KEMA

2004-2005 Statewide Education, Training and Services Program Evaluation

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Final Report

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1. Executive Summary

This report presents the results from the evaluation of the 2004-2005 California Statewide Education, Training and Services (ETS) Program. The program offers services at several physical energy centers (Centers), provides information to a wide array of market actors, and supports participation in other public goods charge (PGC) programs. Section 3 presents a detailed program description. Findings from this study are presented below.

1.1 Evaluation Results

The utilities appear to have met their overall goals in terms of number of classes offered, classes were well attended and a broad range of courses were offered within each Center. During 2004-2005, the utilities reported that over 1,000 total classes were offered through the statewide effort and the characterization database developed for this evaluation contained detailed information on a total of 981 classes. Over 30,000 attendees attended one or more classes during this timeframe and these participants attended a very broad range of courses, ranging from very general and introductory courses to the specific and "leading edge" topics.

In addition to attendance and satisfaction goals, the Centers are feeling pressure to offer courses that more explicitly lead to direct, demonstrable energy savings. Center staff indicated that they feel pressure both from internal utility portfolio managers and program planners, as well as more generally from policy makers who are looking for new strategies to meet aggressive energy saving goals. This issue was emerging during the 2003 evaluation and appears to be more pressing over time. To maintain or grow offerings at their respective Centers, staff feel it is increasingly important that they be able to demonstrate energy savings resulting from their course offerings. There is significant room for improvement in terms of encouraging these linkages. If future programs are designed to achieve goals beyond quantitative attendance targets and high satisfaction ratings (i.e., direct energy savings, cross-program participation), then the Centers will need to establish goals that are linked to specific measurable indicators of these desired outcomes.

Best Practices in program marketing appear to have been employed – a wide range of participants attended courses in 2004-2005 and, for most attendees, their expectations were completely met. A key evaluation objective involved determining to what extent program marketing messages have successfully conveyed what customers can gain from participation so as to align expectations of targeted market segments. We were limited in our ability to assess this objective due to gaps in the course information we received from the Centers (e.g., incomplete and/or inappropriate marketing materials and course descriptions). Instead, we relied on results from the participant survey to confirm the extent to which expectations (presumably based, at least in part, on the messages conveyed in course marketing

materials) were met. From these results, we found that Best Practices in program appear to have been employed in that participants' expectations are in line with what they reportedly achieved.

Participants continue to learn about Center courses through utility channels, with increasing emphasis on electronic forms of communication. More aggressive efforts should be undertaken to develop effective trade partnerships for increasing and broadening the based on participants in the future. Over time, participants have learned about the Center and its courses from a wide array of sources, most consistently direct contact with the utilities. Our evaluation confirms that more recent marketing and outreach strategies that emphasize electronic communication (v. printed materials) have been effective in reaching participants. To reach out to a new, broader group of participants, the utilities need to more aggressively develop marketing and outreach partnerships with outside organizations.

The evaluation confirms that the Centers offered a broad range of classes offered throughout the year with reasonable frequency. Class size may be an issue for some Centers, depending on the type of course and attendees. There may be a potential imbalance between the number of relatively large classes and the number of small classes offered, especially across different Centers. These differences do not appear to have negatively affected participant opinions – i.e., participants rated the frequency with which specific courses were offered very favorably, and few participants mentioned course (in)frequency as a reason for dissatisfaction. Finally, the courses offered in 2004-2005 represent a fairly diverse set of topics.

The Centers delivered quality courses consistent with Best Practices that were highly valued by attendees. The evaluation results clearly indicate that, overall, participants were satisfied with the quality of the courses they attended and there is strong evidence that Best Practices related to course format, level of detail and course content were being addressed effectively. While there were slight statistical differences across Centers and by course type, it is difficult to use these results to draw meaningful conclusions and actionable recommendations about the relative quality of specific courses. Instead, the utilities should be using the results from post-training course surveys to evaluate course quality and make mid-course corrections to course design as appropriate.

Participants feel their capability to implement energy efficiency projects has improved and about half of participants who attended courses in 2005 have implemented projects as a result of the information they learned at the Centers. Efforts to improve program Best Practices should help in continuing to bring about these desired outcomes. Most participants reported that their awareness, knowledge and ability to implement energy efficiency solutions has improved as a result of attending a course. In addition, about half of all end-use customers (47%) reported that, since attending a course in 2005, they have made an energy efficiency improvement to their facility or end-use equipment that was influenced by the information provided during the course. About 16% of all participants who attended a course in 2005 indicated that they were made aware of and participated in another utility program based

on information they obtained during the course. The evaluation has identified elements of Best Practices (e.g., effective marketing and promotion, appropriate level of detail/content, modified course format, etc.) that are not only linked to high participant satisfaction levels but also linked to achievements in the desired course outcome (e.g., improved awareness, knowledge and behavior). Proactive follow-up activities will also help influence project implementation and program participation rates.

1.2   Recommendations

Table 1-1 presents a concise summary of the key conclusions and recommendations from this evaluation.

Table 1-1
Summary of Evaluation Conclusions and Recommendations

Conclusions	Recommendations
Participants are highly satisfied with the courses offered through the Centers, their expectations are consistently met, and they offer very few suggestions for improvement.	1. Strive toward best practices in adult learning (i.e., emphasize learner objectives, use format appropriate for content, strike appropriate balance between meeting participation goals and need for small class sizes, etc.).
Participants represent a mix of market actors and end-use customers across a range of business sizes.	2. Develop course content that is both current and "ahead of the curve" to expose regular attendees to new, technically-advanced topics.
Participants make key decisions related to project development and implementation.	3. Take full advantage of the training investment that has previously been (and will likely continue to be) provided to active participants – e.g., engage these participants in providing case studies or participant testimonials.
Participants have substantial industry experience and are already very knowledgeable.	
Most participants have already attended several training courses offered at the Centers and are very likely to attend future courses.	4. Promote courses via partnerships with external organizations to increase participation from "first timers."
Most participants continue to be informed about upcoming courses through utility announcements (e.g., direct mail, email, website calendars).	5. Use results of post-training evaluation surveys to identify areas for timely, course-specific improvement.
The Centers continue to deliver high quality and valued courses that are consistent with Best Practices in design and implementation.	6. Increase in-course emphasis on specific implementation actions and improve linkages to other utility programs.
About half of participants who attended courses in 2005 have implemented energy efficiency projects as a result of information learned at the Centers.	7. Increase post-course follow-up activities to increase project implementation / program participation rates.
Courses could be more effective in linking attendees to other utility programs.	
Most Centers offered a fairly comprehensive suite of courses during 2004-2005, but only a few Centers offered courses in some of the newer, emerging areas (i.e., green building/LEED design, PV/renewable energy/DG topics).	8. Ensure future programs include new courses addressing emerging topics. 9. Conduct timely and careful evaluations of new course formats (online tools, onsite workshops).

2.   Introduction

This report presents the draft results from the evaluation of the 2004-2005 California Statewide Education, Training and Services (ETS) Program. The program offers services at several physical energy centers (Centers), provides information to a wide array of market actors, and supports participation in other public goods charge (PGC) programs.

2.1.1   Program Background

The program supports information transfer to two distinct market segments:

- End-use customers, to help them reduce energy consumption, lower operating and maintenance expenses, and improve productivity.

- Other market actors, including architects, engineers, consultants, developers, contractors, distributors, and manufacturers, to influence the specification of energy efficient equipment and the design of energy efficient buildings and processes.

The program uses a variety of means to disseminate information and support other programs. For example, the programs:

- Distribute program promotional materials
- Provide field support for programs
- Offer seminars and workshops
- Develop and maintain educational exhibits, displays and equipment demonstrations
- Participate in trade shows and community events
- Partner with third parties

Statewide collaboration of program activities has allowed for more efficient delivery of consistent energy efficiency messages through sharing course materials, instructors, and advertising and marketing materials.

The specific elements of the program are described briefly below by utility:

- PG&E has two distinct energy centers: the **Pacific Energy Center (PEC)** in San Francisco and the **Energy Training Center (ETC)** in Stockton. The PEC targets commercial end-use customers and the engineering and design community in support of new construction programs. The ETC targets residential low-income weatherization and mid- and upstream residential market actors, including contractors, building inspectors and retailers.

- SCE also has two distinct energy centers: the **Customer Technology Application Center (CTAC)** in Irwindale and the **Agricultural Technology Application Center (AgTAC)** in Visalia. CTAC targets commercial and industrial customer end-uses as well as the design and engineering community. AgTAC primarily targets the agricultural community but also services commercial and industrial customers in the San Joaquin Valley.

- SCG operates the **Energy Resource Center (ERC)** in the City of Downey. The ERC primarily targets the non-residential market sector, but also services residential and new construction market actors (e.g., builders, contractors and developers).

- SDG&E does not currently operate a physical energy center, but in 2004-2005, the utility participated in the Statewide Cross-cutting **Education and Training Program (ETP).** Through the ETP, SDG&E offered education & training classes at various locations throughout its service territory, and also disseminated information via printed brochures and fact sheets, the company's website, and active participation in community events. SDG&E's efforts through ETP primarily targeted residential and hard-to-reach audiences, including low-income customers, seniors and non-English speaking audiences, although all customers had access to the information provided through this program.

During 2004-2005, the ETS program delivered over 1,000 courses statewide reaching more than 30,000 attendees. Section 3 provides an overview of each Center, a description of the types of courses offered 2004-2005, and a characterization of the types of participants who attended courses in 2004-2005.

2.1.2   Evaluation Objectives

This study is intended to provide an evaluation of the 2004-2005 Program and assess its performance and effectiveness at achieving program goals. The specific evaluation objectives are to:

- Objective 1: Determine whether program marketing messages have successfully conveyed what customers can gain from participation so as to align expectations of targeted market segments.

- Objective 2: Evaluate program delivery processes and program effectiveness.

- Objective 3: Determine impact of the energy centers' programs on customer actions.

We designed a study approach that leverages recent work and cost-effectively builds from the success already achieved in determining program effectiveness and energy savings impacts. Our research approach satisfies the relevant CPUC EM&V Policy Manual objectives, as shown in Table 2-1.

Table 2-1
Overview of Approach to Meeting CPUC EM&V Policy Manual Objectives

EM&V Goal	Approach to Addressing EM&V Goal
Measure energy and peak savings[*]	N/A (Because this is an information and education program, this goal is not applicable. We have, however, identified behavioral changes as a result of the program.)
IPMVP Option or justification for not meeting IPMVP	N/A
Measurement (and/or impact)	N/A
Sampling plan, adequacy, non-biased	Sampling plan submitted to CPUC and PAC for review and approval prior to launching telephone survey. See Section 3.5.1 for detailed discussion of sample design.
Analytical method(s) & data sources explained	Sources and analytic approaches for key tasks (i.e., indepth interviews, Best Practices workshop, characterization and categorization analyses, and participant survey analyses) described in relevant sections of this report.
Method for peak demand estimates	N/A
Net-to-gross methodology	N/A (However, attribution will be assessed for select outcomes such as increased awareness, knowledge transfer, self-reported behavioral changes, etc.).
Program cost-effectiveness[*]	N/A
Provide upfront market assessment and baseline analysis	N/A
Provide ongoing feedback and guidance	The project provided an Interim Report in July 2006 (see Appendix B), along with several memos presenting results from the characterization analyses.

2.1.3 Evaluation Approach

Each of the key tasks undertaken in this evaluation is described below:

In-depth interviews with Center directors/staff. The evaluation team conducted in-depth interviews with each of the five Center Directors. The purpose of the interviews was to determine any substantial changes to the Centers since the 2003 evaluation, to obtain contact information and key documents needed for the evaluation, and to discuss several specific issues with the Center Directors. These issues included a discussion of the specific Center goals, identification of major challenges to course design and implementation during 2004-2005, and staff perceptions regarding the least and most successful course offerings. A copy of the Center staff interview guide is included in Appendix A, and findings from these interviews were summarized in an Interim Report (submitted July 2006, see Appendix B).

Best Practices Workshop. In April 2006, the evaluation team conducted a workshop with Center staff on Best Practices in adult education. The workshop, entitled the Technical Trainers Toolbox, was included in the evaluation to demonstrate the lessons learned from the previous evaluation and to provide the tools to implement the recommended changes in future years. Our evaluation objectives for the workshop included identifying and understanding:

- Current teaching practices;

- Perceptions and misperceptions of effective learning; and

- Barriers to using Best Practices at the Centers.

Evaluation staff attended the workshop and used it as an opportunity to better understand center operations and challenges faced by staff.

The Technical Trainers Toolbox workshop was a two day workshop designed to help experienced technical trainers in energy efficiency build skills. The course was designed to help the learners:

- Plan and structure training programs to cover essential content within appropriate timeframes;

- Design interactive participant learning activities that both ensure and demonstrate desired learning; and

- Motivate participants to apply learned techniques and prepare them to effectively address anticipated barriers to implementation.

In the Interim Report, we discussed the Best Practices in design and implementation identified in the 2003 evaluation, covered in the Technical Trainers Toolbox, and identified through secondary research conducted outside of this study. We also discussed 2004-2005 practices at the Centers, perceptions regarding learning, participant barriers to implementing these Best Practices at the Centers, and recommendations for overcoming these barriers. See Section 4.2 below for a discussion of the findings from the Best Practices workshop.

Course Characterization. The purpose of the course characterization was to gain a systematic understanding of the differences in the courses offered across the six Centers. We developed a database of Center offerings that included variables describing key characteristics associated with each course offered during 2004-2005. For example, the characterization database contains information on a total of 456 different courses, many of which were offered more than once. The database also contains information on each attendee – during 2004-2005, over 30,000 participants attended courses offered at the six Centers.

Information contained in the characterization database was analyzed to provide preliminary results for several key attributes, such as:

- Building Type. What is the primary use of the buildings targeted by the course content (e.g., residential, commercial, mixed)?

- New vs. Existing. Is the course information applicable to new construction, existing buildings or both?

- End-use. Is the course designed to address specific end-uses (e.g., HVAC, lighting, building envelope, etc.)?

- Target Audience. Is there a target type of participant for the course (e.g., end users, HVAC contractor, architect, etc.)?

- Codes and Standards. Does the course specifically address updates to building codes and standards (e.g., Title 24)?

- Continuing Education Credits. Has the course been approved for continuing education credits?

In order to populate the characterization database, we obtained information from each of the six Centers about the specific courses offered during 2004 and 2005. We requested any and all information on the courses, including course descriptions, marketing materials, and course materials. For the substantial majority of the courses, we were provided only marketing materials. We also requested and obtained detailed attendance lists for each course offered in 2004-2005. Finally, additional information was provided by Center staff (Directors and other designated staff) as needed to fill in gaps from the course materials and attendance lists.

Preliminary findings from the characterization task were presented in the Interim Report submitted in July 2006. A copy of the Interim Report is included in Appendix B.

Participant Telephone Survey. A telephone survey was conducted in September – October 2006 with a sample of 1,509 participants who attended Center courses in 2005. Our sample was designed to address each of the evaluation objectives discussed above with sufficient response so as to be able to look for meaningful differences across the six Centers as well as across 11 broad categories of course topics (e.g., HVAC, lighting, energy codes and standards, green building/LEED, etc.)[1]. Table 2-2 presents the final sample disposition.

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[1] These course type categories are described in more detail in Section 3.

Table 2-2
Participant Sample Distribution

Course Topic	Center						Final Sample Size	Percent by Course Topic
	AgTAC	CTAC	ETP	ERC	ETC	PEC		
Cooking				66			66	4%
Energy Codes/Standards	15	20		17	20	50	122	8%
General	1	20	6	14	25	15	81	5%
Green Buildings/LEED			3		3	90	96	6%
HVAC	13	40	94	100	14	15	276	18%
Lighting	18	75	38			75	206	14%
Other	8	8	10	10	10	10	56	4%
Other End-Use	20	69	51	90	88	36	354	23%
PV/Renew Energy/DG					42	50	92	6%
Sector Specific	25	16	4	30		5	80	5%
Software/Analysis		6		1		73	80	5%
Final Sample Size	100	254	206	328	202	419	1,509	
Percent by Center	7%	17%	14%	22%	13%	28%		

Column and rows percentages sum to approximately 100%.

The survey was designed to capture information on the following topics:

- *Participant/Business Profile*. Type of business, size of the business, respondent's role in business, years of experience, frequency of attending previous courses, etc.

- *Program Awareness*. Identification of sources of awareness for Center activities, sources for specific course attended, suggestions for increasing awareness for future courses, general sources for information on technology advancements, updated design practices, etc.

- *Course Attributes and Value*. Description of course format (e.g., hands-on, interactive, lecture style), assessment of course attributes (e.g., format, level of detail, instructor, content, etc.), and assessment of course value (e.g., provides new information, networking opportunities, objective/unbiased presentation, etc.)

- *Expectations*. Exploration of reasons for attending course, expected outcomes from attending course, effectiveness of course in meeting expectations, reasons for not meeting expectations

- *Outcomes*. Identification of outcomes attributable to the course, including increased awareness and knowledge, improved confidence, enhanced ability to make recommendations and implement

projects, specific changes implemented at facility and influence of course on decisions (if any), awareness of and   participation in other utility programs

- *Satisfaction*. Evaluation of participant satisfaction with course, reasons for dissatisfaction, likelihood of attending courses in the future, suggestions for improving future courses

A more detailed description of the sampling methodology and survey design is contained in Appendix C, along with a copy of the final participant telephone survey instrument. A full set of cross-tabular survey result reports are included in Appendix D (one set for each Center and one set for all Centers combined).

2.1.4   Organization of this Report

The remaining sections of this report are organized as follows:

- Section 3 contains an overview of each Center, a description of the types of courses offered during 2004-2005, and a profile of the types of participants who attended these courses.

- Section 4 provides our program assessment, focused on the following key evaluation objectives:

  - o   Assessment of program accomplishments relative to goals
  - o   "Best Practices" assessment
  - o   Assessment of program marketing effectiveness
  - o   Assessment of program delivery effectiveness
  - o   Assessment of program outcomes

- Section 5 presents our conclusions and recommendations.

The appendices (Volume II of this report) include:

- Appendix A: Program Staff Indepth Interview Guide
- Appendix B: Interim Evaluation Report (July 2006)
- Appendix C: Participant Telephone Survey Methodology, Questionnaire and Summary Results
- Appendix D: Participant Telephone Survey Cross-tabulations

3. Program Description

As mentioned above, the Statewide ETS Program offers services at several physical energy centers, provides information to a wide array of market actors and end-use customers, and supports participation in other PGC-funded programs. The program supports information transfer to two distinct market segments:

- End-use customers, to help them reduce energy consumption, lower operating and maintenance expenses, and improve productivity.

- Other market actors, including architects, engineers, consultants, developers, contractors, distributors, and manufacturers, to influence the specification of energy efficient equipment and the design of energy efficient buildings and processes.

The program uses a variety of means to disseminate information and support other programs. For example, the programs:

- Distribute program promotional materials

- Provide field support for programs

- Offer seminars and workshops

- Develop and maintain educational exhibits, displays and equipment demonstrations

- Participate in trade shows and community events

- Partner with third parties

Statewide collaboration of program activities has allowed for more efficient delivery of consistent energy efficiency messages through sharing course materials, instructors, and advertising and marketing materials.

Subsequent sections provide an overview of each Center, a brief overview of the Center's plans for 2006-2008, a description of the types of courses offered 2004-2005, and a characterization of the types of participants who attended courses in 2004-2005.

3.1 Overview of Centers

3.1.1 Pacific Energy Center (PEC)

PG&E operates the Pacific Energy Center (PEC), located in San Francisco, CA. The objective of the PEC is to target commercial end-use customers as well as the engineering and design community to promote new construction programs. In particular, the PEC offers seminars, aids practitioners through tool lending programs, and provides assistance with energy savings calculations via calculation software. The Center also informs clients about financial incentives offerings (i.e. utility rebate programs) and develops case studies based on previous program efforts. Seminar topics focus, in particular, on new technologies in lighting, HVAC, building envelope and controls.

The PEC offers assistance on daylighting, shading analysis, site orientation, glazing, and electric lighting systems, among other energy efficient building practices. The PEC facility includes a conference center used to host a variety of classes and events, a lighting classroom (available by appointment only) with five exhibits demonstrating fundamental lighting concepts, a heliodon station to simulate the effect of the sun's movement on different lighting environments, and a "green room" (to supplement the primary conference center) as an additional space for presentations, classes and receptions.

3.1.2 Energy Training Center (ETC)

PG&E also operates the Energy Training Center (ETC). Located in Stockton, California, the ETC provides continuing education for businesses, construction professionals, and participants in utility energy efficiency programs. The Center offers courses in HVAC technology, windows, and insulation materials, among other subjects, and provides instruction on energy evaluation and measurement techniques for practitioners in commercial and industrial settings.

A specific area of focus for ETC is the residential low-income weatherization and mid- and upstream residential market actors, including contractors, building inspectors and retailers. In addition to focusing on residential contractor training, ETC offers courses on Title 24 requirements and proper installation practices for high performance air conditioners.

The Center's main facility includes three classrooms, a computer-based training and internet resources center, weatherization and heating and cooling labs, and a "mock" energy efficient living room, attic, and kitchen to demonstrate room-specific energy efficiency practices.

3.1.3 Customer Technology Application Center (CTAC)

SCE operates the Customer Technology Application Center (CTAC) in Irwindale, California. CTAC targets commercial and industrial customer end-uses as well as the design and engineering community, and offers classes on commercial lighting, HVAC, electric safety, energy management and foodservice.

CTAC programs and activities include displays and exhibits, trade shows, community events, one-on-one and group consultations, equipment presentations and industry trade group presentations.

CTAC is a 44,000 square-foot facility that includes seven technology centers, two classrooms, a computer lab, and a conference center. The facility's product and technology centers include the Commercial Center, the Lighting Center, the Industrial Center, the Daylight Center, the Foodservice Technology Center, the Wet Cleaning Demonstration Center, the Refrigeration Demonstration Center, and the Electromagnetic Field & Power Quality Center. CTAC's 110- seat Executive Conference Center is used for workshops and seminars.

3.1.4 Agricultural Technology Application Center (AgTAC)

SCE also operates the Agricultural Technology Application Center (AgTAC) located in Visalia, California. AgTAC primarily targets the agricultural community, such as farmers, growers, dairymen, food processors, and businesses, but also services commercial and industrial customers in the San Joaquin Valley. AGTAC is a 24,000 square-foot facility on a 10-acre site, and serves as a companion to CTAC. The facility has several product and technology centers including: The Business Resource Center; an Exhibit Hall; a Lighting Products Center; a 200-seat Learning Center; an Office Technologies Center; a 5,000 square foot Annex; an Exhibit Center; and an Outdoor Demonstration Grounds.

3.1.5 Energy Resource Center (ERC)

Operated by SCG and located in Downey, California, the Energy Resource Center (ERC) primarily targets the non-residential market sector but also offers services to residential and new construction market actors (e.g., builders, contractors and developers). The ERC offers classes in HVAC, lighting, building envelopes, energy calculation software, Title 24 compliance, commissioning and retro-commissioning, and water efficiency, among other categories.

The Center possesses a "main hall," a 10,000 square foot space with seating for 500 (auditorium style) participants with a technical display area/section. ERC's business center possesses 18 computers to enable commercial and industrial customers to run energy modeling simulations and receive computer training. The Center's "Residential Room" is designated for builders, architects, and homeowners, and possesses demonstration energy efficiency technologies such as an oven, clothes dryer, water heater, and gas furnace.

3.1.6 SDG&E's Cross-Cutting Education and Training Program

Through the 2004-2005 Statewide Cross-Cutting Education and Training Program (ETP), SDG&E offered classes on topics including HVAC, lighting, motors and boilers, and compressed air systems. Class target audiences included architects and designers, builders, energy consultants, engineers, HVAC

contractors, and plan checkers. Since SDG&E does not operate a physical energy center like the other utilities, classes were offered in multiple locations throughout SDG&E's service territory.

Additional seminars, workshops and trainings in the San Diego area were available during 2004-2005 through the San Diego Regional Energy Office (SDREO). SDREO education programs were, however, separate from SDG&E programs and were conducted at SDREO facilities by SDREO staff.

3.2   2004-2005 Course Description

As part of this evaluation, we classified the full set of classes offered during 2004-2005 into 11 broad categories of course topics. These topic categories were created using the information developed from the characterization task described above. Table 3-1 shows the distribution of attendance by Center and course type for 2004-2005.

Table 3-1
Attendance by Center and Course Type (2004-2005)

Course Type	Percent of Attendees by Center						Percent of Attendees Overall
	AgTAC	CTAC	ETP	ERC	ETC	PEC	
Cooking	0%	0%	0%	18%	0%	0%	5%
Energy Codes/Standards	14%	5%	0%	4%	14%	17%	8%
General	8%	7%	10%	3%	11%	3%	6%
Green Buildings/LEED	0%	1%	1%	0%	1%	15%	4%
HVAC	16%	16%	40%	44%	5%	3%	24%
Lighting	12%	24%	13%	0%	0%	23%	13%
Other	9%	7%	12%	6%	19%	9%	9%
Other End-Use	21%	26%	19%	19%	38%	7%	19%
PV/Renew Energy/DG	0%	0%	0%	0%	12%	16%	5%
Sector Specific	19%	12%	5%	5%	0%	2%	6%
Software/Analysis	1%	2%	1%	1%	0%	5%	2%
Total Attendees	**1,696**	**6,063**	**4,456**	**9,581**	**2,084**	**7,895**	**31,775**

Column percentages sum to approximately 100%.

As shown, classes that were most frequently offered and attended in 2004 and 2005 addressed topics specifically related to HVAC, lighting, and other end-use technologies (e.g., motors, refrigeration, food service equipment, etc.). Courses within these broad categories of end-uses that were offered repeatedly and attended frequently in 2005 include:

- HVAC – range includes the IHACI training series of courses, more general courses such as "Selling HVAC Efficiency the Right Way," and specific technical training courses such as "Duct Testing for Change Outs."

- Lighting – range from a series of courses specifically addressing daylighting, more general courses such as "The Principals of Lighting," and more technical topics such as "Measuring the True Value of Light."

- Other End-Uses – includes courses that specifically address the following major categories of equipment or building systems: EMS, boilers, compressed air, refrigeration, food service, water heating, building envelope, etc.

Another category of courses offered in 2004 and 2005 that was frequently offered and well attended is the energy codes/standards category. This broad category includes the many courses offered on Title 24 and other energy codes and standards. There were no such courses offered by ETP in 2004 or 2005.

The two categories labeled "Green Buildings/LEED" and "PV/Renew Energy/DG" (Photovoltaics/Renewable Energy/Distributed Generation) includes what we assume to be somewhat newer, emerging types of courses that were offered at some of the Centers. In addition, these types of courses were offered frequently and well attended (9% of all courses offered during 2004-2005). Specific topics addressed in these types of courses include:

- Green Building/LEED – range from "New Developments for the USGBC LEED Rating System" to "Sustainable Site Planning and Landscape Design Workshop."

- PV/Renewable Energy/Distributed Generation – includes the basic and advanced courses on PV systems for grid-tied applications, the technology-specific "Solar Hot Water Systems," and the sector-specific "Generating Electrical Energy from Dairy Cow Waste."

Nearly all Centers offered some type of course we classified as "General," meaning it addressed general topics such as electricity market updates, fundamentals of energy efficiency or electricity, general advice on managing energy costs, etc. All Centers except ETC appear to have offered these types of courses in 2004 and 2005.

The category "Software/Analysis" includes all courses designed to teach attendees how to use or apply certain types of energy software (e.g., EnergyPro, Micropas, eQuest, etc.) or energy project analysis techniques (e.g., payback calculations, billing data analysis, rate analysis). All Centers except AgTAC and ETP appear to have offered these types of courses in 2004 and 2005.

The category "Cooking" was only applicable for ERC and includes such courses as "The Energy Efficient Chef" series and similar courses.

Courses in the "Sector Specific" category include those that focused on a specific sector, such as dairy, schools, clean rooms, etc. As expected, AgTAC offered a number of sector (agriculture) specific courses, as did CTAC, ERC and PEC. The "Energy Answers" series of courses, which focused on specific sectors (e.g., restaurants, health care facilities, etc.), is included in this category.

Finally, the broad category "Other" contains all other courses that did not fit in any of the other 11 categories, such as:

•   CEPE, DOE, BOC and energy auditing training courses

•   Courses addressing the topics of commissioning or retro-commissioning

•   Program-specific contractor training courses

Approximately 9% of all attendees in 2005 are associated with courses we assigned to this "Other" category.

3.3   2004-2005 Participant Profile

The evaluation explored the characteristics of attendees to assess whether or not the Centers are targeting (and attracting) the appropriate types of participants. As discussed below, while we were unable to reliably compare the characteristics of participants who were *targeted* by the Centers during 2004-2005, we were able to use the results of the participant telephone survey to describe the characteristics of *actual attendees*. These results are shown by Center in Table 3-2 and summarized below:

• **Business type:** Overall, about one third of participants (34%) were classified as end-use customers and 66% were upstream market actors. This result is consistent with attendance over time (i.e., market actors have made up more than half of the participants who attend courses offered at the Centers since 2002). Differences across Centers appear to be consistent with targeting strategies (i.e., AgTAC focuses more on offering courses end-use customers can benefit from, whereas PEC and ETC are more likely to offer courses targeting upstream market actors).

Table 3-2
Profile of Participants who Attended Center Courses in 2005

		AgTAC	CTAC	ETP	ERC	ETC	PEC
Type of Business		Nearly half end-use customers, increased since 2002	40% end-use customers, steady over time	Almost one third end-use customers, increased since 2002	40% end-use customers, increased over time	About one-quarter end-use customers, significantly decreased over time	About one-quarter end-use customers, steady over time
Average Size of Business		Small (<500 employees), 2-3 locations nearby	Large (>2,000 employees), 4-6 locations nearby	Medium (1,000 employees), more than 6 locations nearby	Medium (1,000 employees), 4-6 locations nearby	Small (<500 employees), 2-3 locations nearby	Medium (1,000 employees), 4-6 locations nearby
Role in Business	**Market Actors**	Recommend equipment/ design options	Recommend equipment/ design options	Recommend equipment/ design options, install and maintain equipment	Recommend equipment/ design options	Recommend equipment/ design options	Recommend equipment/ design options
	End-Use Customers	Identify needs/ evaluate options, select suppliers, equipment O&M	Identify needs/ evaluate options, select suppliers, equipment O&M	Identify needs/ evaluate options, select suppliers, equipment O&M	Identify needs/ evaluate options, select suppliers, equipment O&M	Identify needs/ evaluate options, select suppliers	Identify needs/ evaluate options, select suppliers, financial approval
Average Years of Experience (stderr)		20 (1.41)	18 (0.73)	19 (0.84)	19 (0.68)	21 (0.93)	17 (0.61)
Knowledge Relative to Peers		More knowledgeable	More knowledgeable	More knowledgeable	More knowledgeable	More knowledgeable	More knowledgeable
Attend Courses at Least Once/Season		66%	77%	82%	77%	73%	79%
First Time Attendees		7%	10%	5%	11%	10%	6%
Average Number of Courses Attended, 2004-2005 (stderr)		5 (0.48)	6 (0.34)	6 (0.36)	7 (0.57)	6 (0.48)	6 (0.35)

- **Business size:** The average participant works for a firm that has approximately 1,100 employees operating out of five business locations within 50 miles of the Center where they attended a course in 2005. It is expected that some Centers are more likely to attract smaller businesses (e.g., AgTAC and ETC) while others attract medium- to large-sized businesses based on the characteristics of the population located within driving distance of the specific Center.

- **Role in business:** In 2005, courses were attended by participants who would appear to have the appropriate decision-making roles and responsibilities within their business organization. For example:

  o The majority of upstream market actors (81%) are involved with making recommendations to prospective clients or customers involving new equipment and/or building design options. Less than half are involved with installing (45%) and/or maintaining (45%) equipment at their clients' sites.

  o End-use customers are often involved with identifying and evaluating equipment needs for their facilities (72%), as well as selecting suppliers or vendors to install equipment (65%) and installing and maintaining existing equipment (64%). Less than half (45%) of the end-use customers who attended courses in 2005 reported that they were involved with approving new purchases.

- **Years of Experience and Self-Reported Knowledge:** Over time, Centers have consistently attracted participants who have many years of industry experience and consider themselves to be as knowledgeable as or more knowledgeable than their peers.

  o On average, participants who attended courses in 2005 have 19 years industry experience.

  o More than half of all participants who attended courses in 2005 (57%) considered themselves to be *more knowledgeable* about energy efficiency than most of their peers, while another 40% reported that they felt they were as knowledgeable or average relative to their peers.

- **Frequency of Attending Courses:** Participants who attended courses in 2005 were frequent attendees – that is, 78% had attended at least one class per season – and they had attended (on average) about six classes in the past two years. For only 8% of all participants, the class they attended in 2005 was the first class they ever attended.

Clearly, the evaluation results suggest that ETS Program is attracting participation attendees represent some of most knowledgeable, experienced and well-trained individuals. Course content will need to stay current and "ahead of the curve" to be effective in providing new and useful information to this somewhat

captive group. While there appear to be many courses that are offered at an introductory or basic level, the Centers have attracted relatively few "first time" participants and/or participants who have limited knowledge and experience.

4.   2004-2005 Program Assessment

This section contains a detailed discussion of the results of the evaluation organized as follows:

- Goals and Accomplishments

- Best Practices Assessment

- Program Marketing Effectiveness

- Program Delivery Effectiveness

- Program Outcome Effectiveness

4.1   Goals and Accomplishments

Table 4-1 displays summary information about each of the utilities and the relevant Centers that is useful for understanding program participation and spending levels, as well as program operations, marketing and outreach efforts. As shown, most Centers do not appear to have exceeded their approved two-year budgets and most appear to have exceeded their goals in terms of the number of classes held during 2004-2005. Together, the utilities report offering 1,112 courses throughout 2004-2005 (out of a goal of approximately 750). Those that reported hard-to-reach (HTR) goals and accomplishments appear to have exceeded their targets with one possible exception (PG&E). According to the program tracking database compiled as part of this evaluation[2], over 30,000 participants attended courses during 2004-2005.

In addition, many utilities reported that they mailed out hundreds of thousands of course "calendars," or informational brochures listing the specific courses offered during the upcoming season (e.g., "Spring/Summer"). While information may be missing for SCG, the data in Table 4-1 suggest that nearly 500,000 course calendars were mailed during 2004-2005.

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[2] As discussed in Section 3 and in more detail in the Interim Report, KEMA obtained information from each of the six Centers about the specific courses offered during 2004-2005. This included a list of courses that were offered during 2004-2005 and detailed course attendance lists. These lists were used to populate the characterization database. However, we found that the list of courses did not always match the list of courses for which had attendance lists. While KEMA and the Centers worked together to ensure that the information in the characterization database was as accurate as possible, we did not resolve this discrepancy. As a result, the characterization database developed for this evaluation contains information on 456 different courses offered during 2004-2005, many of which were offered more than once, for a total of 981 courses and a total of 31,775 participants.

Table 4-1

Summary of 2004-2005 Statewide ETS Program Goals v. Accomplishments

	PG&E						SCE						SCG			SDG&E		
	PEC (through Nov 05)			ETC (through Nov 05)			CTAC			AgTAC			ERC (through Nov 05)			EIC		
	2004	2005	2004 - 2005	2004	2005	2004 - 2005	2004	2005	2004 - 2005	2004	2005	2004 - 2005	2004	2005	2004 - 2005	2004	2005	2004 - 2005
Program Budget	$1,543,200						$9,805,744						$3,672,314			$2,081,000		
Program Expenditures	$1,172,854						$9,695,092						$ 1,729,746	$ 1,709,480	$ 3,439,226	$ 1,094,114	$ 734,879	$ 1,828,993
Number of Training Classes (goal)	80	80	160			96	176						na	137	na			44
Number of Training Classes (reported)	95	84	179			114	383 (203 in 2004 & 180 in 2005)						184	161	345	51	41	91
Number of HTR Training Classes (goal)						57							40	40	80			8
Number of HTR Training Classes						51							126	127	253	34	29	91
Number of Classes (database)	99	85	184	63	91	154	119	92	211	57	45	102	136	116	252	42	36	78
Number of Attendees (database)	4,088	3,763	7,851	960	1,445	2,405	3,620	2,424	6,044	852	787	1,639	4,485	5,096	9,581	2,185	1,971	4,156
Mailed Center calendars (goal)			100,00			60,000												60,000
Mailed Center calendars (reported)																69,566	2,500	72,066
Email Announcements (goal)																		
Email Announcements (reported)	155,500	99,000	254,500															
Costumer contacts (goal)							61,230											
Costumer contacts (reported)							96,743											
Outreach events (goal)														35				132
Outreach events (reported)							206 (93 in 2004 & 113 in 2005)								54	91	85	176
Distributed brochures (goal)																		
Distributed brochures (reported)															520,000			520,000

During 2004-2005, PG&E sent out over 250,000 email announcements for PEC courses, and SCE initiated nearly 100,000 customer contacts on behalf of both CTAC and AgTAC.

SCE conducted over 200 community events during 2004-2005, while SCG's ERC hosted 54 similar events. SDG&E delivered 176 community events targeted to business customers, hard-to-reach customers, and other community groups.

We discussed goals with the Center Directors, including the specific quantitative participation goals discussed above, as well as the overall goals of each of the Centers. Center Directors indicated that all of the Centers have an overall goal of promoting energy efficiency within their service territory and also offering many courses that support the energy efficiency programs offered by the utility.

In addition, some Center Directors include customer satisfaction as an overall goal for the Centers and for the courses offered. The results from this evaluation suggest overall satisfaction with the Centers and the courses offered is very high: the average satisfaction rating was reported to be 8.9 (stderr = 0.04), on a scale of 1 to 10, where 10 means "excellent." These very favorable ratings are consistent with prior studies. In 2002, the mean satisfaction rating (on a 5-point scale) was 4.4 and in 2003 the average rating was also 4.4.[3]

In addition to attendance and satisfaction goals, Center Directors discussed internal pressure to offer courses that more explicitly lead to direct, demonstrable energy savings. This issue was emerging during the 2003 evaluation and appears to be more pressing over time. These Center Directors believe that to maintain or grow the offerings at their respective Centers it is increasingly important that they be able to demonstrate energy savings resulting from their course offerings.

Center Directors acknowledged that, during 2004 and 2005, there was no pressure to demonstrate this savings from the CPUC. While the Centers obtain funding from a variety of sources (with PGC funding as one source), they also recognize that they are competing with resource acquisition programs for much of their funding. Should PGC funds available for information-only programs become more limited (and/or there is a greater urgency for energy savings from all PGC-funded efforts), the Centers may be called upon to demonstrate (quantify) the energy savings associated with their activities.

While the Center Directors feel they are unlikely to be able to demonstrate direct energy savings from all (or even many) of their course offerings, they hope to be able to show indirect linkages between information learned in a course and the specific actions participants take as a result (including, but not limited to, participation in other utility programs). Center Directors are careful to point out the potential for double-counting if course attendees go on to implement projects with the assistance (financial or otherwise) of other utility programs.

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[3] Standard errors on these mean values are not available from the 2002 and 2003 studies.

The evaluation results suggest that the Centers have been somewhat influential in encouraging energy efficiency behavior and providing direct linkages to other utility programs:

- Just under half of all end-use customers (47%) reported that, since attending a course in 2005[4], they have made an energy efficiency improvement to their facility or end-use equipment that was influenced by the information provided during the course they attended.

- About 16% of all participants who attended a course in 2005 indicated that they were made aware of and participated in another utility program based on information they obtained during the course.

These results are very positive and suggest that the Centers have already achieved significant linkage between information and action. However, if future programs are designed to achieve goals beyond quantitative attendance targets and high satisfaction ratings (i.e., direct energy savings, cross-program participation), then the Centers will need to establish goals that are linked to specific measurable indicators of these desired outcomes.

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[4] Participants were surveyed in September – October 2006 and then again in early 2007 to assess equipment/behavior changes that had been implemented since attending courses in 2005.

4.2 Best Practices Assessment

In this section, we discuss Best Practices in course design and implementation, as well as the barriers to implementing these Best Practices. These are a compilation of findings based upon the 2003 ETS Program Evaluation[5], interviews with Center Directors, observations and reports from attendees at the Best Practices Workshop[6], and secondary research conducted outside the scope of this project. In Sections 4.3 and 4.4 below, we discuss elements of Best Practices that were included in the assessment of program marketing and delivery effectiveness.

4.2.1 Best Practices in Course Design and Implementation

Best Practices in course design and implementation incorporate learning activities that are likely to increase learning, retention and results. The activities are targeted to the specific objectives of the course and provide opportunities for learners to practice the desired behavior. We discuss key components of course design and implementation below:

- *Focus courses on obtaining actions not just transmitting knowledge.* This means identifying the desired actions before developing the course content and materials. It also means describing the intended outcomes in the marketing materials so that the course attracts the appropriate attendees and attendee expectations are met.

- *Design the course materials to meet the objectives outlined in the course description.* The course materials and activities should be designed specifically to meet the learner objectives. All content and class activities should be focused on providing (or reinforcing) the knowledge and skills to the learners to result in the desired behavioral change outcomes.

- *Structure course content so that it is practical and applicable to the participants in their jobs.* Adult learners are less interested in obtaining pure knowledge than in obtaining skills and tools that they can use in their job. "Adults have a strong readiness to learn those things that help them cope with daily life effectively. Training that relates directly to situations adults face is viewed as relevant."[7]

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[5] Wirtshafter Associates, Inc. 2005, *Evaluation of the 2003 Statewide Education and Training Services, Final Report*, June 3, 2005; prepared for Southern California Edison, Pacific Gas & Electric Company, San Diego Gas and Electric and Southern California Gas Company.

[6] In April 2006, the evaluation team conducted a workshop with Center staff on Best Practices in adult education. The workshop, entitled the Technical Trainers Toolbox, was included in the evaluation to demonstrate the lessons learned from the previous evaluation and to provide the tools to implement the recommended changes in future years. The workshop was attended by 11 Center staff, plus two members of the evaluation team, and the instructor. The Center staff represented the three utilities that maintain physical Centers and a representative from SDG&E. Seven of the attendees were instructors at the Centers, the other four served educational support functions. See Appendix B for more detail on the Best Practices Workshop.

[7] Biech, Elaine, 2005, *Training for Dummies,* p. 26.

Employers are more likely to send staff to trainings that result in positive changes in how employees do their jobs.

- *Limit course (or section) content to teaching of three major objectives.* Do not overwhelm attendees with too much information at once. Adults can only process so much before all the material, including the objective is lost. This caution also speaks to the need for frequent changes in approach. If lectures are needed, they should be short and followed by an active activity that reinforces the message of the lecture portion. Many courses include a lot of content, but an increase in course content does not translate into an increase in the amount of information that is learned. Classes can result in more behavioral change if the content is limited, but the material is learned and retained.

- *Provide opportunities for attendees to participate and exchange ideas.* Adult learners bring experience and knowledge to the classroom. Learning is increased if participants recognize their own expertise, build upon it, and share it with others in the classroom.

- *Structure courses so that they engage the attendees in active participation in order to retain information conveyed.* Several of the experts pointed out the need to move from passive learning to actively engaging the students in the learning. As one expert pointed out, "Lecturing is easy, but the instructor needs to engage the student in the learning. The practice or integration phase of the learning cycle can account for 70 percent (or more) of a total learning experience. It's in this phase that the learning actually takes place."[8] Engineers may prefer problem-solving activities that require a calculator. Other student groups may be more extroverted and prefer interactive activities. Courses should provide attendees with opportunities to actively engage in the learning, not only by sharing what they already know, but by practicing what is being taught.

- *Build in opportunities for post-training reinforcement.* Learning is achieved when lessons are reinforced over time. "…even though something may be well-learned, if it is not used it can be forgotten. Consequently, once something has been learned, we need to increase the probability of its retention by changing the practice schedule from 'massed' to 'distributed' practice. Distributed practice means that material is periodically reviewed but with longer and longer time intervals between reviews. Distributed practice makes for very durable learning that is 'forgetting resistant.'"[9] The classroom is the massed practice, reviewing or using class lessons in the workplace is distributed. Some instructors incorporate student action plans (as discussed below) as one method to increase the likelihood of practice. Follow-up emails, and telephone calls can also facilitate this learning.

- *Structure each workshop so that each attendee leaves with an action plan developed by that attendee.* Learners are more likely to change their behavior if they have a plan for how to implement what they

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[8] Meier, Dave, 2000, *Accelerated Learning*, p. 91.
[9] Hunter, 1994, 102.

have learned. Developing an action plan allows the learner to apply what they learned in the class to their job and determine what they need to do to make it happen. An additional benefit is follow-up evaluations can address the learners action plan to determine what changes resulted from the class and identify the barriers to implementing the plan.

4.2.2   Barriers to Best Practices in Design and Instruction

Despite these results presented in the subsequent sections which suggest that the Centers are doing a fairly good job at designing courses according to many of these Best Practices, a number of barriers to further improvements remain. We developed the following list of potential barriers based on the results of the 2003 evaluation, interviews with staff at the various Centers, interviews with other energy education professionals, and by observing and asking the attendees at the Best Practices workshop.

- *Participants may be afraid of getting up in front of others.* Many of the learner activities employed during the Best Practices workshop involved participants performing a function in front of the class. Some of the Best Practices workshop participants expressed concern that some Center course attendees may be uncomfortable in this role. (During the Best Practices workshop, the instructor pointed out effective courses could be designed so that no single activity required this type of participation from all attendees.)

- *Instructors may lack the confidence to employ new approaches.* Several participants in the Best Practices workshop, while enthusiastic about the learning that had taken place, felt that they (or others) may lack the confidence to employ these practices in the classroom.

- *Requires a change in thinking.* Participants in the Best Practices workshop discussed how the strategies learned would require an adjustment in their thinking and an adjustment to the techniques they (or others) have used in the past. Some were reluctant to change due to pressure from the commonly-held belief that subject-matter expert lecturing is the best presentation style.

- *The amount of technical content makes it difficult to limit lecture time.* Some participants felt that the amount of material that is covered in some courses necessitated the use of a lecture style. Other participants noted that this was the "old thinking" or that they may be packing too much into a class.

- *Budget constraints could limit the implementation of Best Practice approaches.* Some participants felt that budget constraints would limit their ability to implement these Best Practices. Additional resources (at least initially) would be required to facilitate training in Best Practice techniques and development of more interactive course content and instructional materials.

- *Goals are not necessarily aligned with Best Practices.* Several participants noted that they face goals of increasing the number of students that attend courses. They spend a substantial amount of effort

achieving or exceeding attendance goals. The Best Practices for design and instruction do not address these goals.

Many course instructors are "subject matter experts" not employed by the Centers. Rarely are they trained in adult education. They are valued for the knowledge they possess, not for their teaching expertise. They are likely to be unfamiliar with the Best Practices discussed above, especially active learning approaches. Participants identified the following barriers to employing Best Practices with these subject matter experts:

- *Limited control of non-utility staff.* Participants in the Best Practices workshop indicated that because subject matter experts are often not utility employees, they often lack total control of individual course curriculum and teaching approach. They felt subject matter experts are much in demand and may be reluctant to change what is already established.

- *Investment of time by instructor.* Changing a course represents a significant investment in time that many instructors are unwilling or unable to undertake. Participants in the Best Practices workshop discussed how instructors may be reluctant to change an existing course that has proven successful (based on satisfaction surveys). They felt many instructors have little motivation or time to spend on course preparation, especially if they may not be compensated for their time.

- *Lack of comfort/confidence.* Participants felt that most instructors are comfortable providing information lecture style. They pointed out that many instructors may have only been exposed this style of instruction and they were successful learners in that teaching environment. Participants questioned if instructors are even aware of these other teaching or learning styles, and felt that many would be uncomfortable with more active learning approaches.

- *Lack of awareness.* Participants mentioned that instructors may not realize that many adults learn differently than they did. The material covered by instructors is so ingrained in their experience that they may not realize how much of what they know was learned through doing (not listening). As a result, participants felt that some instructors may not effectively convey all of the steps needed by students facing their first exposure to the material.

- *Perceived need to establish credibility.* Participants in the Best Practices workshop indicated that some subject matter experts feel it important to establish their credibility as an expert, rather than a facilitator of information. These instructors may perceive that letting students participate in the discussion and provide information undermines their position as an expert. According to some participants in the workshop, subject matter experts who are consultants may see this as a threat to potential consulting opportunities.

4.2.3   Overcoming Barriers to Best Practices in Design and Instruction

We found through this evaluation, as well as prior investigations, that Center staff, course designers and instructors have already implemented many of the Best Practices from the adult learning workshop. There is, however, room for improvement – especially as the Centers stretch to achieve goals beyond attendance and participant satisfaction (i.e., energy savings). In addition, implementing additional Best Practices will require additional investments of staff and financial resources.

Therefore, we would not expect, nor recommend, that the Centers try to immediately adopt the Best Practices approaches for all courses. Instead, Center staff should identify courses that can most easily be modified to employ Best Practices. They might also focus their efforts on courses that are expected to achieve significant energy savings through behavioral change and/or participation in other utility programs.

For example, courses taught by Center staff (not external subject matter expects) and address specific skills to change behavior should be used as the starting point for implementing Best Practices. Second, the Centers may want devote limited resources to offering fewer courses that are likely to result in a greater change in behavior. If the more limited course offerings are marketed, delivered and evaluated to produce behavioral change, the overall outcomes from the courses may be increased.

A slower and more focused approach to adopting Best Practices addresses many of the barriers identified above. This approach allows instructors to become confident using their new tools, is less likely to be a time burden, and exposes others at the Centers to some of the new approaches. This approach also builds institutional knowledge.

Implementing change in courses provided by external subject matter experts may be more challenging. Centers staff at the workshop felt that they have limited control over the subject matter experts, but discussed ways to increase their leverage. They discussed requiring lesson plans and materials prior to the course implementation, but acknowledged that for some instructors, they were unlikely to get compliance. Many subject matter experts provide similar courses across multiple Centers. Workshop participants discussed coordinating on their requirements (and including them in the contracts) to obtain more leverage with these instructors.

4.3   Program Marketing Effectiveness

A key evaluation objective involved determining the extent to which program marketing messages have successfully conveyed what customers can gain from participation so as to align expectations of targeted market segments. This is one of the first steps to achieving the Best Practices discussed above – that is, in order to focus courses on obtaining actions not just transmitting knowledge, not only must the desired course outcomes be identified prior to developing the course content and instruction materials, but also the intended outcomes must be explicitly described in the marketing materials. In this way, the Centers will have a better chance of attracting the appropriate attendees and attendee expectations will be more explicitly linked to these specific outcomes (and can be more easily measured).

As a first step in addressing this objective, we reviewed 2004-2005 course marketing materials and descriptions to assess key messages conveyed to potential participants. Next, we explored participant expectations regarding the courses they attended, the extent to which participant expectations were met, and key reasons participants felt their course expectations were not completely met. We then looked for evidence to link participants' less-than-complete expectations to potentially mixed messages that may have been conveyed to them in the course marketing materials and descriptions.

The course characterization database developed through this evaluation was designed to capture information on the key messages contained in course marketing materials and descriptions. Specifically, course materials were reviewed to determine the extent to which the following were specifically mentioned in the course marketing materials:

- Course content/topic(s)

- Technical complexity (e.g., introductory, advanced)

- Intended course outcome(s)

- Degree to which energy savings opportunities addressed

- Linkages to other utility programs

In order to populate the characterization database, we obtained information from each of the six Centers about the specific courses offered during 2004 and 2005. We requested any and all information on the courses, including course descriptions, marketing materials, and course materials. For the substantial majority of the courses, we were provided only marketing materials. We also requested and obtained detailed attendance lists for each course offered in 2004-2005. Finally, additional information was provided by Center staff (Directors and other designated staff) as needed to fill in gaps from the course materials and attendance lists.

While we were limited somewhat in the completeness of the course information we received from the Centers, we attempted to assess the following:

- *Did the marketing materials indicate the specific topics and content to be covered in the course?* The majority of the course materials we reviewed (78%) mentioned the general course topic but did not provide detail about the specific content to be learned by attendees.

- *Did the marketing materials specify the level of technical complexity to be addressed in the course?* Our review of the marketing materials indicates that about half of all courses (52%) were offered for general participation (i.e., anyone could participate and learn the material). About one third of the courses (36%) required basic skills or knowledge, while 12% required advanced knowledge or expertise.

- *Did the marketing materials indicate the specific outcomes that could be expected from attending the course?* Only about one in five of the courses materials we reviewed mentioned specific outcomes that participants should expect from attending.

- *To what degree and depth were energy savings opportunities addressed in the course marketing materials?* We rated courses based on the information presented in marketing materials as follows:

   o Minimal (18%) – course marketing materials did not give any specific information that will lead attendees to action (e.g., a cooking class that mentions efficiency)

   o Tangential (38%) – course marketing materials mentioned energy savings opportunities but not as the focus of the course content (e.g., a cooking class that includes a section on the efficiency of cooking equipment)

   o General (44%) – course marketing materials mentioned specific energy savings technologies (e.g., a class on improving energy efficiency in restaurants)

   o Concentrated (1%) – course marketing materials indicated that the course would focus on the actions needed to implement specific energy savings technologies (e.g., a class that instructs a restaurant owner or designer on how to specify/install specific energy savings technologies)

- *Did the marketing materials specifically link the course to information about other utility programs?* Only about 7% of the marketing materials we reviewed specifically mentioned that some aspect of another utility program (e.g., a rebate program, design assistance) would be associated with the course content.

It is important to keep in mind the limitations to our approach when interpreting these results:

- We attempted to review course materials to understand underlying marketing "message," but we did not always receive the appropriate/complete set of materials so our review was limited to only what was provided.

- We also attempted to review course materials to determine if certain market segments were explicitly targeted; again, we were limited to what we received which was not always appropriate/complete.

While Center Directors were helpful in filling many gaps when we could not complete this assessment for every course, we do not trust the information we compiled in the course characterization database to give us a complete/accurate picture of whether or not the course marketing materials have been effective in terms of communication and/or targeting.

Therefore, we have incorporated results from the participant survey to assess the extent to which their expectations (presumably based, at least in part, on the messages conveyed in course marketing materials) were met. Specifically, Table 4-2 presents survey results on what participants expected to get out of attending courses and to what extent their specific expectations were met.

As shown, over half of all participants (54%) expected that they would improve or gain knowledge about the course topic. Another 16% expected to get updates on new technologies, products and solutions, 8% sought more general energy efficiency information and a similar 8% were expecting to learn about changes in energy codes and standards. Others participated because it was specifically related to and/or required for their job (3%) or to learn about specific technologies, such as lighting designs (2%) and food service equipment options (2%).

Participants were then asked to provide their honest assessment of how well their expectations about the course were actually met. Specifically, participants were asked to rate the course on a 10-point scale, where 1 meant the course didn't met any of their expectations, and 10 meant the course completely met their expectations. The average overall rating across all participants was 8.6 (stderr 0.04), as shown in Table 4-2. There was little meaningful difference between the specific expectations that participants had for the course and how well they rated the course in terms of meeting those expectations.

Therefore, while we cannot confirm that participants' expectations for what they expected to get out of the course are in fact what the course designer/instructor intended, we can conclude that Best Practices appear to have been employed in that participants' expectations are in line with what they reportedly achieved.

Table 4-2
Participant Expectations from Courses Attended in 2005

Participant Expectation for Course	Percent of Participants	Mean Rating of Expectation[1] (stderr)
Improve/gain knowledge	54%	8.6 (0.05)
Technology updates	16%	8.5 (0.09)
General energy efficiency information	8%	8.5 (0.15)
Changes in codes, standards	8%	8.4 (0.15)
Job related/required	3%	8.8 (0.24)
Lighting designs	2%	8.2 (0.34)
Food service options	2%	9.1 (0.22)
Learn software	2%	8.9 (0.26)
Continue education	1%	8.7 (0.26)
Building/system designs	1%	7.8 (0.45)
Other	2%	8.8 (0.22)
Don't know/recall	12%	8.5 (0.14)
Total Sample	1,509	8.6 (0.04)
[1] Participants were asked to rate the course on a 10-point scale, where 1 meant the course didn't meet any of their expectations, and 10 meant the course completely met their expectations.		

Participants were also asked to indicate the reasons why the course they attended in 2005 did not completely meet all of their expectations. In general, participant responses fell into one of several categories, some of which may directly or indirectly relate to the way in which the course was described in the marketing and promotional materials:

- **Level of Detail (24%):** Overall, about one quarter of all participants whose expectations were not completely met mentioned some aspect of the *level of detail* as their main complaint about the course they attended. Most of these participants felt the course should have provided more detail and/or covered more material (70%). Another 18% felt the course material was too simple/too basic and/or that "they already knew" the information presented, and about 12% had hoped that the course would have been less technical and/or that "too much detail" had been provided.

- **Course Content (7%):** Most of the participants who felt the *course content* was inadequate reported that the information presented did not apply to their specific industry or profession (89%), and a few reported that key concepts were missed or not included in the course (15%).

- **Course Length (6%):** With regard to *course length*, most participants who mentioned this aspect of the course had expected the course to be longer and/or that the course was "too short" (84%). A few mentioned that they thought the class was "too long" (16%).

- **Course Format (4%):** About half of the participants who expected something different with respect to the *course format* indicated that they had hoped the class would involve more hands-on activities (54%), and others had wanted additional time for Q&A (46%).

Marketing efforts should continue to emphasize these key elements of course design and implementation (e.g., level of detail, content, length and format) to minimize these types of complaints and to ensure that the Centers continue to meet (and exceed) participant expectations in the future. Course designers should continue to ensure that marketing materials indicate the specific topics and content to be covered in the course as well as the level of technical complexity to be addressed in the course. Course descriptions should provide participants with a list of specific outcomes they should expect from attending the course, including details on the specific kinds of energy savings opportunities that will be addressed in the course. Course designers must also ensure sure that the course length and format are in line with Best Practices and realistically set participant expectations in these areas.

4.4 Program Delivery Effectiveness

To address the second evaluation objective, we looked at a number of different indicators of program delivery effectiveness as part of this evaluation, including:

- How have participants learned about Center courses? What does this say about the effectiveness of program marketing and outreach?

- Have the Centers offered a range of classes by size? Did they offer courses with sufficient frequency? Were courses offered across a diverse set of topics? Are the same courses offered across utilities?

- Did the Centers delivery quality courses consistent with Best Practices and highly valued by attendees?

- How satisfied were participants with the course they attended in 2005? What were some of the reported reasons for dissatisfaction?

- What suggestions for improvement do participants have for future training courses?

4.4.1 Sources of Program Awareness

The evaluation included an assessment of the sources used to raise awareness of and encourage attendance in Center courses. We assessed these sources to determine what has been effective and what could be improved. Overall, the results indicate that, over time, participants have learned about the Center and its courses from a wide array of sources, including direct contact with the utilities as well as other "word-of-mouth" sources in the industry (e.g., colleagues, trade professionals, etc.). When it comes to the course they recently attended, the main source of awareness participants are likely to recall is a utility source. Brochures and emails are the top two sources, followed by direct mail letters and the Center websites.

Our evaluation also confirms the more recent changes in marketing and outreach strategies used by the Centers. These changes have included increased use of email to announce upcoming courses and other Center events, limited use of high-gloss printed marketing materials (e.g., brochures and calendars), and more strategic outreach and marketing through trade industry partnership.

- *Continued use of email announcements.* In 2002, only 12% of participants preferred to learn about courses through e-mail notifications, and at that time, brochures and flyers were preferred by about half of all participants. These results are dramatically different today where, overall, 70% of participants prefer e-mail notifications and only about 15% prefer brochures, flyers and other types of direct mail notifications. Differences by utility should be considered, as shown in Figure 4-1. While

PEC participants overwhelmingly prefer email notification, a considerable percentage of AgTAC participants will still prefer direct mail contact (i.e., brochures, letters).

Figure 4-1
Preferred Methods for Future Course Announcements by Center (2005)
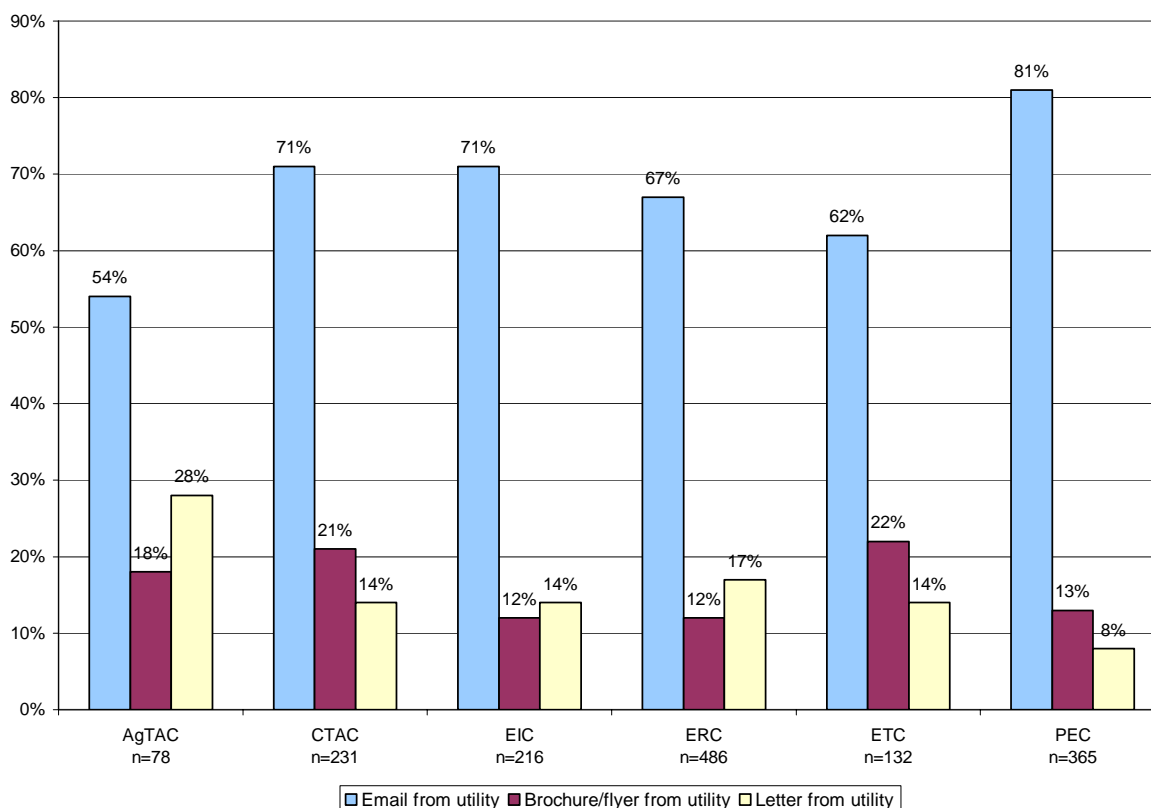
- *More targeted use of print materials.* In 2002, 47% of all participants mentioned hearing about Center courses via a brochure they received in the mail. In 2005, only 22% of participants mentioned this method of communication. Across all Centers, this finding is significant. This is consistent with recent utility strategies to back-off from direct mail campaigns containing high-gloss, expensive printed brochures and course calendars (often referred to as "brochures" in participant surveys). We do not suggest that the utilities abandon the development of these important materials altogether. It is just that brochures/calendars are expensive to print and mail, especially when mailed to the same group of participants who have attended before and would just as likely access the same information via the utilities' websites. A limited amount of these materials should be printed and kept on-hand for more effective distribution at key community and trade events, where in-person contacts can ensure that materials will be used and useful. Direct mail letters or bill inserts should point potential

participants to the utilities' websites where a printer-friendly copy of the program brochure/calendar can be obtained.

- *Aggressively develop/test effectiveness of trade industry partnerships.* While "word-of-mouth" and other trade industry sources of program awareness are increasing over time, we should not assume that the ETS program has matured to the point where utility marketing efforts can be ramped down. On the contrary, while email and other forms of utility contact are relatively inexpensive to implement, they are likely to attract the same group of participants that has already attended courses. To reach out to a new, broader group of participants, the utilities need to more aggressively develop marketing and outreach partnerships with outside organizations. These efforts will differ depending on the specific course content, the intended target audience, as well as other unique characteristics. Therefore, we would expect program marketing efforts and associated expenditures to potentially increase as these partnerships and effective strategies are identified and tested.

4.4.2 Class Size, Frequency, Diversity and Overlap

We also explored class size, frequency and diversity as potential indicators of program delivery effectiveness. As mentioned above, the program delivered nearly 1,000 courses statewide during 2004-2005 reaching more than 30,000 attendees. About 43% of these classes were attended by more than 50 participants per class, whereas only 26% of the classes were relatively small (i.e., less than 25 attendees per class). The extent to which a course is more or less effective based on class size varies considerably by course content and format. Because we lacked detailed information on the specific content and format for the full set of courses offered during 2004-2005, it was not possible to assess class size in any systematic way.

However, it does seem likely that there is a potential imbalance between the number of relatively large classes v. the number of small classes, especially across Centers (Table 4-3). AgTAC and ETC offer relatively smaller classes, which is understandable given size of the target population located nearby these Centers. The challenge for these types of Centers will be to ensure that they offer enough classes so that they can still meet goals.

Table 4-3
Summary of 2004-2005 Course Size Information

	Percent of 2004-2005 Attendees					
	AgTAC	CTAC	ETP	ERC	ETC	PEC
Large class size (> 50 attendees)	6%	21%	75%	58%	0%	43%
Small class size (< 25 attendees)	71%	45%	4%	20%	77%	7%
All Attendees	1,639	6,044	4,156	9,581	2,405	7,851

The majority of ETP classes were large – i.e., 75% of its 2004-2005 courses were attended by 50 or more participants. Given that SDG&E offers its courses at different locations through its service territory, this indicates that the utility's marketing and promotional strategies have been particularly effective in ensuring large turn-outs despite not having a permanent, central facility to hold the classes. However, SDG&E should also ensure its relatively large classes are providing an adequate format and effective learning environment.

We also examined the frequency with which courses were repeated throughout the 2004-2005 program cycle. We found that, overall, about 22% of Center courses were offered relatively frequently (i.e., more than five times in one year). Differences by Center indicate that two thirds of ETC courses offered in 2004-2005 (67%) were offered more than five times per year, whereas AgTAC and ETP rarely offered courses this frequently (3% and 0%, respectively). However, these differences by Center do not appear to have negatively affected participant opinions – i.e., nearly all participants (92%) favorably rated the frequency with which specific courses were offered, and few participants mentioned course (in)frequency as a reason for dissatisfaction.

The courses offered in 2004-2005 represent a fairly diverse set of topics, as described in detail above in Section 3. Most courses focused on specific end-uses. For example, 24% of all participants attended courses addressing HVAC topics, ranging from the IHACI training series, more general courses such as "Selling HVAC Efficiency the Right Way," and specific technical training courses such as "Duct Testing for Change Outs." Another 13% of all participants attended courses addressing lighting topics, including a series of courses specifically addressing daylighting, more general courses such as "The Principals of Lighting," and more technical topics such as "Measuring the True Value of Light." Nearly one out of every 10 participants attended a course on emerging topics such as green building/LEED concepts and PV/renewable energy/DG technologies.

We found that, overall, relatively few courses are offered at multiple Centers (Table 4-4). That is, of the approximately 420 unique course titles, only about 6% were offered at more than one utility. This is most likely driven by the somewhat unique focus of both ERC (food service) and PEC (new construction). These Centers offered the greatest number of total courses and had the least amount of overlap with the other utilities. The most common overlap was between AgTAC and CTAC (understandable, as both are SCE facilities). In addition, five of the 29 courses offered at ETC during 2004-2005 were also offered at other Centers, most likely a result of the limited resources this relatively small, remote Center had to spend on course development.

Table 4-4
Course Overlap by Center (2004-2005)

	AgTAC	CTAC	ETP	ERC	ETC	PEC	All Centers
Number of Unique Courses Offered	71	68	57	110	29	113	419
Percent Offered at Multiple Utilities	31%	25%	7%	1%	17%	5%	6%

4.4.3 Quality, Valued Courses Consistent with Best Practices

Another key indicator of program delivery effectiveness is the extent to which the Centers delivered quality courses that were consistent with Best Practices and highly valued by attendees.

Course Format. We found strong evidence that the courses employed several key elements of the Best Practices mentioned above in Section 4.2, namely providing opportunities for interaction/idea exchange, and engaging students in active participation to retain information conveyed. As shown in Table 4-5, participants rated the courses they attended in 2004-2005 very highly in terms of allowing sufficient time for questions and providing for networking opportunities between and among the students and the instructor.

Table 4-5
Mean Ratings for Time for Questions and Networking Opportunities (2004-2005)

	Time for Questions	stderr	Networking Opportunities	stderr
AgTAC	8.8	0.2	8.0	0.2
CTAC	9.0	0.1	7.6	0.2
ETP	8.4	0.1	7.5	0.2
ERC	9.0	0.1	8.0	0.1
ETC	8.8	0.1	7.5	0.2
PEC	8.5	0.1	7.0	0.1
All Centers	8.8	0.0	7.6	0.1
Participants were asked to rate their opinions of different course attributes using scale of 1 to 10, where 1 means "poor" and 10 means "excellent."				

In addition, participants indicated that while most of the course time was spent lecturing, a fair amount of time was also allocated to interacting with students and/or conducting hands-on activities where students had the change to practice skills they were learning. As shown in Table 4-6, 65% of participants across all Centers indicated that 50% or more of the course was taught in lecture format. However, about 40% of participants reported that at least one third of course time was allowed for interaction between and among students and the instructor, and about one third mentioned that at least 15% of the course time involved hands-on activities were attendees were actively engaged in practicing the skills they were learning.

Table 4-6
Percent of Course Time - Lecture Style, Interactive and Hands-on

	AgTAC	CTAC	ETP	ERC	ETC	PEC	All Centers
Lecture Style	61%	69%	66%	61%	62%	70%	65%
Interactive	45%	40%	43%	45%	38%	36%	41%
Hands-on	45%	29%	30%	43%	36%	29%	35%
Sample Size	95	246	196	315	195	401	1,448

Lecture style – at least 50% of course time was lecture format.
Interactive – at least 33% of the course time involved interaction among the attendees or between the students and instructor
Hands-on – at least 15% of the course time involved hands-on activities where attendees have the chance to practice skills they are learning

As shown in Table 4-7 below, participants who attended cooking courses (at ERC) rated these courses the most favorably across each of the five indicators of Best Practice discussed above. Conversely, participants who attended courses addressing Green Building/LEED topics, as well as courses addressing more "general" topics courses, rated these courses less favorably across these attributes.

Table 4-7
Best Practices Results by Course Type (2004-2005)

Course Type	Mean Ratings				Percent of Course Time		
	Time for Questions	stderr	Networking Opportunities	stderr	Lecture Style	Interactive	Hands-On
Cooking	9.0	0.2	8.4	0.3	59%	50%	39%
Energy Codes/Standards	8.5	0.2	7.1	0.2	67%	33%	37%
General	8.7	0.2	7.5	0.3	67%	36%	28%
Green Buildings/LEED	8.3	0.2	7.0	0.2	76%	34%	23%
HVAC	8.8	0.1	7.7	0.2	66%	42%	42%
Lighting	8.8	0.1	7.6	0.2	64%	46%	26%
Other	8.5	0.3	7.5	0.4	58%	42%	33%
Other End-Use	8.9	0.1	7.7	0.1	65%	44%	33%
PV/Renew Energy/DG	9.0	0.1	7.2	0.3	72%	34%	31%
Sector Specific	9.0	0.2	7.9	0.2	74%	31%	26%
Software/Analysis	8.7	0.2	7.2	0.2	47%	44%	61%
All Course Types	8.8	0.0	7.6	0.1	65%	41%	35%

Level of Detail. Another element of Best Practices discussed above incorporates the idea that course content should be limited in its learning objectives so as not to overwhelm attendees with too much information at once. Ideally, to address this Best Practice, we would have directly assessed the specific course materials used in 2004-2005 (e.g., standard curriculum as well as custom presentation materials)

but, as mentioned above, we were limited in our access to this type of detailed information for the more than 1,000 classes offered during 2004-2005. Instead, we used participant survey results to provide an indicator of the effectiveness of the program in addressing this Best Practice.

Overall, the results indicate that there may be room for improvement with respect to the level of detail provided through courses:

- Very few participants overall indicated that their expectations were not completely met but, of those who did, about 24% mentioned some aspect of the level of detail as the primary reason the course fell short of their initial expectations. (As mentioned above, most of these participants felt the course should have provided more detail and/or covered more material.)

- Similarly, very few participants were dissatisfied with the courses they attended but, of those who were, about half (48%) mentioned some aspect of the level of detail as their reason for dissatisfaction. Participants who attended courses at AgTAC were most likely to indicate dissatisfaction with the level of detail provided through the course and, most often, these participants were hoping the course would have provided additional detail and/or covered more material.

- Only about 3% of all participants mentioned that the level of detail provided through the course was an area in need of improvement. Participants who attended green building/LEED courses were more likely to suggest improvements in this area and, most often, these participants felt that additional detail/more material should have been addressed.

Job Related Content. Another element of Best Practices is to ensure course content is practical and applicable to the participants in their jobs. While this was not directly assessed as part of this evaluation – either through our review of course descriptions, attendee characteristics, or other means, we did look for participant survey results that would indicate whether or not attendees were seeking content that was directly relevant and/or required to do their jobs. Only about 9% of the participants reported this as the specific reason they decided to attend the course, and even fewer (3%) indicated that information relevant and/or required for their job was something they specifically expected to get out of attending the course.

Other Attributes of Course Quality. Participants were asked to rate the course they attended in 2005 on five attributes:

- Level of technical information

- Teaching skill of instructor

- Providing new information

Participants were asked to provide their rating on a scale of 1 to 10, with 1 meaning "poor" and 10 meaning "excellent." Overall, participants rated the courses they attended in 2005 very favorably as shown in Table 4-8.

Table 4-8
Course Attribute Ratings (2005)

	Mean Rating	Sample Size
Technical Information	8.5 (se 0.043)	1,480
Teaching Skill	9.0 (se 0.037)	1,472
New Information	8.5 (se 0.046)	1,486

Rating scale: 1 to 10, where 1 means "poor" and 10 means "excellent."

There is evidence that these ratings are holding fairly constant over time. For example, from 2002 to 2005, participants have been generally very satisfied with the level of technical information, the teaching skill of the instructor, and the provision of "new information." Although direct comparisons cannot be accurately made because of 5-point scale was used in 2002 and 2003, the mean ratings for these attributes were as follows:

- Technical information: 4.4 (2002) and 4.4 (2003)

- Teaching skill: 4.4 (2002) and 4.6 (2003)

- New information: 4.4 (2002 only)

Differences in course attribute ratings for the courses offered in 2005 include:

- Higher than average ratings were obtained for all attributes from participants who attended cooking classes in 2005.

- Lower than average ratings were obtained for all attributes from participants who attended courses addressing green building/LEED concepts.

These differences are shown in Table 4-9 for all course types.

Table 4-9
Average Course Attribute Ratings by Course Type (2005)

	Technical Information	Teaching Skill	New Information
Cooking (n=82)	9.0 (0.16)	9.5 (0.12)	8.6 (0.25)
Codes & Standards (n=118)	8.4 (0.15)	8.9 (0.14)	8.6 (0.15)
General (n=82)	8.4 (0.18)	8.8 (0.14)	8.0 (0.24)
Green Buildings/LEED (n=57)	7.8 (0.19)	8.5 (0.14)	8.1 (0.18)
HVAC (n=412)	8.5 (0.11)	9.1 (0.09)	8.6 (0.10)
Lighting (n=176)	8.5 (0.11)	8.8 (0.10)	8.5 (0.12)
Other (n=123)	8.3 (0.26)	8.5 (0.26)	8.2 (0.28)
Other End-Use (n=277)	8.8 (0.08)	9.1 (0.07)	8.6 (0.09)
PV/Renew Energy/DG (n=78)	8.6 (0.16)	8.9 (0.16)	8.8 (0.16)
Sector Specific (n=66)	8.6 (0.16)	9.1 (0.15)	8.5 (0.18)
Software/Analysis (n=41)	8.3 (0.21)	8.9 (0.13)	8.1 (0.19)
Overall Average (n=1509)	8.5 (0.04)	9.0 (0.04)	8.5 (0.05)

Rating scale: 1 to 10, where 1 means "poor" and 10 means "excellent."
Numbers in parentheses are standard errors.

4.4.4 Participant Satisfaction and Reasons for Dissatisfaction

Another overall indicator of program delivery effectiveness is participant satisfaction. We created an overall measure of satisfaction based on participant feedback regarding:

• Overall level of satisfaction with course

• Course performance relative to expectations

• Likelihood of attending future courses

• Likelihood of recommending course to colleagues

Overall, 70% of participants rated the course they attended in 2005 very highly along these dimensions of satisfaction. Ratings by Center are shown in Table 4-10.

Table 4-10
Overall Satisfaction Rating by Center

	Percent of Participants					
	AgTAC	**CTAC**	**ETP**	**ERC**	**ETC**	**PEC**
Favorable Satisfaction Rating	61%	70%	70%	76%	64%	65%
Sample Size	78	231	216	486	132	365

Ratings expressed as the percentage of participants who rated the course they attended favorably across all four dimensions: overall satisfaction, meeting expectations, likelihood of attending in the future, and likelihood of recommending course to colleague. Favorable ratings were assumed to be 8, 9 or 10 on 10-point scale, where 1 indicates least favorable and 10 indicates most favorable rating.

Participants were asked to indicate their reasons for dissatisfaction and to offer suggestions for making the courses more useful and valuable. Responses were grouped into the following categories:

- Detail
- Format
- Length
- Content
- Instructor
- Frequency
- Location
- Promotion

As shown in Table 4-11 (and mentioned above), nearly half of participants (48%) who were not very satisfied mentioned something related to the level of detail as their reason for dissatisfaction with the course. Other reasons, such as aspects of the course format, length and content were mentioned by 9% of participants. Another 7% were dissatisfied with the course instructor.

Table 4-11 also presents key differences in terms of reasons for dissatisfaction by Center. As shown, two-thirds of AgTAC participants (66%) reported that the course did not provide an appropriate level of detail, yet only one-third of ERC participants (34%) reported this type of reason for dissatisfaction. Nearly one in five CTAC participants mentioned that they were in some way dissatisfied with the course content, and only 5% of ETC participants cited this reason. Again, it is important to note that, while these differences by Center are statistically significant, the overall level of satisfaction with the courses attended in 2005 is very high (8.9 on a 10-point scale, where 10 means "very satisfied").

Table 4-11
Reason for Dissatisfaction by Center

	All Participants	Most Likely	Least Likely
Detail	48%	AgTAC (66%)	ERC (34%)
Format	9%	CTAC (13%)	ETC (5%)
Length	9%	ERC (17%)	ETC (5%)
Content	9%	CTAC (19%)	ETC (5%)
Instructor	7%	ETC (11%)	AgTAC and CTAC (4%)
Location	<1%	ERC (1%)	All Others (0%)
Promote	<1%	PEC (1%)	All Others (0%)
Sample Size	329		

4.4.5   Suggestions for Improvement

Nearly two-thirds of all participants (64%) who attended courses in 2005 did not offer any suggestions for improvement. Of those who did, we summarize the suggestions below without providing any background or context. We encourage the Center directors to review this list and determine which areas, if any, are of particular concern for the specific courses being offered.

- **Course format (24%)** – Of the nearly one quarter of all participants who provided at least one suggestion for improvement, most suggested that the course should include more hands-on activities (64%), provide additional time for Q&A (18%), be offered in smaller/one-on-one classes (15%), include onsite visits (5%), and/or include on-line classes (4%)

- **Course frequency (16%)** – All of these participants suggested that the Centers should offer additional classes or offer classes more often because classes fill up too fast

- **Course length (14%)** – Nearly all of these participants (91%) mentioned that the course should have been longer or that the course was "too short," although 11% mentioned that the Center should offer shorter classes

- **Level of detail (10%) –** Most of these participants mentioned that the course could have provided more detail and/or covered more material (64%), that the Center should offer more advanced classes (28%), and/or that the Center should offer more classes for beginners (23%)

- **Course content (10%)** – Most of these participants reported that the course they attended did not apply to their specific industry or profession (84%) and/or that key concepts were missed or not included in the course (14%)

- **Course instructor/materials (7%)** – Most of these participants suggested that the course materials, hands-outs, and reference documents could have been better (61%), while 39% mentioned that the instructor should be more knowledgeable (39%)

- **Course location (9%)** – These participants suggested that the utilities consider offering courses in different locations

- **Course promotion (8%)** – Most of these participants suggested that the Centers need to expand its advertising activities (77%) and create better course description and marketing materials.

As mentioned above, the results indicate that overall the Centers have offered courses that participants have been very satisfied with and for which they offer very few suggestions for improvement that touch on some very generic areas of course design and delivery effectiveness. The utilities need to implement post-training surveys to identify specific areas for improvement that they can be implemented in a more timely manner. This is particularly important given the extent to which specific courses are offered across utilities multiple times in the same year.

4.5 Program Outcome Assessment

The third evaluation objective involved determining the indirect impact of the Statewide ETS Program on participant actions. We identified several indirect impacts (or outcomes) that were appropriate for this program, including increased awareness, confidence, and capabilities that can be attributed (via self-reports) to information provided through the courses[10]. In addition, we assessed the extent to which the information attendees obtained through participation in courses led them to implement energy efficiency projects (either on their own or through participation in another utility program). We then identified aspects of Best Practice in course design and implementation that are having the most positive (and least negative) influence on these desired outcomes.

4.5.1 Increased Awareness

Participants were asked to indicate whether they agreed or disagreed that, as a result of attending the courses, they were more aware of energy efficient technologies and solutions for their clients (market actors) or their facilities (end-use customers). On a 10-point scale, where 1 meant "strongly disagree" and 10 meant "strongly agree," the average participant rated their agreement as 8.4 (se 0.060), indicating a significant increase in awareness attributable to the information learned through the course. This question was asked of both upstream market actors and end-use customers and there was no significant difference in the average rating between these two groups. Again, due to different scales, we cannot make perfect comparisons over time but we do see evidence that this type of outcome has been consistently reported over time. For example, 79% of 2002 participants reported a 4 or 5 (on a 5-point scale) and in 2003 80% reported either 4 or 5, indicating significant awareness level increases that can be attributed to the course.

Differences by Center are shown in Figure 4-2. Similar to the results presented above for knowledge levels, CTAC participants reported the highest average rating for increased awareness levels (8.7 [0.13]). ETP and ERC participants also reported high awareness ratings; PEC, AgTAC and ETC participants reported significantly lower scores than the other three center participants.

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[10] It is important to acknowledge that we did not ask participants to indicate their baseline levels of awareness, confidence and capabilities prior to attending the course. Given the participant profile presented in Section 3.4, it is possible these baseline levels may already have been fairly high.
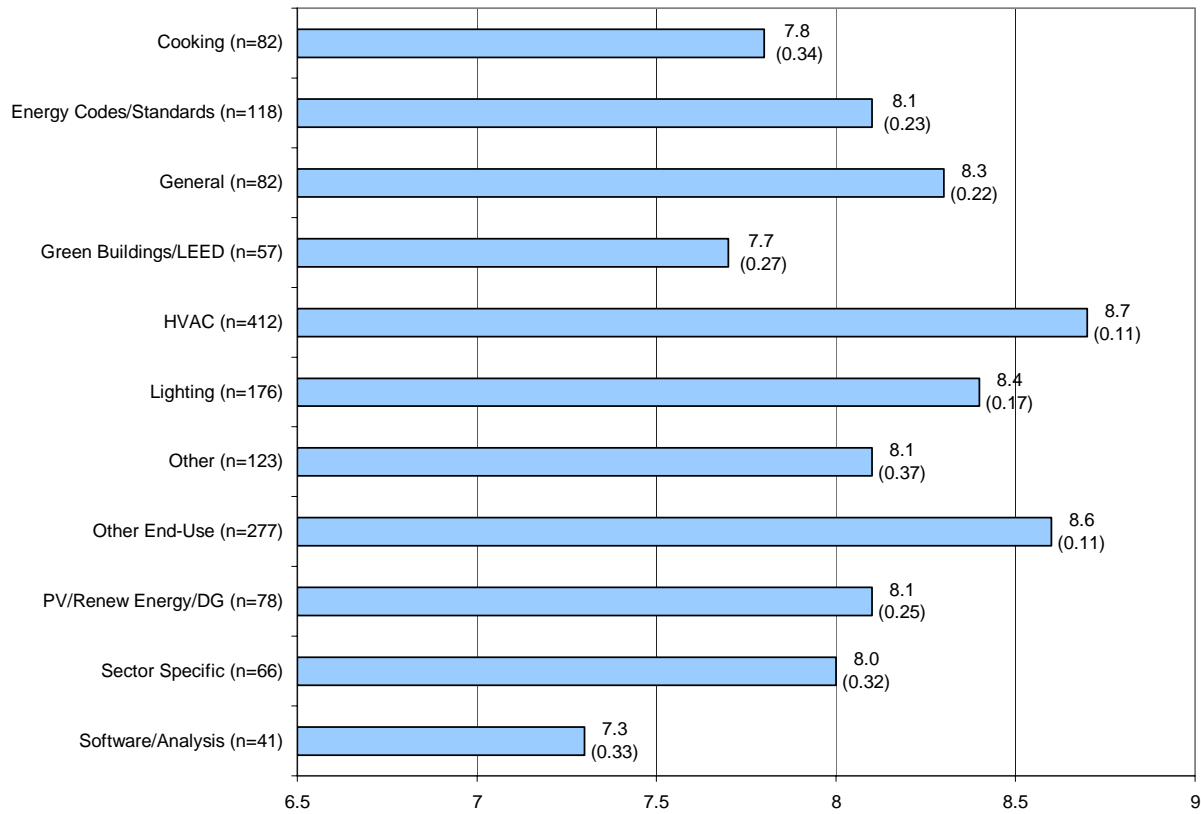
Figure 4-2
Average Awareness Level Ratings by Center (2005)
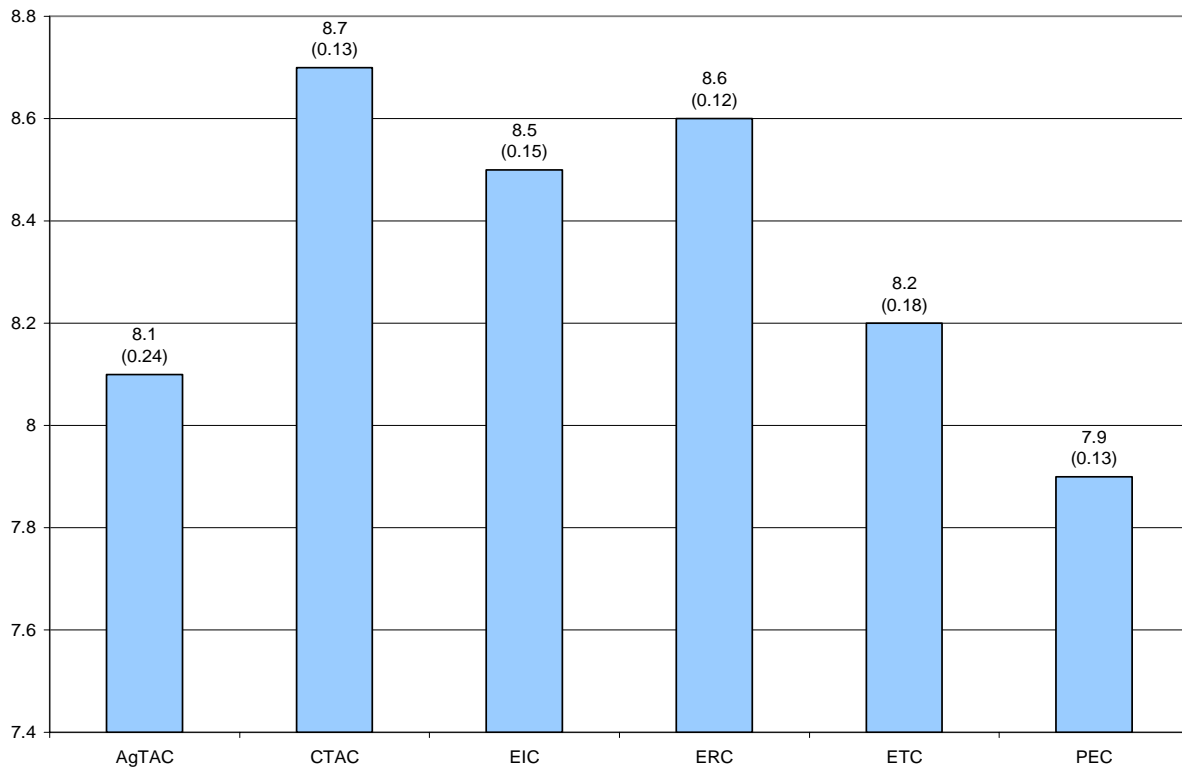
Participants asked to rate their level of agreement with the statement: "As a result of attending [course name], I am more aware of energy efficient technologies and solutions for my clients (market actors) or my facility (end-use customers)." Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.

Differences by course type are shown in Figure 4-3. As shown, participants who attended HVAC courses reported the highest rating for increased awareness levels (8.7 [0.11]) and participants who attended courses addressing software/analysis tools reported the lowest (7.3 [0.33]). This result is somewhat intuitive as the question may not have been as applicable for courses addressing software/analysis tools.

Figure 4-3
Average Awareness Level Ratings by Course Type (2005)

Participants asked to rate their level of agreement with the statement: "As a result of attending [course name], I am more aware of energy efficient technologies and solutions for my clients (market actors) or my facility (end-use customers)." Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.
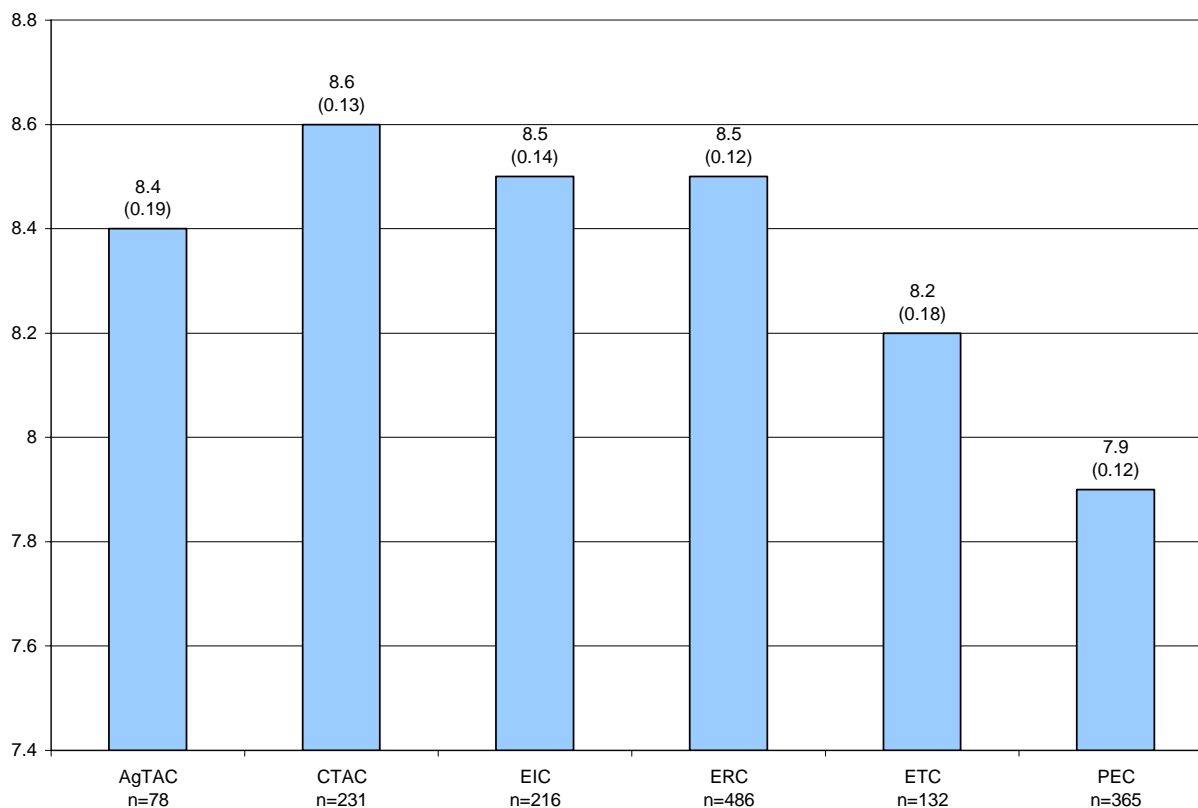
4.5.2   Improved Confidence

Participants were also asked to indicate their level of agreement with the statement, "As a result of taking the [course name], I am more confident in the performance of energy efficient technologies." On the same 10-point scale, where 1 meant "strongly disagree" and 10 meant "strongly agree," the average participant rated their agreement as 8.3 (0.058) indicating a significant increase in confidence attributable to the information learned through the course. This question was asked of both upstream market actors and end-use customers and, on average, end-use customers were somewhat more likely to indicate improvement in confidence levels (8.5 for end-users v. 8.2 for market actors).

As mentioned above, these findings have held steady over time – in 2002, 75% of participants provided ratings for increased confidence levels of either 4 or 5 (on a 5-point scale) and 78% of participants in 2005 reported a 4 or 5.

Differences by Center are shown in Figure 4-4. PEC participants reported the lowest average rating for increased confidence levels (7.9 se 0.12).
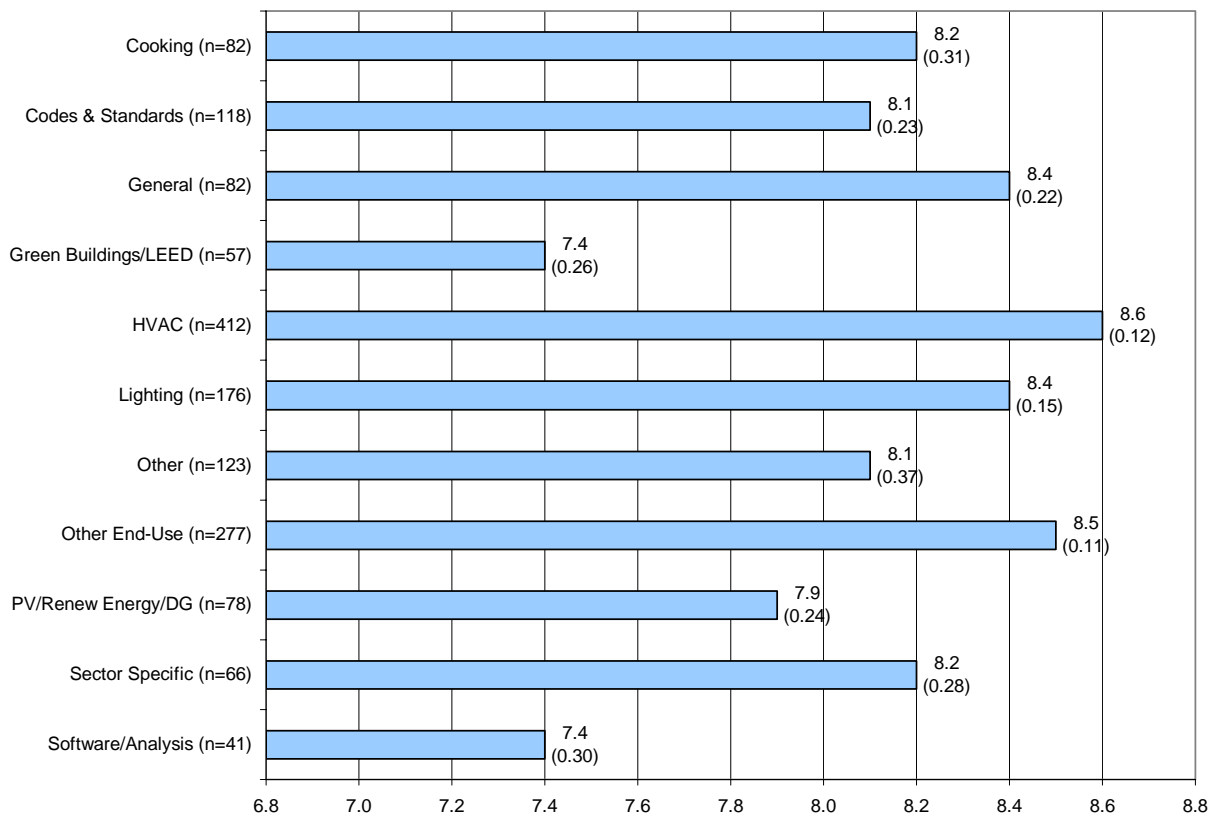
Figure 4-4
Average Confidence Level Ratings by Center (2005)

Participants asked to rate their level of agreement with the statement: "As a result of taking the [course name], I am more confident in the performance of energy efficient technologies." Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.

Figure 4-5 presents the average ratings by course type. Participants who attended HVAC and "Other End Use" courses reported the highest rating for increased confidence levels (8.6 [se 0.12] and 8.5 [se 0.11], respectively). Participants who attended courses addressing software/analysis tools and green building/LEED concepts reported the lowest (7.4 [se 0.30] and 7.4 [se 0.26], respectively).

Figure 4-5
Average Confidence Level Ratings by Course Type (2005)

Participants asked to rate their level of agreement with the statement: "As a result of taking the [course name], I am more confident in the performance of energy efficient technologies." Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.

4.5.3   Improved Capabilities

Participants were also asked to indicate their level of agreement with the following statements related to behaviors: "As a result of taking the [course name]…

- …I recommend energy efficient technologies and solutions to my clients/management more often."

- …I am better able to implement energy efficient technologies or solutions." *(end-use customers only)*

On the same 10-point scale, where 1 meant "strongly disagree" and 10 meant "strongly agree," the average participant rated their agreement with the statement related to increased recommendations as 8.1 (0.067) and the average rating for increased implementation was 8.2 (0.10). There was little difference in the ratings given by upstream market actors and end-use customers for increased recommendations (8.1 and 8.3, respectively).

Differences by Center are shown in Figure 4-6. PEC participants gave the lowest average rating for increased recommendations, and CTAC and ERC end-use customer participants gave the highest average rating for increased implementation.
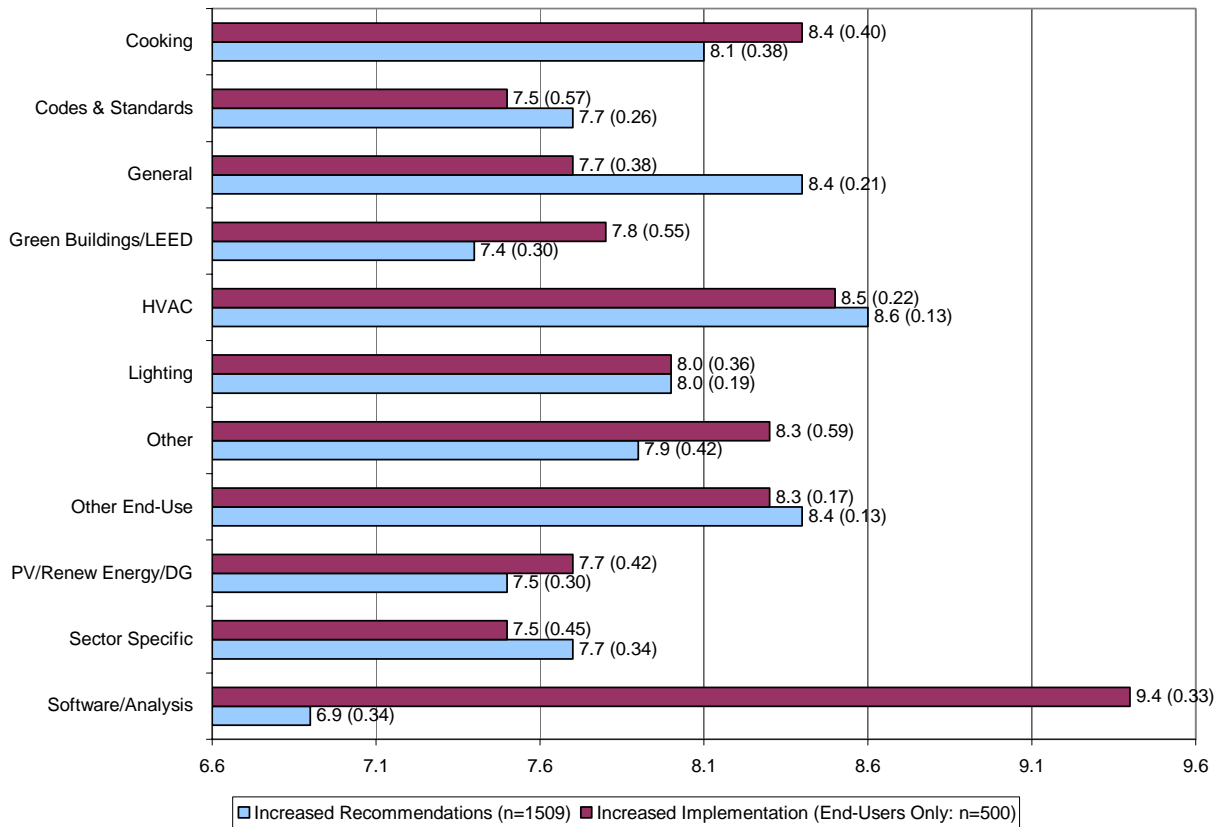
Figure 4-6
Increased Recommendations and Implementation Ratings by Center (2005)
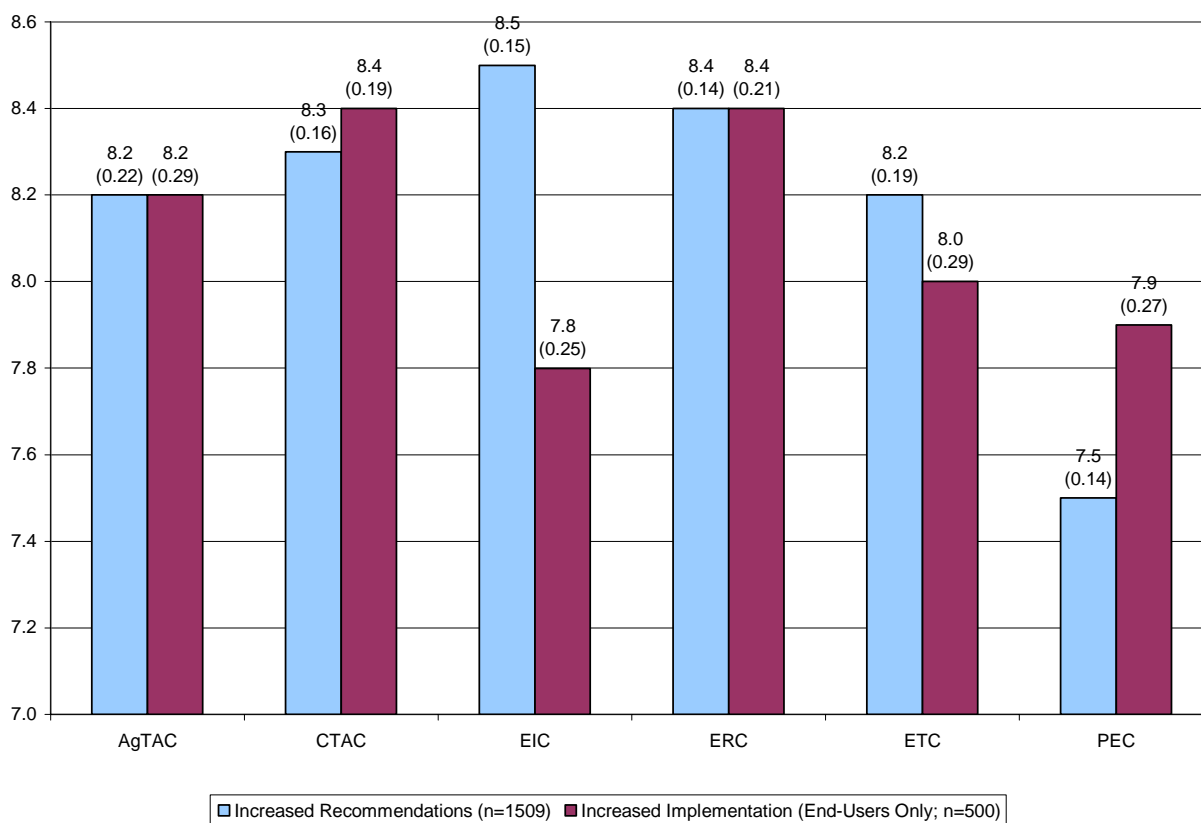
Participants asked to rate their level of agreement with the statements: "As a result of taking the [course name] (a) I recommend energy efficient technologies and solutions to my clients/management more often, and (b) I am better able to implement energy efficient technologies or solutions (end-use customers only.") Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.

Differences by course type are shown in Figure 4-7. Consistent with results presented above, participants who attended HVAC courses reported the highest rating for increased recommendations (8.6 [0.13]), and participants who attended courses addressing software/analysis tools reported the lowest (6.9 [0.34]). In addition, extremely high ratings for increased implementation were reported by end-use customers who attended courses addressing software/analysis tools (9.4 [0.33]).

Figure 4-7
Increased Recommendations and Implementation Ratings by Course Type (2005)

Participants asked to rate their level of agreement with the statements: "As a result of taking the [course name] (a) I recommend energy efficient technologies and solutions to my clients/management more often, and (b) I am better able to implement energy efficient technologies or solutions (end-use customers only.") Rating scale: 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree." Numbers in parentheses are standard errors.

The average rating for increased recommendations was different for market actors v. end-use customers for a few course types. For example, end-use customers gave much higher average ratings (than market actors) for increased recommendations attributable to the information learned in courses addressing cooking topics and software/analysis tools.

- The average rating given by end-use customers for increased recommendations was 8.61 (stderr 0.36) for courses addressing cooking topics and 9.35 (stderr 0.32) for course addressing software/analysis tools.

- The average rating given by market actors for increased recommendations was 7.12 (stderr 0.83) for courses addressing cooking topics and 6.45 (stderr 0.37) for course addressing software/analysis tools.

4.5.4   Implementation of Energy Efficiency Projects[11]

End-use customers who attended courses in 2005 were asked a series of questions to assess the extent to which they had implemented energy efficiency projects based (at least in part) on the information they obtained through the course. Specifically, participants were asked whether or not, since attending the course, they had:

- purchased any major energy-using equipment, such as lighting, refrigeration, HVAC, or food service equipment

- made any major changes to the way it operates or maintains its equipment

- made any major changes to the building's shell, such as, insulating walls, replacing a roof or windows, etc.

- made any major changes to the facility design, such as adding more space or remodeling existing space

- made any other major changes to the energy-using equipment or space

Participants who indicated that any of these changes had been made were then asked whether or not the course they attended in any way influenced the decisions they made about the project.

Overall, nearly three quarters of all end-use customers (70%) reported that, since attending a course in 2005, they have made a change to their facility, and just under half of all end-use customers (47%) indicated that they this change was influenced by the information provided during the course. Detailed results by Center are shown in Table 4-12. End-use customers who attended courses through SDG&E's ETP were the most likely to make changes (89%) and also the most likely to make changes that were influenced by the information they obtained (54%).

Differences by course type suggest that HVAC courses were the most effective in influencing participant actions – 57% of all end-use customers who attended HVAC courses went on to make changes to their facility that were in some way influenced by the information they obtained through the course. Courses focused on lighting and other end-uses were also highly effective in this respect (49% and 50%, respectively). Courses addressing "other" topics were the least effective (24%) and only about one third of the participants who attended Sector-Specific, Software/analysis or Green Building/LEED courses went on to make changes that were influenced by the information they obtained through the course.

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[11] When the survey was initially fielded, there was an error in the skip pattern and, as a result, only 149 end-use customers were asked these questions when a total of 509 should have been asked. We called back all 509 end-use customers in an attempt to administer this brief series of questions. We were successful in completing follow-up surveys with a total of 304 end-use customers (i.e., 60% of those who should have been asked).

Table 4-12
Changes to End-Use Customer Facilities Since Attending Course and Influence of Course
(2004-2005)

		Percent of End-Use Customers Implementing Change						Sample Size
		New Equipment	O&M	Building Shell	Facility Design	Other	Any Change	
Overall	**Made Change Since Attending Course**	**54%**	**33%**	**27%**	**34%**	**14%**	**69%**	**304**
	Made Changes Influenced by Course	**32%**	**22%**	**11%**	**18%**	**4%**	**47%**	
AgTAC	Made Change Since Attending Course	64%	48%	40%	48%	18%	71%	30
	Made Changes Influenced by Course	34%	24%	7%	15%	7%	44%	
CTAC	Made Change Since Attending Course	49%	36%	18%	31%	28%	69%	56
	Made Changes Influenced by Course	31%	22%	2%	17%	9%	48%	
ETP	Made Change Since Attending Course	78%	46%	28%	58%	18%	89%	51
	Made Changes Influenced by Course	42%	34%	10%	25%	4%	54%	
ERC	Made Change Since Attending Course	51%	23%	23%	21%	7%	63%	70
	Made Changes Influenced by Course	35%	14%	14%	13%	2%	44%	
ETC	Made Change Since Attending Course	34%	20%	49%	10%	5%	70%	26
	Made Changes Influenced by Course	14%	14%	26%	7%	5%	43%	
PEC	Made Change Since Attending Course	45%	33%	27%	38%	8%	63%	71
	Made Changes Influenced by Course	24%	25%	14%	25%	2%	45%	

4.5.5   Awareness of and Participation in Utility Programs

Participants were asked if they were aware of any other programs offered by the utilities to help promote energy efficiency. More than half of all participants overall (57%) were aware of other utility programs. Table 4-13 lists the types of programs that ETS participants reported being aware of.

Table 4-13
Participant Awareness of and Participation in Other Utility Programs (2005)

	Percent of All Participants Aware of Program	Percent of Participants Aware of Program Who Have Participated
Prescriptive rebates	21%	39%
Custom incentives	8%	15%
New construction incentives/assistance	9%	17%
Other incentives	8%	15%
Renewable power/demand response	4%	7%
Other programs	3%	5%
None	1%	0%
Don't know	12%	22%
Sample Size	1,509	826

In addition, participants were asked if they had participated in any other utility programs since attending the ETS course. Overall, about one third (31%) reported that they have participated of some type of program since attending the course in 2005. Participants were then asked if they were made aware of these programs during the course they attended in 2005. Across all participants, about 18% indicated that they participated in programs that they were made aware of during course they attended in 2005. This has increased since 2003, when only 11% of participants indicated that they had participated in programs after learning about them during the course they attended.

Differences by Center are shown in Figure 4-8. As shown, PEC participants were among the most aware of other utility programs, and ERC participants represent the least aware. In terms of program participation in general, ETP participants were the most likely to have participated in other utility programs since attending ETP courses in 2005 and, perhaps as expected given relatively low awareness, ERC participants were among the least likely. Nearly one-third of all ETP participants (29%) reported that they participated in a utility program that they were informed about during the ETP course they attended in 2005. Only 11% of ETC participants reported this behavior.

Figure 4-8
Utility Program Awareness, Participation Since Attending Course, and Effectiveness of Course in Leading to Participation by Center (2005)
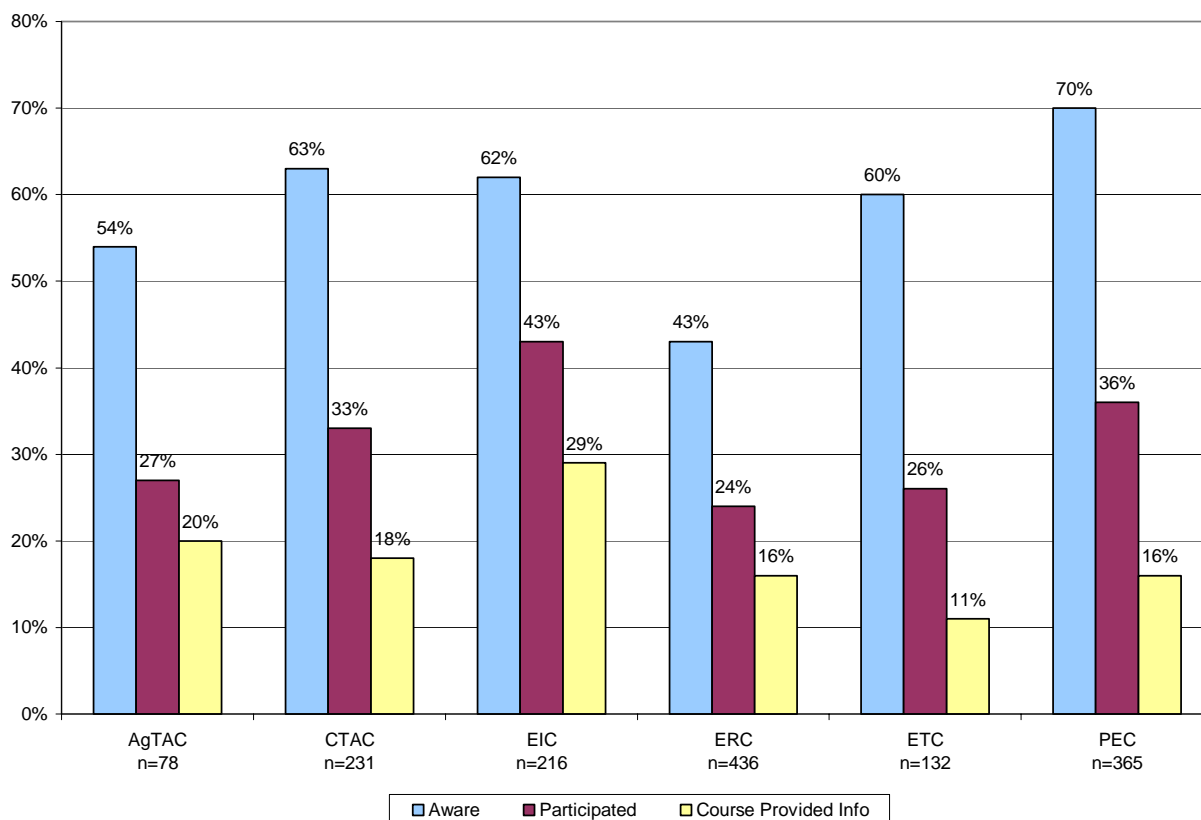

Differences by course type are shown in Figure 4-9. As shown, participants who attended courses addressing software/analysis tools were among the most aware of other utility programs (76%). These participants, along with participants who attended the more general energy efficiency courses, were also the most likely to have participated in these other utility programs since attending courses (42% and 43%, respectively).

By looking at the gap between the percentage of participants who have participated in other utility programs since attending courses and the percentage who report that they learned about these other utility programs during the specific course they attended in 2005, we can evaluate the effectiveness of different courses in leading to participation in other utility programs.

The course type that appears to have been most effective in leading participants to other utility programs is cooking; that is, while only 16% of all participants who attended cooking classes in 2005 participated in other utility programs, many of those who did were informed about these other programs during the cooking class. Similar results are found for participants who attended HVAC classes in 2005.

Figure 4-9
Utility Program Awareness, Participation Since Attending Course, and Effectiveness of Course in Leading to Participation by Course Type (2005)
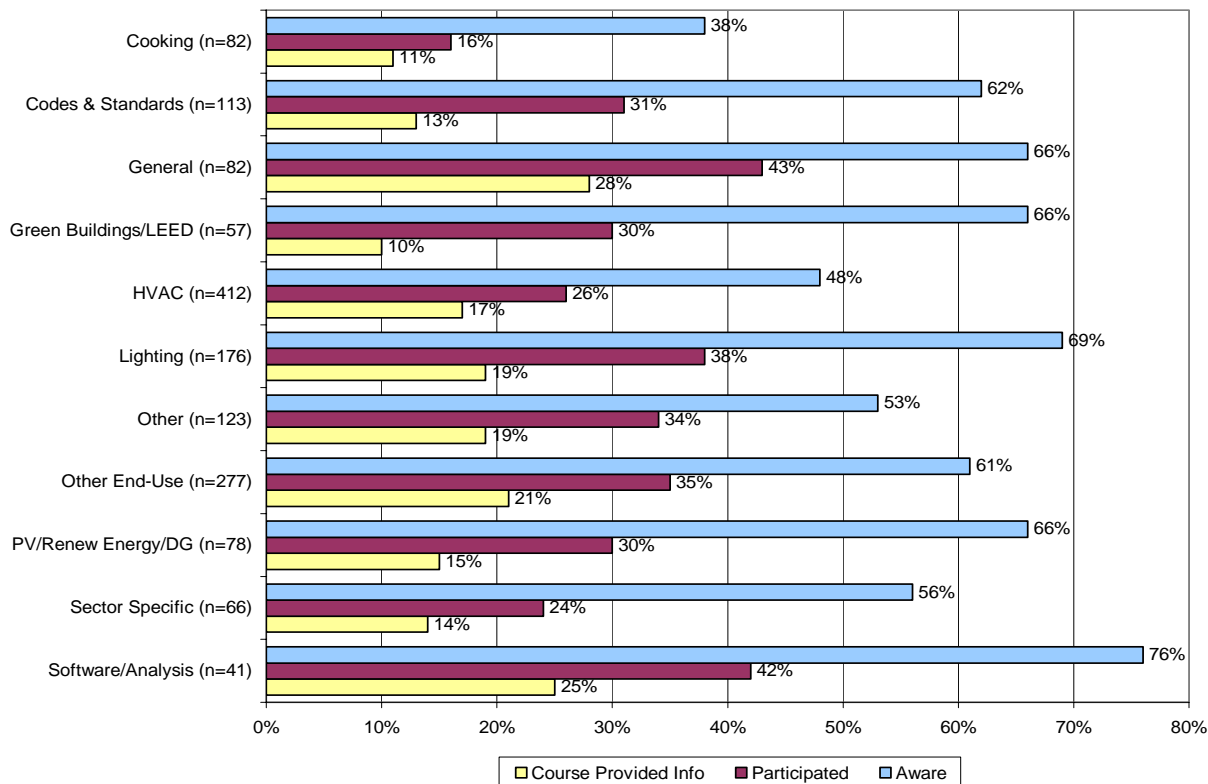
This gap is widest for courses addressing green building/LEED concepts, lighting technologies, codes and standards, and software/analysis tools. This suggests that these courses may have been less effective in leading to participation in other utility programs, and/or or these participants took part in other utility programs that were unrelated to the topic of the course they attended in 2005.

4.5.6 Best Practices Influence on Desired Outcomes

Table 4-14 summarizes a list of key elements of Best Practices in course design and instruction that were assessed to determine the level of influence (positive or negative) each has had on achieving the desired outcomes from the courses offered through the Centers.

The first column in this table lists the desired outcome evaluated through this study. The second column lists attributes that were specifically mentioned as aspects of the course that participants achieving this desired outcome were very satisfied with and/or their primary reason/expectation for attending. For example, participants who achieved improved awareness (that they attributed to the information they obtained through the course they attended) were very likely to mention the course level of detail, content and format as key components of their overall satisfaction with the course. These participants were also highly satisfied with aspect of the course marketing and promotion, as well as the instructor and/or instruction materials. If Center staff focus on doing a good job designing courses with Best Practices in these key areas, the results from this analysis suggest that not only are participants likely to be highly satisfied, they are also more likely to achieve the desired outcome (in this case, improved awareness).

The attributes in the third column were specifically mentioned as aspects of the course that participants were very dissatisfied with, the reasons their expectations were not met, and/or areas they suggested needed improvement. For example, participants who achieved increased knowledge levels (that they attributed to the information they obtained through the course they attended) were likely to mention the course location, length, frequency and lecture-style format as an area of dissatisfaction or suggested improvement. The idea here is that these aspects can potentially negatively affect outcomes; as such, improvements in these areas should be explored in order to increase chances of achieving the desired outcome (in this case, improved knowledge).

The attributes in the fourth column were not shown to have any effect on the desired outcomes. For the improved awareness outcome, factors such as where the course was held, how long it was held for, and how often it was offered do not appear to affect participants in any particular direction related to the desired outcomes. Interestingly, contrary to Best Practices, we did not find the desire to obtain job-related content as having a significant effect on achieving the desired outcomes.

Table 4-14
Desired Outcomes and Areas of Best Practices Influencing Outcome

	Areas of Potential Positive Influence	Areas of Potential Negative Influence	Neutral
Improved awareness	Detail Content Format Marketing/promotion Instructor/materials		Location Length Frequency Job-related
Improved knowledge	Detail Content Hands-on format Marketing/promotion Instructor/materials	Location Length Frequency Lecture style format	Job-related
Improved recommendations to clients (market actors)	Detail Content Interactive format Marketing/promotion Instructor/materials	Frequency Lecture style format	Location Length Job-related
Improved recommendations to management (end-users)	Detail Content Location Instructor/materials Frequency	Length Job-related	Format Marketing/promotion
Improved capability to implement projects (end-users)	Detail Content Format Marketing/promotion Instructor/materials	Job-related	Location Length Frequency
Implemented projects attributable to course (end-users)	Detail Content Interactive format	Length Frequency Lecture-style format Instructor/materials	Location Job-related Marketing/promotion
Participated in other programs	Content Length Frequency Interactive format Instructor/materials	Lecture-style format Job-related	Location Marketing/promotion

5.   Conclusions and Recommendations

The specific objectives of this evaluation were to:

- Determine whether program marketing messages have successfully conveyed what customers can gain from participation so as to align expectations of targeted market segments.

- Evaluate program delivery processes and program effectiveness.

- Determine impact of the energy centers' programs on customer actions.

The following is a concise summary of the key findings as they relate to each of the three research objectives, as well as a consolidated list of the primary conclusions and recommendations from this evaluation effort.

5.1   Evaluation Findings

The utilities appear to have met their overall goals in terms of number of classes offered, classes were well attended and a broad range of courses were offered within each Center. During 2004-2005, the utilities reported that over 1,000 courses were offered through the statewide effort and the characterization database developed for this evaluation contained detailed information on 981 courses. While not an exact match, we feel the characterization database does an adequate job in confirming the overall level of effort claimed by the utilities for 2004-2005. Over 30,000 attendees were listed in program documentation as having attended one or more courses during this timeframe and these participants attended a very broad range of courses, ranging from very general and introductory courses to the specific and "leading edge" topics.

In addition to attendance and satisfaction goals, the Centers are feeling pressure to offer courses that more explicitly lead to direct, demonstrable energy savings. This issue was emerging during the 2003 evaluation and appears to be more pressing over time. To maintain or grow offerings at their respective Centers, staff feel it is increasingly important that they be able to demonstrate energy savings resulting from their course offerings.

The evaluation results suggest there may be room for improvement in terms of encouraging these linkages:

- Just under half of all end-use customers (47%) reported that, since attending a course in 2005, they have made an energy efficiency improvement to their facility or end-use equipment that was influenced by the information provided during the course they attended.

- About 16% of all participants who attended a course in 2005 indicated that they were made aware of and participated in another utility program based on information they obtained during the course.

If future programs are designed to achieve goals beyond quantitative attendance targets and high satisfaction ratings (i.e., direct energy savings, cross-program participation), then the Centers will need to establish goals that are linked to specific measurable indicators of these desired outcomes.

In 2004-2005, courses were designed to successfully employ Best Practices in adult education course design and implementation. Barriers will be difficult (but not impossible) to overcome. This evaluation included an assessment of Best Practices in course design and implementation. Though our review of program materials, course descriptions and program tracking data, as well as our discussions with Center staff and observation of the Best Practices workshop, we identified several areas that the courses appear to be achieving the desired results. Nevertheless, the Centers are still likely to face a number of significant barriers to expanding Best Practices. These range from general to very specific barriers, including significant reliance on subject matter experts (rather than adult learning practitioners) to design/implement most of the courses offered. As the Centers stretch to achieve goals beyond attendance and participant satisfaction (i.e., energy savings), it will be important to continue identifying and implementing Best Practices improvements. Rather than trying to immediately adopt new approaches for all courses, we recommend that Center staff should identify courses that can most easily be modified and focus efforts on courses that are expected to achieve significant energy savings through behavioral change and/or participation in other utility programs.

Best Practices in program marketing appear to have been employed – a wide range of participants attended courses in 2004-2005 and, for most attendees, their expectations were completely met. A key evaluation objective involved determining to what extent program marketing messages have successfully conveyed what customers can gain from participation so as to align expectations of targeted market segments. We were limited in our ability to assess this objective due to gaps in the course information we received from the Centers. Instead, we relied on results from the participant survey to confirm the extent to which expectations (presumably based, at least in part, on the messages conveyed in course marketing materials) were met. Therefore, while we cannot confirm that participants' expectations for what they expected to get out of the course are in fact what the course designer/instructor intended, we can conclude that Best Practices appear to have been employed in that participants' expectations are in line with what they reportedly achieved.

Centers attracted the appropriate types of participants and businesses to attend courses in 2004-2005. The Centers attracted a mix of upstream market actors and end-use customers across a range of business sizes. Participants overall have substantial industry-specific experience and consider themselves to be more than, or at least as knowledgeable as, their peers. Most participants have been to several prior

training courses offered at the Centers. Finally, participants tend to be situated within their place of business to make key decisions related to project development and implementation.

Participants continue to learn about Center courses through utility channels. Overtime, sources have shifted away from printed to electronic forms of communication. More aggressive efforts should be undertaken to develop effective trade partnerships for increasing and broadening the based on participants in the future. Over time, participants have learned about the Center and its courses from a wide array of sources, including direct contact with the utilities as well as other "word-of-mouth" sources in the industry (e.g., colleagues, trade professionals, etc.). Our evaluation confirms that more recent marketing and outreach strategies that emphasize electronic communication (v. printed materials) have been effective in reaching participants (e.g., fewer participants mention brochures, more mention email and "word-of-mouth" sources). To reach out to a new, broader group of participants, the utilities need to more aggressively develop marketing and outreach partnerships with outside organizations.

The evaluation confirms that the Centers offered a broad range of classes offered throughout the year with reasonable frequency. Class size may be an issue for some Centers, depending on the type of course and attendees. We lacked information on the specific content and format for the full set of courses offered during 2004-2005 and, as such, it was not possible to assess class size in any systematic way. However, it does seem likely that there is a potential imbalance between the number of relatively large classes and the number of small classes, especially across different Centers. While there were differences across Centers in terms of the frequency with which courses were offered throughout the year, these differences do not appear to have negatively affected participant opinions – i.e., participants rated the frequency with which specific courses were offered very favorably, and few participants mentioned course (in)frequency as a reason for dissatisfaction. Finally, the courses offered in 2004-2005 represent a fairly diverse set of topics, as shown above. Most courses focused on specific end-uses, and nearly one out of every 10 participants attended a course on emerging topics such as green building/LEED concepts and PV/renewable energy/DG technologies.

The Centers delivered quality courses consistent with Best Practices that were highly valued by attendees. The evaluation results clearly indicate that, overall, participants were satisfied with the quality of the courses they attended. We found strong evidence that the courses employed several key elements of Best Practices, including providing opportunities for interaction/idea exchange and engaging students in active participation to retain information conveyed. We also found strong evidence that the Best Practices related to level of detail and course content were being addressed effectively. Courses were highly rated a number of other attributes, including the level of technical information provided, the extent to which information provided was new to the participant, and the overall teaching skill of the instruction. While there were slight statistical differences across Centers and by course type, it is difficult to use these results to draw meaningful conclusions and actionable recommendations about the relative quality of specific

courses. Instead, the utilities should be using the results from post-training course surveys to evaluate course quality and make mid-course corrections to course design as appropriate.

Participants were highly satisfied with the courses they attended and offered few suggestions for improvement. The majority of participants (70%) indicated that they were satisfied with the course they attended in 2005, that they were likely to attend a future course and that they would likely recommend the course to a colleague. These findings are consistent with prior evaluation results. The relatively few suggestions for improvement focused on course format (e.g., include more hands-on activities, additional time for Q&A, smaller/one-on-one classes, onsite visits, on-line classes), frequency (i.e., offer additional classes and/or or offer classes more often), length (i.e., offer longer courses), and level of detail (i.e., provide more detail, cover more material).

Participants feel their capability to implement energy efficiency projects has improved and about half of participants who attended courses in 2005 have implemented projects as a result of the information they learned at the Centers. Efforts to improve program Best Practices should help in continuing to bring about these desired outcomes. Most participants reported that their awareness, knowledge and ability to implement energy efficiency solutions has improved as a result of attending a course. In addition, about half of all end-use customers (47%) reported that, since attending a course in 2005, they have made an energy efficiency improvement to their facility or end-use equipment that was influenced by the information provided during the course. About 16% of all participants who attended a course in 2005 indicated that they were made aware of and participated in another utility program based on information they obtained during the course. The evaluation has identified elements of Best Practices (e.g., effective marketing and promotion, appropriate level of detail/content, modified course format, etc.) that are not only linked to high participant satisfaction levels but also linked to achievements in the desired course outcome (e.g., improved awareness, knowledge and behavior). Proactive follow-up activities will also help influence project implementation and program participation rates.

5.2   Conclusions and Recommendations

The following is summary of the key conclusions and recommendations from this evaluation:

- Participants are highly satisfied with the courses offered through the Centers, their expectations are consistently met, and they offer very few suggestions for improvement.

    o Recommendation #1: Maintain Best Practices in adult learning.

        ▪ Emphasize general course topic, as well specific course content and intended outcomes, in course marketing materials and descriptions.

- Offer courses of varying technical complexity to appeal to a wider range of participants. Clearly describe the level of technical detail to be covered in course marketing materials and descriptions.

- Offer courses that provide attendees with specific action plans for implementing energy efficiency projects.

- Design course format that is appropriate for content (e.g., classroom style learning v. hands-on activities).

- Limit course size where appropriate.

- Build in linkages to other programs and follow-up post-course as appropriate.

- Participants represent a mix of market actors and end-use customers across a range of business sizes, they make key decisions related to project development and implementation, and they have substantial industry experience and are already very knowledgeable.

  o Recommendation #2: Develop course content that is both current and "ahead of the curve" to ensure increased learning among regular participants.

    - Push the envelope to design courses that expose these participants to new, technically advanced topics.

- Most participants have already attended several training courses offered at the Centers and are very likely to attend future courses.

  o Recommendation #3: Take full advantage of the training investment that has previously been (and will likely continue to be) provided to active participants.

    - Actively engage these participants in providing case studies or participant testimonials.

    - Ensure these active participants are aware of and actively participating other utility programs as appropriate.

- Most participants continue to be informed about upcoming courses through utility announcements (e.g., direct mail, email, website calendars).

  o Recommendation #4: Promote courses via partnerships with external organizations to increase participation from "first timers."

- Expand marketing reach beyond the pool of prior course attendees.

- Promote courses through existing partnerships with traditional trade organizations (e.g., IHACI, DOE, etc.) as well as new partnerships with emerging industry trade associations and conferences (i.e., USGBC, renewable energy organizations/working groups, etc).

- The Centers continue to deliver high quality and valued courses consistent with Best Practices. Areas for improvement need to be addressed at the course level.

  o Recommendation #5: Use results of post-training evaluation surveys to identify areas for timely, course-specific improvement.

    - Utilities should implement post-training evaluation surveys as standard practice.

    - Develop action plans to address feedback obtained.

    - Document survey results and action plans as part of formal quarterly reporting process.

- Most participants feel their capability to implement energy efficiency projects has improved, but there is a potential disconnect between this capability and stated behavior. Direct linkages to other utility programs could be improved.

  o Recommendation #6: Increase in-course emphasis on specific implementation actions and improve linkages to other utility programs.

    - Require course instructors to focus class time on the development of action plans

    - Encourage participants to take action through proactive follow-up activities.

  o Recommendation #7: Increase post-course follow-up activities to increase project implementation / program participation rates.

    - Rely on program managers and/or Account Executives to cross-promote other utility programs as appropriate.

- Most Centers offered a fairly comprehensive suite of courses during 2004-2005, but only a few Centers offered courses in some of the newer, emerging areas (i.e., green building/LEED design, PV/renewable energy/DG topics).

o Recommendation #8: Ensure future programs include new, integrated and technically-advanced course offerings.

  ▪ Review 2006-2008 to identify gaps and develop plans for 2009-2011

  ▪ Review best practices in course design for new/emerging topics

o Recommendation #9: Conduct timely and careful evaluations of new course formats (online tools, onsite workshops).

  ▪ Conduct real-time evaluation of new course formats to ensure effective learning (e.g., usability testing, participant onsite observation)

  ▪ Use evaluation feedback to improve course format/design

  ▪ Document results as part of formal quarterly reporting process