Most technicians play a role in sales and are interested in sales training. The vast majority of technicians reported being responsible for selling new HVAC equipment (89%) or selling maintenance agreements (85%) as part of their job. Overall, 73% of technicians responsible for sales indicated they were interested in sales training. (pp. 67-70). Market actors suggested that customers understand the value of QI/QM better when it is put in terms that are familiar to them, which is often related to quality and comfort. (p. 27) Technicians were least likely to rate "online HVAC course training" as very effective (although the particular source of online training technicians had received is unknown). (p. 43)	Provide sales training to technicians. Making sure that technicians are being offered sales training, in addition to contractors and sales staff, is important because they are often the first point of contact with the customer for selling new equipment or maintenance agreements. Sales training should teach contractors, technicians, and sales staff how to speak to customers about sales in a language that customers will understand (e.g., downtime = revenue loss, using analogies such as car maintenance to discuss HVAC maintenance). If the training is provided via webinar, as in the past, effectiveness of the training should be carefully tracked; online training is viewed as least effective by contractors and technicians, and it is unknown if particular sources of online training are viewed as more effective than others.	All IOUs	Accepted	The IOUs agree that there is great value in offering sales training to technicians and appreciate the study findings that show technicians would generally be open to additional sales training. We believe that more effective communication between contractors/ technicians and customers has to begin with a thorough understanding of the value proposition on the part of the contractor. The IOUs currently offer a variety of sales training to program participants. The program offers a variety of in person training, webinars, and recorded webinars for self paced viewing. We note that while we recognize technician sales training could be deepened through better integration with other IOU webinars and self-paced tools, participation of individual technicians in IOU training is at the contractor's discretion. Additonal sales training would support more cohesive contractor sales activities, but should not be mandatory as it would create unnecessary participation barriers by adding significant entry costs to contractor participation.
5	18-19, 21, 23, 26, 88	Both the implementer and market actor interviews emphasized that quality contractors are those who understand and buy in to the value proposition of QI/QM. (pp. 18, 21) In turn, these contractors and the technicians at their firms have the ability to demonstrate the value of QI/QM to customers. One strategy for helping technicians sell QI/QM, identified in the market actor interviews, is to empower technicians so they correctly view their role as crucial in installing/maintaining systems that are energy efficient. (p. 88) Although customers are highly motivated by cost savings, QI/QM contractors are generally unable to compete solely based on price. (p. 19, 23) Given that customers are unsure of the benefit of QI/QM above-and-beyond typical services, it makes sense to approach the sale as "educating" the customer about the additional benefits, rather than trying to sell a service or product. (p. 26) This includes emphasizing the impact that QI/QM will have on reducing equipment failure and increasing energy efficiency, as long as these claims can be substantiated. (see reference to right)	Craft QI and QM training so contractors and technicians are well-versed in the value proposition. While selling to customers on price is important, emphasis on other benefits such as craftsmanship, comfort, reliability, and efficiency is needed. Buy-in from contractors and from technicians is necessary, as they are the ones selling QI and QM to customers, and if they do not believe in the value, it will be difficult at best to convince customers. Strong contractor leadership support will allow room for ongoing feedback and training. Empowering technicians so they correctly view their role as crucial in installing/maintaining systems that are energy efficient is equally important. However, to achieve buy-in from contractors and technicians, it will likely be necessary to show evidence of energy savings achieved by implementing the standards (see Recommendation # 6). Another technique that can be tried is to ask for verbal or written "commitments" by contractors and technicians and to personally involve them in crafting the value proposition that will work for them and their customers.	All IOUs	Accepted	PG&E sales training currently covers the value propositoin of the QM programs and we believe the message is being received by contractors. The IOUs do recognize the barrier when customers are not convinced of that value proposition. For the commercial QM program PG&E plans to pilot an approach that incorporates more direct marketing of the value proposition to the end users. We will discuss the possibility of opening sales training for technicians as well with the implementer, but note that their attendance will be at the discretion of the contractors. The SCE CQM program emphasizes the importance of the HVAC value proposition and strongly encourages avoiding a price-based model to contractors and sales employees. The CQM program is currently evaluating whether existing customer information can be utilized to demonstrate energy savings and case studies are planned that emphasize the value of CQM. The RQI program is implementing several touch points between the program staff and contractor to inform them of the value proposition for RQI and how to incorporate best practice sales strategies. This information is intended to be included in the welcome packet for new participants. Targeted sales training for the RQI program is under development and being considered as an optional class for participants. Potential case studies to show savings scenarios and other value propositions seen by participants can be utilized by contractors.

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6	18, 22, 23	Provide tools such as case studies and data that contractors and technicians can use to demonstrate energy savings and reliability to customers. Because customers' concerns about cost are the primary barrier to selling QI and QM, communicating the value proposition will be much easier if those selling standards-based services can show customers examples of how much other similar customers have saved. Furthermore, if the customers' prior billing data can be accessed, and compared to post-installation or post-maintenance billing data, customers can be provided with tangible feedback of how much they have actually saved. The programs may also be able to use currently available savings estimation tools compiled by the Western HVAC Performance Alliance. This is the kind of information that is needed to transform the marketplace, because evidence of cost effective savings will drive demand among customers. For commercial customers, the Customer Decision-Making Study found that reliability was a common concern. Therefore, reliability should also be emphasized, if evidence of this can be obtained. To convey how reliability is improved by QI and QM, the IOUs could first collect data from participating commercial customers to illustrate "before" and "after" experiences. Another option is for the IOUs and/or program implementers to explore whether any participating contractors keep records on service calls made to commercial customers, and to compare this rate before program participation to after program participation.	Provide tools such as case studies and data that contractors and technicians can use to demonstrate energy savings and reliability to customers. 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The case study documents how the school district was able to take advantage of generous IOU incentives to enroll in a CQM contract. The maintenance was performed for more than 27 school buildings that serve about 30,000 students. The case study describes how the District has saved millions of dollars in HVAC operating costs, money that can now be put toward improved education and facilities. Quotes from the facilities manager provide powerful endorsements of the program and its benefits. The case study also showcases the connection between quality maintenance and adherence to Standard 180. Finally, the case study material provides a synopsis of the program and contact information where potential participants can turn for more detail and enrollment. This case study can now be used to market the programs to other small and medium businesses. In 2016, the IOUs will look to conduct more such case studies. We see an opportunity to utilize AMI data to document energy savings for individual customers during peak hours that will provide customers with high energy usage profiles during peak TOU rates with examples of program benefits. SCE has also made savings estimation tools available to program contractors and the program provides estimates based on work paper calculations. SDG&E agrees that tools such as case studies and energy savings data would be beneficial to contractors and will work with the IOU's to develop reasonable metrics. The concern about savings is that the numbers vary considerably depending on baseline conditions, deferred maintenance and customer practices, but AMI data will support more refined estimates by building type. With AB802, customers will have better access to their AMI data and savings and be able to better monitor results.
7	68, 71	Those who were responsible for selling new equipment and also aware of ACCA 4 were asked what they see as the primary barrier to selling installation services based on the standard. The most common response was that customers do not want to pay extra money for the service (43%). (p. 68) Responses were similar for barriers to selling standards-based maintenance services. Again, technicians frequently cited customers' unwillingness to pay any extra money for standards-based maintenance as the top barrier (cited by 35% of technicians overall). (p. 71)	To help build momentum in the marketplace for QI and QM services, consider pairing Quality Maintenance contracts with financing of new HVAC equipment purchases. Pairing a maintenance contract at the point of purchase, and including that contract in the financing, will help overcome cost barriers while ensuring that new HVAC equipment is properly maintained.	All IOUs	Rejected	SCE has implemented an early retirement program in which a QM contractor can recommend to the customer that their unit be replaced with a more efficient unit. PG&E is in the early stages of assessing the feasability of running a similar program. However, amidst many other program changes, incorporating financing options will need to wait for future efforts.

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8	15	Technicians participating in the programs are usually required to have obtained formal education or certification. (p. 15)	Educate customers about the training/certification requirements for trade allies to participate in the QI and QM programs. This should include information on what these certifications signify. The QI/QM programs already require technicians to hold a certification such as North American Technical Excellence (NATE), HVAC Excellence, Refrigeration Service Engineers Society (RSES), UA STAR, or Building Performance Institute (BPI) in order to participate. Educating customers about these requirements and what they mean will allow them to differentiate QI/QM services from standard practice. In turn, customers may begin to demand contractors/technicians with these credentials.	IOUs and CPUC	Rejected	The IOUs recognizes that customer awareness and understanding of insdustry credentials would help drive the value proposition of HVAC optimization programs and may have the added benefit of holding the broader industry more accountable. Therefore, we support efforts to increase awareness of the benefits of trained and certified techs, much like the automotive industry has created awareness around the ASE certification. However, we note that with limited IOU bandwith and influence, this is a recommendation that we feel is better addressed by industry groups.
9	19, 21	According to the market actor interviewees, strong contractor leadership support of the value of quality installation and/or quality maintenance is essential, because technicians need support from leadership in the form of time for (1) training on QI and QM processes and the value proposition, and (2) completing all necessary steps required for QI and QM implementation. (p. 21) According to implementers, a major barrier to QI and QM programs' success is that most contractors' business models do not include the robust internal processes necessary to consistently perform work to ACCA/ASHRAE standards. (p. 19) All of the third-party implementers and program staff emphasized the essential role QA/QC plays in enforcing standards in the field. (p. 19)	Design and teach ways to build QA/QC into contractors' internal processes. In order for market transformation to occur, sound standards-based practices and QA/QC must occur outside of required program processes. Teaching contractors how to build QA/QC into their ongoing processes will help them sustain quality practices even after the programs end.	All IOUs	Other	Within the QM program we reach out to contractors and help them understand the cost of poor quality service. Specifically, we provide concierge mentoring to select contractors. We provide online training via webinars to all program participants and they can view the recorded webinars at any time, which are posted on the PG&E website. However, though we can communicate the benefits and costs of QI/QM, redesigning more detailed contractor business models is outside the scope of the program and the bandwidth at our disposal. Through the SCE HVAC Optmization newsletter and ongoing mentoring and coaching provided in the SCE RQI, CQM, and CQR programs, best practices are communicated to participating contractors.
10	78, 81	A number of key terms will need to be defined before the MTIs can be operationalized or consistently measured. For example, for MTI HVAC-1a and MTI HVAC-1b, the term "climate appropriate" must be clearly defined and a list of qualifying unit types developed. (p. 78) To measure MTI HVAC-2 and MTI HVAC-3, the IOUs will first need to define what is meant by a "residential contractor" and a "commercial contractor." (p. 81) Furthermore, a strict definition must be assigned to "using the QI guidelines" so that there is no room for misinterpretation. (p. 81)	See detailed Considerations and Recommendations in Chapter 7 of the report.	IOUs and CPUC		

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11	76	Proximate indicators may help measure any market transformation that takes place in the near term. For example, measuring changes in awareness and understanding would be useful to track, as awareness and understanding of the standards are necessary prior to implementing standards-based work. (p. 76)	See detailed Considerations and Recommendations in Chapter 7 of the report.	IOUs and CPUC		