

# WE&T Barriers to and Solutions for the Adoption of Whole Building Design

## Summary

Identification of barriers in Workforce Education and Training, credentials, and licensing to the adoption of whole building design from the perspective of 1) state/ local governments; 2) contractors/ technicians; and 3) educators. Solutions are recommended.

**Finalized:** April 9<sup>th</sup>, 2014

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## Use of this document

*This document provides WE&T barriers and solutions for the adoption of Whole Building design. It is based on an official [WHPA Work Product](#) from April 9<sup>th</sup>, 2014 titled “HVAC in Whole Building Performance Education Industry Roadmap.” This Work Product was developed by the WHPA HVAC in Whole Building Education Committee.*

*This document, and also the WHPA Work Product, may be used in part or whole at no charge. Attribution to the Western HVAC Performance Alliance is requested.*

*We would also ask that you inform the WHPA through [info@performancealliance.org](mailto:info@performancealliance.org) if you have made use of either document, so that we can inform and encourage the hundreds of volunteers who donate their time to providing expert HVAC advice in order to support energy efficiency objectives.*

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## Background

The Western HVAC Performance Alliance (“WHPA”) Whole Building Education Committee focused on identifying barriers preventing the adoption of whole building design from the perspective of three different stakeholder groups: 1) state and local governments; 2) contractors and technicians; and 3) educators.

Each of the barriers identified under these groups are paired with recommended solutions that the Committee strongly believes are required to foster an environment where whole building design can succeed.

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## WE&T barriers and solutions for the adoption of Whole Building design

### STATE AND LOCAL GOVERNMENT

1. **BARRIER: Insufficient involvement by the Contractors State Licensing Board (CSLB),<sup>1</sup> California State Legislature and state energy agencies to ensure that energy and whole building design is adequately addressed in contractor licensing requirements, and that minimum workforce competencies for technicians are established within the HVAC trade. (Title 24 is not a training guide *per se*, but provides the framework to define the necessary competencies to develop training.)**

#### SOLUTIONS:

- a. **The WHPA Executive Committee should lead an effort to establish a statewide industry consortium.** The purpose of this consortium will be to discuss the tier-level competencies developed by this Committee and discuss how these competencies can be appropriately addressed at all levels of the California educational system and to identify budget requirements to implement integrated whole building design education.
- b. **The WHPA Executive Committee should explicitly approve a list of industry-valued credentials** based on the attached WHPA Credentials List<sup>2</sup> spreadsheet. These credentials should be posted on the WHPA website and kept current to maintain their relevance.

2. **BARRIER: Lack of statewide building official competency.**

#### SOLUTIONS:

- a. **The WHPA Executive Committee should establish a Committee or Working Group that is tasked with developing an intensive HVAC Mechanical Inspector Whole Building Training program for building officials.** This Committee/Working Group should be chaired by CALBO and/or International Association of Plumbing and Mechanical Officials (IAPMO) and shall consist of members representing the CEC, national licensing/credentialing organizations, trade unions, code development and training organizations statewide, and nationally as appropriate. The course will be developed for applicability across the 537 code authorities in California.

#### END USER AND CONSUMER BEHAVIOR

*Recognizing that consumer behavior is not within the scope of what this Committee intended to address, consumers have a significant influence on whether or not an integrated Whole Building Design education can be successful. Without consumers demanding such an approach from the design/build industry, contractors and technicians will not seek to achieve the education and credentials required to achieve California's energy vision.*

**BARRIER:** *Difficulty in creating customer (owner, builder, developer, investor, tenant) interest to invest in energy efficiency and the related comfort improvements that result.*

**SOLUTION:** *The WHPA Executive Committee should reconvene the Marketing Committee and leverage its member resources to develop and release a coordinated customer awareness campaign that addresses HVAC energy and non-energy benefits (e.g. comfort/productivity, health and safety), code compliance and the benefit of Whole Building approaches. A separate campaign focused on contracting companies should also be launched in parallel with the consumer campaign. The contractor-focused campaign should showcase successful companies who have implemented high performance HVAC systems as part of a whole building retrofit. The WHPA website can be used as a repository where Whole Building information and tools can be stored and an online forum created where contractors and consumers can discuss their experiences.*

- b. Once the Mechanical Inspector Whole Building Training is developed, the WHPA Executive Committee should:
- i. Initiate outreach efforts with Community College Districts throughout the State that have existing construction and specialty trade-related educational and training programs to ensure that they are aware of this training program and then work with them to integrate as much of this training as possible into their existing programs.
  - ii. Initiate dialog between Public Educational Institutions and Private Industry Education and Training and Credentialing Providers to discuss pathways towards building an integrated tier-level competency model into their existing educational and training programs.

It is imperative that the new and next generation inspectors understand the importance of effective enforcement of the energy codes. New and next generation inspectors must demonstrate the industry knowledge, skills and abilities to ensure code enforcement activities.

#### **ADDITIONAL RESOURCES:**

- Bay Area Regional Energy Network (BayREN) for possible details around codes as they have codes and standards curriculum and education systems offered in the Bay area.
- Sheet Metal Workers (SMWIA) or Joint Committee on Energy and Environmental Policy JCEEP for understanding of technician applicable codes
- Cal SMACNA for education on building code changes and Standards updates through Chapter sponsored programs.
- Codes, Standards and Regulations programs to leverage existing Title 24 and other training currently offered for building Departments and inspectors

#### ***CONTRACTOR / TECHNICAL WORKFORCE***

3. **BARRIER: Contractor's lack knowledge of building performance principles.** Contractors need to be well versed in building performance and fully understand all aspects of the principles of building science, and the whole-building relationship of HVAC, Envelope, and Building requirements in Title 24 Building Energy Efficiency Standards, California Building Code, California Mechanical Code and California Green Code to the specific work they perform.

**SOLUTION: The WHPA Executive Committee should launch an effort to develop a Title 24 training module and deploy this module by leveraging the many channels that the WHPA membership provides.**

A common program is required to ensure that a consistent message is being delivered to contractors. The existing Title 24 training offered by the IOUs can be utilized and/or modified with existing and new Title 24 comprehensive industry-related Title 24 plus performance training programs. The key is delivering a coordinated program through multiple channels to reach as many contractors as possible. This effort should be closely aligned with the work being done by the Compliance Committee to ensure consistency with their efforts.

4. **BARRIER: There is a general apathy among the existing technician workforce to enhance their career opportunities with credentials.** This apathy is a result of several factors including:
- a. Customer demand for Whole Building Design is low creating minimal business opportunities for the contractor and thus presenting no clear business need to encourage credentialing for their technicians;

- b. Facility managers have low awareness about their building's energy usage and the impact that the HVAC system contributes to this overall usage and thus do not understand how paying for service by a credentialed technician will provide any real benefit to them;
- c. Employers do not encourage their technician workforce to participate in continuing education and/or obtain credentials because pay rates would increase with enhanced knowledge and their business cannot justify these higher salaries and do not understand the real cost to their business in low-quality work or the profit potential for quality workmanship that can be provided by credentialed technicians;
- d. Technicians who are being asked to obtain additional certifications must do so on their own time and do not see the value in doing so without a clear explanation of what they get in return; and
- e. Employers are afraid that employees will take employer provided education to other job opportunities and thus the risk of spending money on training is too great.

#### SOLUTIONS:

- a. **The WHPA Executive Committee should convene a Committee or Working Group to articulate a clear value proposition for HVAC training and credentials.** This value proposition can be integrated into the sales (see Solution for Barrier #5) and communications (see Solution for Barrier #6) efforts as they are implemented. The Whole Building Education Committee can assume the responsibility for developing this value proposition as part of its future efforts if so desired.
- b. **The IOUs should only require licensed contractors who employ credentialed technicians to be allowed to participate in their Calculated, Deemed and Third-Party incentive programs.** These contractors should be required to document an annual continuing education process for their technicians in order to ensure their continued participation in IOU programs. This continuing education process can also be used as a platform to deploy training needs that are documented by other WHPA efforts such as the CQM, FDD and Compliance Committees. These program participation requirements should be consistent statewide and will provide a necessary "carrot" to encourage contractors to employ credentialed technicians. Requiring technicians to achieve and maintain a minimum level of competency will provide a necessary "stick" to ensure that technicians have the appropriate knowledge, skills and abilities to deliver the quality services envisioned by the California Energy Efficiency Strategic Plan.

*"HVAC companies that have successfully expanded their business model to include Building Performance demonstrate a compelling value proposition. They show the benefits of investing in staff skill development through credentialing programs and expanding services to grow the market among existing as well as new customers. Articulating the core value proposition of the HVAC-to-Building Performance model and supporting company success stories comprise the basis for a coordinated "campaign" to promote the integration of whole building performance services. With a well-crafted value proposition and examples, whole building performance supporters can change the conversation within their own networks, and beyond by identifying existing industry communities where this topic is relevant and putting it on their radar." Chris Cone, Efficiency First California*

- c. **The WHPA Executive Committee should launch a WHPA Marketing Committee<sup>3</sup> with the goal of developing and coordinating oversight of a marketing campaign that highlights the importance of licensed contractors and a credentialed workforce.** (See also Solution under Barrier #6 and sidebar titled End User and Customer Behavior.) This campaign should be launched in a coordinated fashion with these other related Recommendations with the purpose of: 1) informing contractors about why it is important to hire credentialed technicians; 2) encouraging technicians to seek professional level certifications by demonstrating a real value proposition to them (see Solution (a) above); and 3) informing consumers about the benefit of hiring contractors who employ a credentialed workforce. This marketing campaign should ultimately seek to celebrate the true professionals in the HVAC industry.

5. **BARRIER: Contractors lack proper education and training on “How to Sell” energy efficiency to their customers.**

**SOLUTION: The WHPA Executive Committee should spearhead an effort to develop education and training on “How to Sell” energy efficiency.** This recommendation is similar to one made by the WE&T Sales Force Working Group and a 2014 goal recently adopted by the Executive Committee to develop sales training and estimation tools warehouses and host a sales trainer teleconference. An interactive approach that brings SMEs who know how to sell energy efficiency to the table to help contractors sell efficiency is a critical piece to making widespread efficiency a reality. These SMEs can provide contractors with an experiential demonstration on how to present an energy efficiency application to their customers and provide contractors with real life solutions rather than talking points. This would allow contractors to feel the difference and increase their understanding of the comfort benefits to the customer. The IOUs can host sales trainings at their Energy Centers.

6. **BARRIER: Service technicians and industry sales/marketing workforce typically do not belong to an “industry group” that would enhance communications.**

**SOLUTION: The WHPA Executive Committee should launch the Marketing Committee with a goal of developing a communication strategy that reaches service technicians and industry sales/marketing workforce with consistent and frequent messages about the importance of energy efficiency and how they specifically impact California’s energy future.** Technicians need to be reached directly through multiple channels including social media. The WHPA should be at the forefront of this messaging strategy and develop a proactive approach to reaching technicians by leveraging the collective horsepower of its more than 200 industry members. Industry organizations need to break down the barriers between organizations and find common goals to ensure they are all addressing their members/customers/individuals that come to the various groups for information with the same content. (See also Solution (c) under Barrier #4.)

7. **BARRIER: Training programs and resources are not always affordable, accessible or promoted to those interested in career development<sup>4</sup>. Additionally, many do not perceive enough value in continuing**

<sup>3</sup> Marketing Committee members should be comprised of a broad cross-section of industry stakeholders including members from the workforce development community in order to gain as much perspective as possible. The Marketing Committee should work in a collaborative manner with all WHPA Committees and Working Groups to ensure that the marketing-related needs for these individual groups are addressed in a comprehensive marketing strategy/plan.

<sup>4</sup> Those interested in career development could include the entry-level workforce – whether currently unemployed or underemployed – and the existing workforce seeking to move up the professional career lattice.

**education to pay for training out of their own pocket. Oftentimes, contracting firms do not compensate technicians for training or for upgrading skills and in some cases may even dock pay for missing work to attend a daytime training class.**

#### **SOLUTIONS:**

- a. **The IOUs should continue to provide workforce development funding and work with industry stakeholders to provide course subsidization and individual scholarships** for workforce development that will enable entry-level and existing workforce to participate in training and credentialing programs at little to no cost to the participant.
- b. **The IOUs should enhance their existing training programs and resources by working closely with industry instructors to provide support for technicians with industry-recognized credentials or those seeking credentials for the first time that indicate competency to prospective employers.** The IOU Energy Centers provide a great opportunity to those seeking to gain or enhance their skills. However, the training offered needs to go farther to build stronger, tested technician competency. The IOUs should use the tier-level competency model that is ultimately produced by this Committee and engage the HVAC industry in an advisory capacity to ensure that their training provides a launch point for entry-level technicians.
- c. **The WHPA Executive Committee should convene a Committee or Working Group to articulate a clear value proposition for HVAC whole-building design and energy efficiency training and credentials.** (See also Solution (a) under Barrier #4.) A true value proposition needs to be established so that technicians understand that there is value in obtaining professional credentials. This value proposition must be effectively communicated to technicians through multiple channels (see also Solution under Barrier #6).
- d. **For entry-level students, programs in California should adhere to curriculum design driven by minimum competencies identified by the Whole Building Education Committee.**

#### ***Educator and Education***

8. **BARRIER: Lack of a statewide forum for HVAC educators to interact and discuss issues related to Whole Building Design and energy efficiency educational and training programs.**

**SOLUTION: The WHPA Executive Committee should lead efforts to develop an authoritative statewide advisory group for HVAC Educational and Training Institutions Providers.** The mission of this advisory group should be to advocate for a common set of workforce competencies, standards of performance for technical skills and abilities, and standard evaluation criteria for educational programs and student performance.

Participants in this advisory group should include representatives from organizations that teach HVAC Industry related subjects, such as: K-12 schools, community colleges, regional occupational and adult education programs, trade schools, private/proprietary schools, pre-apprenticeship training, joint apprenticeship training centers, IOU energy centers, universities, workforce development services, government officials, manufacturers, distributors, building energy service providers, and other interested stakeholders. The participating organizations might be institutionally accredited, programmatically accredited, or offer specialized training that might not necessarily fit the “accreditation model” for education. Once approved by the WHPA Executive Committee, the Whole Building Education Committee can expand the list of invitees.

9. **BARRIER: Lack of involvement by the State educational community in implementation of the California Energy Efficiency Strategic Plan.**

**SOLUTION: The WHPA Executive Committee should initiate a membership campaign to recruit educators into the WHPA and link these new members with relevant Committee activities.** This recruitment effort will bring educators to the table as part of the overall energy efficiency dialog and better engage them in the statewide process. It will also help create channels to disseminate WHPA work product into the State education system and improve the overall level of trade-based education.

**ADDITIONAL RESOURCES:**

The following organizations can be leveraged to assist in this recruiting process and to help disseminate the tier-level competency model developed by this Committee:

- a. The California Community Colleges Chancellor's Office
- b. Building and Construction Trade Department (of AFLCIO) for Multi Craft (MC3) curriculum
- c. County Offices of Education (to assist implementation of HVAC and Whole Building and Design Education Programs in Secondary Education)
- d. State Education Department K-12
- e. Adult Education Superintendent
- f. CalCERTS, Inc.
- g. Joint Journeyman Apprenticeship Training Center (JJATC)
- h. California Workforce Investment Board - Green Collar Jobs Council
- i. Building Performance Institute, Inc.
- j. IHACI
- k. NCI
- l. IOUs

**10. BARRIER: Specific curriculum offered by educational institutions is typically confidential and thus assessing individual curricula is not a viable approach.**

**SOLUTION: Once this Roadmap is approved by the WHPA Executive Committee, the Whole Building Education Committee will focus its efforts on cataloging, evaluating and enhancing competencies for both entry-level and experienced HVAC industry professionals.** Through this effort, the Committee will establish proficiency levels with a scoring system for each HVAC industry professional technical level and establish a common definition for terms such as "HVAC" and "Building Performance". The approach should be to identify competencies rather than assess existing curriculum which is often proprietary and not sharable even in the public school realm. The Committee does not propose creating new competencies, but rather working in a collaborative process to catalog the existing industry competencies that are publically available through resources such as: K-12 STEM Programs, Pre-Apprenticeship and Apprenticeship Programs, and Post-Secondary Associate, 4-Year, Master's Degree Programs, and published professional personnel certification and credentialing JTAs and KSAs. The approach for which those competencies would be identified, indexed and cataloged follows the "stackable" credential model that provides job progression in a career with detailed description of the education, training, work experience and industry recognized credentials that facilitates movement between jobs and leads to wage increases and will support and provide a career lattice as described previously<sup>5</sup> for the HVAC Building Performance workforce. Competencies would be assembled in an ascending order beginning with a solid foundation. As they ascend the ideal index points would be existing industry credentials that could be

<sup>5</sup> IBID, pg. 2, Footnote 2.

achieved based upon the competencies developed. Proficiency levels will be developed based on an existing proficiency model (to be determined) with competencies appropriately adjusted to the proper focus.

11. **BARRIER: The HVAC workforce has a low awareness of available quality training and educational resources and lacks reliable information to differentiate those training resources.**

**SOLUTIONS:**

- a. **The WHPA Executive Committee should actively promote the comprehensive list of training resources that exists at the [www.performancealliance.org](http://www.performancealliance.org) website.** This list should be continually reviewed and updated to ensure accurate information is provided.
- b. **The WHPA Executive Committee should establish a Committee or Working Group to consider an annual benchmarking/scorecard process that identifies those training programs that support the tier-level competency model developed by the Whole Building Education Committee.** Given the fact that this competency model will support the lead up to the 2020 residential ZNE goal, the WHPA can take a leadership role and act as an independent resource to identify training programs that support California's energy efficiency mission. This scorecard process will prove valuable to HVAC industry technical professionals who are considering training resources.

**Additional Information**

*While not directly included in the Barriers and Solutions above, there is some additional overarching information to consider when evaluating this Roadmap.*

*The [2011 report from the Donald Vial Center for Employment](#) in the Green Economy at the University of California, Berkeley, provides a detailed look across the entire HVAC industry workforce employment sector at the education and training needs that will be required to support California's public policy goals for energy efficiency and the environment. The importance of a competent workforce was also emphasized when the CPUC established a statewide energy efficiency WE&T stakeholder group to address workforce issues and goals related to its own Energy Efficiency Strategic Plan.*

1. *The UC Berkeley California Workforce Needs Assessment:*  
[http://www.irle.berkeley.edu/vial/publications/ca\\_workforce\\_needs\\_assessment.html](http://www.irle.berkeley.edu/vial/publications/ca_workforce_needs_assessment.html)
2. *The UC Berkeley WE&T Appendix: K12 Inventory:*  
[http://www.irle.berkeley.edu/vial/publications/WET\\_AppendixL\\_K12Inventory.pdf](http://www.irle.berkeley.edu/vial/publications/WET_AppendixL_K12Inventory.pdf)

*The recommendations identified in the [WHPA WE&T Certification Working Group Gaps Report dated January 15, 2014](#) are complimentary to the proposed solutions in this HVAC in Whole Building Performance Education Roadmap.*