

# Strategically and Effectively Building a Green Workforce

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## ABSTRACT

California has taken the position that workforce training and education is fundamental to “fueling our future with energy efficiency.” The state has laid out a strategy for an energy efficient economy, and the key role for training and education efforts. Investor-owned utilities (IOU)-funded workforce education and training (WE&T) in California includes both training incumbent workers, and building the next generation of workers through primary and secondary educational institutions from grade school to higher education.

This paper and oral presentation discuss: (1) our approach to measuring the effectiveness of training and education combining traditional survey methods and the use of instructional design assessment practices, (2) some outcomes of this measurement, and (3) suggestions for how to align similar training efforts with learning needs and statewide strategic goals that call for building an energy efficiency workforce positioned to help achieve long-term energy saving goals.

## Introduction

California has taken the position that workforce training and education is fundamental to “fueling our future with energy efficiency.” The state has laid out a strategy for an energy efficient economy, and the key role for training and education efforts. IOU-funded workforce education and training in California includes both training workers and building the next generation of workers through primary and secondary educational institutions from grade school to higher education. This paper focuses on the education and training efforts for existing workers through seven different IOU-sponsored Energy Training Centers.

The Energy Training Centers facilitate workforce education and training to achieve energy savings and demand reductions through the delivery of courses. The courses contribute to California’s Long Term Energy Efficiency Strategic Plan (Strategic Plan) and address some of the needs identified in California’s Workforce Needs Assessment Report (Needs Assessment). The Strategic Plan vision for workforce education and training is that: “[b]y 2020, California’s workforce will be trained and engaged to provide the human capital necessary to achieve California’s economic energy efficiency and demand side management potential.”<sup>1</sup>

California’s Strategic Plan was followed by a Needs Assessment that asked the Energy Training Centers to consider several recommendations<sup>2</sup>, including supporting sector-strategies, expanding collaborations, modifying course structures, and targeting disadvantaged users. In

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<sup>1</sup> California Long Term Energy Efficiency Strategic Plan, September 2008, p. 75

<sup>2</sup> Note that these are taken directly from the Executive Summary of the Needs Assessment report.

addition, the Needs Assessment asked the Centers to begin evaluating workforce outcomes from its courses and to develop and update curriculum to reflect new technologies and practices. Evaluating workforce outcomes is a relatively new concept for the energy efficiency industry. Our research suggests that evaluating course-based training requires an assessment of both workforce outcomes and an assessment of whether the educational content and teaching methods align with educational “best practices” to produce the desired outcome. This paper discusses both: (1) our assessment of the effectiveness of the existing training and education combining both traditional research methods and instructional design assessment practices, and (2) how to align utility training efforts with workforce advancement and learning to build an energy efficiency workforce to help achieve long-term energy saving goals.

*Notably, the data presented throughout this report is part of an evaluation that is still in progress at the time of this paper submittal. New or updated data will likely be presented at the Summer Study.*

## **Combining Traditional Survey Methods with Instructional Design Assessment Methods**

In our assessment of the Energy Training Centers, we used multiple methods to measure alignment with educational best practices and to measure workforce outcomes. One method involved executing a quantitative online survey of students that attended courses at the Centers to understand what type of worker they are and what kind of career benefit (if any) they realized after receiving the training. We designed the survey to measure both education best practice alignment and workforce outcomes. During the three-week survey, we gathered data from 519 students that attended courses at the Centers between 2009 and 2011.

Another method we used was to review and analyze a sample of course curriculum (including all course materials) as well as to observe course delivery. We conducted the curricula review and observations by measuring against a set of key metrics, otherwise known as “yardsticks.” We consolidated the two sets of criteria into a single instrument that we refer to as a course evaluation “yardstick.” We tailored the yardstick to include metrics that assessed both the Strategic Plan’s goal of contributing to the Energy Training Centers’ goals and the WE&T Needs Assessment findings and recommendations. We then applied the yardstick in analyzing a sample of course materials and observations of courses.

Once the yardsticks are applied, the course curricula receive a score for each metric. For example, consider the “Lesson Design” dimension of the Learning Effectiveness yardstick. This dimension comprises four criteria, as shown in

Table 1 below.

Let us say that the review of a particular set of materials results in: “Yes” on three of these criteria; or “No” on one criterion. That means that materials score 3 (three “yes” answers) out of 4 total possible points on this dimension.

Table 1 shows how the yardstick is used as a scoring system.

**Table 1. Example Scoring for “Lesson Design” Dimension on the Learning Effectiveness Yardstick**

<b>Lesson Design</b>	<b>Score</b>
Lesson content directly supports the learning objectives	YES
Lesson content directly supports related activities	YES
The lessons as a whole employs a variety of media/modes (visual, aural, and kinesthetic)	YES
Each lesson includes estimated time frames for completion	NO
Total Points Scored / Total Possible Points	3/4
Score	75%

## **Measuring the Impact on Workforce Development**

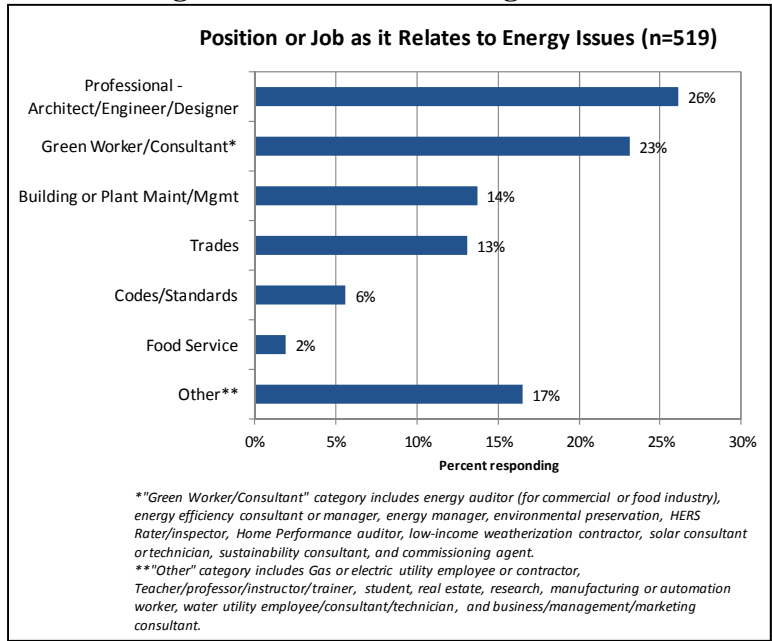
We developed a two-pronged approach to collect data, speaking to metrics that measure whether the Centers are in fact “training and educating a workforce.” When evaluating the effectiveness of these programs, past measurements to assess effectiveness include metrics such as: Satisfaction ratings; Energy efficiency knowledge gained; and Energy Savings (direct or indirect).

Evaluating the programs for whether they were effectively training and educating a workforce requires developing and applying different metrics from those traditionally used in evaluating energy efficiency programs. Past research into skills development for a clean energy economy suggests that education and training for existing workers should provide “mobility, bargaining power, and higher returns in the labor market.”<sup>3</sup> As such, we sought to determine whether the courses were providing workers with information and/or credentials that gave them some career benefit. The career benefit that a worker might receive is largely dependent upon their job and their position. The Centers train a diverse mix of workers from building trade contractors, to codes and standards enforcers, to building management and maintenance personnel. In addition to the sector in which course attendees work, the position of the workers also affects the type of career benefit one might achieve after receiving training. For example, a business owner of a contracting firm might be able to expand the services they offer customers or it might give them a competitive edge in the marketplace. However, a building trade worker might benefit by obtaining new skills that allow them to receive a pay increase or job promotion. The survey design and analysis allowed us to segment the types of workers coming to the Centers for course training (Figure 1 and Figure 2).

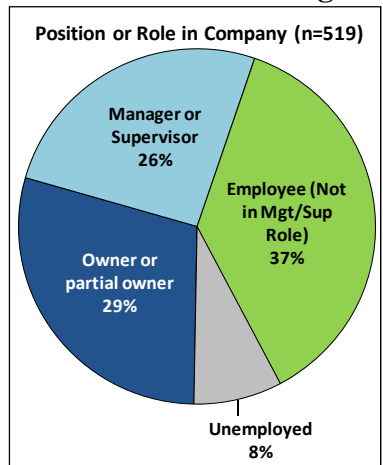
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<sup>3</sup> 2010, W. White, L. Dresser, J. Rogers, “Greener Skills; How Credentials Create Value in the Clean Energy Economy.” Center on Wisconsin Strategy.

**Figure 1. Sectors Attending Centers**

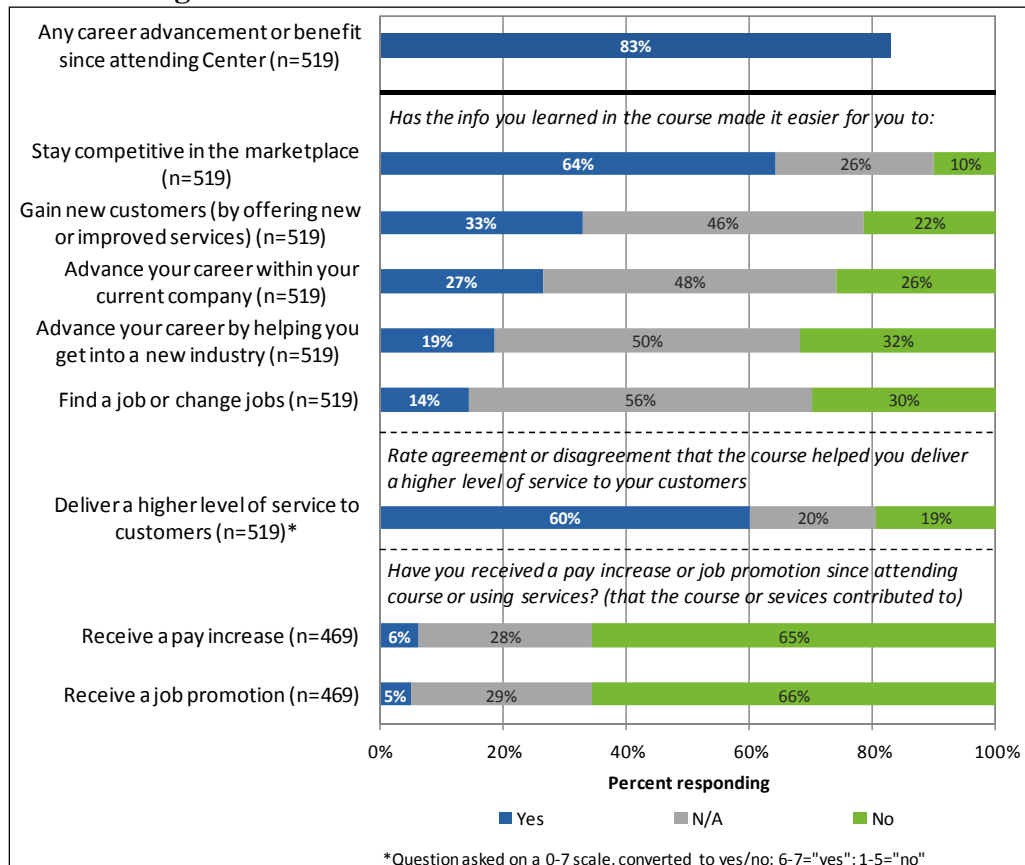


**Figure 2. Job Roles Coming to the Centers**



Given the varying nature of attendees' sectors and roles, we developed and measured multiple indicators to determine whether the Centers were providing a career benefit to the workforce. We collected these data via the course participant survey. This assessment defined career advancement by assessing whether any of the following occurred after attending courses and whether these occurrences were attributable to the Center: (1) Received a pay increase; (2) Received a job promotion; (3) Advanced career within current company; (4) Helped to get into a new industry; (5) Helped gain new customers by offering new or improved services; (6) Helped stay competitive in the marketplace; (7) Helped to find a job or change jobs; or (8) Helped to deliver a higher level of service to customers. Survey findings showed the 83% of Center participants advanced their career or received a career benefit from the Center.

**Figure 3. Career Advancement Outcome Measurement**



In addition, we developed and measured multiple metrics by applying the “yardstick” to a sample of course materials to determine whether the courses were targeted to career-oriented issues. When reviewing course materials, we looked at several factors specific to career-oriented learning focus. Specifically, we looked for evidence that the courses:

- were targeted to a specific job, role, and/or responsibility
- had content and concepts that clearly related to on-the-job responsibilities
- included examples and activities that reflect “real-world” on-the-job requirements
- provided direct support for certification or had a clear relationship to certification
- addressed skill development (Apply learning level or higher)
- are action oriented by including:
  - specific calls to action or specific next steps;
  - development of an individualized action plan;
  - job aids or worksheets to assist in assessing or analyzing options;
  - job aids or checklists to assist in taking action; and/or
  - information on where or how to get assistance in taking action.

The portfolio of courses offered by the Energy Centers reflects a broad spectrum of goals. These include foundational courses designed to introduce basic building system and energy efficiency concepts, operational sessions that focus on steps to increase energy efficiency at

home and on the job, and role-based training targeted toward job-specific skills and knowledge required for various energy-related professions.

Because this evaluation focused on workforce education and training, we targeted our instructional design assessment toward those courses identified by the Energy Centers as relatively high on key dimensions associated with workforce enablement. (A few courses that did not rank high on these dimensions also were included in the review, at the Energy Centers' request to provide a more well rounded view of the overall portfolio.)

**Table 2. Selection Criteria for Courses Targeted for Instructional Design Review**

<b>Dimension</b>	<b>Characteristics to “qualify” for pool</b>
Core Job Responsibility Focus	High or Medium
Certification Support	Direct Support or Clear Relationship
Adherence to Adult Learning Principles	Medium or High
Skill Development Level	Apply, Analyze, Evaluate, or Create

After applying the yardstick to assess sample courses for their learning focus and behavior change, the courses scored high on some dimensions but lower on skill level and action orientation dimensions. We found that lower scores on these dimensions were the product of the Centers' tendency to use the Expert Presenter model of instruction, with limited opportunity, in the context of the training course itself, for participants to use the information being presented.

**Table 3. Learning Focus and Behavior Change**

<b>Dimension</b>	<b>Score</b>
Targeted to a specific job, role and/or responsibility	78%
Content clearly related to on-the-job responsibilities	79%
Real-world examples and activities	86%
Support for certification	
Direct support	13%
Clear relationship	77%
Targeted to "Apply" skill level or higher	25%
Action oriented	26%

In addition to assessing whether the courses were providing career advancement opportunities, we also sought to determine whether there was evidence to suggest that the Centers were helping to train a “workforce” in California. One reality in any business sector is that workers come and go. This happens for many reasons beyond the control of education and training programs, such as the economy, people move to different locations, and health issues. As such, when seeking to train a workforce, education and training programs should focus efforts beyond just the individuals directly touched by the training. Best practices should include targeting supervisors or others who can re-train the workforce. Therefore, we geared survey efforts toward understanding how many of the attendees are in a supervisory or management role within their company (26% self-reported this role). Further, among those in this role, we sought to understand how many were sharing information learned with other employees (91% claimed to have shared information). Finally, among supervisors, we explored whether they thought the course information was easily transferable (81% thought it was).



We also included some metrics within the course material review to assess whether courses were designed to support dissemination so that attendees can help train others/their employees. We looked for whether the course materials showed evidence that the courses:

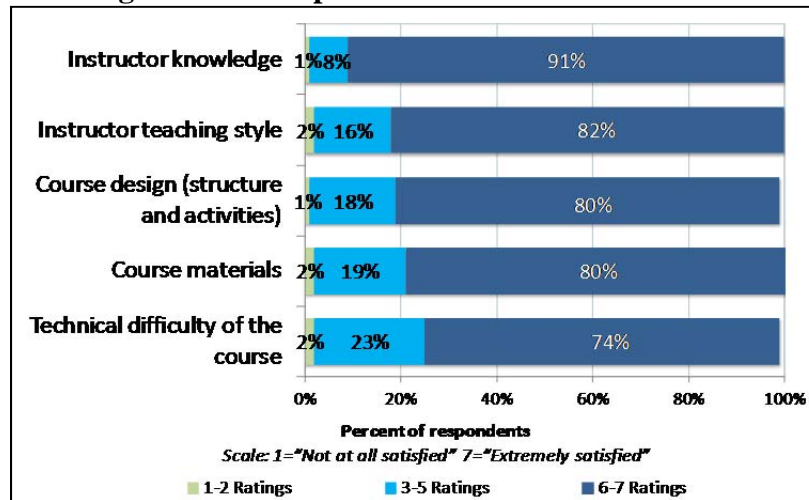
- Included units of instruction appropriate to “in-house” training by supervisors or others to support development of their organization’s workforce
- Provided preparation guidelines and delivery suggestions for the “in house” units of instruction
- Supported a variety of delivery formats such as one-to-one, short (e.g., one- to two-hour) small group “brown bag” sessions, and longer, more formal, “in service” sessions)
- Specified one or more learning objective for each “in house” unit of instruction
- Provided materials to support delivery of specific teaching points that directly support the targeted objective(s)
- Included “go to” activities that directly support the targeted objective(s) (“Go to” activities are structured learning opportunities that the in-house trainer can assign to trainees to provide practice and application of the skills or knowledge addressed in the unit of instruction.)
- Provided appropriate evaluation, coaching, and feedback guidelines for each “go to” activity associated with an “in-house” unit of instruction

After reviewing a sample of courses, we found that none of the courses incorporated any elements designed for dissemination, though a few included job aids and reference materials that could be shared. However, survey data showed that course participants are sharing information in some capacity.

## **Measuring Alignment with Learning Principles and Educational Best Practices**

We also looked at whether Centers’ courses aligned with educational best practices. Again, this evaluation employed a two-pronged approach to assessing this alignment by leveraging both attendee feedback in a survey and an instructional design assessment. We asked attendees to rate their satisfaction with: The course materials; Instructor knowledge; Instructor teaching style; Course design (including the course structure and activities); and The technical difficulty of the course.

**Figure 4. Participant Course Satisfaction Scores**



In addition, the instructional design assessment developed and applied metrics to assess whether the courses aligned with adult learning principles and practices. When reviewing course materials and observing classes, we looked for evidence that the courses:

- Focused on the learners, actively engaging them and gaining their buy-in
- Were designed to help participants be successful throughout the learning experience
- Helped ensure acquisition of skills and knowledge through a variety of interactions, including practice and in-class application
- Reflected lesson plans and content decisions that supported the training goals
- Incorporated some form of assessment to determine whether course participants achieved the targeted objectives
- Were appropriately facilitated by the instructor (applicable only to observed courses)

In general, the courses assessed in this evaluation reflect an Expert Presenter model, rather than a Learning Facilitator approach, which is necessary to accomplish higher-level objectives — developing skills and enabling the learner to apply information on the job in meaningful ways.

- In the Expert Presenter approach, the experience is a passive process of being “educated,” with the focus on the expert:
  - The expert presents wisdom and experience while the learners listen and absorb.
  - The learner’s prior experience is not considered very relevant.
- In a Learning Facilitator approach, the experience is an active process of learning, with the focus on the participants:
  - The facilitator guides the participants’ learning experience, tailoring presentations to participants’ skills and knowledge and providing appropriate coaching and feedback as participants actively engage in the experience.
  - The participants’ prior experience is considered a rich source of information and meaning.

- The participants actively apply new information and concepts and practice the skills associated with on-the-job success.

In previous evaluations conducted for the Energy Centers, we had established performance rating definitions (from “very poor” to “excellent to very good”) for each of the dimensions pertaining to adult learning principles, based on scores for each criterion (“yes” = 1; “no” = 0). A course that meets all the criteria for a dimension scores 100%; a course that meets none of the criteria scores 0% on that dimension. We applied the same rating scheme during this evaluation, summarized in Table 4.

**Table 4. Rating Scheme for Performance on Dimensions for Adult Learning Principles**

Score Range			Interpretation
0%	to	35%	Very Poor
36%	to	55%	Poor
56%	to	70%	Fair
71%	to	85%	Good
86%	to	100%	Excellent to Very Good

The courses we observed did very well (average score 93%) on the Learning Facilitation and Feedback dimension, within the context of an Expert Presenter model. That is, the instructors tended to encourage students’ questions and respond appropriately to their comments. In general, they also ensured all could see and hear the presentation and provided for regular breaks during the session.

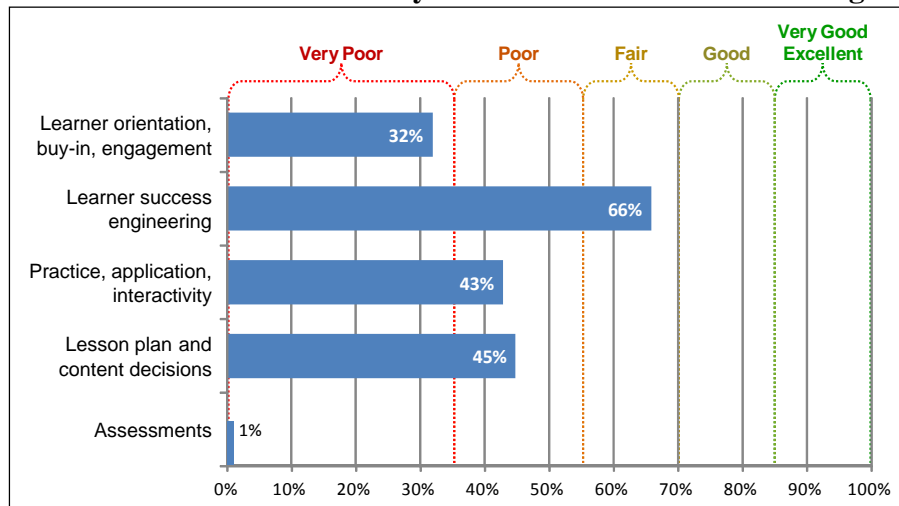
The review of course materials and the observations of class implementations, resulted in relatively consistent poor scores across the other dimensions, as shown in

Figure 5. (This is not always the case. Sometimes a course may be very well designed, but delivered in a manner at odds with the design. Sometimes an excellent facilitator can make a poorly designed course very effective.) The most striking findings relative to the specific criteria include:

- Very few (1%) of the courses had learning objectives that reflected what class participants are expected to be able to do as a result of the training.
- Most of the courses were very “content laden,” with little time for participants to discuss and assimilate the information presented. (Only 27% of the courses were rated as having an appropriate amount of content for the time period, with many courses averaging less than two minutes per information-rich slide.)
- Only about half (52%) of the courses included any type of activity designed to allow participants to check their understanding of information or concepts or practice key skills.
- Very few (1%) of the courses incorporated an assessment that would indicate whether an individual attained the training goals.

As a result, the degree to which most courses affect the participants’ ability to use the information presented in the class in an appropriate and meaningful way is unclear.

**Figure 5. Course Performance on Key Dimensions for Adult Learning Principles**



## **Aligning Utility Training Efforts with Learning Needs and Training a Workforce**

This research found that participant survey feedback and instructional design assessment methods are both critical to evaluating education and training programs for learning effectiveness and goal alignment. This research also produced lessons learned for how to ensure that training efforts are best positioned to both align with educational best practices and with building an energy efficiency workforce positioned to help achieve long-term energy saving goals:

- Ensure that course content, materials and instruction supports taking specific actions that are relevant to a specific job or responsibility.
- Make certain that course content can be easily disseminated or transferred.
- Target education and training efforts to workers in a supervisory or management role to the extent possible; education and training should be made available to all who want or need it regardless of their position. However, targeted marketing to those in supervisory and management roles increases the likelihood that these workers will receive training and in turn extend the reach of the education beyond direct participants.
- Ensure that course content is relevant to knowledge and skills that can advance attendees' careers.
- Ensure that education and training efforts align with adult learning principles.

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