



# Certification Working Group Gaps Report

**Goal 2.3-2.4 Workforce Education & Training Committee**

**A WHPA Report dated January 15, 2014**

## **Background:**

Heating, ventilation and air conditioning (HVAC) is the single largest contributor to utility demand during the summer season. Residential and small commercial HVAC systems represent up to 30 percent of peak load demand in summer months with the residential sector consuming one-third of California's overall electricity and natural gas consumption. To curb energy consumption and demand, reduce greenhouse gases, and delay the construction of new power plants, the California Public Utilities Commission (CPUC) adopted the "Big, Bold Energy Efficiency Strategies", established in D.07-10-032 and D.07-12-051, as the basis for the California Long-Term Energy Efficiency Strategic Plan (CLTEESP)<sup>1</sup>.

The CLTEESP 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.

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 CLTEESP Goals. In support of Goal 2 above, this report describes perceived weaknesses and gaps in California's HVAC technical workforce certification processes that WHPA members have identified and offers recommendations to improve them.

## **The Need for a Topical Working Group:**

According to the California Workforce Education and Training Needs Assessment, impediments to CPUC's goals include the high incidence of poor quality HVAC installation.<sup>2</sup> This issue is most dramatic in the residential sector where studies have reported that 30 to 50 percent of new installations and up to 85 percent of replacement systems are installed incorrectly<sup>3</sup>. Poor installation techniques that include improperly sized equipment and ductwork, air duct leakage, and refrigerant line pressure drops have profound negative effects on the equipment operation and efficiency. Improper installation and/or poor maintenance may cancel out the benefits of high air conditioner SEER rating or high furnace efficiency, depriving consumers of any added value from their investment in HVAC improvements.

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<sup>1</sup> Electronic reference from Western HVAC Performance Alliance. Received August 9, 2013, from <http://www.performancealliance.org/LinkClick.aspx?fileticket=1-UsjbOJ6tQ%3d&tabid=257>

<sup>2</sup> Donald Vial Center on Employment in the Green Economy (2011). California Workforce Education and Training Needs Assessment: For Energy Efficiency, Distributed Generation and Demand Response: University of California Berkeley.

<sup>3</sup> Messenger, M. (2008). Strategic Plan to Reduce the Energy Impact of Air Conditioners. California Energy Commission Staff Report. CEC-400-2008-010. P.31

A challenge to the California HVAC workforce from the CPUC is to transition to a "Certified" workforce by 2020 and improve the quality of its work in order to reduce energy consumption. The CPUC takes this position, stating in the January 2011 update of the Strategic Plan that "The HVAC industry has struggled to provide qualified technicians and market conditions rarely value quality installation and maintenance (QI/QM). Less than 10 percent of HVAC systems obtain legally required pre-installation local building permits and 30-50 percent of new central air conditioning systems are not being properly installed. As a result, Californians pay a large price for the lack of quality installation and maintenance, with commensurate poor performance."<sup>4</sup>

The HVAC industry clearly needs to participate in identifying and managing the training and knowledge-based certification rates of its workforce that promote energy efficiency. Only then can the industry self-regulate and increase the number of highly qualified certified HVACR technicians.

**Table 1.**

Estimated Employment and Projected Growth for SOC 49-9021 to 2018				
Occupation	Estimated Employment	Estimated Growth	Percentage Growth	Numeric Change
Heating, air conditioning, and refrigeration mechanics and installers	19,900	23,100	+16%	3,200

According to the California Employment Development Department (EDD), 19,900 heating, air conditioning, and refrigeration technicians and installers were employed in the state of California in 2008<sup>5</sup>, as indicated in Table 1. This sizable workforce is expected to grow substantially in response to market demands. The size and growth of this workforce underscore the impact on both energy and employment that the quality of its training and certification will have.

**Objectives and Membership of the Goal 2.3 & 2.4 Certification Working Group:**

Much of the significant and detailed work of the WHPA is accomplished through its subject matter-focused Committees as well as functional Working Groups (WGs) aligned with the CLTEESP and the CLTEESP HVAC Action Plan<sup>6</sup>. The HVAC Quality Installation/Quality Maintenance Committee generally supports Goal 2, described above. Its Workforce Education & Training Subcommittee (WE&T – now a Committee)<sup>7</sup>, is responsible for addressing two supporting goals from the Action Plan:

- **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.

<sup>4</sup> California Energy Efficiency Strategic Plan, January 2011 Update, P. 53

<sup>5</sup> Electronic reference from Employment Development Department, State of California. Retrieved November 17, 2011, from <http://www.labormarketinfo.edd.ca.gov/OccGuides/Summary.aspx?Soccode=499021>

<sup>6</sup> HVAC Action Plan, Electronic reference from Western HVAC Performance Alliance. Retrieved August 9, 2013 from [http://performancealliance.org/Portals/4/Documents/HVAC%20AP%20June%202011\\_FINAL.pdf](http://performancealliance.org/Portals/4/Documents/HVAC%20AP%20June%202011_FINAL.pdf)

<sup>7</sup> All subcommittees were renamed committees in the April 2013 updated WHPA Charter.

- **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)

The WE&T Subcommittee constituted this Certification Working Group "...to evaluate the existing HVAC QI/QM certifications and identify any gaps in the current certifications as well as gaps in certifications looking out to 2020 and zero net energy<sup>8</sup>". Those gaps and recommendations from the WG on how to fill them are the subject of this report, whose primary audience is the WE&T Task 2 Committee. Because the CPUC is focused on *installer* and *technician* certifications, the scope of this report is limited to personnel certifications that are portable, personal, stackable credentials not tied to the company or organization employing the individual.

To reframe the objective of the Working group as a driving question: What are the gaps between where our HVAC workforce is today and where it needs to be by 2020 and how can we remove those gaps? Briefly, the gaps that the Working Group identified were:

- **Gap 1** - No Career Lattice for the HVACR industry
- **Gap 2** - No Statewide Technician Certification Database
- **Gap 3** - Lack of contractor support for technicians' certification
- **Gap 4** - Shortage of Certified HVACR Instructors
- **Gap 5** - Shortage of Accredited HVACR Instructional Programs

The gaps described in detail and solutions recommended by the Working Group are presented below:

Members of the Working Group involved in the development of this report included:

**Working Group Chair:**

- Gary Andis, NEMI

**Working Group Members and Contributors:**

- Emily Rogers and Charles McCrudden, ACCA
- Warren Lupson, AHRI
- Jim Scarborough, ASHRAE
- Tiger Adolf, BPI
- Chris Ruch, Final Air Balance
- Steven Allen, Green Mechanical
- Tom Tebbe, Howard Weiss and Jerry Weiss, HVAC Excellence
- Chris Compton, HVACRedu.net
- Susie Evans, IHACI
- Jeff Taylor, It's About Q
- Erik Emblem, JCEEP (*Chair of parent WE&T Committee*)
- Darrow Soares, Mt. San Antonio College (*prior Working Group Chair*)
- Don Frendberg and Denny Smith, NATE
- Rob Falke and Scott Johnson, NCI
- Tom Morton, PIPE Trust Fund

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<sup>8</sup> As stated by the Chair of the parent WHPA Goal 2.3&2.4 WE&T Committee

- Mark Lowry and Patrick Murphy, RSES
- Don Tanaka, SoCal Pipe Trades
- Jim Page, TABB (ITI)
- Pepper Hunziker, Tre'Laine Associates
- Robert Mowris, Verified, Inc.
- Dale Gustavson/Dave Van Holde/Wendy Worrell, WHPA Staff (*primarily formatting*)

**Findings and Recommendations of the Goal 2.3 & 2.4 Certification Working Group:**

**Gap 1: No Career Lattice for the HVACR industry**

- A career lattice for the HVACR industry should be established identifying milestones via competency based professional certification and criteria for maintaining those credentials.

**Recommendations:**

- **Residential and commercial panels.** Convene two panels (Residential & Commercial) to identify common competencies to be certified by all Certification bodies offering professional personnel certifications to California's HVAC technicians in the residential and commercial sectors.
- **Representation on panels.** The panels will consist of one individual from each of the organizations listed below:

NATE	NEBB
HVAC Excellence	TABB
RSES	BPI
UA	Green Mechanical Council
ASHRAE	AHRI
AABC	IFMA
AEE	NCI

The Panel should consist of knowledgeable and experienced individuals from each of the personnel certification agencies with a neutral moderator not engaged with the certification agencies.

- **Panel functions and authority.** The panel will identify the minimum core competencies for the various tiers of the lattice for the Progressive Levels of Certification or stackable credentials that allow technicians to identify their knowledge and skill level at each stage of their career, and understand the next step necessary for career level advancement. The panel may also identify minimum exam requirements (e.g., written exams, field practical exams, virtual reality exams) and minimum certification maintenance and recertification requirements (e.g. continuing education, recertification time frame, re-examination requirements) commonly required and considered sufficient.
- **Interim approval of certification body.** The list of personnel Certification Bodies listed above shall be conditionally approved as authorized Certification Providers if they meet the eligibility requirements (if any) established by this committee within 12 months of the date said requirements may be established.

## **Gap 2: No Statewide Technician Certification Database**

- No central system exists that counts the number of HVAC technicians holding competency-based personnel certifications duplicated by multiple organizations. Nor is there a central location to verify an individual's certification status.

### **Recommendations:**

- **Annual certification reporting.** Personnel Certification bodies will provide the WHPA with an annual report containing the number of currently certified professionals nationally and in California as well as the number of certifications by type in the State of California.
- **On-line certification data.** Personnel Certification bodies will provide links to their certification verification list or verification request forms to ensure up-to-date information is readily obtainable from each certification body.

At this time, the following organizations provide links where verification of individual certification can be obtained, as these links may be updated from time-to-time. The personnel certification bodies will provide link updates to the appropriate entity (to be identified) and WHPA as necessary.

Examples:

- HVAC Excellence <http://www.hvacexcellence.org/Verification/Login.aspx>
- NATE [http://www.natetesting.com/NATE\\_Lookup.htm](http://www.natetesting.com/NATE_Lookup.htm)
- BPI [http://www.bpi.org/individual\\_locator.aspx](http://www.bpi.org/individual_locator.aspx)
- UA Star  
<https://nationalitc.net/map/stateCerts.html;jsessionid=E423ED29DE119B416C3FE8CC13AAA0B6>
- NEBB <http://www.nebb.org/directory/professional/>

## **Gap 3: Lack of contractor support for technicians' certifications**

- A large number of contractors are not motivated to require certification of their field technicians.

### **Recommendations:**

- **Utility support for certification.** The investor owned utilities could help establish the higher value and consumer benefits of industry-recognized knowledge-based personnel certifications by promoting such certifications and showcasing them in program, incentive, and rebate promotional collateral. The purpose will be to educate and assist residential and commercial consumers in identifying the benefit of high quality installation and maintenance procedures, while providing them with a resource for verification and listing of contractors that meet these requirements. Consumer awareness of certifications could be established by the following:
  - Utilities could provide and publish on the IOU websites a list containing the names of contractor companies that employ a minimum threshold of certified professionals and the certifications they hold.
  - Utilities could provide resources to HVAC contractors that meet and exceed the minimum established threshold of certified professionals and who provide information on the certifications they hold to perform efficiency assessment, inspection, installation, service, maintenance, commissioning and/or acceptance testing.
  - Customers could receive a financial incentive when they agree to a three-year maintenance contract that is performed by the certified staff of a participating contractor

with personnel certifications aligned to appropriate performance and maintenance standards.

**Gap 4: Shortage of Certified HVACR Instructors**

- Most HVACR instructors and educators are not participating in instructor certification.

Recommendations:

- **Encourage instructors to become certified** in the disciplines that they teach as either a professional technician or as certified subject matter educator.
  - Set a 100% goal that HVAC instructors working within a training program should be certified in the discipline they are teaching.

**Gap 5: Shortage of Accredited HVACR Instructional Programs**

- Many HVACR instructional programs are not accredited.

Recommendations:

- **Encourage program accreditation.** HVACR instructional programs should be encouraged to obtain accreditation.



## WHPA Work Product Summary

**DATE:** October 21, 2013

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**INITIATING BODY:** Goal 2.3 & 2.4 WHPA Workforce Education and Training Committee - Certification Working Group

**WORK PRODUCT NAME:** Goal 2.3 & 2.4 WHPA Certification Working Group Gaps Report dated March 27, 2013

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

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### APPROVAL HISTORY

**WORKING GROUP:** Goal 2.3&2.4 Certification

**BY CONSENSUS**     **BY VOTE**

**TALLY:** Unanimous "Aye", no "Nay" or "Abstain" to escalate to the WHPA WE&T Committee. There was post-meeting discussion noted below in the Outstanding Issues section.

**DATE:** March 27, 2013

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**COMMITTEE:** Goal 2.3&2.4 Workforce Education and Training

**BY CONSENSUS**     **BY VOTE**

**TALLY:** 11 "Aye", 1 "Nay", 0 "Abstain" to escalate to the WHPA Executive Committee

**DATE:** September 27, 2013

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**WORK PRODUCT OBJECTIVES:** The Goal 2.3 & 2.4 Certification Working Group’s assigned objective was to “evaluate the existing HVAC QI/QM certifications and identify any gaps in the current certifications as well as gaps in certifications looking out to 2020 and zero net energy.” The scope of this ‘gap analysis’ was limited to HVAC installer and technician certifications, that are portable, personal and “stackable” - credentials not tied to the company or organization employing the individual. The Working Group identified key gaps and made recommendations to close them in the Western HVAC Performance Alliance Goal 2.3 - 2.4 Working Group Gaps Report, that this Action Request summarizes. Briefly, the gaps identified are:

- Gap 1 - No Career Lattice for the HVACR industry
- Gap 2 - No Statewide Technician Certification Database
- Gap 3 - Lack of contractor support for technicians’ certification
- Gap 4 - Shortage of Certified HVACR Instructors
- Gap 5 - Shortage of Accredited HVACR Instructional Programs

**CA ENERGY EFFICIENCY PLAN STRATEGIC GOAL ALIGNMENT:**

GOAL 1     GOAL 2     GOAL 3     GOAL 4

**CEESP HVAC GOAL STRATEGIES:** CLTEESP 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:** The recommendations are expected to improve HVAC system installation and maintenance quality and performance, thus providing energy savings. The report will help inform the HVAC Section Strategy project.

**OUTSTANDING ISSUES / DEBATES / MINORITY VIEWS:**

- After the last Working Group consensus vote on March 27, 2013, a recommendation was made by RSES (Mark Lowry) and HVAC Excellence (Jerry Weiss) related to “Gap 5 – Shortage of accredited HVACR Instructional Programs” to include the word “programmatic” as shown, “HVACR instructional programs should be encouraged to obtain programmatic accreditation.” WHPA Staff recommended not to use this term as it may be exclusive. The topic was also discussed during the WE&T Committee vote. The decision was to leave the existing language as "accreditation".
- Following the March 27, 2013 Working Group vote, WHPA Staff clarified factual corrections in the background and overview information regarding language in the HVAC Action Plan that was carried over from the initial report draft under the original Working Group Chair. The content was presented to and approved by the WE&T Committee following consultation with the Working Group.
- During the consensus vote at the WE&T Committee level to escalate the report to the WHPA Executive WHPA WE&T Cert Gaps Report

Committee, there was one "nay" vote from the following 12 voting members present: AHRI, BPI, Honeywell ECC, HVAC Excellence, IHACI, IAPMO, JCEEP, NCI, NEMI, PIPE Trust Fund, SMW104, UA. The rest of the voting members all voted "aye". There were no abstentions.

**POTENTIAL AUDIENCE:** WHPA Goal 2.3&2.3 Workforce Education & Training (WE&T) Committee, WHPA Executive Committee, Statewide IOU WE&T Team, HVAC Sector Strategy Steering Working Group (not yet formed), WHPA member distributors and manufacturers.

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**VOTING DECISION:** WHPA Executive Committee

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

1. That the "Certification Working Group Gaps Report" dated March 27, 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 "Certification 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 Certification Working 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, SDG&E voted aye. PG&E opposed. SCE 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 Certification Working Group Gaps Report dated March 27, 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 a letter of appreciation from the Executive Committee to members of the Certifications Working Group and email it to them.

**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.