



Commercial QI/QM Working Group Gaps Report

Goal 2.3-2.4 Workforce Education & Training Committee

A WHPA Report dated January 15, 2014

Background:

The Western HVAC Performance Alliance (WHPA) is a collaboration of professionals representing the heating, ventilation and air conditioning (HVAC), energy efficiency, facility management, utility industries and government formed in the state of California to support the goals of the California Long-Term Energy Efficiency Strategic Plan (CEESP).

The CEESP sets four goals for the HVAC sector. They are:

- **Goal 1:** Consistent and effective compliance, enforcement, and verification of applicable building and appliance standards.
- **Goal 2:** Quality HVAC installation and maintenance becomes the norm. The marketplace understands and values the performance benefits of quality installation and maintenance.
- **Goal 3:** Building industry design and construction practices that fully integrate building performance to reduce cooling and heating loads.
- **Goal 4:** Develop new hot/dry climate HVAC technologies (equipment and controls, including system diagnostics) and greatly accelerate their marketplace penetration.

Commercial QI/QM Working Group:

Much of the significant and detailed work of the Performance Alliance is accomplished through its subject matter-focused Committees as well as functional Working Groups aligned with the CEESP. The Workforce Education & Training Subcommittee (WE&T)¹ is responsible for addressing two supporting goals:

- **Strategy 2.3:** Develop and provide expanded Quality Installation (QI)/Quality Maintenance (QM) Training for contractors, technicians, and sales agents. Conduct comprehensive training needs assessments to identify industry skill gaps between expanded training programs.
- **Strategy 2.4:** Develop and implement comprehensive contractor accreditation programs. (Requested to be assigned to another group on 5/17/11, no further action taken)

To help address these two goals, the Commercial QI/QM Working Group was launched in September 2011. The group met for one month to identify gaps between the Commercial QI/QM education and training needs of the HVAC workforce and the industry's current education and training practices. The working group also worked to identify actionable recommendations to address those gaps. The Working Group reconvened once in October 2013 and also communicated through email to refine the report recommendations following feedback from the parent WE&T Committee. This report summarizes the Commercial QI/QM Working Group findings and is organized into four sections each addressing the key questions that the Commercial QI/QM Working Group was charged with answering:

- **Question 1:** Where are we today with regard to WE&T Commercial QI/QM?
- **Question 2:** Where do we need to be with Net Zero Energy by 2020?
- **Question 3:** What or where are the gaps between where we are today and where we need to be in 2020?
- **Question 4:** How can we fill those gaps?

¹ All subcommittees were renamed committees in the April 2013 updated WHPA Charter.

Committee Chair:

- Tom Morton, Chair, PIPE Trust Fund

Committee Members:

- Chris Compton, Scribe, HVACRedu.net
- Chris Ruch, Final Air Balance Co., Inc.
- Daniel Jones, Honeywell ECC
- Lorene Flaming, Consultant
- Mark Lowry, RSES
- Mark Paavola, Sacramento Valley SMW JATC
- Pepper Hunziker, Tre'Laine Associates
- Ron Mitchell, SMACNA Bay Area
- Randy Young, SMW 104 JATC

Question 1: Where are we today with regard to WE&T Commercial QI/QM?

- The contractors and technicians working in the HVAC industry have a very broad spectrum of skills, but **only a few are highly skilled and qualified to perform quality performance work.**
- There is a **lack of continuity and coordination in building design, construction, installation, maintenance, and service.** Often the service technician, who comes in at the end after design and installation, is being asked to “fix” an HVAC system that was never designed or installed to perform at peak levels.
- Most **buildings do not have a baseline measurement of current HVAC performance** to compare against for the impact of efficiency improvements. Without this baseline, building owners and managers do not know what energy improvements need to be made.

Question 2: Where do we need to be with Net Zero Energy by 2020?

- All workers need to **understand quality workmanship** in building performance. This includes workers pouring concrete, framing, insulating, ducting, piping, doing HVAC start up, etc. All aspects of a building need to be taken into consideration when building an efficient building.
- All commercial buildings need to be **evaluated for their energy performance levels and upgraded** in order to achieve Quality Installation Net Zero Energy.
- Buildings must be **maintained and serviced according to best practices for Quality Maintenance** to maintain building peak performance.
- Buildings’ **energy performance will need to be measured using standardized criteria** throughout the service and maintenance cycle.
- **Quality diagnostic tools** must be used properly in order to gather accurate measurement data on building air flow, water flow, amperages, watt usage, etc.
- The building performance program needs to have some **enforcement capabilities** to drive building owners to get the needed work done and to force workers to perform quality work.

Question 3: What or where are the gaps between where we are today and where we need to be in 2020?

- New HVACR **technicians need a career preparation education and training program** that provides consistent training.
- There is a **lack of continuity and coordination in building design, construction, installation, maintenance, and service.** Often the service technician, who comes in at the end after design

and installation, is being asked to “fix” an HVAC system that was never designed or installed to perform at peak levels.

- There are sufficient continuing education and training programs available for HVAC installers and technicians, but **they do not avail themselves to learn what they need** in order to do quality workmanship.
- High quality industry certifications, as identified in the WHPA Certification Working Group Report, **are voluntary programs**, not required.

Question 4: How can we fill those gaps?

- **Change the mindset of the industry and the public** about the importance of quality workmanship and energy efficiency. A higher standard or higher level of workforce capabilities needs to be established through adequate training. Focus on **workforce education and training about building energy performance strategies and requirements** from the engineering design phase, through the construction, installation, inspection, maintenance, and service levels of the workforce so everybody is addressing the same set of guidelines in a cohesive manner.
- **One flow chart or chain through sequenced steps of design, construction, installation, inspection, maintenance, and service** (with sign offs at each step) needs to be established in order to get all the players working together to achieve the best system performance. There needs to be an inspection of feedback loop built into the sequence in order to hold all parties accountable throughout the process. This standard procedure goes beyond meeting building codes, and raises the bar to a higher level of building performance. (For example, we need to have our technicians trained enough to identify possible application, design, and/or sizing issues at time of install or reviewing a set of plans. We want our technicians to be savvy enough to say that it doesn't look right with this design and to catch any problems before the start-up person gets there. The start-up technician is the quality assurance person. He/She should be the one that catches anything that was missed by the engineers, architects, or the installing technicians.)
- Establish **design teams that get the contractor and the operating personnel for the equipment involved at the front end**. Try to get away from the cycle of focusing on who is to blame, and get to the cycle of designing correctly up front with the input of people who know how to optimize energy usage.
- **Establish protocols for how to measure current energy performance and how to measure energy improvements after work is done**, in order to provide a clearer picture of energy savings. Involve EM&V contractors in this process to ensure all stakeholders are measuring savings in a credible manner. One option would be to establish a rate schedule, based on characteristics such as building zone or hours of operation, that can be used to estimate energy savings relatively quickly, assuming there is a good benchmark of the baseline energy usage.
- When a **new building** is commissioned, there needs to be a **test start-up assessment** of the building. If the building does not meet Net Zero Energy standards upon start-up or commissioning, the design/construction contractors need to fix it.
- As recommended in a study out of the University of California, Berkeley,² there needs to be a **ladder that skilled workers who enter the construction trades can climb**, with different certifications required at each level. Wages would be tied to achieving the certifications of each level, providing workers with an incentive to invest in their on-going education.
 - This approach will be more successful if customers are educated enough to ask for tradesmen with those certifications.

² “California Workforce Education & Training Needs Assessment.” Donald Vial Center On Employment In The Green Economy Institute for Research on Labor and Employment, University of California, Berkeley. 2011.

- **Establish forms of leverage** to incent quality workmanship and technician certifications, such as the following:
 - Contractors should be properly licensed for the scope of work they are performing.
 - The State should require relevant certifications as a contractor licensing requirement.
 - The State should require technicians to hold relevant certifications.
 - Contractor license and technician certification requirements must be mandated and enforced—not voluntary compliance.
 - Utility companies should require relevant technician certifications for incentive eligibility.
 - There should be incentives in place for customers who utilize technicians and contractors with the required certifications.
 - The State should mandate that building owners ensure the technician(s) doing HVAC work are qualified and performing the work in compliance with applicable codes and standards.
 - Equipment manufacturers should require certifications for installation and warranty work.



WHPA Work Product Summary

DATE: December 2, 2013

INITIATING BODY: Goal 2.3 & 2.4 WHPA Workforce Education and Training Committee – Commercial QI/QM Working Group

WORK PRODUCT NAME: Goal 2.3 & 2.4 WHPA Commercial QI/QM Working Group Gaps Report dated November 22, 2013

TYPE OF ACTION REQUESTED: **VOTE** **GUIDANCE** **OTHER:**

APPROVAL HISTORY

WORKING GROUP: Goal 2.3&2.4 Residential QI/QM

BY CONSENSUS **BY VOTE**

TALLY: Unanimous "Aye", no "Nay" or "Abstain" to escalate to the WHPA WE&T Committee.

DATE: November 22, 2013

COMMITTEE: Goal 2.3&2.4 Workforce Education and Training

BY CONSENSUS **BY VOTE**

TALLY: 12 "Aye", 0"Nay", 0"Abstain" to escalate to the WHPA Executive Committee.

DATE: December 2, 2013

WORK PRODUCT OBJECTIVES: To help address CEESP Goals 2.3&2.4, the Commercial QI/QM Working Group was formed to identify gaps between the Commercial QI/QM education and training needs of the HVAC workforce and the industry's current education and training practices. The working group also worked to identify actionable recommendations to address those gaps. The result is the Western HVAC Performance Alliance Working Group Gaps Report that this Action Request summarizes. Briefly, the Working Group's findings are organized into four sections addressing the key questions the Working Group was charged with answering:

Question 1: Where are we today with regard to WE&T Commercial QI/QM?

Question 2: Where do we need to be with Zero Net Energy (ZNE) by 2030?

Question 3: What or where are the gaps between where we are today and where we need to be in 2030?

Question 4: How can we fill those gaps?

The primary Gaps identified included

- 1) no consistent HVACR technician career preparation education and training program;
- 2) lack of continuity and coordination in building design, construction, installation, maintenance, and service;
- 3) lack of HVAC installer and technician pursuit of needed education to do quality workmanship; and
- 4) high quality voluntary industry certifications instead of required ones.

CA ENERGY EFFICIENCY PLAN STRATEGIC GOAL ALIGNMENT:

GOAL 1 GOAL 2 GOAL 3 GOAL 4

CEESP HVAC GOAL STRATEGIES: CEESP Goal 2: Quality HVAC installation and maintenance becomes the norm. The marketplace understands and values the performance benefits of quality installation and maintenance.

- Strategy 2.3: Develop and provide expanded Quality Installation/Quality Maintenance Training for contractors, technicians, and sales agents. Conduct comprehensive training needs assessments to identify industry skill gaps between expanded training programs.

- Strategy 2.4: Develop and implement comprehensive contractor accreditation programs. (Requested to be assigned to another group on 5/17/11, no further action taken)

BENEFITS: This work product developed within the WHPA addressing Workforce Education & Training “Commercial QI/QM” will help inform the HVAC Sector Strategy project. The recommendations would improve energy efficiency by changing the mind-set of the industry and the public about the importance of quality workmanship and energy efficiency, including focus on workforce education and training about building energy performance strategies and requirements throughout all process phases. One flow chart or chain through sequenced steps of design, construction, installation, inspection, maintenance, and service would encourage all players to work together to achieve the best system performance. Correct up front designing would occur through the establishment of design teams that get the contractor and the operating personnel for the equipment involved at the front end. Protocols for how to measure current energy performance and energy improvements after work is done would be established to provide a clearer picture of energy savings. ZNE standards compliance would be improved through a test start-up assessment when a new building is commissioned. Forms of leverage would be established to incent quality workmanship and technician certifications to further ensure compliance.

OUTSTANDING ISSUES / DEBATES / MINORITY VIEWS: After rework at the Working Group level, the WE&T Committee unanimously approved escalation of the Residential QI/QM Gaps Report to the WHPA Executive Committee as indicated in the following detailed roll call vote:

AYE (x12): AHRI, ASHRAE, BPI, CalCERTS, CEC, Honeywell ECC (by Proxy), HVAC Excellence, HVACRedu.net, JCEEP, PIPE Trust Fund, RSES, UA

There were zero NAY and ABSTAIN votes.

POTENTIAL AUDIENCE: Goal 2.3&2.3 WHPA Workforce Education & Training (WE&T) Committee, WHPA Executive Committee, Statewide IOU WE&T Team, HVAC Commercial Sector Strategy Committee, WHPA member distributors and manufacturers.

VOTING DECISION: WHPA Executive Committee

5-Part Motion presented by Erik Emblem (JCEEP):

1. That the "Commercial QI/QM Gaps Report" dated November 22, 2013 be "Validated" by the Executive Committee.
2. That the EC Action Request Summary be retitled "WHPA Work Product Summary," that it be completed by staff, and that it be joined to the aforementioned "Commercial QI/QM Working Group Gaps Report" to become a single document.
3. That the word "Proposed" on the above referenced report's cover page be replaced by the words "A WHPA Report"
4. That the single document described in #2 above be posted at the WHPA website on: (a) the homepage in the "WHPA Work Products" section, and (b) WE&T Committee page listed under "Working Group Reports"
5. That WHPA Staff draft a letter of appreciation from the Executive Committee to members of the Commercial QI/QM Group and email it to them.

VOTE TALLY: During the WHPA Executive Committee Vote on January 15, 2014, ACCA, AHRI, ASHRAE, CPUC, HARDI, IHACI, JCEEP, RSES, voted aye. There were no opposed. PG&E, SCE and SDG&E abstained. The motion carried.

FURTHER ACTIONS REQUIRED: Per the accepted motion, WHPA Staff retitled the EC Action Request Summary to "WHPA Work Product Summary" and added the two page document as the cover pages to the following Commercial QI/QM Working Group Gaps Report dated December 2, 2013. This single document will be posted at the WHPA website on: (a) the homepage in the "WHPA Work Products" section, and (b) the WE&T Committee page listed under "Working Group Reports". Additionally, WHPA Staff will draft and send a letter of appreciation from the Executive Committee to members of the Commercial QI/QM Working Group.

NEXT STEPS: Note: WHPA Staff reported that all five WE&T Working Group Gap Reports were forwarded to the statewide WE&T team prior to the January 15, 2014 WHPA Executive Committee meeting.