Goal 2: Residential Quality Installation Committee
August 17, 2016 Meeting Notes

Call to Order

The meeting was called to order at 10:04 am PDT by Buck Taylor, Chair, Roltay, Inc.

Roll Call

5 of 9 voting members are needed for a quorum. 7 of 9 voting members, 7 non-voting members and 3 guests/staff attended. There were 17 total attendees at this meeting. Bob Sundberg facilitated the online Webex and call conference, recorded the meeting and produced summary meeting notes.

P = present at meeting
A = absent voting member; if proxy has been assigned it will be noted below.

WHPA Goal 2: RQI Committee VOTING Members				Roll Call
ACCA (Air Conditioning Contractors of America)	Wes	Davis	Contractor Association	P
Benningfield Group	Russ	King	Third Party Quality Assurance Provider	P
DNV GL Energy Services (formerly KEMA)	Zachary	Connolly	Energy Efficiency Program Consultant	
Energy Analysis Technologies	Chris	Ganimian	Third Party Quality Assurance Provider	
Mechanical Systems Design & Consulting (MSDC)	Jeff	Henning	Educator, Trainer	P
NCI (National Comfort Institute)	Scott	Johnson	Educator, Trainer	P
Henry Bush Plumbing, Heating and Air Conditioning and Home Energy Solutions (Redlands Plumbing & Heating & AC)	Tyler	Miner	Contractor (Residential)	P
Roltay Inc.	Buck	Taylor (Chair)	Other Stakeholder	P
Superior Air	Larry	Kapigian	Contractor (Residential)	P
WHPA Goal 2: RQI Committee NON-VOTING Members				
Air Conditioning Contractors of America (ACCA)	Glenn	Hourahan	Contractor Association	
Air Conditioning Contractors of America (ACCA)	Donald	Prather	Contractor Association	P
Air Conditioning Contractors of America (ACCA)	Todd	Washam	Contractor Association	
ASHRAE			Engineering Society	
BuildingMetrics	Pete	Jacobs	Energy Efficiency Program Consultant	
Building Performance Institute	Jeremy	O'Brien	Certifying Body	
CEC (California Energy Commission)	Samuel	Lerman	Government	
CEC (California Energy Commission)	Jeff	Miller	Government	
CPUC/ED (California Public Utilities Commission - Energy Division)			California PUC	
Clean Energy Horizons, LLC	Norm	Stone	Energy Efficiency Program Consultant	
Davis Energy Group	David	Springer	Energy Efficiency Organization	
EPA/ENERGY STAR	Chandler	Von Schrader	Government (Other than CPUC)	P
ICF International	Casey	Murphy	Energy Efficiency Program Consultant	P
Misti Bruceri & Associates, LLC	Misti	Bruceri	Energy Efficiency Program Consultant	
PG&E (Pacific Gas and Electric Company)	David	Bates	California IOU	
PG&E (Pacific Gas and Electric Company)	Marshall	Hunt	California IOU	
PG&E (Pacific Gas and Electric Company)	Swapna	Nigalye	California IOU	P

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Quinn-Murphy Consulting LLC	Patrick	Murphy	Educator, Trainer	
Sacramento Municipal Utility District (SMUD)	Ravi	Patel	Publicly Owned Utility	
SDG&E (San Diego Gas & Electric)	Collin	Smith	California IOU	P
SDG&E (San Diego Gas & Electric)	Jeremy	Reefe	California IOU	P
SCE (Southern California Edison)	Lori	Atwater	California IOU	
SCE (Southern California Edison)	Anne Marie	Blankenship	California IOU	
SCE (Southern California Edison)	Scott	Higa	California IOU	
SCE (Southern California Edison)	Steve	Clinton	California IOU	
SCE (Southern California Edison)	Jarred	Ross	California IOU	
SoCalGas (Southern California Gas Company)	Harvey	Bringas	California IOU	P
ZONEFIRST	Richard	Foster	Controls (Manufacturer or Distributor)	
WHPA Goal 2: RQI Committee Pending Candidates				
WHPA Goal 2: RQI Committee NON-VOTING Guests				
Aire Rite Air Conditioning and Refrigeration	Don	Langston	Contractor (Nonresidential)	
Benningfield Group	Lynn	Benningfield		
Building Performance Institute	John	Jones	Certifying Body	
California Public Utilities Commission (CPUC) - Energy Division	Pete	Skala	California PUC	
CDH Energy	Hugh	Henderson	Energy Efficiency Organization	P
CLEAResult (formerly PECI)	Michael	Blazey	Energy Efficiency Program Consultant	
CLEAResult (formerly CSG)	Mike	Withers	Energy Efficiency Program Consultant	
Field Diagnostic Services	Dale	Rossi	Third Party Quality Assurance Provider	
Galawish Consulting	Elsia	Galawish	Energy Efficiency Program Consultant	
ICF International	Ben	Bunker	Energy Efficiency Program Consultant	
Johnson Consulting**	Katherine	Johnson+		
Johnson Controls Inc. (JCI)	Bryan	Rocky	HVAC Manufacturer	
National Comfort Institute	Rob	Falke	Educator, Trainer	
NIST (National Institute of Standards and Technology)	Piotr	Domanski** +		
NIST (National Institute of Standards and Technology)	Vance	Payne**+		
PG&E (Pacific Gas and Electric Company)	Mary	Anderson+	California IOU	
PG&E (Pacific Gas and Electric Company)	Sam	Choe+	California IOU	
PG&E (Pacific Gas and Electric Company)	Robert	Davis	California IOU	
PG&E (Pacific Gas and Electric Company)	Leif	Magnuson	California IOU	
SCE (Southern California Edison)	Joseph "Dario"	Moreno	California IOU	
SCE (Southern California Edison)	Andres	Fergadiotti+	California IOU	
SCE (Southern California Edison)	Sean	Gouw	California IOU	
Tre' Laine Associates	Pepper	Hunziker	Energy Efficiency Program Consultant	P
WHPA Staff				
BBI (Better Buildings Inc.)	Mark	Lowry	WHPA Executive Advisor/BBI COO	
BNB Consulting/WHPA staff support	Bob	Sundberg	Energy Efficiency Program	P

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			Consultant	
Enpowered LLC	Shea	Dibble	WHPA Co-Director	
WHPA emeritus staff	Mark	Cherniack		

*** Organization is Not a Member of the WHPA; + Individual is NOT Registered with the WHPA*
(P) following last name = Member/Registrant is Pending Approval from the WHPA Executive Committee
To avoid repetition, the name of the member organization will not be repeated in the body of the minutes; the individual names of meeting participants will be used.

Approve Minutes of Previous Meeting

July 20 meeting draft notes were distributed August 1. Revisions received were incorporated into the notes. Finalized meeting notes would be posted to the WHPA site under the RQI Committee.

AGENDA

Topic	Discussion Leader	Desired Outcome
Welcome, roll call, previous meeting minutes, new members, candidates and guests, new business topics	Buck Taylor and Bob Sundberg	Produce an accurate record of all attendees, finalize and approve past meeting minutes, welcome new members and guests, identify new business.
Review previous Action items and meeting agenda	Buck Taylor	Resolve older items, determine status of current action items, finalize meeting agenda items.
NEWS: Industry, IOU, Regulator announcements	Buck Taylor and Bob Sundberg	Keep committee members aware of WHPA related subjects and issues
EUC/Home Upgrade/Adv. HU and RQI program coordination update	Collin Smith	Members understand status of program integration; incentive level realignment or other program revisions/plans for revision.
Working Session: review proposed work product and suggestions – Code to Standard 5/9 comparison table	Buck Taylor	Progress on approach to comparison and comparison table.
Set next meeting date, time and tentative agenda items	Buck Taylor and Bob Sundberg	Meetings are normally scheduled the third Wednesday of each month.

Welcome New Members and New Guests; consider new member candidates

- Welcome Eric Brodsky, Aprilaire (Research Products, OEM). He's Director of Technology. His firm manufacturers indoor air quality products including furnace humidifiers. He'd been active on ASHRAE Technical Committees 2.3 & 2.4 and has been Section Chair for air cleaners at AHRI. He had a strong interest in IAQ for commercial as well as residential environments.

Review past Action items

NEW ACTION ITEMS:

July 2016 ACTION: WHPA staff would like to request CEC staff assistance for this committee in locating where at the CEC site a case initiative report could be located which would reveal the cost attributed to a HERS inspection for a new residential system. Samuel Lerman and Jeff Miller were asked for assistance. Ongoing.
STATUS: No response to date.

July ACTION: Jeff Miller, CEC, would help identify other staff members more involved with policy and implementation based on AB 802 and provide the Chair and committee staff with contact information.

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July ACTION: Bob Sundberg, WHPA staff, would locate and provide copies of 1) the WHPA Summary of the CPUC baseline policy proposal document, 2) the AMI Billing Regression Study Report and 3) PG&E's assessment study of three smart meter billing disaggregation products. COMPLETED 7.21.16.

PREVIOUS ACTION ITEMS:
April 2016 ACTION: Lori Atwater, SCE, committed to having the IOU leads provide the RQI Committee members with a summary of the IOUs HVAC ResQI strategy. Ongoing.

April 2016 ACTION: IOU program leads (Lori Atwater/SCE, Swapna Nigalye and Leif Magnuson/PG&E, Collin Smith/SDG&E) would provide committee chair and staff with IOU HU program manager and HU Working Group contact information as well as other key HU representatives (ICF or other implementer staff) going forward. Ongoing.

April 2016 ACTION: Once provided with HU/Advanced HU contact information, Chris Ganimian would contact the HU Working Group co-directors to request attending a future RQI Committee meetings and coordinate RQI Committee members possibly attending HU program related meetings. Pending

New Business

None.

IOU Representative Program and Issue Updates

None.

NEWS – Buck Taylor

1. **Home Upgrade Impact Evaluation studies and reports**

Buck Taylor reminded members about the recent Home Upgrade impact evaluation reports which Bob Sundberg had distributed. These and other program related documents could be accessed at:
http://www.energydataweb.com/cpuc/search.aspx

At the home page – select CPUC Evaluation Project Public Review Site – to go to the Evaluation Studies Document search page. At that page, put the exact text "Home Upgrade" into the search box at the bottom left side of the screen. No login is necessary.

Buck - there was a first study report conducted by DNV GL under EUC Energy Upgrade California which he didn't think showed favorable results regarding costs and results. The second study was an attempt to explore some of the factors which determined those results.

Buck encouraged members and guests to review the documents. The documents included pertinent findings and points which the committee might get into later on.

Staff REMINDER:
There was no new news or details about the HU WG scheduled meeting or contact information. Members were encouraged to keep on top of this and try to connect with HU Working Group members and attend, if possible, to help bridge the program and communications gap between the two programs.

- Home Upgrade Working Group to schedule September meeting.

Home Upgrade Working Group Meeting Courtesy Notice
For those that are interested, mark your calendar for **September 28, 2016** for the next Home Upgrade Working Group meeting. Proposed meeting time is 9:30am-4:00pm. CORE Working Group will attend this meeting in person in Southern California. All are welcome to attend via phone. More meeting details will be posted on the CAEECC calendar page as they become available. This is a not a CAEECC sponsored event.

- Proposed meeting time: 9:30am-4:00pm. CORE Working Group will attend the meeting in person in Southern California. All are welcome to attend by phone. Agenda will be set in early September. More details to come.

2. <u>DOE New Reporting Requirements – serial number tracking</u>

Jeff Henning, MSDC, summarized that the DOE now required manufacturers to store equipment serial numbers for a minimum of four (4) years. He thought that both the manufacturers and installing contractors were required to keep those records.

Buck Taylor provided some background information. There had been some controversy during the Upstream Program development over whether wholesalers/distributers would be required to provide serial number tracking or the high efficiency equipment they received rebates for maintaining inventories locally. Committee members and others were concerned that those Upstream inventory stocking rebates were not tied in any way to any higher level of competent installation. Many, including Buck, believed that it was even more critical that higher efficiency units be provided with more competent installation or tied to an RQI level of installation process. There were also concerns expressed during the program development process that without tracking those high efficiency units, 1) there would be no method for determining whether contractors were gaming the system and 2) there would be no proactive effort to try and insure that units were properly sized, selected into a properly engineered and designed system or even that they followed the permitting/compliance process. There was strong opposition expressed during those planning meetings against such requirements for wholesalers and distributors. Both serial number tracking and tying Upstream rebates to RQI were omitted from being requirements of that program.

Buck indicated that the DOE now required tracking of higher SEER equipment in two of the climate zones, which included California. The DOE, he believed, needed a method for investigating and holding people accountable for trafficking product across state lines and across climate zones to undercut or get around those energy efficiency standards. This was now a federal requirement.

Buck believed that HARDI must have been involved. There had to be some connection to the contractors as well. But, he didn't know what that process would be, how local records could be made available for inspection. Maybe someone would recommend that there should be a central tracking system for the multiple climate zones where records of purchases and installations could be stored. Enforcement requirements might not be stepped up until or unless there was some indication of fraud.

ACHR The NEWS article referred to during the August 17 meeting.
http://www.achrnews.com/articles/132995-new-ac-reporting-rules-coming

DOE Regional Standards Enforcement Procedures, July 14, 2016
http://energy.gov/gc/regional-standards-enforcement
http://www.ecfr.gov/cgi-bin/text-idx?SID=753d31511c08185672832085207406 22&mc=true&node=sg10.3.429_1134.sg0&rgn=div7

ISSUANCE 2016-06-10: Energy Conservation Program: Enforcement of Regional Standards for Central Air Conditioners, Final Rule

http://energy.gov/eere/buildings/downloads/issuance-2016-06-10-energy-conservation-program-enforcement-regional

Chandler von Schrader, EPA/ENERGY STAR, added that he'd read in the ruling that, as of July 1, distributors must maintain records for 4.5 years on sales of each split systems, central AC and single packaged units.

Buck Taylor responded that he'd understood that this requirement was only in effect for the higher SEER units in those two climate zones. A contractor could go over the state line, out of that climate zone, and purchase a unit from a distributor which was not required to keep those records. He didn't this would be a large issue because of the small difference in cost for a slightly higher SEER unit. But, someone might develop a racket out there.

Bob Sundberg, WHPA staff, asked Jeff Henning to locate the link to access the article and a copy of the article to distribute. Buck Taylor agreed to also run down the article.

RQI Work Session – Buck Taylor

2012 RQI Committee Market Barriers White Paper Topics

1. **Program Implementation Barriers** – The current energy savings documented in DEER do not seem to provide an adequate incentive for utilities to sufficiently stimulate the market for the purpose of accelerating adoption of QI and QM. There is a cost required to overcome decades of industry complacency in the areas of training, mentoring, and compelling verification. In the absence of credit for providing the high level of contractor support required, utilities may be able to offer little more than a standard equipment replacement program.
2. **Program Participation Barriers** – Contractors have not adopted standards-based QI in large numbers because there is a significant cost to do so. Contractors must commit to technician training, purchasing instrumentation, lost business to contractors who are not willing to comply with QI standards and/or Title 24, and the risk of failing. Perhaps most importantly though is the fact that customers are not demanding the level of service required by the utilities and have not demonstrated that they are willing to pay for it. Customers are more likely to make purchasing decisions based on price rather than competence.
3. **Code Inconsistencies** – Title 24 needs to better align with industry standards. Much of what Title 24 has tried to do is regulate workarounds that simplify the design and installation process rather than create the provisions for enforcing industry standards.
4. **Verification Barriers** – Assuming that the necessary code improvements are made and an effective enforcement mechanism is created, then better trained HERS raters will be required to verify compliance with industry standards. The current crop of HERS raters have not been trained to the level required to confirm the proper design and commissioning of residential HVAC systems.

Review of Work Product Topics

Buck Taylor said that after reviewing the large number of specific topics from the summary he'd provided the group at the July meeting, what they seemed to all have in common was that they were in some way related to differences between Title 24 installation code requirements and compliance and ACCA Standards 5 & 9 requirements. The differences had great impact on how evaluations were conducted, how energy savings work papers could be proposed as well as how programs were designed and. Because of this, he and Jeff Henning had put together a "strawman" table for code comparison to ACCA Standards 5/9 which he had distributed to the group the previous day. He wanted to determine whether members would agree that developing a detailed comparison was a foundational work product which could lead to many of the other high priority efforts the committee could select from in the future. But, he recalled that the group had only reviewed page one of the topic summary. He thought they should review the rest of the list and discuss any topics of high interest before deciding on their primary work product topic.

Buck summarized the process of developing the topics list over the last couple of months from his ideas and those submitted to him by of other committee members and guest. The committee had discussed options for updating the 2012 barriers white paper, expanding it with issues which had developed since 2012 or to work on a new high priority topic as their primary 2016 work product. Committee work would not address IOU overall strategies or business plans since those were to the CPUC in only a couple of months and there had been CPUC guidance provided regarding potential conflicts of interest. How AB 802 would apply to utility programs, how this option for determining savings with various approaches to disaggregation of HVAC energy use, all had yet to be worked out. He'd thought that working from their list of topics proactively, choosing one primary topic for the remainder of 2016, would be a way that the committee could help the utilities without a need to worry about potential conflicts of interest. The foundational topic that all of the other topics seemed to depend on, in his opinion, was there was a significant difference between code and the national standard process for quality installation and verification. He also believed that one of the key state strategies was to move from Title 24 code based installation requirements to one based on international codes and a national installation standard.

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Buck reviewed two topic groups on page 2 – technical issues and program design and implementation. He hoped that whatever work product they completed would provide the utilities with committee guidance prior to IOUs putting any plans or questions before this committee for review or input. The work product might also be valuable for those outside the California utility programs arena who were discussion the same issues and had the same need for clarity regarding differences between codes and national standards like ACCA Standard 5 and 9. He believed that the IOUs would need to be more proactive to challenge those policy issues because the WHPA was not permitted to since it could not be recognized as a third party which could comment.

Chandler von Schrader wanted to raise a topic related to program design and implementation. The Energy Star Verified Installation (ESVI) program was entering the recruitment phase and was seeking utility sponsors. It could be adopted as a platform on which quality installation programs could begin. He requested adding it as a sub-topic on the summary list as a potential pathway for utilities to consider.

Buck Taylor didn't have any objection since the utilities were involved in re-shaping residential installation programs. PG&E had taken a higher performance approach in their pilot/study. He invited Chandler to provide more details to flesh out how that sort of implementation could work. That would be important for the group and the utilities to hear. His major concern was that the way the programs had been run and evaluated, deemed savings hadn't recognized the savings they were convinced had been delivered. As a result, the programs as they were run had not been considered cost-effective. The way California evaluated and counted the savings was the major issue that needed to be confronted. California counted measures that were required by code for all, 100 % of, past installations disregarding that only a fraction of installations pulled permits or were subject to any level of inspection. And, that didn't even address all of the differences between a code compliant level of savings vs. a standards based installation level of savings. In order to have a meaningful dialogue regarding savings, there needed to be a thorough comparison between code based and standards based installations as a foundation. Where were the overlaps, the voids and gaps and where did one go far beyond the other? Then, there were the Work Order 32 and other studies trying to find out whether or to what degree compliance was really happening.

Completing that overlay comparison was important because, he believed, California was already taking credit for almost everything that the RQI program was doing. The major difference was that the RQI program was taking a performance based approach while codes took a prescriptive one. Presently, the I-codes (international codes) allowed for a performance approach. But, you had to go through all the steps of compliance to show the performance of the building and the shell, code-check software or other compliance pathways. Designing a mechanical system was not was not a simple set of prescriptive rules of thumb. Just because there was a check in a box didn't mean that the task was done correctly. If the load calculation at the beginning of the process was done wrong, everything that followed would be flawed. Recognizing and beefing up that engineering process was critical to having greater confidence in the rest of the process and outcome. Once that pre-engineering was adopted, it would be a lot easier to look into better ways to verify compliance. It was that front end that was missing in every marketplace. Even good contractors made mistakes. The front end engineering needed to be done correctly but there also needed to be a solid verification process, someone looking over their shoulders to avoid shortcuts being taken, a natural byproduct of the pressures of running a business.

Chandler agreed that the new approach wouldn't address the claimed savings issues in California.

Bob Sundberg, WHPA staff, added that he thought they should keep in mind that the IOUs were political entities and had to, somehow, meet the energy savings goals for their entire program portfolio. If RQI wasn't getting recognized for sufficient savings, they needed to seek out other, more cost-effective sources and limit support for RQI. Until how savings was recognized could be confronted and changed, RQI programs would not be substantially expanded and might even be in jeopardy of being eliminated. Raising and tackling that fundamental issue of savings recognition seemed to him to be the critical one this committee needed to focus on proactively.

Donald Prather, ACCA, agreed with Buck's proposal to complete a comparison between codes and standards requirements. The difference was in the pre-engineering and design and then whether the requirements were ever executed correctly, as he'd said. He added that he thought they'd made a mistake by calling the standards "quality installation." It really should have been titled as being minimum requirements for selecting and installing systems correctly. He was convinced that you could show significant savings over code and marginal levels of installation by holding the installer accountable to meet the requirements.

Buck added that it was really a complicated situation. The utilities probably felt constrained by regulators from being able to claim and verify greater RQI program savings. At the same time, the regulators were committed to safe-guarding ratepayer funds, that those funds not be misspent. He strongly recommended that the utilities take better advantage of existing access to meter data prior to knowing how implementation of AB 802 would evolve. They should be conducting their own analysis of the disaggregated data in real time as jobs came into the program as well as on randomly selected homes with AC (statistically, 7 of 10 California homes owned and operated AC according to saturation studies) which were not part of the program to help establish a better measure of current marketplace levels of energy use – the marketplace "baseline" for a more valid comparison.

Jeremy Reefe, SDG&E, thought that Buck's proposal was getting the cart before the horse to start before they had any clear idea for how implementation using meter data would be allowed. He also thought that there were serious issues regarding disaggregating that data and taking into account other major variables like weather normalization and customer behavior. Customer selection of thermostat setpoint would have huge implications for energy use no matter how well or poorly a system ran. They couldn't really determine whether a home was an RQI program participant or a code approved installation from the meter data. He thought they should get the rules for how to implement AB 802 before starting anything, He wasn't sure that meter data would be of any use even though the legislature had passed this bill.

Buck disagreed. He thought that the IOUs needed to know the answer before all the rules got set. The reason was they needed to do those program plans now, not later in 2017. He could appreciate that Jeremy wanted to be cautious. But, he thought that when you were designing a program it really helped to know what could really be accomplished as he'd learned in his years of running EE programs in Connecticut years before. And, the California IOUs were being required to propose their long term programs now. They might not uncover all of the right answers, but if they accumulated and analyzed the data available to them, they'd have a much clearer idea of what could be accomplished from what already had been done. They'd be in a much stronger position in discussions with regulators if they had data that had been analyzed in the context of WO32. The data would either be noise or strongly support RQI delivering a greater degree of savings than was currently recognized or not. They'd have more confidence with whatever they proposed to regulators. If they were analyzing the meter data on a job by job basis, they'd be in the position to know whether the program was going in the right direction or not. The data would help them know whether this was the right direction to be going with their program designing and implementation. And, they didn't need to spend a million dollars to find this out. Before they wrote their 2017 + program plans they should know whether information from meter data could support greater savings or not.

Jeremy Reefe responded that one of the rubs they had at the IOUs was they were being asked to do a lot more with less. Double the savings with half the program resources. Part of the collateral damage in those changes was that program managers like himself had to argue with their management about the great opportunity. But, when they ran the program through the current total resource cost (TRC) calculation, the amount of labor and resource that these programs required was difficult to justify. Jeremy agreed with that opportunity but he expressed his reservations about going out and spending the money pre-emptively before know what the implementation rules would be. He expected this committee to help them define the parameters about how they should measure and disaggregate HVAC load from the rest. There were plenty of expensive consultants offering to do that for them.

Buck Taylor added that he thought they really needed the x-ray machine results which meter data could provide to know the pre and post state of energy use. If billing data agreed with the claimed savings, they'd have a better leg to stand on. If it disagreed and there was site testing which contradicted the meter data, they'd need to look into other options like improper installation, intentional fraud, the modeling projections weren't accurate.

Jeremy Reefe added that their IOU would be looking to this committee for a lot of guidance as they worked on claiming savings below the current code baseline level as well as for units which were not properly installed. He stated that this committee represented industry which was considered the experts. Those guidance documents and white papers which it developed would be the evidence they would stand behind. When it was an IOU engineer proposing evidence or a theory, that always was an uphill battle. But, when industry could provide studies, proof and guidance, that was when he thought they could move the needle.

Jeff Henning, MSDC, qualified Jeremy's comments and reminded the group that many of industries best experts had worked with the CAL Technical Forum the previous two years to propose how accurate and valuable the IEA Annex 36 NIST study findings were and the recommendations made by those experts, which included some of the regulator's own consultants, as a result of the study implications for how to consider energy savings in California. Those industry findings were largely ignored, dismissed and put on the shelf by the regulators which was highly frustrating for those who had put forth so much effort to provide industry based guidance, supported by this committee.

Review of Proposed Code to Standards Comparison Tables

Buck Taylor – what he and Jeff Henning hope to provide for the group was a starting point, a draft, for a comparison on key points between the codes and ACCA Standard 5 requirements. Buck hadn't filled many of the Title 24 entries because they also wanted to provide the specific location in the code document where that element was addressed.

California, "I-Code", ACCA Standard 5, Cross Reference Table

Measure	California Code	2015 I-Code	ACCA Standard 5	Design Process	Design Impact / Comment	QA
Design Conditions	Title 24		Table 1A & 1B, Code/AHJ	Manual J	Affects: Δ-T, Δ-Grains, infiltration, ventilation, duct loads	
Equipment Efficiency Standards	Title 24	IECC R403.7	Code/AHJ	Manual S	Affects: Equipment SHR and dehumidification	
Setback Thermostat	Title 24	IECC R403.1.1	Code/AHJ	Controls	N/A	
Thermostat Balance Point (Heat Pumps)		IECC R403.1.2	Code/AHJ	Manual S / Controls	Affects supplemental heating selection & operation	
Duct R-Value	R-8	IECC R403.3.1 R-8 / R-6	Code/AHJ - Existing Actual	Manual J / S	Affects: duct loads	
Duct Leakage	Title 24	IECC R403.3.4 - 4 cfm/100 sf cond. Space	Sect 5.1 - 10% inside / 6% outside or 50% redux	Manual J / S	Affects: duct loads	
Building Cavities		IECC R403.3.5)/IRC N1103.3.5 Prohibited	Code/AHJ	Manual D	Affects: duct loads (duct leakage), potential for mold and fire	
Air Filtration			Appendix A	Manual D	Affects: Available Static Pressure (fan power, duct sizing and system airflow)	
Airflow - Equipment	Min 350cfm/ton		Sect 4.1: CFM = BTUH / (1.09 x ACF x TD) where TD dependent on SHR	Manual S / D	Affects: Operating SHR, runtime cycling, fan power, duct sizing, duct loads	
Airflow - Registers			Sect 5.2 (+/- 20% or 25 cfm)	Manual T	Affects: Register placement, throw, selection	
External Static Pressure		IRC M1411.2 (min 0.5 i.w.c. or rated w/coil)	Sect 4.1.1	Manual D	Affects: Fan power, duct sizing	
System Fan/Duct Efficacy		N/A	N/A	Manual S / D	Calculated result	
Ventilation		IRC M1507	Sect 3.1, Code/AHJ	Manual J / S	Affects: Design ventilation loads	
Ventilation Fan Efficiency		IECC R403.6.1	Code/AHJ		N/A	
Boiler Temperature Setback		IECC R403.2	Code/AHJ		Affects: may affect flue placement	
Pipe Insulation		IECC R403.4 - R3	Code/AHJ	Manual J	Affects: distribution loads (similar to duct loads)	
Building Leakage		IECC R402.4.1.2 (New)	Manual J	Manual J	Affects: infiltration loads, moisture gains/losses, design SHR	
Equipment Clearances		IRC M1305.1 (extensive)	OEM, Code/AHJ		Affects: available equipment configuration solutions	
Return Air		IRC M1602.2	Sect 4.1.1	Manual D	Affects: SHR, capacity	
Refrigerant Metering Device		N/A	N/A		N/A: May be small changes in operating SHR	
Refrigerant Charge		N/A	Sect 4.3		N/A: May affect capacity	
Matched (Rated) Components			Sect 3.5		Affects: Provides OEM capacity and SHR values needed for sizing and airflow	
System Documentation			Sect 6.1		N/A: Copies of all system design engineering and OEM installation and operation	
Design:						
Load Calculation		IECC R403.7 - Manual S/J	Sect 3.2	Manual J		
Equipment Sizing/Selection		IECC R403.7 - Manual S/J	Sect 3.3	Manual S		
Duct Design		IRC M1601.1 - Manual D and M1601		Manual D		
System Commissioning:						
Combustion Capacity			Sect 4.5			
Airflow - Equipment	Min 350cfm/ton		Sect 4.1 (+/- 15% of design)			
Airflow - Registers			Sect 5.2 (+/- 20% or 25 cfm)			

Some of the ACCA Standard 5 references actually mention Manual J, S or D. Maybe there needed to be another Manual J, D, S column where details could be located. There was much clarification needed. For example, the 350 CFM per ton used in California code as a minimum airflow didn't indicate it that was nominal (rated) tonnage or per ton based on actual demand conditions. The point was to try and isolate elements where they believed savings could be achieved. That could be the result of an enforcement mechanism or other method like educating the marketplace.

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Jeff Henning stated that California had not yet accepted or recognized the I-codes so they were limited to the California building code and Title 24 energy code. He also said that Standard 5 was not an upgrade to code as many stated. There was a commissioning requirement in code but it was really not enforced anywhere. Jeff thought it would be confusing to introduce the I-code detail. Distract from a direct comparison between the Title 24 and ACCA Standard 5 direct comparison. But, he agreed that they needed to be included at some point.

Buck Taylor thought that the I-codes needed to be included because they, along with Standard 5 & 9, included the need for verification of compliance while the California codes did not. Standard 5 indicated the need for supporting documentation to prove compliance. Code did not address that.

Jeff Henning agreed. He offered an example of system commissioning referenced in an appendix of the California mechanical code which was not enforced or approved anywhere.

Buck Taylor agreed. If claims of savings were based on system performance, commissioning was the obvious mechanism for enforcement. Ultimately, California should adopt a requirement for Appendix E which Jeff referred to or adopt Standard 5/9 equivalent language.

Jeff thought that the table proved an excellent point (table above). It indicated that the only performance related element address through California code was the 350 CFM per ton requirement.

The group discussed California code requirements around the refrigerant metering device (TXV) and the need for refrigerant temperature sensors, placement and fault condition indication like a charge status indicator light at the thermostat.

Buck Taylor wanted the group to first get the code referenced accurately and then deal with what degree did they believe it help provide savings.

Jeff Henning had provided Buck Taylor with a starter document which broke out both the California Mechanical Code and California Energy Code (Title 24) to allow individual comparison to ACCA Standard 5. The first table Buck reviewed had combined the two California codes into one.

	A	C	D	E	F	G	H
1	California Code Comparison Table						
2	Measure	California Mechanical Code		California Energy Code		ACCA Standard 5 Quality Installation	
3							
5	Permit	X		X		X	
6	Design conditions			X		X	
7	Minimum Efficiency Equip			X			
8	SetBack Thermostat			X			
9	Load Calculation (Man J)			X		X	
10	Equip Selection (Man S)					X	
11	Duct Sizing (Man D)	X		X		X	
12	AC Clearances	X		X			
13	Fau Termperature Rise			X		X	
14	Duct R Value			X			
15	Duct Leakage Testing			X		X	
16	Air Filtration			X		X	
17	Minimum Air Flow			X		X	
18	Fan Efficancy			X			
19	Ventilation	X		X		X	
20	Return Duct Sizing Min			X		X	
21	Refrigerant Charge			X		X	
22	Equipment Sizing Limits					X	
23	Equipment Perfomance Min/ Max					X	
24	System Testing & Commissioning					X	

The group discussed the references in California code to Manual D for duct design but that there was no requirement to properly use Manual D for system duct design.
Wes Davis, ACCA, clarified that they referred users of ACCA Standard 5 to Manual D but did not make use of it a requirement.

Buck Taylor concurred that there was no requirement for use of Manual D. However, he didn't understand how the ventilation requirements were to be met without it for new duct systems. The ACCA standard did require following existing code. Proper duct design was important because it had a dynamic impact on humidity levels, return airflow, fan watts per CFM and other elements of system performance.

Donald Prather explained that ACCA had decided not to specify Manual D for duct design. But, there was no way to pass the commissioning and other requirements in the standard if you didn't design the ducts right. Standard 5 Appendix A under #13 under duct design did call for ACCA Manual D. The rub was that an appendix was not a required part of the standard. It was considered informative rather than required.

Buck Taylor then indicated that the I-code did address return air. So, he saw the need to definitely revise Standard 5 requirements to include duct design when the standard was next up for review and revision.

Casey Murphy, ICF, pointed out that there was a difference between the allowed duct leakage values for new construction being 10% vs. existing buildings which was 20% or a 50% reduction in leakage.

The group discussion how the table could be improved to bring out some important nuances. The group would need to look at other ACCA and ASHRAE standards which might make additional references to duct design and system performance.

Buck called on attendees to comment on whether producing this detailed comparison was the right thing for the committee to focus on or whether there was something else on their topic list that they should be doing. He thought that someone designing a utility program could pick up this comparison and quickly see important system performance issues which their codes might not adequately address.

Jeff Henning suggested that there might be a need for another document to provide an explanation for what the table provided and how it was intended to be used.

Wes Davis, ACCA, wondered whether the committee needed to address the topics Jeremy Reefe expressed concern about.

Buck Taylor clarified that two different topics had been discussed with Jeremy before he had to leave the meeting. The first was about the table, the informational graphic comparison of codes to standards. The second topic had been about use of existing meter day in advance of the CPUC determination for how AB 802 would be allowed to be implemented. Jeremy had expressed concerns over the usability of that data. Whether it would ever be useable to break out the HVAC portion from the total electrical use from only the building's single meter with enough accuracy to use. The CPUC had previously drawn a line, he believed, at about 10% error. If the error rate was within a certain range considered noise, it couldn't be used for determining whether a program delivered savings or not. Buck thought it was important for the IOUs to determine whether there was a better way to flush out the HVAC portion of electrical use so that meter data, past and present, could be used to determine program energy savings. Then, they could mine all of the past data associated with RQI program participant homes as well as code permitted dwellings and others for general marketplace baseline electrical use. More importantly, he thought they had Work Order 32 processes, the ability to do spot performance pre/post commissioning testing. They could do test in pre-installation commissioning and then perform test-out performance testing after a successful RQI was completed. This could be compared to the meter data. If the meter data over time confirmed the spot test evaluations, you'd be creating a scientific correlation

and the potential for statistically supportable confirmation of an installation which delivered savings. On the other hand, if meter data didn't confirm that commissioning projected savings, you'd need to look at other possible variables which effected performance. Was it that particular job? If this occurred many times, was the program not being implemented effectively? Was it one contractor's jobs which weren't effective? Was there a pattern which could be determined? Program implementers needed to be held more accountable for delivering results for the incentives they were paid. There should be a method for determining whether their work delivered the expected results, the savings. They should be able to tell in less than a year whether each job had a reasonable expectation of delivering the expected savings or not. If not, why not. This would allow utilities to adjust their programs on the fly, iterate and refine program elements and locate variables where they were not getting savings results or those who were not getting expected results rather than wait for the results of a regulator's EM&V study from too small a statistical sample. The utilities could be collecting this valuable data routinely to adjust and improve their programs rather than wait for the evaluation at the end of a program cycle.

Jeremy had argued that he didn't believe their IOU had the tools and the resources or management support to do that. Jeremy hadn't objected to developing the code/standards tables. He'd objected to preemptively addressing meter data.

Bob Sundberg, WHPA staff, reminded the group that with the brief remaining time, Buck had asked for a vote or confirmation about whether the code/standards comparison should be the focus of the committee and their 2016 work product or not.

Wes Davis thought that some work needed to be done to craft that introductory document or explanation of intended use before the next meeting. Maybe a little subcommittee or working team could work together to flesh out the table a bit before the next meeting.

Bob Sundberg agreed with that suggestion for between monthly meeting work. He then had Buck call for a verbal vote of yay or nay on the question regarding the tables being the committee's goal for 2016.

VERBAL VOTE RESULT: seven of nine voting members who were present all voted "aye." There were no nay votes or abstentions. The motion passed. Aye votes were provided by the following organizations:

Buck Taylor volunteered to draft an introductory paragraph which both Jeff Henning and Wes Davis had suggested before the next meeting.

ACTION: Buck Taylor volunteered to draft an explanatory introductory paragraph for the proposed code/standards informative comparison table the committee would develop.

Next Steps/Closing Comments/Adjournment

The next meeting was tentatively set for Wednesday September 21 at 10:00 to 11:30 am PDT - for 1.5-hour. Meetings were normally scheduled for the 3rd Wednesday of each month.

Tentative agenda items for the next meeting would include:

- Review of the information table introductory document which Buck Taylor would draft.
- Further refinement of the codes to standards comparison table

Buck Taylor adjourned the meeting at 11:37 am PDT.

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ACTION Item summary below.

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Summary of Action Items and Key Decisions (from above)

Key Decision: the committee voted that their primary focus for 2016 would be the development of a comprehensive comparison of codes (Title 24 energy code, International Codes) to ACCA Standards 5/9 in the form of an informative table.

ACTION: Buck Taylor volunteered to draft an explanatory introductory paragraph for the proposed code/standards informative comparison table the committee would develop.