

## Summary

This study identifies gaps between the Commercial Quality Installation (QI) and Quality Maintenance (QM) education and training needs of the HVAC workforce and the industry's current education and training practices. It also identifies actionable recommendations to address those gaps.

**Finalized:** January 15, 2014

---

## Use of this Document

*This document identifies training and education gaps for the commercial HVAC workforce and provides recommendations.*

*It is based on an official [WHPA Work Product](#) of January 15, 2014, titled “Commercial QI/QM Working Group Gaps Report.” This Work Product was developed by the WHPA Commercial QI/QM Working Group (Workforce Education & Training 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.*

---

# Training and Education Gaps and Recommendations – Commercial HVAC

## Table of Contents

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

## Background

The Commercial QI/QM Working Group of the Western HVAC Performance Alliance was launched in September 2011 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 and to identify actionable recommendations to address those gaps. This report summarizes the Commercial QI/QM Working Group's 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?**

- 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 who 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

## Training and Education Gaps and Recommendations – Commercial HVAC



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,\* 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.

\*"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.