

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 2010-2012 Energy Efficiency Program Cycle. This Appendix contains the Responses to Recommendations in the report:

<p><i>California HVAC Contractor & Technician Behavior Study</i> (2012, EMI, Calmac ID# SCE0323.01)</p>

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 2013-2014 Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan (version 3) 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.

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/cpucFiles/pdaHomeDocs/2/2013-2014_Energy_Efficiency_EMV_Plan.zip (visited on 10/1/14).

² Attachment 7, p.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 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 & Technician Behavior Study Final Report (SCE0323.01); Published September 14, 2012

Program: Residential and Commercial QI and QM Programs

Author: Energy Market Innovations, Inc.

Item #	Page	Findings	Best Practice / Recommendations	Recommendation Recipient	Disposition (Accept, Reject, or Other)	Disposition Notes (e.g. Description of Specific Program Change or Reason for Rejection or Under Further Review)
1	78,82-83	Roughly 40% of contractors reported that they are aware of ACCA and ASHRAE industry standards, and most of those that were aware reported that their companies use the specifications on the job. Specifically, 39% stated they are aware of ACCA 5 (the residential and commercial HVAC installation standard), 45% stated they are aware of ACCA 4 (the residential HVAC maintenance standard), and 45% stated they are aware of ASHRAE/ACCA 180 (the commercial HVAC maintenance standard). Most of those aware of industry standards reported that they adhere to the majority or all of the standard's specifications on a job. Specifically, 83% of those aware of ACCA 5 stated that they adhere to the majority or all of the specifications on a job; reported adherence was 65% for ACCA 4 and 74% for ASHRAE/ACCA 180.	<p>Educate technicians and contractors on the specifics of the ACCA/ASHRAE installation and maintenance standards. Although surveyed contractors reported that standards are often implemented in the field, none of the observed technicians were knowledgeable of ACCA 4, and technicians stated that they did not use it as a guideline in their work. Linking the national industry standards with technicians' knowledge and skill sets may help technicians perceive the performance of high quality maintenance and installation within a larger industry context that could increase technicians' motivation to perform to that level and increase the sense of pride associated with the skills.</p> <p>Utilities: One way to begin to accomplish this is to more actively advertise the ACCA/ASHRAE standards on utility HVAC program websites and through related outreach materials</p> <p>Utilities, Industry Stakeholders: Technician training programs should consider placing more emphasis on the standards and the standards' names, what they represent, the specific tasks and approaches involved, and how to perform the tasks correctly. Encourage contractors to help link technicians' performance with the national standards by incorporating the standards into the expectations and policies set for their technicians. This includes educating technicians on the value proposition of quality maintenance and quality installation.</p>	All IOUs	Accept	The IOUs agree with the need to continue to raise the ACCA/ASHRAE standards and are therefore actively advertising the ASHRAE/ACCA standards. The IOUs also recognize the importance of training. The IOUs are training technicians on ACCA Standards and continue to improve and update training materials on an on-going basis. The IOUs are considering different types of HVAC training (ACCA, ASHRAE/ACCA 180, NATE and IHACI, etc.) to determine if there are better training options. The IOUs have and continue to update their training to provide additional instruction on how to perform maintenance and installation tasks. The training also includes revamping the discussion on the maintenance value proposition. This should facilitate technicians and salesmen who talk to customers about the value of maintenance. For broader reach, it would be ideal to offer these standards-based WE&T courses to the general public through the EECs. But additional WE&T funding for these types of efforts would be needed.
2	78,83	However, none of the technicians observed in a residential setting were knowledgeable of ACCA 4, and technicians stated that they did not use it as a guideline in their work. It is possible that the observed technicians were familiar with the contents of ACCA Standard 4, just not by name, but the technicians' observed maintenance practices did not come close to complying with ACCA Standard 4. While interviews completed for the field observations suggest that technicians may be more knowledgeable than their technical performance scores would suggest, technicians' behavior appeared more dependent on their company's protocols than on their depth of knowledge or ability to execute protocols.	<p>Investigate how industry standards are communicated to technicians and how contractors follow up with technicians to ensure that standards are enacted in the field. Survey results showed that a great majority of contractors aware of the standards reported that most or all of the standard's specifications are used in the field. However, this conflicted with field observation results.</p> <p>CPUC, Utilities: Future research could examine if and how contractors request that their technicians follow the specifications, and whether such contractors have procedures in place to check that their technicians are complying with these requests. This additional research could examine how company policy gets translated into fieldwork, and how contractors ensure that policies are followed.</p>	CPUC/ All IOUs	Other	HVAC training was revamped to provide hands-on training on the standards. Quarterly rooftop side-by-side observations support continued emphasis of industry standards and training of technicians in ACCA specifications. Program training could add a component to the field work to require technicians to explain the processes and attributed impact. Contractor program training could be enhanced to include this component and make it effective within their business model. In addition, IOUs' WE&T efforts should continue to focus on connecting the dots between the Standards and the procedures that they dictate as best practices. The EM&V research currently conducted by EMI should shed light on technician and contractor behavior and may provide insight into the specific issues raised in this recommendation.

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3	78, 83-84	Contractors and technicians do not generally associate “quality maintenance” and “quality installation” with industry standards, nor with utility programs. The most common criteria used to define quality installation was complying with city or state codes. Standards were only mentioned by 2% of respondents asked to define quality installation. However, installation contractors also mentioned specific tasks (correct system sizing, duct sealing) that are part of standards such as ACCA 5. The most common definition for quality maintenance, mentioned by 15% of respondents, included some type of inspections or testing. Contractors also mentioned doing a job the “right way,” mentioned by 12% of survey respondents, and this was echoed in the field observations. Data gathered from the field observations corroborate the finding that quality maintenance is not a concept with a generally agreed-upon meaning. In many cases, the answer to the question indicated that quality maintenance is what the observed technicians had just performed, and non-quality maintenance would be what “other technicians” do.	<p>Determine how “Quality Installation” and “Quality Maintenance” programs should be branded, and what the primary message should be based upon. When asked how they define “quality maintenance” or “quality installation,” very few survey respondents and none of the observed technicians cited a utility program or ACCA/ASHRAE standards, and over half of those who had not participated in utility QI or QM programs were not aware that such programs exist. It is unclear whether the issue is that: ACCA and ASHRAE have been unable to widely establish the names and nicknames of Standards 4, 5, and 180 as “Quality Installation” and “Quality Maintenance”; whether the utility programs based on the standards have not been effectively marketed; or whether the terms may compete with other pre-existing and well established meanings (e.g. maintenance is avoiding failure, quality work is “what we do”).</p> <p>CPUC, Utilities: Investigate whether the terms “quality installation” and “quality maintenance” are terms that technicians can readily differentiate from “good” maintenance, as it is regularly understood. Investigate whether program names could be altered to include references to “standards-based” maintenance or “ACCA/ASHRAE-based” maintenance to more clearly link quality practices with the standards themselves.</p> <p>Industry Stakeholders: Provide insight to the CPUC and utilities as to how best to address the QI and QM branding issue.</p> <p>All Stakeholders: Pursue additional market research with contractors and technicians in order to collect data regarding the fluency with which the utility program names can be linked with standards-based practices, as well as specific data on the effectiveness of the current marketing strategies for these programs.</p>	CPUC/ All IOUs	Accept	<p>The IOUs are open to considering other program branding for its HVAC QM and QI programs, including a renewed emphasis on technical excellence and rescoping to reduce excessive costs such as utility responsibility for enforcing and/or compensating customer responsibilities under Standard 180 Section 4.</p> <p>The IOUs are reviewing the program’s primary message and want to move the industry towards a standard-based HVAC maintenance and installation. The QI and QM programs are in their infancy and the program reach is still relatively small. The current focus of the Programs is increasing the quality of the technician work before scaling up the program. The IOUs, with the support of WHPA staff, are willing to discuss how to address the QI and QM programs’ primary messaging, as well as, open to listening to Industry Stakeholders. The IOUs are also open to additional research on the program messaging but do not currently have the funding for this effort. If the Standards are to be willingly adopted by the workforce they must be mentioned at every opportunity presented by the IOU’s in their WE&T efforts. Connection of the Standards to the “right way” of doing work will take a continuous and serious effort over a long period of time.</p>
4	81, 84	When communicating the benefits of proper HVAC maintenance to customers, technicians often only present basic explanations, as opposed to providing concrete reports of benefits and costs or examples with customer-specific data. Contractors reported that when selling maintenance service to customers, technicians most often provide a “basic explanation of benefits” resulting from proper HVAC maintenance, reported by 70% of contractors whose technicians sell directly to customers. Forty-one percent indicated that technicians are explicit with how maintenance addresses each benefit (e.g., energy savings, electric bills, and indoor air quality). Contractors did not frequently report that technicians write up a service report that addresses benefits and costs (indicated by only 18% of respondents) nor did they frequently report that technicians show the customer data gathered with diagnostic tools to demonstrate how much money they can save (indicated by only 10% of respondents). Field observations found that technicians usually emphasized the “perks,” such as discounts and priority service, rather than the services themselves or the maintenance benefits.	<p>Develop sales and technical training for contractor firm staff. Survey results and field observations revealed that, when selling maintenance services, technicians do not frequently provide concrete evidence of benefits and costs or provide examples using customer-specific data. Furthermore, almost one-third of survey respondents reported a lack of contractor or technician knowledge as barriers to implementing high quality installation services. Survey results indicate that contractors are interested in receiving technical training from utilities, particularly if it is “on-the-job” training.</p> <p>CPUC, Utilities: Research best practices in sales training processes/approaches specific to HVAC services and then synthesize these best practices in a manner useful to contractors, technicians, dispatchers, and salespeople.</p>	CPUC/ All IOUs	Accept	<p>The sales and technical training for contractor firm staff were updated and continued to change to better train sales staff. The IOUs have also received input from the WHPA on how to better train the sales staff. A key component to the SW HVAC Sector Strategy is selling high quality HVAC QI/QM. In this effort there are two supporting opportunities to this recommendation: (1) creating a clearinghouse for EE Sales Training offerings on the WHPA website, and (2) creating a clearinghouse on the WHPA website for Sales estimation tools. Once vetted and approved, the IOUs intend to leverage these resources within the HVAC programs.</p>

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5	82, 84	Contractors are very interested in receiving training from both manufacturers and from utilities. About three-quarters of respondents indicated they were either "interested" or "very interested" in training from these sources. Surveyed contractors overwhelmingly reported that they perceive on-the-job training to be the most effective for teaching quality installation skills. Contractors rated online courses as least effective. Post-observation interviews indicated high levels of technician pride in their training and ongoing education. Observed technicians generally viewed themselves as well-trained, expert professionals, regardless of actual performance.	<p>For training initiatives, carefully consider not just the skills of technicians, but also the goals of the contracting firms and the perceived goals of customers. Companies need to fulfill their monetary goals, and field observations and survey results suggest this is often accomplished by offering low-price and brief-visit maintenance services. Customers may be perceived as interested only in functional equipment with minimal time and financial investments.</p> <p>1. To increase the implementation of ACCA/ASHRAE standards, technicians will likely need to see the goals of quality technical performance as consistent with the goals of their employers and their customers. 2. Contractors and technicians will need to learn to see customers as a heterogeneous group, where some are interested in the more traditional goals of saving money and avoiding failure, but others may be looking for opportunities to optimize energy savings and explore advanced technologies.</p>	All IOUs	Other	The IOUs recognize that this is an issue in the HVAC industry. The IOU training is attempting to train the contractors and technicians on the value proposition of the program and hope that the market transforms. A key component to the SW HVAC Sector Strategy is selling high quality HVAC QI/QM. In this effort there are two supporting opportunities to this recommendation: (1) creating a clearinghouse for EE Sales Training offerings on the WHPA website, and (2) creating a clearinghouse on the WHPA website for Sales estimation tools. Once vetted and approved, the IOUs intend to leverage these resources within the HVAC programs. The efforts are ongoing and it is early in the process. This is a difficult market to transform but the IOUs will continue to update the training to respond to market conditions.
6	79, 84-85	A majority of contractors believe that the primary barrier to implementing high quality installation services is that customers are not willing to pay for it, while almost one-third reported a lack of contractor or technician knowledge. When asked about barriers to implementing high quality installation services, 62% of the contractors indicated that their customers simply did not want to pay for it. Additional barriers included that technicians lack the knowledge of what is necessary (29%) and that contractors/owners lack the knowledge of what is necessary to implement high quality installation (28%).	<p>Develop analysis tools that help persuade customers about quality installation and quality maintenance. Contractors, as well as the technicians that were observed for this study, hold the perception that customers are primarily interested in minimizing costs. Therefore, a way to quantify savings that can be expected from maintenance and installation activities that are performed according to industry standards will help contractors, technicians, and customers to see the benefits of quality maintenance and quality installation. Although quantification of savings may be difficult and perhaps not even possible, it is worth undertaking this effort, because quantifying savings is a key route to justifying programs based on the standards. Quantification of savings will help convince contractors and technicians that quality maintenance and quality installation are compelling products/services to recommend, and quantified savings will provide customers with a compelling reason to implement quality maintenance or quality installation.</p> <p>Explore the feasibility and value of providing stakeholders with easy-to-use energy savings estimating software that would make it possible for technicians, salespeople, contractors, and end-users to determine the approximate energy and monetary savings from quality installation and quality maintenance in specific buildings. One way to do this is to coordinate with stakeholders currently working on closely-related issues outside of the utilities.⁴⁰ In addition, estimates could be developed for savings associated with specific tasks called for by industry standards, and these can then be rolled up to provide a range of savings that can be expected at the customer level.</p>	All IOUs	Other	The IOUs are developing and piloting computational tools for use in other program areas that will help contractors market retrofits based on estimated savings both for the customer and for utility claims. For example, the Advanced Lighting Controls Systems tool will be piloted in 2015. The statewide HVAC team will pay close attention to the successes and challenges of using these tools and will consider similar efforts if they prove cost effective, receive positive reviews from contractors, and are appropriate for HVAC retrofits. Results from the ongoing 2015 CA HVAC QI/QM Customer Decision-Making Study may also inform program design centered on customer behavior and education.
7	85		<p>Undertake a field observation study similar to that conducted for this research that examines the behavior of technicians of contractors that currently participate in utility HVAC programs. The field observations completed for this research observed a limited number of technicians from SCE Program participant companies. One of these three technicians told the research team that "SCE Maintenance" would achieve the same result but would take much longer to complete. A field observation study that focuses on program participating contractors could examine the extent of this sentiment or behavior in the field.</p> <p>CPUC, Utilities: A systematic study of maintenance behavior of technicians from participating contractors could shed light on the circumstances under which technicians and contractors promote the utility HVAC programs.</p>	CPUC/ All IOUs	Accept	SCE is currently leading a SW study that is looking at these study goals (see "HVAC Contractor & Technician Behavior Phase II Study").