2006-08 SCE Energy Centers (AgTAC, CTAC) Process Evaluation Report

Presented November 2008
CALMAC Study ID: SCE0260.01

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Executive Summary

This report is the result of a process evaluation project focused on gauging AgTAC and CTAC SCE Energy Centers (ECs) current performance in several key areas related to EC goals and objectives as defined in the EC Program Theory documentation.

Specifically, this report addresses the following questions related to EC effectiveness in encouraging and supporting customers' to take action to increase energy efficiency and reduce demand:

- What progress have the ECs made toward the addressing the recommendations made in the recent KEMA process evaluation for Program Years 2004 to 2005?
- Do current EC classes reflect Adult Learning Principles and associated best practice — and what are the key areas for improvement relative to these principles and practices?
- How are the EC classes doing relative to key metrics associated with support of energy efficiency programs and support of customer segments?
- How are the EC exhibits doing relative to key metrics associated with support of classes, energy efficiency programs, and customer segments?
- What do class Exit Surveys indicate in terms of the impact that classes have on participants knowledge and action relative to energy efficiency measures and practices?
- What are the key needs and interests of people attending classes at the ECs and how do they differ among people who frequently attend classes compared to those who do not return after attending one class?
- What does the current literature tell us that can help guide future efforts to home in on the most appropriate "levers" for behavior change?

The following pages of this section:

- Provides brief discussion of EC goals and program theory to provide the context and background for this evaluation project
- Summarizes key findings and recommendations around the key questions that focused our evaluation effort
- Reviews past EC evaluations and the recommendations made, together with the work that has been done to build on them

The remaining sections of this report explore the key questions in more detail.

EC Goals and Program Theory

AgTAC and CTAC, SCE's Energy Centers (ECs), serve as an important delivery channel for information concerning energy efficiency programs and offer a place where customers can see, hear, touch and learn about the latest energy-efficient technologies for their business and home. The ECs are relied upon by, and are trusted resources for, utility customers seeking unbiased and accurate information regarding existing and emerging energy efficiency technologies and their application.

With an overarching goal of **encouraging and supporting customer action to increase energy efficiency and reduce demand**, the ECs primarily target business customers, but also support residential customers, with the following objectives:

- Disseminate information about efficient technologies and practices to electric, natural gas, and water utility customers in order to help these customers:
  - Reduce energy and water usage
  - Lower their bills
  - Reduce operation and maintenance costs
  - Improve productivity
- Provide services to a variety of midstream and upstream market actors (e.g., architects, engineers, distributors, contractors, etc.) who use information and tools to design more efficient buildings or processes and to conduct efficient energy system retrofits and renovations

The ECs also promote energy efficiency programs in coordination with business and community-based organizations by holding seminars outside of the centers and within economically disadvantaged and ethnically diverse communities. Off-site events are sometimes supported through outreach activities that provide customers hands-on material and displays to further enhance their learning experience.

In third quarter 2007, Caroline Chen, M&E Project Manager, and KVD Research Consulting — in cooperation with SCE EC staff — completed the *Program Logic Diagram, Program Theory, Potential Indicators and Success Criteria* report. That Program Theory report describes the program, identifies market barriers, indicates goals, explains strategies, and shows how success will be measured and problems will be detected.

In effect, the Program Theory report defines the context for a journey that the ECs can undertake to enhance current approaches — and implement new approaches — for classes, exhibits, and related materials in order to better meet the goal of **effecting behavior change (implementing EE measures and practices) among customers.**

Program Theory Issues Explored in this Report

In fourth quarter 2007, the SCE ECs asked our research team to follow up on key issues associated with the measures of success identified in the Program Theory report. Our team, consisting of Jim Davenport and Lisa McLain (affiliates of ASW Engineering), Deborah Laurel and Associates, and KVD Research Consulting, undertook five main tasks, as well as two related supportive activities. These tasks are summarized below.

Task	Description	Approach	Primary Responsibility
Supportive Task A:	**Review of Past EC Evaluations and Actions** Review past evaluations and the recommendations made, together with the work that has been done to build on them	Review the recommendations from the PY2004-05 EC evaluation; determine how recommendations have been addressed in PY2006-08 by analyzing published materials, the program database, and direct reports from program staff	Katherine Randazzo
Task 1:	**Adult Learning Gap Assessment** Assess selected classes against Adult Learning Principles and best practices	Conduct in-person audit of five classes (two at AgTAC, three at CTAC); rate each session and materials based on criteria for adult learning principles and best practices	Deb Laurel
Task 2:	**Baseline Metrics — Classes** Establish a baseline metric for class goals: ● 100% have tie-in to existing programs ● Encourage action / behavior change in class participants ● Address target customer segments in training	Review available materials for 56 classes (17 AgTAC, 15 CTAC, 24 both locations); rate materials based on specific criteria regarding support of programs, behavior change, and customer segments	Jim Davenport and Lisa McLain
Task 3:	**Baseline Metrics — Exhibits** Establish baseline metrics for display and exhibit goals: ● 100% have tie-in to classes, programs, and customer segments ● 100% show documentation of customer benefits and technology or practice	Conduct in-person audit of 32 exhibits (17 AgTAC, 15 CTAC); rate exhibits and associated signage and collateral based on specific criteria regarding support of classes, programs, behavior change, and customer segments	Jim Davenport and Lisa McLain

Task	Description	Approach	Primary Responsibility
Task 4:	**Baseline Metrics — Knowledge and Action** Use Exit Survey (Customer Satisfaction Survey) data to establish baseline metrics re. knowledge and action	Analyze data from class Exit Surveys (Customer Satisfaction Survey) for all classes January through December 2007; focus on survey items specific to knowledge, action, and request for SCE follow-up	Jim Davenport and Lisa McLain
Task 5:	**Energy Center Participants** Conduct a follow-up study to the KEMA 04-05 findings to learn more about participants needs and interests	Analyze data from AgTAC and CTAC class attendance databases and from telephone interviews (100 participants AgTAC, 100 participants CTAC); focus on differences between frequent and one-time participants in terms of participants' organizations, reasons for attending, satisfaction and impact on behavior, and suggestions for improvement	Katherine Randazzo
Supportive Task B:	**Review of Literature re. Attitudes and Behavior** Conduct a short, focused review of the literature on attitudes and behavior in efforts to promote energy-efficient behavior	Review current literature on attitudes and behavior in efforts to promote energy-efficient behavior; identify issues likely to have implications for program design, delivery, and evaluation to help increase effectiveness	Katherine Randazzo

Table E.1: Summary of project tasks, activities, and responsibilities

Overview of Key Findings and Recommendations

Findings Overview

(Supportive Task A) Progress Review: Past EC Evaluations and Actions	
Previous Recommendations	**Responses (Actions Taken by ECs)**
Target the right people with the right courses	
100% of existing classes are reviewed and updated, per program cycle	● Program staff report that this has been completed for the PY2006-08 cycle.
100% of demos/exhibits and/or displays are reviewed and updated, per program cycle	● Program staff report that this has been completed for the PY2006-08 cycle.
Classes target small Commercial, Industrial, and Agriculture (C/I/A) customer segments: one class offered per major end use	● Program staff report that this has been completed for the PY2006-08 cycle.
Classes offered in-language: one class offered per major end use	● Program staff report that this goal was deemed inappropriate. ○ There were attempts to offer in-language classes; however, the response was very low to none. ○ There were a few Spanish classes and one Chinese class during 2008.
At least one class offered on the web and formulate plan for 2009-2011 based on results	● Program staff reports that this goal was exceeded. There have been several successful webinars during 2008 at both ECs.
More than 40% classes offered offsite/web-based	● Neither CTAC nor AgTAC is meeting the goal of 40% of classes being offered in more accessible formats, including off-site and web-based formats.
Each year, 10% of class titles will be new [This goal covers improvements (enhancements) to classes as well as new class titles.]	● Both AgTAC and CTAC have generally been meeting the 10% goal for new and making good progress toward enhancing existing classes.

(Supportive Task A) Progress Review: Past EC Evaluations and Actions	
Previous Recommendations	**Responses (Actions Taken by ECs)**
Broaden the reach of EC courses	
10% new program participants every year	● First-time attendance is very high: between 75% and 85% depending on the year and the center. (This implies the need to re-consider the specific goal relative to broadening reach of EC courses.)
Further Emphasize Course Outcomes	
Continue to strive toward best practices in adult learning	● In 2007, the ECs sponsored a multi-day adult learning principle seminar for its own staff. Nearly 100% of EC staff has attended this training. ● ECs sponsored a gap analysis of their current practice as compared to best practices. Task 1 of this report (page 29) describes this gap analysis. ● The EC RFP sent in 2007 to prospective instructors requested that adult learning principles be incorporated into their responses.
Use results of post-training surveys to identify areas for course-specific improvement	● Recent follow-up telephone interviews with EC class participants asked them for suggestions on course improvement, including content and presentation issues. Task 5 of this report (page 133) describes these telephone interviews along with other related assessment activities targeted at learning more about class participants' needs and interests. ● Revisions to the event Exit Survey (also known as Customer Satisfaction Survey) are under way. Enhancements to this instrument will help pinpoint other areas that could be improved, such as assessments of SCE program connections, follow-up possibilities, impact on knowledge and behavior of participants, and others.

Table E.1: Summary of findings — Progress Review: Past EC Evaluations and Actions (Supportive A)

Task 1: Adult Learning Gap Assessment	
EC Goal	**Evaluation Questions and Findings**
Use teaching methods suitable for adult learning	● Do the classes follow adult learning principles? ○ Two of the five classes audited did well overall (scored 87%) relative to adult learning principles. ○ Three classes did poorly overall (scored 54 – 57%). ● Do the classes reflect best practices for adult training experiences? ○ Three of the courses did poorly overall (scored 60 – 67%) relative to best practices. ○ Two did very poorly overall (45%).

Table E.2: Summary of findings — Task 1: Adult Learning Gap Assessment

Task 2: Baseline Metrics — Classes	
EC Goals/Metrics	**Evaluation Questions and Findings**
100% classes demonstrate direct tie-in to programs Inform about programs and benefits Encourage and facilitate participation in programs Educate about benefits of program-related measures and practices	● How many classes have a tie-in to one or more program? ○ Excellent tie-in between classes and programs — essentially all classes have high tie-in to one or more program ● How well do the classes **directly** support the programs — with program-specific information? ○ Very poor **direct** program support ● How well do the classes **indirectly** support the programs — with information on technologies or practices related to programs? ○ Excellent **indirect** program support
Help achieve "real world" change in participants' behavior Encourage action Overcome market barriers	● How well do the classes **encourage action** — helping them apply information and concepts addressed in the class to their own environment? ○ Mostly poor (but 16% very good) in encouraging action ● How well do the classes **help overcome common market barriers**, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation? ○ Mixed results in overcoming market barriers
Tap into untapped markets Provide courses with segment-specific content Offer in-language courses	● How many classes have a logical tie-in to one or more customer segment? ○ Excellent tie-in between classes and customer segments ● How well do the classes support segment-specific needs? ○ Poor in addressing segment-specific needs ● Are the classes offered in a language other than English? ○ Very poor in second-language offerings

Table E.3: Summary of findings — Task 2: Baseline Metrics — Classes

Task 3: Baseline Metrics — Exhibits	
EC Goals/Metrics	**Evaluation Questions**
100% of exhibits and displays are linked to seminars/classes Illustrate technologies, measures, and concepts addressed in classes Encourage participation in related classes	● How many exhibits have a logical tie-in to classes? ○ Excellent tie-in between exhibits and classes — essentially all exhibits have high tie-in to one or more class ● How are the exhibits used in tied-in classes? ○ Excellent use of exhibits in classes — typically used directly in class or in regularly scheduled class tour ● Are relevant classes promoted at the exhibits? ○ Mixed results in promotion of classes at exhibits — excellent at AgTAC; poor at CTAC
100% of exhibits and displays are linked to incentive and rebate programs Encourage participation in related incentive and rebate programs	● How many exhibits have a tie-in to one or more program? ○ Excellent tie-in between exhibits and programs — essentially all exhibits have high tie-in to one or more program ● How well do the exhibits directly support the programs through signage and collateral specific to the program? ○ Poor support of programs through signage and collateral at exhibits
Support change in behavior Document customer benefits Support hands-on demonstrations Encourage action Overcome market barriers	How well do the exhibits (and associated signage and collateral)… ● Convey purpose, use, and benefits of the technology? ○ Excellent use of signage to convey purpose, use, and benefits of the technology; mixed results for collateral ● Support both guided and independent hands-on interaction? ○ Excellent support of guided hands-on interaction ○ Very good support of independent hands-on ● How well do the exhibits encourage action — helping people relate the exhibit to their own environment and take appropriate steps to evaluate and implement the technologies or measures? ○ Very poor at directly supporting and encouraging action through signage and collateral ● How well do the exhibits help overcome common market barriers, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation? ○ Mixed results in helping overcome market barriers
100% of the exhibits and displays are linked to target customer segments Appeal to specific customer segments Provide in-language information	How many exhibits have a logical tie-in to customer segments? ○ Excellent tie-in between exhibits and customer segments — all exhibits support one or more customer segment ● How well do the exhibits support segment-specific needs? ○ Very poor support of segment-specific needs ● Are signage and collateral in a language other than English? ○ Very little second-language support in signage and collateral

Table E.4: Summary of findings — Task 3: Baseline Metrics — Exhibits

Task 4: Baseline Metrics — Knowledge and Action	
EC Goals	**Evaluation Questions**
After attending workshops and seminars, 50% of participants show an increase in knowledge by one point	● How many attendees believe the class had a positive affect on their knowledge of the subject matter? ○ Excellent in terms of participants' belief that the classes had a positive affect on their knowledge of the subject matter (Overall score of 85% compared to a Program Theory goal of 50%) ● How did scores vary by class, location, technology area, and instructor? ○ Moderate variation in total average scores when considering different "views"
50% of participants will agree that the information provided will increase the likelihood of taking EE (energy efficiency) actions in the future	● How many participants believed the event increased the likelihood EE (energy efficiency) purchases or practices? ○ Good in terms of likely impact on EE purchase or practices (Overall score of 60% for likely impact compared to a Program Theory goal of 50%) ● When will they be making purchase decisions? ○ Almost half of the participants (48%) planned to purchase or upgrade equipment within the year ● What kinds of equipment were they considering to add or upgrade? ○ Lighting and HVAC represent the majority (69%) of upgrades and additions planned ● How did scores vary by class, location, technology area, and instructor? ○ Moderate variation in total average scores when considering different "views"
10% of participants will request referral to audit or rebate programs	● How many participants wanted SCE to tell them more about the Energy Audit Service? ○ About 12% of participants made a "full request" for more information on the Energy Audit Service ● How many wanted SCE to tell them more about Energy Efficiency Programs? ○ About 15% of participants made a "full request" for more information on Energy Efficiency Programs ("Full request" refers to the participant responding "yes" to the question and provided contact information.)

Table E.5: Summary of findings — Task 4: Baseline Metrics — Knowledge and Action

Task 5: Energy Center Participants	
Basic Facts	● A large percentage of total class attendance is accounted for by a relatively small number of participants: people who have attended 10 or more classes in four years. ● Most participants are first-time participants, and many of them did not return after the first class.
Organizational Patterns	● Participants come mostly from Commercial, Industrial, and Government segments. ● SCE and Military represent the organizations with the most frequent participants.
Event Selection Patterns	● One-timers tend to select classes with basic or narrow-focus topics. ● Frequent participants select a broad cross section of classes, including those that focus on more advanced topics.
Attendance Reasons	● The most common reasons participants cite for coming to classes is to learn technical information and to keep current. ● The primary reasons that one-timers do not attend more classes are related to feasibility issues.
Satisfaction and Impact	● Both one-timers and frequent participants report that classes have a positive impact on their knowledge and attitude. ● Both groups report that classes have a positive impact on their actions — though the impact is greater for frequent participants.
Suggestions from Participants	● For both AgTAC and CTAC, half or more of the participants said the classes were “great as is.” ● At AgTAC, the most common suggestions for improvement focused on logistics (timing, location, etc.). ● At CTAC, the most common suggestions focused on student participation (hands-on, interaction, etc.).

Table E.6: Summary of findings — Task 5: Energy Center Participants

(Supportive Task B) Review of Literature re. Attitudes and Behavior	
Focus	**Findings**
Is the AKA model that served as a framework previous EC assessment-oriented activities still appropriate	● Current literature indicates that the AKA (Awareness, Knowledge, and Attitude) model continues to be an appropriate framework. ● The framework is more robust and focused on end results when we expand it to specifically include "behavior" — the AKA-B model.
How can we apply the AKA-B model and associated lessons learned to increase EC effectiveness?	● The AKA-B model can be used to address behavior at the program level, the technology level, or at the environmental/energy-efficiency level. ○ Program theory, design, and evaluation can be specifically targeted to one or more of these levels. ○ If program theory, design, and evaluation aren't aligned in terms of the levels addressed by the AKA-B model, results will be compromised. For example, if an energy center has a goal of affecting attendees' attitudes toward energy-efficiency and its value to the environment, but its classes and displays are focused only on the technological aspects of energy-efficiency measures, the goal of changing attitudes is much less likely to be achieved. ● Attitudes and motivations for behavior in the area of energy-efficiency/environmental behaviors generally fall into three categories: environmental concern, concern about limited resources, and self-interest. ○ Considering the most appropriate or all of these categories in program planning could help increase effectiveness. ○ Making the choices explicit will also help align evaluations with programs, which will benefit the outcome as well. ● Measuring behavioral intentions as well as actual post-program behavior would be wise. For example, if we know a class participant intended to take action — but does not follow through on this intention — that information can help focus investigations about what went wrong that could be improved in the next program cycle.
What can help achieve the (above) goals for further enhancing EC effectiveness?	● Program planning can be further improved by looking more deeply into social ecology theories of behavior change, together with the supporting empirical research For example, in addition, concepts such as trust, ascription of responsibility to self, and situational factors can be addressed directly in training and marketing. ○ The key to using these ideas successfully is to use them systematically as guides to program design, delivery, and evaluation. ○ In addition, including them in evaluation research can provide a much more rich and complete picture of what was and was not accomplished by the program

Table E.7: Summary of findings — Review of Literature re. Attitudes and Behavior (Supportive Task B)

Summary of Key Recommendations

Overall, substantial progress has been made during the PY06-08 cycle. Areas where impressive improvements have been pursued and implemented are listed below:

- Reviewing and updating of classes and materials to strive for new course offerings
- Updating course design to increase emphasis on course outcomes, including participant behavior changes
- Monitoring progress through changes in Exit Satisfaction Survey to track participants awareness, knowledge and attitude and energy efficiency behavior
- Embracing Adult Learning Principles by committing to internal training
- Committing to program implementation using a theory-driven approach for output and outcome

The key findings from this process evaluation indicate that all these changes have lead to favorable outcomes for the ECs. However, more changes are required in the next program cycle.

Recommendations re. Past EC Evaluations and Actions

Overall, substantial progress has been made during the PY06-08 cycle. Areas where impressive improvements have been pursued and implemented are review and updating of classes and materials, increased emphasis on course outcomes, including participant behavior, use of surveys to identify areas for further improvement, increased connection to SCE programs, and an increase in more advanced courses.

Areas where further efforts are called for include: off-site classes, web-based classes, shorter, more accessible classes, more hands-on classes, more targeted marketing, creating more repeat participants, increasing the use of adult learning principles, and increasing the rate of post-class follow-up.

There is a first-time attendee incidence of 75-85% over the two ECs and the years of 2006-2007. This is explained by a very high rate of one-time attenders among the first-time group. This implies a different problem than was assumed by the evaluators; i.e., there is a very high rate of non-return among first-time attenders.

- PY09-11 metrics should be adjusted to reflect PY06-08 findings; 10% new attendees is no longer an appropriate goal.
- Organizational changes should be considered to meet the 40% web-based or off-site class offering goal.

Recommendations re. Adult Learning Principles Implementation and Next Steps

There needs to be a clear paradigm shift in the education model used at AgTAC and CTAC if they are to fulfill their mission to create awareness, increase knowledge, change attitudes, and affect behavior related to energy use.

A first step in achieving this transformation is to accurately take stock of the current offerings and determine how these classes help accomplish the fundamental goals of the ECs. Once the ECs have a clear understanding of what current classes are designed to achieve, it will be possible to identify any important gaps in the current curriculum and to refine the classes to better meet their goals and objectives.

At the same time, the ECs can make progress toward increasing the effectiveness of the current training by developing the instructors' facilitation skills and accommodating various learning styles and other needs of individual class participants.

The following recommendations are for all Energy Center classes in general and address the next steps of taking stock of "where we're at" to better target future efforts and increasing the effectiveness of the current training. These recommendations are organized as follows:

- Taking Stock of "Where We're At"
  - Label Classes to Identify the Learning Level Associated with the Desired Outcomes
  - Require Lesson Plans for All Classes
  - Create More Effective Evaluation Tools
- Increasing Effectiveness of Current Training
  - Develop Facilitation Skills
  - Meet Different Learners' Needs

Recommendations re. Classes Tie-in to EE Programs

Our primary recommendations based on the findings for Task 2: Baseline Metrics for Classes focus on two main areas:

- More clearly and directly support the programs in the classes, actively encouraging participation in relevant programs
  - Integrate program-specific information into the training experience:
  - Identify/create one (or very few) "point person(s)" for basic program information at CTAC and at AgTAC (or for both combined), encompassing all programs — or at least all "high-impact" incentive and rebate programs.
- Actively encourage and support behavior change on the part of class participants—helping participants bridge the gap between classroom training and real-world application is key to successfully influencing participants' on-the-job (and at-home) behavior. Much of this is directly related to the recommendations associated with "adult learning principles," described in *Task 1: Adult Learning Audit* earlier in this report.

Some recommendations specific to encouraging action and facilitating behavior change that are appropriate to all levels of EC courses include:

- Include a specific suggestions (and discussions or activities) focused on "next steps" class participants can take to put their new knowledge (and skills) into action to save energy (and reduce demand)
- Provide participants with action-oriented checklists and worksheets that they can use after class.
- Provide "real world" examples of how others have benefited by acting on the measures and practices addressed in the class.
- Over time, consider developing a program-oriented, web-based "performance support system" that would help customers identify the most relevant programs for their situation and needs. The idea here is that somebody could go to the web site, answer some straight-forward questions (or put check marks next to a few sets of relevant criteria) and the system would return with a short list of programs the customer should consider pursuing.

Recommendations re. Exhibit/Display Tie-in to EE Programs and Classes

The following recommendations apply to both AgTAC and CTAC unless otherwise noted.

- Keep up the good work relative to tie-in between exhibits and programs and classes, continuing to ensure exhibits illustrate related concepts, technologies, and measures.
- To enhance support of classes at CTAC, consider using AgTAC's approach to "volatile" signage promoting classes directly at related exhibits. (See "Promotion of Classes" on page 85 for more information.)
- To enhance support of incentive and rebate programs:
  - Consider "volatile" signage to promote programs at the exhibits (similar to the approach AgTAC uses to promote upcoming classes)
  - Provide relevant program collateral at the exhibits
- Better leverage exhibits with independent audiences. In addition to the above recommendations:
  - Enhance signage to invite people to interact and to highlight key points of the interaction. ("Do this and you'll see… And the implications of what you're seeing are…")
  - At CTAC, consider placing relevant collateral within three feet of most exhibits.
- Over time, refine the focus of exhibit signage and collateral focus to more directly encourage behavior change.
- Identify/create one (or very few) "point person(s)" for basic program information at CTAC and at AgTAC (or for both combined), encompassing all programs — or at least all "high-impact" incentive and rebate programs. (**NOTE: This recommendation also applies to Classes.)**

Recommendations re. Frequent and One-time Participants

- Almost all participants take fundamental classes early in their history with the ECs. Therefore, consider using the fundamentals classes as gateways to additional ones by building in reasons for participants to come back for other classes.
- Motivate participants to make energy efficiency changes. Tie the content to rebates, show direct monetary value to participants, and tie class content to other classes.
- Make classes easier to attend for very busy people and those who live far away:
  - More satellite classes
  - Make value more evident in descriptions
  - Offer some shorter classes
  - Offer evening and weekend classes
  - Offer online classes or DVDs and develop a library of classes
  - Offer more evening and weekend classes
- Expand classes to the residential sector.
- Make class descriptions clear and accurate and make the value of the class apparent in the descriptions; get the notices out to relevant customers, especially as the time for the class is approaching.
- Make classes more hands-on, interactive, visual, and include demonstrations.
- Build on known motivations for attending in marketing materials and class content: for frequent participants, straight technical learning, keeping current, knowledge of energy efficiency, and professional development. For one-time participants: straight technical learning and knowledge of energy efficiency.
- Since it is clear that actual implementation due to classes is quite low for bureaucracies, offer more classes aimed at overcoming bureaucratic barriers.
- There is a great deal of interest in certification courses. Consider pursuing the paths (e.g., with colleges and universities) that would allow them to be offered.
- There are unanswered questions about first-time, one-time, and frequent participants, including why frequent participants repeat so many classes. Consider doing more research on these groups.

Recommendations re. Applying the AKA-B Model in Future Efforts

While the AKA model used in previous program theory documentation is still considered sound, it will be useful to consider an enhancement that encompasses action on the part of EC participants: the AKA-B (Awareness, Knowledge, Attitude, and Behavior) model.

A review of current literature and empirical research related to this model suggests several guidelines for future efforts:

- Ensure that program theory, design, and evaluation all are aligned in terms of the type of kind of attitudes, awareness and knowledge (AKA) they are intended to have an affect on. For example:
  - Consider which of the following areas we trying affect people's AKA about:
    - Programs
    - Technologies
    - Energy efficiency and the environment
  - Let's say program theory establishes a goal related to changing participants' attitude toward programs and toward energy efficiency and its value to the environment (an environmental/energy-efficiency level target).
  - If classes and displays focus only on technological aspects of measures (a technology level target), they are less likely to achieve the goal than they would be if they focused on the environmental/energy-efficiency level.

- During program planning, explicitly decide which "motivators" to target.
  - Three common relevant areas of "motivators" are:
    - Environmental concern
    - Concern about limited resources
    - Self-interest
  - Specifically considering which of these "motivators" are most appropriate to focus on could help:
    - Increase program effectiveness
    - Align evaluations with the programs

- Measure participants' intentions regarding EE behaviors as well as their actual post-program behavior.

  For example, let's say the Exit Survey tells us that someone, at the end of a class, intends to implement an EE measure or practice. However, during a follow-up phone interview year or two later, we learn that this participant has not actually taken any action.

  This information (that something is interfering with the participant taking action or has changed the participants' intentions) can help focus investigations on what "went wrong" and how it might be addressed in the next program cycle.

- Further improve program planning by looking more deeply into social ecology theories of behavior change, together with the supporting empirical research.

  For example, concepts such as trust, ascription of responsibility to self, and situational factors can be addressed directly in training and marketing. The concepts could be used systematically:
  - As guides to program design, delivery, and evaluation
  - In evaluation research that would provide a much more rich and complete picture of what was and was not accomplished by the program

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Progress Review: Past EC Evaluations and Actions

Before getting into the meat of the current process evaluation of the SCE Energy Centers (ECs) — AgTAC and CTAC — it will be helpful to review past evaluations and the recommendations made, together with the work that has been done to build on them.

The most prominent and recent process evaluation was presented by KEMA concerning the Program Years 2004 to 2005 (PY04-05). The following sections will reprise the recommendations made in that study, grouping them into four main areas, and then describe what has and has not been done to address those areas.

Targeting the Right People with the Right Courses

The PY2004-5 evaluation indicated that the courses offered by the SCE ECs were targeting the right people, and that the participants represent a mix of upstream market actors and end-use customers across a range of business sizes. Those participants tend to be the ones who make key decisions related to project development and implementation. They also have substantial industry-specific experience and already consider themselves to be knowledgeable.

Building on these facts and successes, the KEMA report recommended that future courses offered should stay current and ahead of the curve. In other words, go beyond the basics and offer more technically advanced, and more cutting edge courses that will help the knowledgeable decision makers who attend the courses to keep current on developments in the field. One component of this need is to increase the number of technically advanced and new courses offered.

Review of PG&E's Course Offerings

One major activity that was undertaken in response to this recommendation was a systematic review of PG&E's course offerings covering the period from January through June 2007. This was done as part of a process to generate new ideas by learning what other utilities are doing. The review revealed the following patterns:

- They offer a large number (20%) of classes in the areas of renewable energy and other green topics (e.g., photovoltaics, water, solar, etc.).
- About 25% of classes are Title 24-based.

EC Goals and Actions re. Course Offerings

The SCE ECs have set goals for increases in new and technologically advanced courses in each program year, compared to the prior year. The relevant goals are listed below with information on what has been accomplished through 2008.

SCE EC Goals for Course Offerings	Accomplishments through 2008
100% of existing classes are reviewed and updated, per program cycle	Program staff report that this has been completed for the PY2006-08 cycle.
100% of demos/exhibits and/or displays are reviewed and updated, per program cycle	Program staff report that this has been completed for the PY2006-08 cycle.
Classes target small Commercial, Industrial, and Agriculture (C/I/A) customer segments: one class offered per major end use	Program staff report that this has been completed for the PY2006-08 cycle.
Classes offered in-language: one class offered per major end use	Program staff report that this goal was deemed inappropriate. ● There were attempts to offer in-language classes; however, the response was very low to none. ● There were a few Spanish classes and one Chinese class during 2008.
At least one class offered on the web and formulate plan for 2009-2011 based on results	Program staff reports that this goal was exceeded. There have been several successful webinars during 2008 at both ECs.
More than 40% classes offered offsite/web-based	Neither CTAC nor AgTAC is meeting the goal of 40% of classes being offered in more accessible formats, including off-site and web-based formats.* (See "About Offsite and Web-based Classes" on page 21 for more information.)
Each year, 10% of class titles will be new This goal covers improvements (enhancements) to classes as well as new class titles.	Both AgTAC and CTAC have generally been meeting the 10% goal for new and making good progress toward enhancing existing classes.* (See "About New and Enhanced Classes" on page 21 for more information.)
* Data for these findings are based on an analysis of the posted and mailed schedule of seminars for both ECs. It should be noted that some analyses are based on the number of class titles listed, while others are based on the number of classes offered, where there can be multiple classes offered for any given class title.	

Table P.1: Summary of EC goals and accomplishments through 2008 for course offerings

About Offsite and Web-based Classes

As noted in Table P.1, neither CTAC nor AgTAC is meeting the goal of 40% of classes being offered in more accessible formats, including off-site and web-based format.

- Figure P.1 shows that the closest AgTAC came to meeting this goal was in 2004, when 4% of the classes were offered off-site.

  Fewer off-site classes were offered by AgTAC in 2005, none in 2006 and 2007, and 1% in 2008.

- Figure P.2 shows that the closest CTAC came to meeting this goal was in 2006, where 31% of the classes were offered off-site.

  The trend from there is downward. In addition, virtually none of these classes were reported as web-based.

  The staff report offering web-based seminars from both ECs during 2008. This appears not to be reflected in the current database. However, this is only because the number of these seminars was too small to register on the chart.

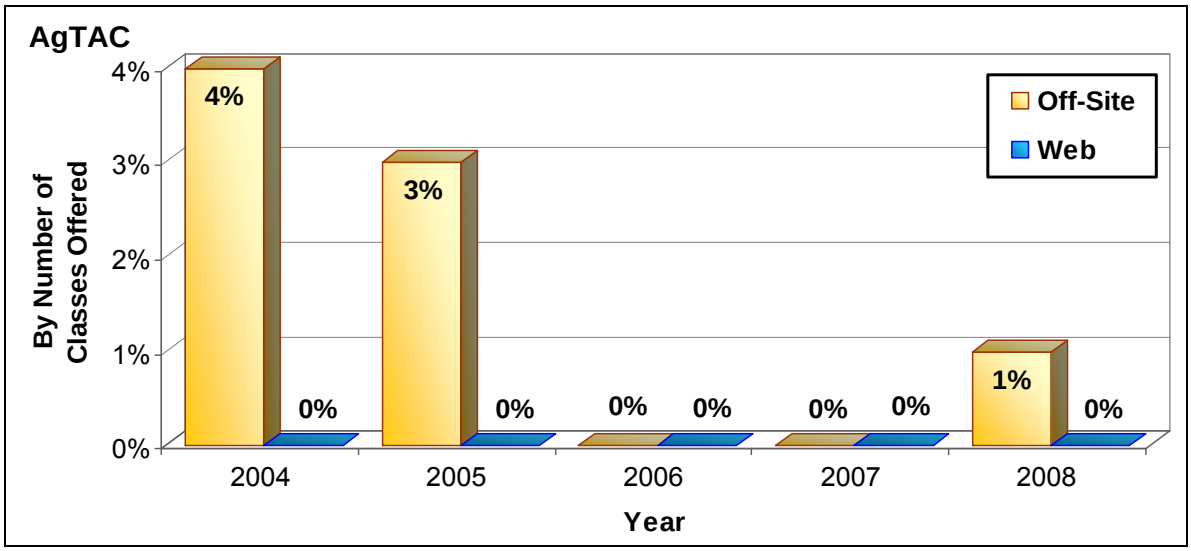


Figure P.1: Percent of classes that were offered off-site or web-based — AgTAC, 2004-2008

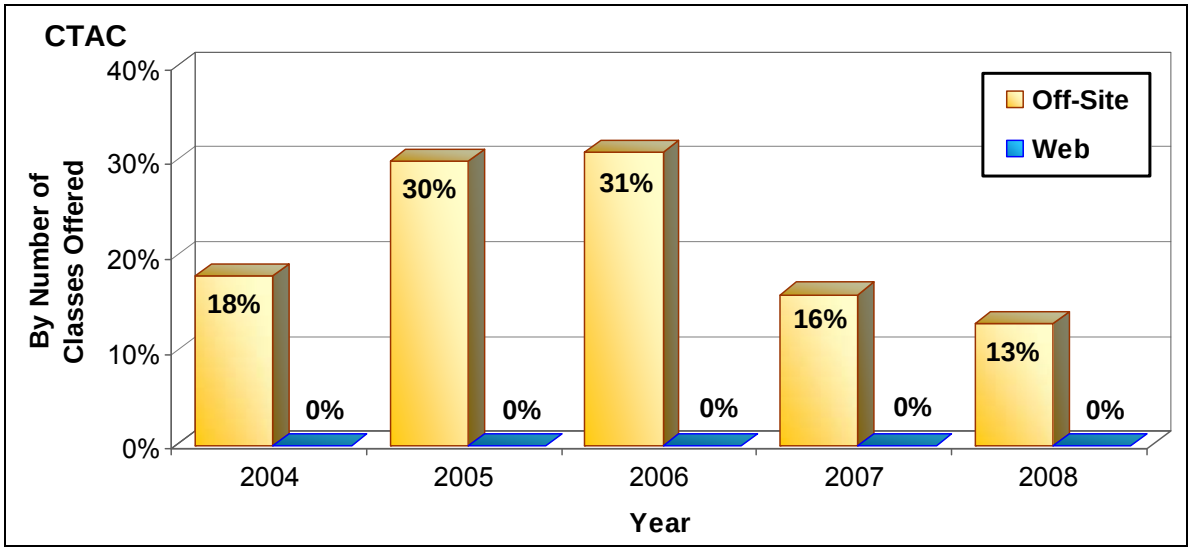


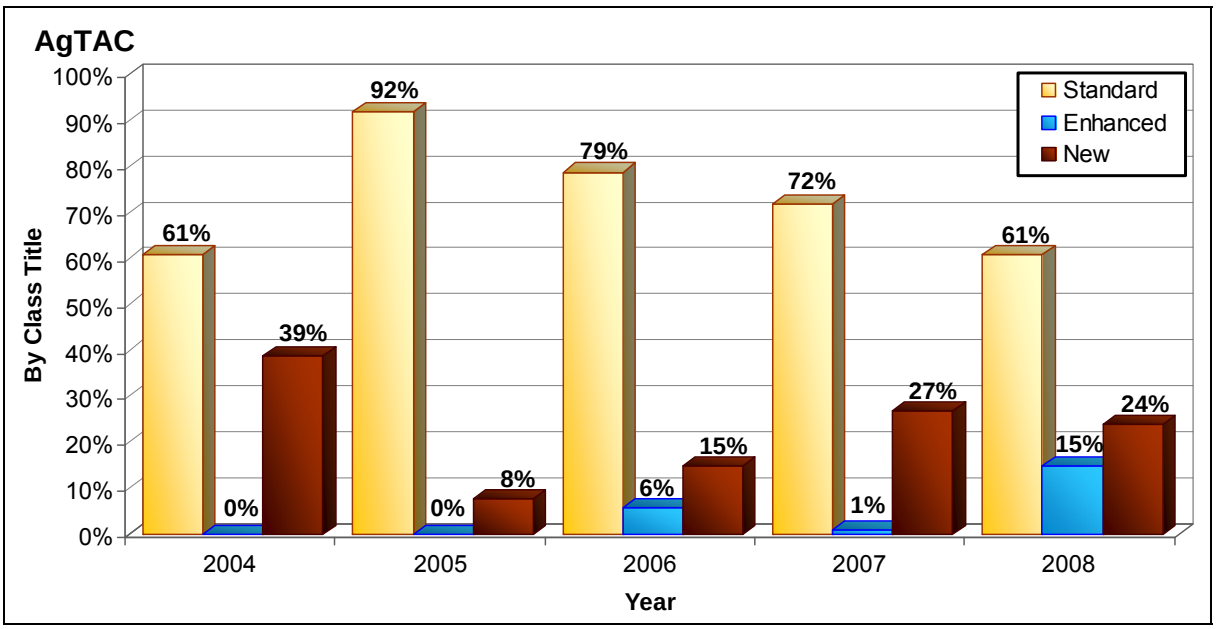
Figure P.2: Percent of classes that were offered off-site or web-based — CTAC, 2004-2008

About New and Enhanced Classes

As noted in Table P.1, both AgTAC and CTAC have generally met the 10% goal for new classes.

- Figure shows AgTAC met the 10% goal in 2004 — and from 2006 onward — in terms of creating new titles. There have also been improvements in class enhancements.
- Figure shows that in 2008 CTAC created about 24% new and 7% improved classes, which includes the new titles with enhanced classes where either new applications are covered, or new technologies within applications.

  The goal for new class titles has been met in 2008 and in the prior years shown as well. The trend is for further growth there, but enhancements have been at a low level throughout the period studied.



FigureP.3: Percent of class titles that are standard, enhanced, or new by year — AgTAC, 2004-2008

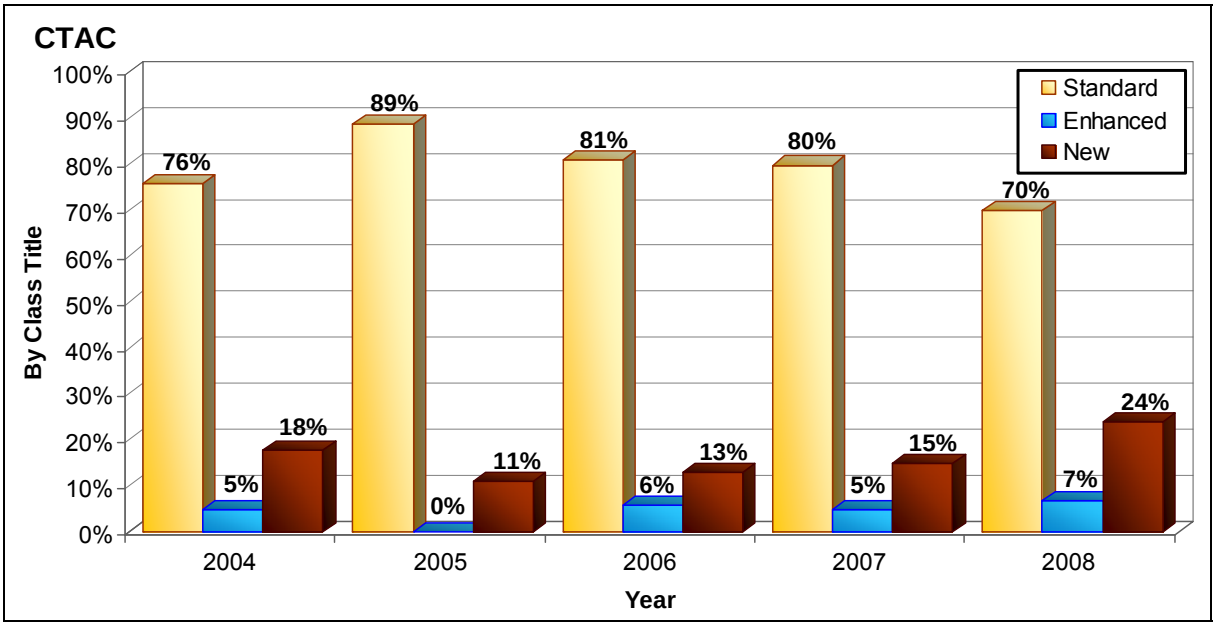


Figure P.4: Percent of class titles that are standard, enhanced, or new by year — CTAC, 2004-2008

In addition, to forming new classes and improving old one, the ECs have begun to generate more classes that go beyond the basics. An analysis of classes offered between 2004 and 2007 — based on the program tracking system — shows the trends in offering more classes beyond the basics. It should be noted that:

- For this analysis, an experienced EC instructor classified all class titles into three levels of technical depth: Basic, Intermediate and Advanced.
- Program-tracking-system dataset is different from that presented in the figures above, which was based on the posted schedule of offerings over a slightly different period.

If there has been progress on this recommendation, we should see a larger increase in advanced and intermediate courses than we see in courses overall. Table P.2 shows the class types by technical level and the number of attendees over each year. The table also shows the total number of attendees over all classes for each year.

AgTAC	Program Year			
Technical Level of Class	**2004**	**2005**	**2006**	**2007**
Intermediate	73	32	52	112
% of year before		-56%	+63%	+115%
Advanced	25	18	26	57
% of year before		-28%	+44%	+119%
All Classes	1,201	1,146	1,284	1,639
% of year before		-5%	+12%	+28%

Table P.2: Changes in class attendance by class level and program year — AgTAC, 2004-2007

The table shows that at AgTAC center total attendance went from 1,201 in 2004 to 1,146 in 2005, to 1,284 in 2006, and ends at 1,639 in 2008. This represents a drop of 5% from 2004 to 2005, and an increase of 12% from 2005 to 2006, and 28% from 2006 to 2007.

To show improvement in offering courses beyond the basics, intermediate and advanced classes would have to show increases beyond what we see in total class offerings. After all, if, hypothetically, overall class attendance increases by 50%, an increase in advanced classes of 25% would not be impressive. In fact, what we see is that while there was a 5% decrease in overall class attendance from 2004 to 2005, there was a 56% decrease in intermediate class attendance, and a 28% decrease in advanced class attendance. Thus, 2005 was not a banner year for meeting the goal of increasing more advanced classes; while overall attendance was down, the decrease in more advanced classes was more dramatic than the overall figure.

However, the picture changed in 2006 when the overall attendance increased by 12% compared to a 63% increase in intermediate classes and a 44% increase in advanced classes. The improvements were more dramatic in 2007: compared to an overall increase of 28% in 2007, intermediate class attendance increased by 115% and 119% in advanced classes. The summary of this table is that there was a big drop in attendance in 2005, and that drop came disproportionately from intermediate and advanced courses. However, the numbers in 2006 and 2007 showed overall increases, but the intermediate and advanced classes show larger increases. This would imply that the recommendation-based goals were being pursued aggressively starting in 2006.

Table shows the same analysis for CTAC. Here, the year 2005 also had an overall drop of 33% in attendance compared to 2004. By comparison, there was a larger drop in intermediate class attendance (-67%) and a drop in advanced classes of 24%. On the other hand, the 70% increase in overall attendance in 2006 was the backdrop for intermediate class increases of 185% and advanced class increases of 15%. Thus, intermediate classes exceeded the base rate, while advanced classes fell considerably short of the base rate of increase. In the following year, the overall attendance went up by 11%, but the intermediate class attendance went down by 16%, but the advanced class attendance went up by 72%. The larger trend at CTAC seems to be the same overall drop in 2005, followed by increases in 2006 and 2007. Intermediate classes were strongest in 2006, while advanced classes were much stronger in 2007. Overall, though, the intermediate and advanced classes moved ahead more strongly than the overall trend of class attendance over this period, and that pattern didn't emerge until 2006.

CTAC	Program Year			
Technical Level of Class	**2004**	**2005**	**2006**	**2007**
Intermediate	325	106	302	254
% of year before		-67%	+185%	-16%
Advanced	135	103	118	203
% of year before		-24%	+15%	+72%
All Classes	2,812	1,886	3,214	3,583
% of year before		-33%	+70%	+11%

Table P.3: Changes in class attendance by class level and program year — CTAC, 2004-2007

Broadening the Reach of Center Courses

One set of recommendations suggested the need to broaden the reach of the courses to additional audiences; specifically, to expand the reach of energy efficiency seminars in general, it will be necessary to increase applicability of seminars beyond agricultural and large commercial and industrial customers (C&I), at least to the smaller C&I customers.

Review of PG&E's Course Offerings

A review of PG&E's course offerings also helped SCE ECs consider new ideas to improve on this dimension as well. Following are the findings that were considered useful for this:

- There is a high percentage (43%) of classes aimed at residential and small commercial customers.
- PG&E's ECs offer general, event-oriented classes on hot topics (e.g., global warming) as event workshops.
- Shorter classes (3-4 hours) are offered across many venues.
- Over 50% of classes are held outside of PG&E ECs at 37 locations outside of PG&E.
- The centers are tied in with unions, labs, colleges, and universities, including using them as sites for class offerings.
- Some class topics are offered with different depths (half versus full days).
- Some courses are offered with concurrent internet sessions. These are typically designed to be 2-3 hours, although some are longer. These offerings constitute about 9% of total classes for all locations, and account for 31% of classes held at the ECs.
- A full-year calendar of offerings is to be made available so that potential participants can see what is available and plan to attend.

SCE Actions

Another of the set of recommendations for broadening the reach of the program is that the SCE ECs expand their program marketing to external sources to increase participation from first time participants. Many participants have already attended several training courses offered at the centers, and most find out about current courses through utility sources. Thus, the effort to bring in more new comers might begin by recruiting through additional channels.

For the PY06-08 cycle, the ECs set a goal to have 10% new program participants every year. Results shown in Chapter 5 indicate that the issue is different than imagined when the 10% goal was set. In reality, first-time attendance is very high (between 75% and 85% depending on the year and the center). Further, a majority (55%-71%) of the first-time attenders do not return, at least within the study period. The implication of these findings is that, while it is still important to broaden the reach of the ECs' programs, at least as important is to set and pursue a goal of motivating first-time attenders to return.

Further Emphasize Course Outcomes

While behavioral outcomes have been a focus for some time, and many participants report being influenced to take energy efficiency actions after attending EC classes, the evaluators recommended further emphasizing behavioral changes to increase the actions taken by participants. Specifically, it was recommended that there be an increase in course emphasis on other SCE programs and to conduct follow-ups to increase participation rates.

Part of the efforts directed to responding to this recommendation included the review of PG&E's course offerings. One item that was gleaned from the PG&E course offerings is that there is a close linkage between classes and PG&E's programs. Many of the classes are given specifically to explain the programs. This makes a direct connection between the participant and paths to energy efficiency actions.

In addition, in 2007, the EC marketing staff completely revised all the course descriptions to better reflect the "what's in it for me" principle. Wherever possible, course outcomes and benefits are emphasized. Related to this will be added emphasis in the course content toward developing action plans for each participant. The goal that has been set in the PY09-11 program theory and metrics document for the ECs for this segment is that 100% of the classes will contain a program link. A further goal is to increase the percentage of participants requesting follow-up to 10%, and that 100% of those requests would be followed up. This has been accomplished. However, more participants can be reached for follow-up after another problem is solved. In the process of doing analyses to determine the current position on this goal/recommendation, it was discovered that many participants did not provide their contact information in spite of having asked for follow-up contact. The clear reason for this seemed to be that the request for contact information was made on the course evaluation form, which should be confidential. A new exit questionnaire has now been designed that separates evaluation information from follow-up information, and this should increase the number of participants who get follow-up contact from SCE staff.

Course Improvement

Two recommendations were made in the PY04-05 process evaluation that were aimed at continuous course improvement. They are shown below.

Continue to strive toward best practices in adult learning

In 2007 the ECs sponsored a multi-day adult learning principle seminar for its own staff. Nearly 100% of EC staff has attended this training. After the training, the ECs requested a gap analysis of their current practice as compared to best practices of adult learning principles. This analysis is part of this current PY06-08 process evaluation. As part of this evaluation, we conducted a five-class audit using Deborah Laurel; a set of recommendations resulted from this audit and will be described under Task 1 of this report.

Also relevant is that the RFP sent to prospective instructors requested that adult learning principles be incorporated into their responses.

Use results of post-training surveys to identify areas for course-specific improvement

PY2005 courses were rated positively for attributes such as level of technical information, teaching skill of instructors, providing new information, providing time for questions, and networking opportunities. In addition, the courses were considered valuable because of the classroom format, interaction, and unbiased information.

The current study interview asked participants for suggestions on course improvement, including content and presentation issues. Details are reported under Task 5 of this study. Some of the major findings are that while the majority of participants (50-60%) had no suggestions, the others often requested some shorter courses, some longer ones that extend over several days, more hands-on work, field demonstrations, more take-home material, more residential-oriented courses, and more off-site courses.

In addition, a revision of the exit survey is under way that would pinpoint other areas that could be improved, such as assessments of SCE program connections, follow-up possibilities, impact on knowledge and behavior of participants, and others. Thus, this recommendation has been taken very seriously and has been implemented in several ways.

Summary

Overall, substantial progress has been made during the PY06-08 cycle. Areas where impressive improvements have been pursued and implemented are review and updating of classes and materials, increased emphasis on course outcomes, including participant behavior, use of surveys to identify areas for further improvement, increased connection to SCE programs, and an increase in more advanced courses.

Areas where further efforts are called for include: off-site classes, web-based classes, shorter, more accessible classes, more hands-on classes, more targeted marketing, creating more repeat participants, increasing the use of adult learning principles, and increasing the rate of post-class follow-up.

There is a first-time attendee incidence of 75-85% over the two ECs and the years of 2006-2007. This is explained by a very high rate of one-time attenders among the first-time group. This implies a different problem than was assumed by the evaluators; i.e., there is a very high rate of non-return among first-time attenders.

Recommendations re. Past EC Evaluations and Actions

- PY09-11 metrics should be adjusted to reflect PY06-08 findings, e.g. 10% new attendees is no longer an appropriate goal.
- Organizational changes should be considered to meet the 40% web-based or off-site class offering goal.

Task 1: Adult Learning Gap Assessment

Background (Goal and Questions)

In 2007, the Energy Centers (EC) engaged Deborah Laurel from Laurel and Associates, Ltd., to conduct a multi-day Adult Learning Principles training session for EC staff and other SCE organizations who engaged in Energy Center training and curriculum development. As an outcome of this class, this process evaluation engaged Laurel and Associates, Ltd. to perform an audit of selected EC classes. This audit was Task 1 of the 2006–2008 SCE Energy Center Process Evaluation.

The primary goal for Task 1 was to establish baseline metrics for how well selected classes delivered at the ECs use teaching methods suitable for adult learning. The baseline established through Task 1 can be used in the future to determine the progress that the ECs are making toward the goal over time.

It should be noted that the underlying purpose for using teaching methods suitable for adult learning is to provide training experiences that are more likely to have a positive impact on participants' "real world" behavior. That is, the goal of employing methods appropriate to adult learning was **not** established because the evaluation team believes in the "inherent goodness or appropriateness" of these principles.

Rather, the goal was established because current research on adult education and training — as well as our experience — indicate learning experiences that adhere to these principles and practices are more likely to result in:

- Participants applying the newly acquired skills, knowledge, or attitude in their everyday environment
- Success of the learning experience as reflected by "bottom line" metrics (e.g., implementation of energy efficiency measures and practices)

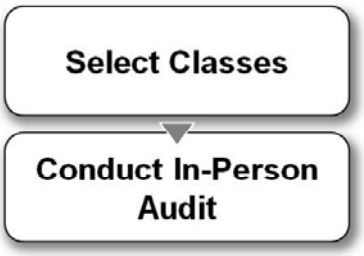
The following summarizes the questions that guided the Task 1 evaluation effort.

EC Goal	Evaluation Questions
Use teaching methods suitable for adult learning	• Do the classes follow adult learning principles? • Do the classes reflect **best practices** for adult training experiences? • What are the strengths and weaknesses relative to adult principles and practices? • What are the suggestions for improvement?

The findings and recommendations addressed in Task 1 have been presented to CTAC and AgTAC management in two briefings. The first, on March 10th, pertained to only the CTAC audits. The second, on March 13th, pertained to all audits.

Approach

The graphic below summarizes the major activities the evaluation team completed during Task 1. Both activities are described below and on the following page.



Select Classes

Five classes were selected for audit during the first quarter of 2008. The table below summary information about these classes and notes the abbreviations that are used to refer to the classes in other tables throughout this section of the report.

Class	Instructor	Location	Date (2008)	Abbrev.
HID Outdoor & Indoor Lighting Applications	Kathleen Peake	CTAC	February 12	HID
Introductory eQuest: "Schematic Design"	Marlin Addison	CTAC	February 13	eQuest
Package Unit HVAC Efficiency	David Wylie	CTAC	February 14	HVAC
Lighting Fixture Maintenance Workshop	Doug Avery	AgTAC	March 11	Fixture
Green Building: Hype or Help?	Hank Jackson	AgTAC	March 12	Green

Table 1.1: Summary of classes audited for Task 1

Prior to the audits, the instructors were asked to provide copies of their lesson plans, learning objectives, and participant materials for preliminary review.

- Two out of the five instructors provided lesson plans and learning objectives.
- All of them submitted PowerPoint slides and other reference materials.

Conduct In-person Audit

The audit process involved:

- Preliminary review of available class materials
- Class attendance
  - Review participant materials
  - Observe participants and instructor-participant interactions
  - Take notes regarding the program content, learner activities, and learning facilitation
- Session evaluation based on criteria regarding:
  - Adult learning principles
  - Best practices for training events

How Scores Were Calculated

For both segments of the session evaluation, we looked at several major principles or practices.

- The major principles of adult learning we considered are:
  - Obtain learner buy-in
  - Build on what the learners know
  - Engage the learners
  - Set up learners for success
  - Let learners apply what they have learned
- The major best practices of adult learning we considered are:
  - Lesson plan
  - Content decisions
  - Learner centered
  - Interactive activities
  - Learning facilitation

(See Appendix 1-1 for a discussion of the adult learning models and precepts on which the evaluation criteria were established.)

There are two to four evaluation criteria under each of the principles, and four evaluation criteria under each of the practices. We used a five-point scale to rate performance on each criterion:

1 Not at all or poor

2 Rarely or fair

3 Occasionally or average

4 Frequently or good

5 Always or excellent

Task 1: Adult Learning Gap Assessment

Summary

We calculated a class's rating for each principle and practice by adding the points assigned to each criterion, then dividing the total points scored by the total highest possible points.

For example, let's say there were three criteria for a given principle.

- The total highest possible score is 15 (5 + 5 + 5)
- The course scores as follows on that principle:
  - 3 on the first criterion
  - 5 on the second criterion
  - 4 on the third criterion
- The rating for that principle would be 80% = [(3 + 5 + 4) / 15]

A class's overall rating is calculated in a similar manner: Actual points scored for all criteria under each principle or practice are added together, then divided by the total highest possible number of points (five for each criterion under each principle).

For example, there are a total of 14 criteria across the five adult learning principles we considered. That means that a perfect score (100%) for adult learning principles would be 70 points (14 * 5).

Findings

As noted on page 29, for Task 1 we focused on two areas: adult learning principles and best practices for adult training.

Overview of Findings

Findings re. Adult Learning Principles:

- Two of the classes audited did well overall (scored 87%) relative to adult learning principles.
- Three classes did poorly overall (scored 54 – 57%).

Findings re. Adult Learning Best Practices:

- Three of the courses did poorly overall (scored 60 – 67%) relative to best practices.
- Two did very poorly overall (45%).

Evaluation Results for Adult Learning Principles

Three out of five audited classes were found to primarily employ the Expert Presenter model of adult education.

This Expert Presenter approach is effective in creating awareness of new information. It is not effective in accomplishing the other desired goals of increasing knowledge, changing attitudes, and affecting behavior.

- In the Expert Presenter approach, learning is a passive process of being educated, with the focus on the expert:
  - The expert presents wisdom and experience while the learners listen and absorb.
  - The learner's prior experience is not considered very relevant.

To accomplish higher-level objectives — such as those that help accomplish the goals of affecting knowledge, attitudes and behavior — the Learning Facilitator approach is necessary.

- In the Learning Facilitator approach, learning is an active process of involvement, with the focus on the learner:
  - The facilitator guides the participants' learning experience, tailoring presentations to participants' skills and knowledge and providing appropriate coaching and feedback as participants actively engage in the experience.
  - The learner's prior experience is considered a rich source of information and meaning.
  - The learners discover and practice new skills as they offer information and demonstrate their learning.

(See Appendix 1-1 for further discussion of the Expert Presenter and Learning Facilitator models of adult education.)

Overall Scoring for Adult Learning Principles

We assessed classes' performance on five key adult learning principles. Overall scores for these principles are summarized below. Detailed scoring for each of the five principles is on the following pages.

(See page 30 for summary information about the classes referred to in the tables below and on the following pages. See page 31 for a discussion of how scores were calculated.)

Principles	HID	eQuest	HVAC	Fixture	Green
Obtain learner buy-in	67%	67%	67%	100%	93%
Build on what the learners know	80%	80%	80%	100%	100%
Engage the learners	47%	47%	53%	93%	87%
Set up learners for success	45%	45%	50%	75%	85%
Let learners apply what they have learned	40%	50%	40%	70%	70%
Total Points Scored / Total Possible Points	**38/70**	**39/70**	**40/70**	**61/70**	**61/70**
Overall Score for Principles	**54%**	**56%**	**57%**	**87%**	**87%**

Table 1.2: Overall scores for adult learning principles

Principle: Obtain Learner Buy-in

Below is a summary of the tenets that underlie the evaluation criteria for the principle Obtain Learner Buy-in, as well as the scores for the classes evaluated in Task 1.

Criteria for Obtain Learner Buy-in	Tenets Underlying the Criteria
There is an initial activity that helps participants see the value of the training.	Adults learn because they see the value of the training content to their lives.
The usefulness of the learning in the participants' lives is emphasized and demonstrated.	Adults learn best when practical application is encouraged.
The instructor creates a safe and respectful learning environment.	Adults learn best in an informal atmosphere.

Table 1.3: Criteria and underlying tenets for principle Obtain Learner Buy-in

	Scores by Class				
Criteria for Obtain Learner Buy-in	HID	eQuest	HVAC	Fixture	Green
There is an initial activity that helps participants see the value of the training.	2	4	2	5	5
The usefulness of the learning in the participants' lives is emphasized and demonstrated.	4	4	4	5	5
The instructor creates a safe and respectful learning environment.	4	2	4	5	4
Total Points Scored / Total Possible Points	**10/15**	**10/15**	**10/15**	**15/15**	**14/15**
Score	**67%**	**67%**	**67%**	**100%**	**93%**

Table 1.4: Scoring in specific criteria for principle Obtain Learner Buy-in

Principle: Build on What Learners Know

Below is a summary of the tenets that underlie the evaluation criteria for the principle Build on What Learners Know, as well as the scores for the classes evaluated in Task 1.

Criteria for Build on What Learners Know	Tenets Underlying the Criteria
There are activities that enable the participants to indicate and/or demonstrate their level of experience and expertise.	Adults bring a wealth of experience that must be acknowledged and respected in the training setting.
Good examples and stories are provided that connect new learning to the participants' prior learning and experience.	Adults learn and retain information more easily if they can relate it to their reservoir of past experiences.

Table 1.5: Criteria and underlying tenets for principle Build on What Learners Know

	Scores by Class				
Criteria for Build on What Learners Know	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
There are activities that enable the participants to indicate and/or demonstrate their level of experience and expertise.	3	3	3	5	5
Good examples and stories are provided that connect new learning to the participants' prior learning and experience.	5	5	5	5	5
Total Points Scored / Total Possible Points	**8/10**	**8/10**	**8/10**	**10/10**	**10/10**
Score	**80%**	**80%**	**80%**	**100%**	**100%**

Table 1.6: Scoring in specific criteria for principle Build on What Learners Know

Principle: Engage the Learners

Below is a summary of the tenets that underlie the evaluation criteria for the principle Engage the Learners, as well as the scores for the classes evaluated in Task 1.

Criteria for Engage the Learners	Tenets Underlying the Criteria
There is an activity that enables participants to indicate their learning goals, and/or participants are given choices to select activities or content that is relevant to their interests and needs.	Adults have a need to be self-directing and take a leadership role in their learning.
There are activities that enable the learners to discover important information on their own.	Adults are more likely to believe something if they arrive at the idea themselves.
There are activities that enable the participants to contribute ideas.	Adults have ideas to contribute.

Table 1.7: Criteria and underlying tenets for principle Engage the Learners

Scoring for…	Scores by Class				
Engage the Learners	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
There is an activity that enables participants to indicate their learning goals, and/or participants are given choices to select activities or content that is relevant to their interests and needs.	2	2	2	5	5
There are activities that enable the learners to discover important information on their own.	3	3	3	4	4
There are activities that enable the participants to contribute ideas.	2	2	3	5	4
Total Points Scored / Total Possible Points	**7/15**	**7/15**	**8/15**	**14/15**	**13/15**
Score	**47%**	**47%**	**53%**	**93%**	**87%**

Table 1.8: Scoring in specific criteria for principle Engage the Learners

Principle: Set Up Learners for Success

Below is a summary of the tenets that underlie the evaluation criteria for the principle Set Up Learners for Success, as well as the scores for the classes evaluated in Task 1.

Criteria for Set Up Learners for Success	Tenets Underlying the Criteria
A maximum of 5 familiar and meaningful concepts and a maximum of 3 unfamiliar concepts are taught at one time.	Adults can learn only a specific amount of information at one time.
Rules are taught first. Exceptions are not introduced until it is clear that the rules are understood.	Adults need to learn rules before they learn exceptions to the rules.
Transitional statements are made that show how different sections of the training relate to each other.	Adults need to know how one part of the training relates to other parts.
A variety of instructional methods are used to ensure that visual, aural, and kinesthetic learners' needs are addressed.	Adults have different learning styles that are responsive to different instructional methods.

Table 1.9: Criteria and underlying tenets for principle Set Up Learners for Success

Scoring for…	Scores by Class				
Set Up Learners for Success	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
A maximum of 5 familiar and meaningful concepts and a maximum of 3 unfamiliar concepts are taught at one time.	2	2	2	5	4
Rules are taught first. Exceptions are not introduced until it is clear that the rules are understood.	3	2	4	4	5
Transitional statements are made that show how different sections of the training relate to each other.	2	2	2	3	5
A variety of instructional methods are used to ensure that visual, aural and kinesthetic learners' needs are addressed.	2	3	2	3	3
Total Points Scored / Total Possible Points	**9/20**	**9/20**	**10/20**	**15/20**	**17/20**
Score	**45%**	**45%**	**50%**	**75%**	**85%**

Table 1.10: Scoring in specific criteria for principle Build on What Learners Know

Principle: Let Learners Apply What They Have Learned

Below is a summary of the tenets that underlie the evaluation criteria for the principle Let Learners Apply What They Have Learned, as well as the scores for the classes evaluated in Task 1.

Criteria for Let Learners Apply What They Have Learned	Tenets Underlying the Criteria
There are problem-solving activities that actively engage the learners.	Adults use a hands-on, problem-solving approach to learning.
There are opportunities for participants to immediately apply their new learning in the classroom.	Adults want to apply new knowledge and skills immediately.

Table 1.11: Criteria and underlying tenets for principle Let Learners Apply What They Have Learned

Scoring for… Let Learners Apply What They Have Learned	Scores by Class				
	HID	eQuest	HVAC	Fixture	Green
There are problem-solving activities that actively engage the learners.	2	2	2	4	4
There are opportunities for participants to immediately apply their new learning in the classroom.	2	3	2	3	3
Total Points Scored / Total Possible Points	**4/10**	**5/10**	**4/10**	**7/10**	**7/10**
Score	**40%**	**50%**	**40%**	**70%**	**70%**

Table 1.12: Scoring in specific criteria for principle Let Learners Apply What They Have Learned

Evaluation Results for Adult Learning Best Practices

Adult Learning Best Practices are applied through the use of specific techniques in the classroom. These techniques are based upon decisions that the instructors make about what will be taught and how it will be taught. It is possible to determine the probability of learning in the classroom by evaluating these decisions.

How Design and Delivery Decisions Affect Learning Outcomes

Decisions regarding the training design and delivery have a direct bearing on participant awareness, knowledge, attitude, and behavior. The key decision areas that we focused on during the Task 1 evaluation are:

- Lesson Plan — What is the expected outcome of the training? What training methods are planned to help achieve these outcomes?
- Content — What content will be covered in the class? How will it be structured to help participants place new information in the appropriate context and distinguish the essentials from the "nice to know"?
- Interactive Learner Experiences — What will participants do to learn and to demonstrate that learning has occurred?
- Learner Centricity — How will the session be adapted to meet the needs, interests, and experiences of the actual class participants?
- Learning Facilitation — What will the instructor do to aid learning through stand up presentation and group facilitation?

Decisions regarding the learning objectives identified in the lesson plan — as well as the decisions made regarding content and learning activities — drive the learning outcomes, or end results of the training experience.

Learning outcomes often are categorized into six levels; from the most "basic" to the most "advanced." These learning levels are:

- Knowledge — Remembering; simply recalling information
- Comprehension — Understanding; interpreting, comparing, or explaining
- Application — Using; applying concepts to different situations
- Analysis — Deducing; identifying the parts of the whole, comparing and contrasting
- Synthesis — Integrating; putting the parts together to create a coherent or functional whole
- Evaluation — Critiquing; making value judgments based on standards or other criteria; interpreting the "pros and cons" of alternatives

Task 1: Adult Learning Gap Assessment

Findings

Which learning outcomes are most appropriate depend upon the overarching goal of the training. For example:

- The Knowledge level is appropriate if the end goal is to raise participants' awareness — or to establish a "background understanding" necessary to achieve the higher levels of outcomes.
- The Comprehension level is appropriate if the end goal is to change participants' attitudes.
- The Application level is appropriate if the end goal is to change participants' behavior in relatively discrete and structured ways.
- The Analysis, Synthesis, and Evaluation levels are appropriate if the end goal is to help participants make relatively complex decisions relative to how they change their behavior.

(See Appendix 1-1 for further discussion of the design and delivery decisions that affect learning outcomes.)

In addition to the Best Practice scoring (summarized below), we noted that the learning levels implied in the class promotional material does not necessarily match the learning levels of the actual class objectives, content, and activities. (See "Label Classes to Identify the " on page 44, in the Recommendations section, for a further discussion of matching class descriptions to learning outcomes.)

Overall Scoring for Best Practices

We assessed classes' performance on five key decision areas (summarized on page 39). Overall scores for these are summarized below.

Detailed scoring for each of the five practices is on the following pages. (See page 30 for summary information about the classes referred to in the tables below and on the following pages. See page 31 for a discussion of how scores were calculated.)

Best Practices	HID	eQuest	HVAC	Fixture	Green
Lesson Plan	25%	30%	85%	30%	50%
Content Decisions	55%	45%	50%	65%	80%
Learner Centered	45%	60%	50%	85%	80%
Interactive Activities	45%	45%	50%	70%	45%
Learning Facilitation	55%	45%	65%	80%	80%
Total Points Scored / Total Possible Points	**45/100**	**45/100**	**60/100**	**66/100**	**67/100**
Overall Score for Best Practices	**45%**	**45%**	**60%**	**66%**	**67%**

Table 1.13: Overall scores for adult learning best practices

Best Practice: Lesson Plan

Below is a summary of the scores for best practices associated with Lesson Plan for the classes evaluated in Task 1.

	Scores by Class				
Criteria for Lesson Plan	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
There are learning objectives	1	1	5	1	5
The learning objectives are specific, observable and measurable	1	1	5	1	1
Desired learning levels are identified	1	1	5	1	1
There is a variety of training methods	2	3	2	3	3
Total Points Scored / Total Possible Points	**5/20**	**6/20**	**17/20**	**6/20**	**10/20**
Score	**25%**	**30%**	**85%**	**30%**	**50%**

Table 1.14: Scoring in specific criteria for best practices associated with Lesson Plan

Best Practice: Content Decisions

Below is a summary of the scores for best practices associated with Content Decisions for the classes evaluated in Task 1.

	Scores by Class				
Criteria for Content Decisions	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
Clear focus on key content	3	2	3	5	5
There is an organizing principle	2	3	2	2	4
Interesting but unimportant content kept to a minimum	4	2	3	4	5
There is an appropriate amount of content for the time period	2	2	2	2	2
Total Points Scored / Total Possible Points	**11/20**	**9/20**	**10/20**	**13/20**	**16/20**
Score	**55%**	**45%**	**50%**	**65%**	**80%**

Table 1.15: Scoring in specific criteria for best practices associated with Content Decisions

Best Practice: Interactive Activities

Below is a summary of the scores for best practices associated with Interactive Activities for the classes evaluated in Task 1.

	Scores by Class				
Criteria for Interactive Activities	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
Has a participant workbook for hands on activities to check learning and comprehension	1	1	2	1	1
Learners actively engaged in discovering answers	3	3	3	5	3
Checks for comprehension before leaving a key topic area	2	2	2	5	2
Opportunity for learners to practice what they've learned as they learn it	3	3	3	3	3
Total Points Scored / Total Possible Points	**9/20**	**9/20**	**10/20**	**14/20**	**9/20**
Score	**45%**	**45%**	**50%**	**70%**	**45%**

Table 1.16: Scoring in specific criteria for best practices associated with Interactive Activities

Best Practice: Learner Centricity

Below is a summary of the scores for best practices associated with Learner Centricity for the classes evaluated in Task 1.

	Scores by Class				
Criteria for Learner Centricity	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
In-class mini needs assessment conducted	2	3	2	5	5
Focus is on learner rather than presenter	2	3	3	4	3
Builds on learner's prior learning or experience	3	3	3	5	5
Meets needs of different learning styles	2	3	2	3	3
Total Points Scored / Total Possible Points	9/20	12/20	10/20	17/20	16/20
Score	**45%**	**60%**	**50%**	**85%**	**80%**

Table 1.17: Scoring in specific criteria for best practices associated with Learner Centricity

Best Practice: Learning Facilitation

Below is a summary of the scores for best practices associated with Learning Facilitation for the classes evaluated in Task 1.

	Scores by Class				
Criteria for Learning Facilitation	**HID**	**eQuest**	**HVAC**	**Fixture**	**Green**
Validates learners' involvement and responses	4	3	4	5	5
Makes transitional statements between sections	2	2	2	2	4
Ensures that all learners can see and hear	1	2	2	4	5
Provides breaks every 50 minutes or so	4	2	5	5	2
Total Points Scored / Total Possible Points	**11/20**	**9/20**	**13/20**	**16/20**	**16/20**
Score	**55%**	**45%**	**65%**	**80%**	**80%**

Table 1.18: Scoring in specific criteria for best practices associated with Learning Facilitation

Recommendations

There needs to be a clear paradigm shift in the education model used at CTAC and AgTAC if they are to fulfill their mission to create awareness, increase knowledge, change attitudes, and affect behavior related to energy use.

A first step in achieving this transformation is to accurately take stock of the current offerings and determine how these classes help accomplish the fundamental goals of the ECs. Once the ECs have a clear understanding of what current classes are designed to achieve, it will be possible to identify any important gaps in the current curriculum and to refine the classes to better meet their goals and objectives.

At the same time, the ECs can make progress toward increasing the effectiveness of the current training by developing the instructors' facilitation skills and accommodating various learning styles and other needs of individual class participants.

The following recommendations are for all Energy Center classes in general and address the next steps of taking stock of "where we're at" to better target future efforts and increasing the effectiveness of the current training. These recommendations are organized as follows:

- Taking Stock of "Where We're At"
  - Label Classes to Identify the Intended Learning Level
  - Require Lesson Plans for All Classes
  - Create More Effective Evaluation Tools
- Increasing Effectiveness of Current Training
  - Develop Facilitation Skills
  - Meet Different Learners' Needs

Taking Stock of "Where We're At"

Understanding what the current courses are intended to achieve, the approaches used to realize those goals and objectives, and how well the courses actually accomplish what they set out to do will help the ECs evaluate their full portfolio of classes to determine whether there are any big "holes" in the curriculum that should be filled and how the current courses can be refined to better achieve their goals.

The following recommendations are important initial steps to accomplishing this.

Label Classes to Identify the Learning Level Associated with the Desired Outcomes

We suggest categorizing all classes based on the learning levels that are appropriate to the outcomes targeted for the class.

It is important to note that the intent of these labels is **not** to reflect the degree of technical difficulty sophistication of the content addressed in the class — nor are the proposed labels intended to be used in communications with the target audiences. Rather, the labels would be for internal EC use and would reflect the desired outcome: what the participants will be able to do as a result of the class.

For example:

- One course may be intended simply to inform — the desired outcome would be that participants know something new.
  - That course may address very complex and sophisticated content about a new technology — but the learning level would be relatively rudimentary.
  - That is, the desired outcome would be at the Knowledge or Comprehension level.

    The expectation would be that participants would be able to describe or discuss the new technologies, but the class itself would not require that they apply that understanding to solve a problem or address a need in a given situation.
- Another course may provide fairly simple information about a technology, but ask participants to analyze or evaluate alternative approaches based on that information.
  - For example, a course on lighting may teach basic information about the tradeoffs between common incandescent and fluorescent lighting options, then ask participants to outline an approach for reducing kWh by 20% in a given situation.
  - The desired outcome would be at a relatively sophisticated learning level (Analyze, Synthesize, or Evaluate), even though the content addressed is relatively basic.

An Approach to Labeling Based on Learning Levels (Desired Outcomes)

The table below shows a proposed approach for categorizing classes based on the ***expected outcomes*** of the class. Note that each level assumes the accomplishment of the preceding learning levels. For example, before you can apply or analyze, you need to know and comprehend. This is reflected in the table below:

- Gray cells marked with "X" indicate more basic levels that may be accomplished in a class
- Black cells marked with "X" indicate the level of the end goal (terminal performance objectives) of the class.

For example, consider a class at the "Operation" performance level. Although that class is primarily targeted at the Application and Analysis learning levels, it probably helps participants know and comprehend. Nonetheless, the end goal is targeted toward participants applying that knowledge (and perhaps analyzing situations based on that knowledge).

Learning Levels	Suggested Labels for Performance Levels			
	Foundation	**Appreciation**	**Operation**	**Realization**
Knowledge	X	X	X	X
Comprehension		X	X	X
Application			X	X
Analysis			X	X
Synthesis				X
Evaluation				X

Table 1.19: Suggested labels for classes addressing different learning levels

An Example of How the Labels Might be Applied

As noted above, the issue of a class's content is distinct from the learning and performance levels (desired outcomes) for a class. To help illustrate this, we have provided a rough example (Table 1.20) of how the classes we evaluated in Task 1 might be categorized both in terms of content level and outcome level.

- *HID Outdoor & Indoor Lighting Applications* is marketed as an "intermediate-level interactive workshop," so the appropriate desired outcomes (learning levels) are likely application and analysis.
- *Introductory eQuest "Schematic Design"* is clearly intended to be introductory. Since it involves using computer software, the appropriate outcomes would be at the comprehension and application levels.
- *Package Unit Heating, Ventilation & Air Conditioning (HVAC) Efficiency* promises an "in-depth exposure to the fundamentals of HVAC systems." It appears to be an introductory program, with outcomes targeted at the comprehension and application learning levels.
- *Lighting Fixture Maintenance Workshop* promises a "hands-on session during which participants practice cleaning, replacing and installing lamp holders and ballasts for efficient fluorescent systems." It is apparently an introductory class with a clear emphasis on application.
- *Green Building: Hype or Help?* indicates the class will "familiarize participants with the state-of-the-art in sustainable design, current issues and design tools, and likely future developments." It also appears to be an introductory course, with a heavy emphasis on attitudinal and behavioral change, so the appropriate learning levels would be comprehension and application.

Class	Content Level	Performance Level (Learning Level)	Some Possible Example Outcomes
HID Outdoor & Indoor Lighting Applications	**Intermediate**	**Operation** (Application, Analysis)	• Determine appropriate use of HID lighting in given environment, weighing issues of energy efficiency, lighting application requirements, and costs. *[Application and Analysis levels]*
Introductory eQuest "Schematic Design"	**Introductory**	**Operation** (Application)	• Use eQUEST's Building Creation Wizard (Schematic Wizard) and the Energy Efficiency Measures (EEM) Wizard create and explore building design alternatives. *[Application level]*

Class	Content Level	Performance Level (Learning Level)	Some Possible Example Outcomes
Package Unit Heating, Ventilation & Air Conditioning (HVAC) Efficiency	**Introductory**	**Appreciation** (Comprehension) or **Operation** (Application)	● Discuss the implications of different SEER values. *[Comprehension level]* ● Use package unit name plate information and historical usage data to determine unit efficiency. *[Application level]*
Lighting Fixture Maintenance Workshop	**Introductory**	**Operation** (Application)	● Given a standard T8 fluorescent lighting system, clean, replace and install lamp holders and ballasts. *[Application level]*
Green Building: Hype or Help?	**Introductory**	**Appreciation** (Comprehension) or **Operation** (Application)	● Describe key criteria for evaluating green buildings and the relevant authorities for establishing the evaluation criteria. *[Comprehension level]* ● Given key characteristics of a building (site impact, water efficiency, energy and atmosphere, etc.) determine if the building is likely to qualify as LEED-NC Silver or higher. *[Application level]*

Table 1.20: Example categorization of classes based on content and learning levels

Require Lesson Plans for All Classes

A lesson plan gives a "bird's eye view" of a class's design and intent. A review of a lesson plan can help answer questions about the decisions made regarding desired outcomes, content, and activities.

Ask instructors to provide a lesson plan for every class they teach. Each lesson plan should include:

- A brief description of the target audience
- A statement of the overall goal — that is the desired outcome or targeted learning level
- Specific, observable and measurable learning objectives that support the desired outcome
- A summary of key content to be covered (ideally based on a task analysis to discriminate between "need to know" and "nice to know" information)
- A description of the class flow (agenda), including a variety of learning activities appropriate to the learning objectives

Create More Effective Evaluation Tools

Refine the current class Exit Survey (also known as the Customer Satisfaction Survey) to measure if the class met the objective of impacting attendees' awareness, knowledge, attitude, and behavior on energy efficiency practices.

Increasing Effectiveness of Current Training

Develop Facilitation Skills

Current instructors are knowledgeable and sincerely committed to sharing their knowledge. The issue is that they are operating within a traditional Expert Presenter model of instruction, in which the learner is dependent upon the instructor for all learning, and learning is a process of acquiring prescribed subject matter. An expert lecturer builds learner confidence in the expert's competence. It cannot build learner confidence in his/her own competence.

CTAC and AgTAC need to shift to the Learning Facilitator model, where the learner brings expertise to the classroom and actively participates, and learning involves applying new skills to perform a task or solve a problem. Active practice is the only way that learners will develop confidence in their new competence. Their confidence will increase the probability that the learners will use their new skills outside of the classroom. This is the only way that energy-wise behaviors and choices will occur as a result of the training.

Offer an Adult Learning Principles class to train the current expert presenters in learning facilitation techniques. It is important to provide them with opportunities to practice these facilitation techniques.

Meet Different Learners' Needs

Classes must be designed to meet the needs of all three learning styles and be specifically addressed in the lesson plan. Please ensure that breaks are given every 50 minutes. It is helpful to create participant workbooks with activity worksheets and reference materials. The instructor should use PowerPoint only as a supplement to the participant workbook.

Task 2: Baseline Metrics — Classes

Background (Goals and Questions)

The principle goal for Task 2 was to establish baseline metrics for how well selected classes delivered at the Energy Centers (ECs):

- Support energy efficiency (EE) programs
- Help class participants take meaningful action to increase energy efficiency (and reduce demand)
- Tap into untapped markets with classes that address needs of specific customer segments

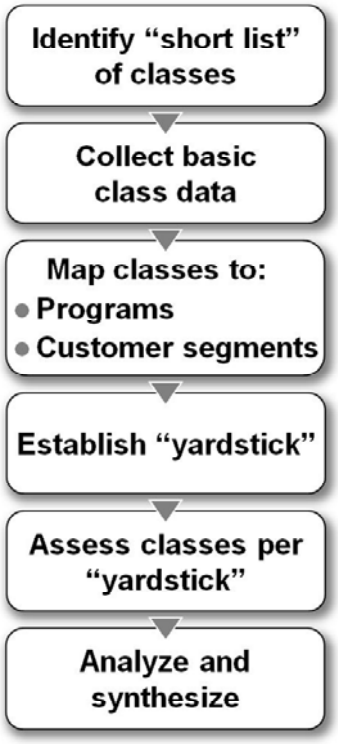
The baseline established through Task 2 can be used in the future to determine the progress that the ECs are making toward the relevant goals over time.

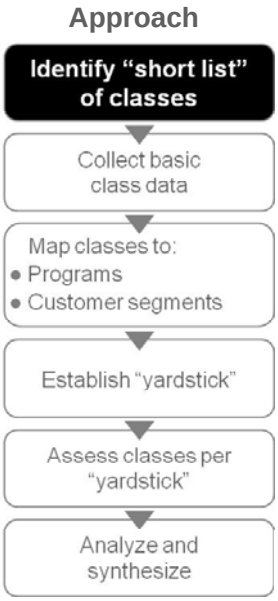
The following summarizes the goals outlined in the program theory documentation (*SCE CTAC & AGTAC Energy Centers: Program Logic Diagram, Program Theory, Potential Indicators and Success Criteria*, September 2007) and the questions that guided the Task 2 evaluation effort.

EC Goals	Evaluation Questions
100% classes demonstrate direct tie-in to programs Inform about programs and benefits Encourage and facilitate participation in programs Educate about benefits of program-related measures and practices	• How many classes have a tie-in to one or more program? • How well do the classes **directly** support the programs — with program-specific information? • How well do the classes **indirectly** support the programs — with information on technologies or practices related to programs?
Help achieve "real world" change in participants' behavior Encourage action Overcome market barriers	• How well do the classes **encourage action** — helping them apply information and concepts addressed in the class to their own environment? • How well do the classes **help overcome common market barriers**, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation?
Tap into untapped markets Provide courses with segment-specific content Offer in-language courses	• How many classes have a logical tie-in to one or more customer segment? • How well do the classes support segment-specific needs? • Are the classes offered in a language other than English?

Approach

The graphic below summarizes the major activities the evaluation team completed during the assessment. Each activity is described below and on the following pages.





Identify the "Short List" of Classes for Evaluation

The project assessment team worked closely with SCE personnel to identify classes for evaluation. SCE provided the project team a preliminary list of the titles of most of the classes offered at the ECs.

From the preliminary list, we eliminated classes that were "one-time" only (scheduled for only one delivery). Then we worked with SCE personnel to identify a cross-section of courses that:

- Included a mix of half-day and full-day sessions
- Reflected a range of instructors
- Were balanced in terms of the locations in which they were taught (AgTAC, CTAC, and other locations)
- Focused primarily on energy efficiency and were PGC (public goods charge) funded rather than those funded by O&M (operation and maintenance)

The resulting "short list" is composed of 56 unique classes focused primarily on issues related to energy efficiency, and representing a cross section of other key characteristics.

- Thirty-one of the classes are half-day sessions; 25 are full-day sessions.
- Thirty-three different instructors are represented (teaching teams of multiple instructors for a single class are counted as one instructor)
- Seventeen of the classes were held at AgTAC only; 15 at CTAC only; and 24 at both AgTAC and CTAC. Three of them also were offered at locations other than the ECs.
- Three of the 56 classes are O&M funded (*Generating Electrical Energy from Dairy Cow Waste, Introduction to the California Solar Initiative,* and *Motors Starters*); the remaining 53 classes are PGC funded.

(See Appendix 2-1 for the complete list of classes included in the short list of classes we focused on in this evaluation.)

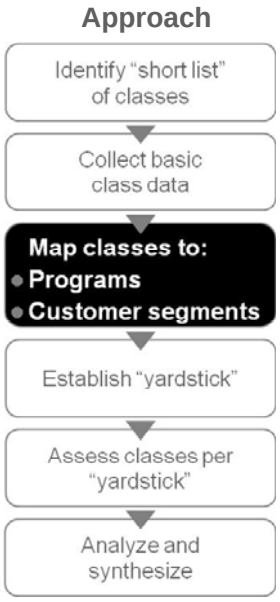
Collect Basic Information about the Classes

Once we identified the short list of classes, we:

- Summarized information about teaching time, class location, instructors, PGC and O&M funding
- Reviewed published and SCE-internal class descriptions to get a general understanding of the topics addressed in the class
- Worked with an engineer familiar with most of the classes and relevant technologies to determine which major technology areas the classes addressed

  (See Appendix 2-1 for a list of technology areas to which classes were mapped.)
- Confirmed summary information with SCE
- Gathered the available class materials (PowerPoint presentation, participant workbooks and handouts, Welcome Package materials, etc.) associated with each class

  SCE was unable to provide the class materials (other than the Welcome Package) for approximately 20% of the classes on the short list.



Map Classes to Rebate and Incentive Programs and to Customer Segments

After receiving the available class materials, we mapped each class to Edison's rebate and incentive programs, and to selected customer segments. There were two reasons for mapping courses to programs and segments:

- To answer whether any programs or segments are not addressed
- To ensure a class was not "scored down" because it doesn't address something it wouldn't logically address.

  For example, a class focusing on foodservice wouldn't get a low score simply because it doesn't address residential, industrial, or agricultural customer segments.

Mapping Classes to Rebate and Incentive Programs

To maintain a reasonable project scope, we focused on 16 high-impact programs that account for 93% of all impact program budget and over 73% of kWh savings and 63% of kW savings.

(See Appendix 2-1 for a list of the programs considered in this project and a summary of the calculations that helped us determine which to focus on.)

Tie-in level (high, medium-low, or none) between a class and a program was based on whether a class addressed technologies, measures, or practices that are encompassed by a program.

- High tie-in between class and program — If 25% or more of the content covered in a class addressed technologies or measures encompassed by a program, that class was considered to have a logical "high tie-in" to the program.
- Medium to low tie-in between class and program — If the class addressed technologies encompassed by a program, but less than 25% of the content covered in class focused on those technologies or measures, the class was considered to have a logical "medium to low tie-in" to the program.
- No tie-in between class and program — If all the topics addressed in the class were irrelevant to a program, the class was considered to have no tie-in to the program.

The initial tie-in level was established by a review of the program documentation, class materials (when available), and input from an engineer familiar with the programs and most of the classes. If class materials were unavailable, the initial tie-in level was based on a review of the class description and input from the subject matter expert.

Tie-in levels between classes and programs were reviewed by EC personnel and adjusted based on their feedback.

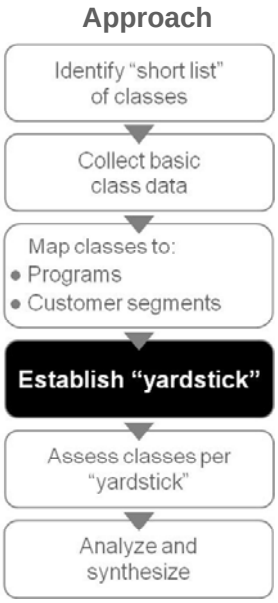
Mapping Classes to Customer Segments

We focused on five main customer segments — as well as "Market Actors," which was a segment considered separately because of their ability to influence numerous customers in a range of segments. The short list of customer segments was initially determined by the project team, then reviewed and approved by EC personnel.

The tie-in level (tied-in or not tied-in) between a class and customer segment was based on whether the class addressed technologies or practices of significant relevance to the customer segment.

The initial tie-in level was established by a review of the class materials and input from an engineer familiar with the customer segments and most of the classes. Tie-in levels were reviewed by EC personnel and adjusted based on their feedback, as necessary.

(See Appendix 2-1 for a list of customer segments considered in this evaluation.)



Establish the "Yardstick" (Evaluation Criteria)

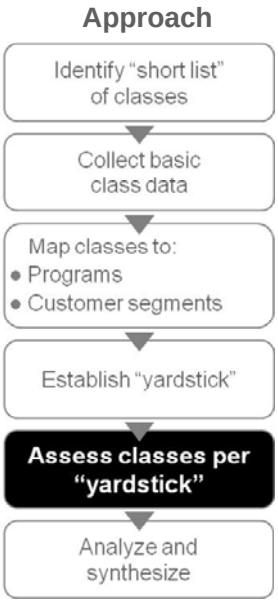
In order to determine how well the classes support the programs, help encourage change in participants' behavior, and help tap into key market segments, we established the evaluation criteria, which we refer to as our "yardstick."

For each of the evaluation questions noted on page 103, we developed a short series of objective Yes/No questions that we used to determine "how well" a class met the relevant goal.

(See page 31 for more information on how the yardstick items were used in scoring and how scores were calculated.)

Our internal project team reviewed the yardstick and cross checked the evaluation criteria with the program theory documentation several times before we presented SCE with a draft. We then discussed the yardstick with EC personnel and fine-tuned it based on their feedback.

(See Appendix 2-2 for the complete yardstick we used to establish baseline metrics for the classes.)

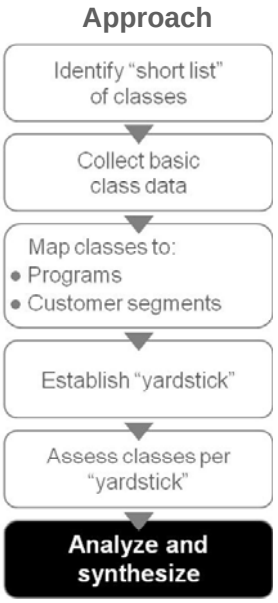


Assess the Classes Using the Yardstick

The scope of the Task 2 effort was confined to a review of available class materials only; it did not include interviews with instructors or auditing of "live" classes. Therefore, we applied the yardstick only to classes for which materials were available. (As noted earlier, this was approximately 80% of our "short list" classes.)

To determine a class's score in a given area, we closely reviewed the available class materials to address each item on the yardstick. (See Appendix 2-2 for a copy of the yardstick.)

After the initial rating of each class, we conducted a second internal review of available class materials to verify findings, then did a third, "spot-check" audit to confirm the rating process was on target.



Analyze and Synthesize Results

We captured the data from the yardstick in individual spreadsheets, then we consolidated all Task 2 evaluation data to obtain overall scoring for classes at AgTAC, CTAC, and both ECs combined.

When determining if a class is logically tied-in to a program or customer segment, we considered the full short list of 56 classes.

When determining how well a class supports a program, a customer segment, or behavior change, we considered only the 45 classes for which class materials were available — and those programs and customer segments with a logical tie-in to the class. (A class was not "scored down" for not addressing issues not logically related to that class.)

(See Appendix 2-1 for a listing of the classes, programs, and customer segments considered.)

Findings

As noted on page 103, for the baseline metrics regarding classes, we focused on three main EC goal areas established in the Program Theory documentation—support of programs, support of behavior change, and support of customer segments. Below is an overview of findings relative to these goals. The following pages provide additional detail on the findings.

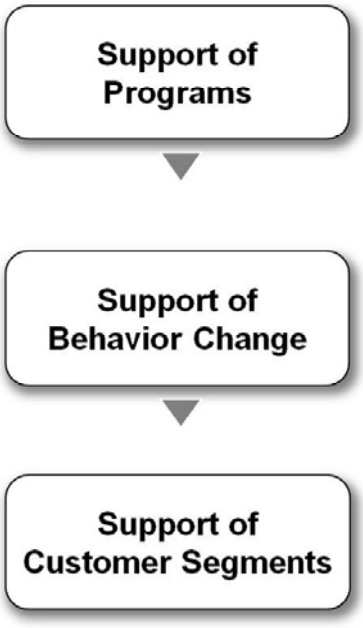
Note: Considerations re. Findings

As you review these findings, keep in mind that they reflect only content addressed in the class materials that were made available for our review. **This likely results in scores that are lower than they would be if the actual delivery of a "live" class were evaluated**.

For example, let's say an instructor or a guest speaker discusses program-specific information during the class, but that information is not documented in the class materials. It's possible that the "live" course would score very well for direct support of programs, but a review of the materials alone would result in a very poor score.

The same is true for other areas considered: Instructors or guest speakers may tailor the live presentation to address the needs of specific customer segments represented in the class or to encourage participants to take action based on what they've learned in the class. Unless that content is captured in the class materials (and the class materials were available through the ECs), it will not be reflected in this evaluation of the classes.

Overview of Findings



Findings re. Support of Programs:

- Excellent tie-in between classes and programs
- Very poor **direct** program support
- Excellent **indirect** program support

Findings re. Support of Behavior Change:

- Mostly poor (but 16% very good) in encouraging action
- Mixed results in overcoming market barriers

Findings re. Support of Customer Segments:

- Excellent tie-in between classes and customer segments
- Poor in addressing segment-specific needs
- Very poor in second-language offerings

How Scores Were Calculated

As described on page 53, for each focus area in the yardstick, we established several objective, Yes/No items that we used to determine how well a class met certain goals. The following describes the how these scores were calculated.

Scoring Yes/No Items

- A "perfect" score in an area is 100%; that is, a "yes" for every item in that area.
- Each item was weighted equally, so a class's total score for an area is the average (arithmetic mean) of the points scored on all items in that area.

  For example, consider the section of the yardstick that addresses "How well does the class **directly** support this program (with program-specific information)?"

  To address this question, we used the following yardstick items… Does the class:

  - Describe program goals/objectives (from target customer perspective)?
  - Describe program features?
  - Describe program benefits to participants?
  - Provide information on how to pursue program offerings?
  - Include recommended next steps to pursue program offerings?
  - Include contact information (URL, email, phone) for more information or next steps?
  - Have a scheduled presentation by a program manager or account executive on the program?

  For each of the above items, if the answer was "yes," the class scored one (1) point for that item; if the answer was "no," the class scored zero (0) for that item.

  - If the answer was "yes" for each of the seven items above, the class scored 100% for that section.
  - If the answer was "yes" for only three of the seven items above, that class would score 43% (3/7).

(See Appendix 2-2 for the complete yardstick we used to establish baseline metrics for the classes.)

Other Scoring Considerations

- We used the yardstick to score a class relative to each program and customer segment with a tie-in to that class.

  If there was no tie-in between a class and a program or customer segment, that program or customer segment was marked "not applicable," and not considered the class scoring in that area.

  For example, if a class is tied-in to only one program, the class's program-related scores would reflect how the class does relative to that one program. If a class has a tie-in to three programs, the class's program-related scores would reflect how well it does relative to all three programs.

- Only those classes for which we received class material were scored using the yardstick.

  This may result in scores that are lower than they would be if the study had encompassed audits of the "live" class deliveries. (See the note on the preceding page.)

- We calculated scores for classes offered at AgTAC, classes offered at CTAC, and for the two ECs combined. Some classes were offered only at AgTAC, some were offered only at CTAC, and some were offered at both locations.
  - To calculate the score for an individual EC (AgTAC or CTAC), we averaged the scores of all the classes that were offered at that location (including classes that were offered only at that location and classes that were offered at other locations in addition to that one).
  - To calculate the overall score of both locations combined, we averaged the scores of all classes.
  - Because some classes were offered at both locations, the overall score for both locations combined is not necessarily the average of the two locations' individual scores.

    Averaging the two locations' individual scores would, in effect, be counting twice those classes that were offered at both locations.

  (See Appendix 2-3 for further explanation of why the "All" (combined) score is not the average of the two individual EC scores.)

Support of Programs

Findings for classes' support of programs are grouped into three areas related directly to EC goals identified in the Program Theory documentation, summarized below.

- Tie-in to Programs
- Direct Support of Programs
- Indirect Support of Programs

Tie-in to Programs

Tie-in to Programs addresses the question, "How many classes have a tie-in to one or more program?" *Tie-in*, in this context, refers to the logical relationship between the information (and skills) addressed in a class and the incentive and rebate programs offered through SCE.

- If approximately 25% or more of the class addresses technologies, measures, or practices encompassed by a program, we said there is a high tie-in between the class and that program.
- If less than 25% of the class addresses topics directly related to a program, we said there is a medium to low tie-in between the class and that program.
- If the class addresses only topics outside the scope of a given incentive or rebate program, we said there is no tie-in between the class and that program.

When answering this item, we considered all short list classes.

Task 2: Baseline Metrics — Classes

Findings

- When class material was available for review, we based the tie-in level (high, medium to low, or none) on a review of those materials, as well as the class description and input from subject matter experts.
- When class materials were unavailable, we based the tie-in level solely on the class description and input from experts familiar with the class.

(See Appendix 2-1 for the list of programs considered in this project.)

EC goal: 100% classes demonstrate direct tie-in to programs

The classes offered at both ECs (AgTAC and CTAC) essentially met the goal of 100% direct tie-in to programs. (The classes that were not tied-in to the "short list" programs were tied to other programs or met special needs.)

Tie-in Between Classes and Programs	AgTAC	CTAC	All
Some tie-in (low through high)	95%	95%	96%
High tie-in	90%	85%	88%

Table 2.1: Tie-in between classes and programs

- Fifty-six classes (the full short list of classes) were considered when addressing Tie-in to Programs.
- Although some of these classes did not have a high tie-in to the 16 programs that this evaluation encompassed, those that did not show a high tie-in:
  - Clearly addressed programs outside the scope of this evaluation

    For example, the class *Introduction to the California Solar Initiative* has no tie-in to any of the programs we focused on during this evaluation, but it obviously addresses the California Solar Initiative program.

  OR

  - Addressed special audience needs

    For example, *Fundamentals of Electricity and Energy Efficiency* addresses very basic concepts of "what is electricity and how does it work?" that may be necessary to understand other information more directly related to programs and energy efficiency issues.

    As another example, *Wet Cleaning Demonstration* shows only low tie-in to two of the programs we focused on, but it obviously meets the needs of SCE customers who are dry cleaners striving to meet environmental regulatory requirements.

  Because of apparent reasons for the exceptions to tie-in between classes and programs, we consider that the ECs have essentially met the goal of 100% tie-in to programs.

- There were two classes with no tie-in to one or more short list program:
  - *Introduction to the California Solar Initiative*
  - *Fundamentals of Electricity and Energy Efficiency*

  As noted above, *California Solar Initiative* class has a high tie-in to a program not specifically considered during this project; and the *Fundamentals of Electricity* class addresses extremely basic background information about electricity that may be a prerequisite for other courses for some participants.

- There were five classes that had only a medium to low tie-in to one or more short list program:
  - *Demand Response Programs: What They Are and How Participants Can't Lose*
  - *HVAC System Air Flow and Static Pressure Diagnostics*
  - *Title 24 - Acceptance Training for Designers and Contractors*
  - *Title 24 Duct Leakage Testing*
  - *Wet Cleaning Demonstration*

  The Demand Response class would have a high tie-in to programs not specifically considered during this project.

  The other classes listed above meet special audience needs that, while not directly related to the incentive and rebate programs we focused on, are clearly targeted directly at special needs associated with kW and kWh reduction and regulatory requirements.

Direct Support of Programs

Direct Support of Programs addresses "How well do the classes **directly** support the programs — with program-specific information?" The yardstick items in this area focus on whether a class:

- Conveys program purpose, features, and benefits to participants
- Encourages participants to actively pursue the relevant programs

When answering the yardstick items for each class, we considered each program that had a high tie-in to the class (and that had class materials available to us).

EC goals: Inform participants about programs and benefits
Encourage and facilitate action relative to programs

Most classes did very poorly in direct program support. Only three classes scored well; three-fourths of the classes scored extremely poorly (0%).

Overall score for…	AgTAC	CTAC	All
Direct Support of Programs	7%	10%	6%

Table 2.2: Overall scores for Direct Support of Programs

- Forty classes were scored when addressing Direct Support of Programs.

  Fifty-one classes had high tie-in to one or more program. Eleven of these had no materials available for our review, so were not considered in the scoring.

- The range of scores was as follows:
  - Scoring 75 – 100%: 3 classes (7.5%)
  - Scoring 50 – 74%: 3 classes (7.5%)
  - Scoring 1 – 49%: 4 classes (10%)
  - Scoring 0%: 30 classes (75%)

Task 2: Baseline Metrics — Classes

Findings

- The three classes scoring 75% or higher in Direct Support of Programs are:
  - *Compressed Air System Efficiency* (86%)
  - *Improving Pump Plant Efficiency to Lower Energy Cost* (86%)
  - *Save Energy, Save Money* (86%)

The details regarding Direct Support of Programs:

Criteria	AgTAC	CTAC	All
Describes program goals/objectives (from target customer perspective)	8%	11%	7%
Describes program features	8%	12%	7%
Describes program benefits to participants	8%	12%	7%
Provides information on how to pursue program offerings	8%	11%	7%
Includes recommended next steps to pursue program offerings	8%	12%	7%
Includes contact information (URL, email, phone) for more info or next steps	8%	12%	7%
Has scheduled presentation by program manager or account executive on program(s)	0%	0%	0%

Table 2.3: Scores on each criterion for Direct Support of Programs

Indirect Support of Programs

Indirect Support of Programs addresses "How well do the classes **indirectly** support the programs — with information on technologies or practices related to programs?" The yardstick items in this area focus on whether a class:

- Conveys the benefits of program-related technologies
- Helps participants weigh their options by distinguishing among technology variations that are or are not encompassed by relevant programs
- Helps prepare participants for implementing appropriate technologies by presenting key considerations and offering specific guidance for implementation of relevant technologies and practices

When answering the yardstick items for each class, we considered each program that had a high tie-in to the class (and that had class materials available to us).

EC goal: Educate about the benefits of program-related measures and practices

Most classes did very well in addressing benefits of program-related technologies (84% overall score for all classes). However, results were mixed on other criteria related to indirect program support.

Overall scores were almost evenly divided among good to excellent, poor, and very poor.

Overall score for…	AgTAC	CTAC	All
Indirect Support of Programs	57%	71%	57%

Table 2.4: Overall scores for Indirect Support of Programs

- Forty classes were scored when addressing indirect program support.

  Fifty-one classes had high tie-in to one or more program. Eleven of these had no materials available for our review, so were not considered in the scoring.

- The range of scores was:
  - Scoring 75 – 100%: 13 classes (32.5%)
  - Scoring 50 – 75%: 13 classes (32.5%)
  - Scoring 1 – 49%: 13 classes (32.5%)
  - Scoring 0%: 1 class (2.5%)

- The thirteen classes scoring **75% or higher** in Indirect Support of Programs are:
  - *Adjustable Speed Drives* (80%)
  - *Advanced Lighting Technologies* (84%)
  - *Chilled Water System Efficiency* (80%)
  - *Daylighting for Buildings* (80%)
  - *DOE (CEC) Fan System Assessment Training* (80%)
  - *DOE Motor Systems Management* (80%)
  - *Efficiency Technologies for Commercial Refrigeration* (80%)
  - *HID Outdoor and Indoor Lighting Applications* (80%)
  - *Industrial Refrigeration* (80%)
  - *Lighting Fixture Maintenance Workshop* (80%)
  - *Package Unit Heating, Ventilation & Air Conditioning (HVAC)* (80%)
  - *Save Energy, Save Money* (80%)
  - *Specifying Foodservice Lighting for Energy Efficiency* (80%)

The details regarding Indirect Support of Programs:

Criteria	AgTAC	CTAC	All
Describes benefits of program-relevant technologies or practices	84%	94%	84%
Distinguishes between technology variations that are and are not included by program	1%	1%	1%
Includes considerations for implementing relevant technologies or practices	65%	86%	65%
Provides specific guidance for implementing technology or practice	35%	72%	36%

Table 2.5: Scores on each criterion for Indirect Support of Programs

Support of Behavior Change

Findings for classes' Support of Behavior Change focus on whether classes provide information that will help effect "real world" change in participants' decisions and actions on-the-job (or at-home).

The findings are grouped into two areas related to EC goals identified in the Program Theory documentation, summarized below.

- Encouraging Action
- Helping Overcome Market Barriers

Encouraging Action

Encouraging Action addresses the question, "How well do the classes **encourage action** — helping them apply information and concepts addressed in the class to their own environment?" The yardstick items in this area focus on whether a class:

- Specifically recommends appropriate next steps participants may take to reduce kWh (and kW)
- Helps participants apply the information presented in class to their own situations and needs
- Provides guidance regarding actions they may take (assessing options, recommended "to-dos," and where to get more information or assistance)

When answering the yardstick items for each class, we considered all short list classes for which materials were available.

EC goal: Increase likelihood of participants' EE action

Seven classes did an excellent job in this area (scored 100%). However, most of the classes (72%) did very poorly (scored lower than 50%).

Overall score for…	AgTAC	CTAC	All
Encouraging Action	25%	28%	29%

Table 2.6: Overall scores for Encouraging Action

- Forty-five classes were scored when addressing these items. (Eleven of the 56 classes had no materials available for review.)
- The range of scores was:
  - Scoring 75 – 100%: 7 classes (15.5%)
  - Scoring 50 – 74%: 4 classes (9%)
  - Scoring 1 – 49%: 9 classes (20%)
  - Scoring 0%: 25 classes (55.5%)

- The seven classes scoring **75% or higher** in Encouraging Action are:
  - *Adjustable Speed Drives* (100%)
  - *Compressed Air System Efficiency* (100%)
  - *Demand Response Programs: What They Are and How Participants Can't Lose* (100%)
  - *DOE (CEC) Fan System Assessment Training* (100%)
  - *DOE Motor Systems Management* (100%)
  - *Metal Halide VS Fluorescent – 10 Rounds in the Hibay Arena* (100%)
  - *Save Energy, Save Money* (100%)

The details regarding Encouraging Action:

Criteria	AgTAC	CTAC	All
Includes specific calls to action / specific next steps	24%	28%	27%
Supports development of individualized action plan	21%	25%	22%
Includes job aids / worksheets to assist in assessing / **analyzing options**	21%	25%	22%
Includes job aids / checklists to assist in **taking action**	21%	22%	20%
Includes information on where/how to get assistance in taking action	38%	41%	36%

Table 2.7: Scores on each criterion for Encouraging Action

Helping Overcome Market Barriers

Helping Overcome Market Barriers addresses the question, "How well do the classes **help overcome common market barriers**, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation?" The yardstick items in this area focus on whether a class addresses common market barriers such as:

- Lack of technical knowledge regarding application of EE measures and practices
- Lack of clarity regarding economic benefits of EE measures and practices
- Lack of clarity regarding non-financial benefits
- Perception of high risk; uncertainty regarding risk assessment and mitigation

EC goal: Reduce market barriers (to EE investments and actions)

Most (84%) provided information on application of EE measures, but didn't do as well on other criteria. All did very poorly on risk assessment and mitigation.

A few classes (16%) did a good overall job of encouraging action (scored 75% or higher); most (67%) did very poorly overall (scored less than 50%).

Overall score for…	AgTAC	CTAC	All
Helping Overcome Market Barriers	33%	44%	42%

Table 2.8: Overall scores for Helping Overcome Market Barriers

Task 2: Baseline Metrics — Classes

Findings

- Forty-five classes were scored when addressing Helping Overcome Market Barriers. (Eleven of the 56 classes had no materials available for review.)
  - Scoring 75 – 100%: 7 classes (16%)
  - Scoring 50 – 74%: 8 classes (18%)
  - Scoring 1 – 49%: 24 classes (53%)
  - Scoring 0%: 6 classes (13%)
- The seven classes scoring **75% or higher** in Helping Overcome Market Barriers are:
  - *Chilled Water System Efficiency* (80%)
  - *Compressed Air System Efficiency* (80%)
  - *DOE (CEC) Fan System Assessment Training* (80%)
  - *DOE Motor Systems Management* (80%)
  - *Industrial Refrigeration* (80%)
  - *Lighting for Architecture and Interiors* (80%)
  - *Package Unit Heating, Ventilation & Air Conditioning (HVAC)* (80%)

The details regarding Helping Overcome Market Barriers:

Criteria	AgTAC	CTAC	All
Provides information on application of EE measures and practices	80%	88%	84%
Describes typical cost savings associated with EE measures and practices	35%	53%	40%
Quantifies other typical financial benefits (ROI, payback, etc.)	15%	31%	22%
Describes typical non-financial benefits	35%	47%	36%
Includes info on risk assessment and risk mitigation	0%	0%	0%

Table 2.9: Scores on each criterion for Helping Overcome Market Barriers

Support of Customer Segments

The evaluation of classes' Support of Customer Segments is related to the overarching EC goal of tapping into untapped markets. Findings for Support of Customer Segments are grouped into three areas related to EC goals identified in the Program Theory documentation, summarized below.

- Tie-in to Customer Segments
- Segment-specific Support
- Second-language Support

Tie-in to Customer Segments

Tie-in to Customer Segments addresses the question, "How many classes have a logical tie-in to one or more customer segment?" *Tie-in*, in this context, refers to the logical relationship between the information (and skills) addressed in a class and customer segments in the SCE marketplace.

- If a class addressed technologies, measures, or practices of significant relevance to a customer segment, we said there was a tie-in between the class and that segment.
- If the information addressed in a class was not applicable to a customer segment, we said there was no tie-in between the class and that segment.

When answering this item, we considered all short list classes.

- When class material was available for review, we based the tie-in level (tie-in or no tie-in) on a review of those materials, as well as the class description and input from subject matter experts.
- When class materials were unavailable, we based the tie-in level solely on the class description and input from experts familiar with the class.

Five main customer segments were considered:

- Commercial
- Industrial
- Agricultural
- Residential
- New Construction

In addition, we considered Market Actors (e.g., energy efficiency consultants, architects and designers, commercial property developers, government agencies, equipment designers and manufacturers) as a special category of customer segment.

EC goal: Provide courses with segment-specific content

All classes were logically tied to one or more of the five customer segment.

Tie-in to Customer Segments	AgTAC	CTAC	All
Average number of tied-in segments per class	3	3	3

Table 2.10: Overall scores for Tie-in to Customer Segments

Task 2: Baseline Metrics — Classes

Findings

- Fifty-six classes (the full short list of classes) were considered when addressing Tie-in to Customer Segments.
- The range of number of segments (excluding Market Actors) tied-in to classes was:
  - Five segments: 2 classes (4%)
  - Four segments: 17 classes (30%)
  - Three segments: 13 classes (23%)
  - Two segments: 10 classes (18%)
  - One segment: 14 classes (25%)
  - No segments: 0 classes (0%)

The details regarding Tie-in to Customer Segments:

	% of Classes with Tie-in		
Customer Segment	**AgTAC**	**CTAC**	**All**
Commercial	74%	95%	82%
Industrial	56%	61%	54%
Agricultural	44%	37%	41%
Residential	31%	22%	29%
New Construction	64%	76%	64%
Market Actors	54%	73%	62%

Table 2.11: Scores on each criterion for Tie-in to Customer Segments

Segment-specific Support

Segment-specific Support addresses the question, "How well do the classes support segment-specific needs?" The yardstick items in this area focus on whether a class:

- Addressed special considerations or concerns of groups within the customer segment
- Gave examples specific to a customer segment (typical benefits, customer success stories, and case studies)

When answering the yardstick items for each class, we considered all short list classes for which materials were available.

EC goal: Provide courses with segment-specific content

Three quarters of the classes did very poorly (less than 50%) in segment-specific support; only one class did extremely well.

About half the classes described considerations for specific "sub-segments," but didn't do as well on other criteria.

Overall score for…	AgTAC	CTAC	All
Segment-specific Support	24%	23%	22%

Table 2.12: Overall scores for Segment-specific Support

- Forty-five classes were scored when addressing Segment-specific Support. (Eleven of the 56 classes had no materials available for review.)
- The range of scores was:
  - Scoring 75 – 100%: 1 class (2%)
  - Scoring 50 – 74%: 10 classes (22%)
  - Scoring 1 – 49%: 19 classes (42%)
  - Scoring 0%: 15 classes (33%)
- The one class scoring **75% or higher** in Segment-specific Support is:
  - *On-Farm SCADA* (100%)

The details regarding Segment-specific Support:

Criteria	AgTAC	CTAC	All
Describes considerations for specific "sub-segments"	51%	58%	53%
Includes example of "typical" benefits realized through energy efficiency measures (EEM) in this segment	31%	25%	26%
Includes EEM success stories of actual customers in this segment	7%	4%	5%
Includes detailed case study of actual implementations in this segment	7%	5%	5%

Table 2.13: Scores on each criterion for Segment-specific Support

Second-language Support

Second-language Support addresses the question, "Are the classes offered in a language other than English?"

All 56 short list classes were considered; information regarding second-language offerings was provided by EC personnel.

EC goal: Offer in-language courses

None of the classes considered in this assessment were offered in a language other than English.

Overall score for…	AgTAC	CTAC	All
Second-language Support	0%	0%	0%

Table 2.14: Overall scores for Second-language Support

Recommendations

Our primary recommendations based on the findings for Task 2: Baseline Metrics for Classes focus on two main areas:

- More clearly and directly support the programs in the classes, actively encouraging participation in relevant programs
- Actively encourage and support behavior change on the part of class participants

More Clearly and Directly Support the Programs

- **Integrate program-specific information into the training experience**:
  - Incorporate a quick and easy-to-read summary of relevant program information in the Welcome Package for each individual course.
  - Have an SCE representative scheduled to do a quick walk through of the program specific information (at beginning or end of class — or at a natural "break" in the session).
  - Consider having a brief "module" providing an overview the relevant programs — why/how they're relevant to the focus of the class; how participants can learn more and apply to participate.
  - Since program details are relatively volatile, the "module" materials can be a brief PowerPoint presentation accompanied by a participant handout or appendix to the workbook.

    This material could summarize at a relatively high level:
    - Overall program benefits to participants
    - Overview of how to pursue program offerings
    - Contact information (URL, email, phone) for more info or next steps
  - Provide a high-level "technology cheat sheet" (to instructor or to students) summarizing which common variations on a class-related technology are encompassed by the major programs and which are not covered by the major programs.
- **Identify/create one (or very few) "point person(s)" for basic program information** at CTAC and at AgTAC (or for both combined), encompassing all programs — or at least all "high-impact" incentive and rebate programs.

  This individual could be responsible for doing the following:
  - Be the go-to resource for the high-level summary of which programs are relevant to a class and which common technologies do and do not apply to key programs
  - Help prepare relevant "technology cheat sheets" (see above) and coach the SCE representatives who lead the brief program-specific "module"
  - Bring it to the class "owner's" attention when program information encompassed by the class needs to be updated

  NOTE: This recommendation also applies to Task 3: Baseline Metrics — Exhibits.

Actively Encourage and Support Behavior Change

Helping participants bridge the gap between classroom training and real-world application is key to successfully influencing participants' on-the-job (and at-home) behavior. Much of this is directly related to the recommendations associated with "adult learning principles," described in *Task 1: Adult Learning Audit* earlier in this report.

Some recommendations specific to encouraging action and facilitating behavior change that are appropriate to all levels of EC courses include:

- Include a specific suggestions (and discussions or activities) focused on "next steps" class participants can take to put their new knowledge (and skills) into action to save energy (and reduce demand)
- Provide participants with action-oriented checklists and worksheets that they can use after class. Some examples include:
  - Guidance for analyzing options among alternative technologies or practices
  - Summary of typical activities to implement specific EE technology or practice
  - Recommendations on where to get support for taking action
  - In-class development of personal action plan based on concepts and content presented in the class
- Provide "real world" examples of how others have benefited by acting on the measures and practices addressed in the class.
  - Include a few "generic" examples of "typical" results/benefits in the body of the class
  - Have handouts or appendices with a variety of examples **specific to different customer segments**. If possible, cite the actual customer in a "success story / testimonial" format; at a minimum, provide basics (type of business, size of facility, types of measures and practices employed, financial benefits realized, non financial benefits realized.)

    (This implies, over time, a more rigorous approach to collecting data on customer impact. In the short-term, there is a variety of promotional collateral that could serve as the basis for some "real-world," segment-specific examples.)
- Over time, consider developing a program-oriented, web-based "performance support system" that would help customers identify the most relevant programs for their situation and needs.

  The idea here is that somebody could go to the web site, answer some straight-forward questions (or put check marks next to a few sets of relevant criteria) and the system would return with a short list of programs the customer should consider pursuing.
  - The information could include a short description of relevant elements of the program — along with specific next steps, pointers to more information, and appropriate contact information.
  - It might also include links to appropriate action-oriented checklists and worksheets to help them pursue relevant measures and practices.

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Task 3: Baseline Metrics — Exhibits

Background (Goals and Questions)

The principle goal for Task 3 was to establish baseline metrics for how well selected exhibits at the Energy Centers (ECs):

- Support the classes offered by the ECs
- Support energy efficiency (EE) programs
- Help class participants take meaningful action to increase energy efficiency (and reduce demand)
- Tap into untapped markets by addressing needs of specific customer segments

The baseline established through Task 3 can be used in the future to determine the progress that the ECs are making toward the relevant goals over time.

The following summarizes the goals outlined in the program theory documentation (*SCE CTAC & AGTAC Energy Centers: Program Logic Diagram, Program Theory, Potential Indicators and Success Criteria*, September 2007) and the questions that guided the Task 3 evaluation effort.

EC Goals	Evaluation Questions
100% of exhibits and displays are linked to seminars/classes Illustrate technologies, measures, and concepts addressed in classes Encourage participation in related classes	• How many exhibits have a logical tie-in to classes? • How are the exhibits used in tied-in classes? • Are relevant classes promoted at the exhibits?
100% of exhibits and displays are linked to incentive and rebate programs Encourage participation in related incentive and rebate programs	• How many exhibits have a tie-in to one or more program? • How well do the exhibits directly support the programs through signage and collateral specific to the program?

Task 3: Baseline Metrics — Exhibits

Recommendations

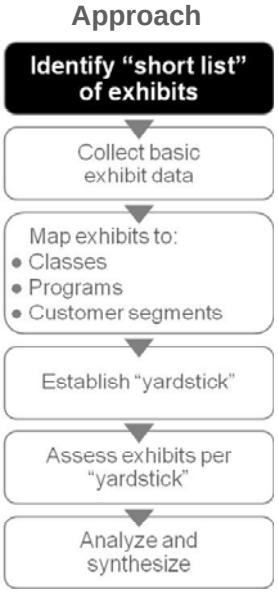
EC Goals	Evaluation Questions

Support change in behavior
 	
Document customer benefits
 	
Support hands-on demonstrations
 	
Encourage action
 	
Overcome market barriers
	How well do the exhibits (and associated signage and collateral)…
	
	• Convey purpose, use, and benefits of the technology?
	
	• Support both guided and independent hands-on interaction?
	
	• How well do the exhibits encourage action — helping people:
	
	  ○ Relate technologies or measures illustrated in the exhibit to their own environment?
	
	  ○ Take appropriate steps to evaluate and implement the technologies or measures?
	
	• How well do the exhibits help overcome common market barriers, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation?

100% of the exhibits and displays are linked to target customer segments Appeal to specific customer segments Provide in-language information	• How many exhibits have a logical tie-in to customer segments? • How well do the exhibits support segment-specific needs? • Are signage and collateral in a language other than English?

Approach

The graphic below summarizes the major activities the evaluation team completed during the assessment. Each activity is described below and on the following pages.



Identify the "Short List" of Exhibits for Evaluation

To keep the project within an appropriate scope, we focused on a "short list" of 32 exhibits — 17 at AgTAC and 15 at CTAC. (See Appendix 3-1 for the list of exhibits considered during this evaluation.)

All exhibits on the "short list" were nominated by the Energy Centers. Some exhibits were located both at AgTAC and CTAC. Both installations of these "duplicate" exhibits were evaluated separately. In several instances there were significant differences in the implementation of the display.

All exhibits in the short list are related to energy efficiency, and the list as a whole reflects a cross section of:

- Technologies
- Design approach (fixed or mobile)
- Intended use (in-class, tour, consultation, guided and independent hands-on, etc.)
- Relevant customer segments

Collect Basic Information about the Exhibits

Once we identified the short list of exhibits, we:

- Worked with EC personnel to summarize information about the exhibits
- Worked with an engineer familiar with most of the exhibits and relevant technologies to determine which major technology areas the exhibits addressed
- Confirmed summary information with SCE

Map Exhibits to Classes, Rebate/Incentive Programs, and Customer Segments

After refining the short list and summarizing the basic information, we mapped each exhibit to classes offered at the ECs, to Edison's rebate and incentive programs, and to selected customer segments. There were two reasons for mapping exhibits to classes, programs, and segments:

- To answer whether any exhibits address one or more class, program, and segment
- To ensure an exhibit was not "scored down" because it doesn't address something it wouldn't logically address.

  For example, an exhibit demonstrating an agriculture-specific technology wouldn't get a low score simply because it doesn't address residential or industrial customer segments.

Mapping Exhibits to Classes

Our emphasis was on the short list of 56 classes that focused primarily on issues related to energy efficiency, and represented a cross section of key characteristics (identified in Task 2). When mapping exhibits to classes, we also considered an additional 93 classes that came from the comprehensive list of classes provided by SCE.

(See Appendix 2-1 for the short list of classes considered for this project. See Appendix 3-1 for a list of the 93 additional classes considered when mapping exhibits to classes.)

Tie-in level (high, medium to low, or none) between a class and exhibit was based on whether a class addressed technologies or measures that are encompassed by the exhibit.

- High tie-in between exhibit and class — If 25% or more of a class addressed technologies or measures illustrated by the exhibit, that exhibit was considered to have a logical "high tie-in" to the class.
- Medium to low tie-in between exhibit and class — If the class addressed technologies illustrated by an exhibit, but less than 25% of the class focused on technologies or measures encompassed by the exhibit, the exhibit was considered to have a logical "low tie-in" to the class.
- No tie-in between exhibit and class — If none of the class topics included technologies represented by an exhibit, the exhibit was considered to have no tie-in to the class.

The initial tie-in level was established by a review of class descriptions and class materials (when available), as well as input from an engineer familiar with the exhibits and most of the classes.

Tie-in levels between exhibits and classes were twice reviewed by EC personnel — initially in a spreadsheet review and a second time during the on-site exhibit reviews. When appropriate, we adjusted the exhibit-to-class mapping based on EC personnel's feedback.

Mapping Exhibits to Rebate and Incentive Programs

To maintain a reasonable project scope for Task 3, we focused on the same 16 high-impact programs that we focused on during Task 2. These programs account for 93% of all impact program budget and over 73% of kWh savings and 63% of kW savings. (See Appendix 2-1 for a list of the programs considered in this project.)

Tie-in level (high, medium-low, or none) between an exhibit and a program was based on whether an exhibit addressed technologies, measures, or practices that are encompassed by a program.

- High tie-in between exhibit and program — For programs that identify specific technologies or measures (e.g., the Express Efficiency Program), if an exhibit is an example of a technology or measure specified by the program, the exhibit was considered to have a high tie-in to that program.

  For programs that offer incentives based on calculated savings for a wide, unspecified array of technologies or measures (e.g., the Standard Performance Contract), if an exhibit is an example of technologies or measures commonly proposed and accepted under the program, the exhibit was considered to have a high tie-in to that program.
- Medium to low tie-in between exhibit and program — If an exhibit illustrated key concepts related to technologies encompassed by a program, but is not an example of the actual measures specified by the program (or commonly proposed and accepted under the program), the exhibit was considered to have a logical "medium to low tie-in" to the program.

  For example, the Heat Pump Demonstrator (at both AgTAC and CTAC) was considered to have a medium to low tie-in to most of the programs because it illustrates key concepts (heating/cooling cycle) relevant to numerous measures, but is not itself a measure encompassed by the short list programs.
- No tie-in between exhibit and program — If the technology or measure illustrated by the exhibit is unrelated to technologies or measures typically encompassed by a program, the exhibit was considered to have no tie-in to the program.

Task 3: Baseline Metrics — Exhibits

Approach

The initial tie-in level was established by a review of the program documentation and input from an engineer familiar with the programs and the exhibits.

Tie-in levels between exhibits and programs were twice reviewed by EC personnel and adjusted based on their feedback.

Mapping Exhibits to Customer Segments

When mapping exhibits to customer segments, we focused on the same short list of customer segments identified for Task 2. The list of five main segments (plus Market Actors) was initially determined by the project team, then reviewed and approved by EC personnel.

The tie-in level (tied-in or not tied-in) between an exhibit and customer segment was based on whether the exhibit was an example of technologies or measures of commonly applied in customer segment — or illustrated key concepts associated with technologies or measures relevant to the segment.

The initial tie-in level was established by input from an engineer familiar with the customer segments and the exhibits. Tie-in levels were reviewed by EC personnel and adjusted based on their feedback, as necessary.

(See Appendix 2-1 for a list of customer segments considered in this evaluation.)

Establish the "Yardstick" (Evaluation Criteria)

In order to determine how well the exhibits support the classes and programs, help encourage change in participants' behavior, and help tap into key market segments, we established the evaluation criteria, which we refer to as our "yardstick."

For each of the evaluation questions noted on page 103, we developed a short series of objective Yes/No or "multiple choice" questions that we used to determine "how well" an exhibit met the relevant goal.

(See page 80 for more information on how the yardstick items were used in scoring and how scores were calculated.)

Our internal project team reviewed the yardstick and cross checked the evaluation criteria with the program theory documentation several times before we presented SCE with a draft. We then discussed the yardstick with EC personnel and fine-tuned it based on their feedback.

(See Appendix 3-2 for the complete yardstick we used to establish baseline metrics for the exhibits.)

Assess the Exhibits Using the Yardstick

Once we had collected the background information, mapped the exhibits to classes, programs, and customer segments, and refined the yardstick used to evaluate exhibits, we conducted site visits to answer yardstick questions.

During the site visits to AgTAC and CTAC we:

- Examined the exhibits on our short list and entered an initial rating for each exhibit
- Worked with EC contacts to confirm exhibits' intended use, how the exhibit is used in classes, etc.

  We also discussed and noted any special issues that should be taken into consideration during our assessment — for example whether an exhibit was currently under construction or was temporarily "reserved" for in-class use only.
- Photographed the exhibits and signage and collected collateral available at each exhibit

After the site visits, we reviewed our photographs and the collateral we collected to verify the initial on-site ratings.

Analyze and Synthesize Results

We captured the data from the yardstick in individual spreadsheets, then we consolidated all Task 3 evaluation data to obtain overall scoring for the exhibits at AgTAC, CTAC, and both ECs combined.

When determining if an exhibit had a tie-in to one or more classes, we considered the full list of classes (56 classes from our short list used in Task 2, plus 93 other classes for which SCE provided class descriptions).

When determining how well an exhibit supports a program or a customer segment, we focused only on those programs or segments on our short lists and that had a logical tie-in to the exhibit.

(See Appendix 2-1 for a listing of the short list classes, programs, and customer segments considered. See Appendix 3-1 for the "extra" classes considered when mapping exhibits to classes.)

Findings

As noted on page 103, for the baseline metrics regarding exhibits, we focused on four main EC goal areas established in the Program Theory documentation (support of classes, support of programs, support of behavior change, and support of customer segments). Below is an overview of findings relative to these goals. The following pages provide additional detail on the findings.

Note: Considerations re. Findings

Information Based Solely on Interviews with EC Personnel

Two data points in the exhibit evaluation were based solely on interviews with EC personnel:

- Exhibits' intended use (for example whether an exhibit was designed to support guided or independent hands-on interaction)
- Exhibit's use in classes (whether an used directly in a class or included in class tours)

What Constitutes "Collateral At or Near an Exhibit"

When addressing items related to collateral (flyers, brochures, fact sheets) "at or near the exhibit," we considered only collateral that was within approximately three (3) feet of the exhibit — that is, roughly within arm's length. In general, this means that:

- Most AgTAC exhibits did have collateral "at or near the exhibit."
- Most CTAC exhibits did **not** have collateral "at or near the exhibit."

We understand from discussions with EC personnel that CTAC has made a conscious design decision to aggregate collateral in relatively centralized areas, rather than to place it at individual exhibits. For example, in the Innovation Center, most all the collateral is located in displays at the entrance to the room, grouped under three headings: Industrial Equipment, HVAC/Lighting, and Water Resources.

Our evaluation team deliberated whether to include collateral in such centralized locations when scoring those items that encompassed collateral. Our primary consideration was the effect of the collateral from the **target audience's perspective**.

After careful consideration (and on-site viewing of the exhibits), we decided that because there is such a wealth of collateral on such a wide range of topics, the typical independent observer (e.g., a class participant on break, informally touring the exhibits) would be unlikely to readily see the relationship between a given exhibit and collateral at a central location.

Therefore, we established a "three-feet rule." That is, if collateral was within approximately three feet of an exhibit, we considered it to be "at or near the exhibit," since an individual would likely relate that collateral to the exhibit.

While we acknowledge that there are other important considerations relative to placement of collateral, it is our opinion that given the overarching goal of the ECs to facilitate behavior change, the effect on the target audience should take precedence.

Please see Appendix 3-3 for more information relative to the rationale for centralizing collateral at CTAC.

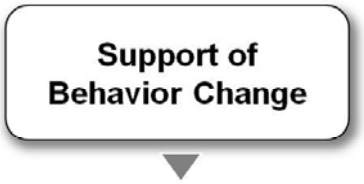
Overview of Findings

Findings re. Support of Classes:

- Excellent tie-in between exhibits and programs
- Excellent use of exhibits in classes
- Mixed results in promotion of classes at exhibits (very excellent at AgTAC; poor at CTAC)

Findings re. Support of Programs:

- Excellent tie-in between exhibits and programs
- Poor support of programs through signage and collateral at exhibits



Findings re. Support of Behavior Change:

- Excellent use of signage to convey purpose, use, and benefits of the technology; mixed results for collateral
- Excellent support of guided hands-on interaction; very good support of independent hands-on
- Very poor at directly supporting and encouraging action

Findings re. Support of Customer Segments:

- Excellent tie-in between exhibits and customer segments
- Very poor support of segment-specific needs
- Very little second-language support in signage and collateral

How Scores Were Calculated

As described on page 53, for each focus area in the yardstick, we established several objective Yes/No and "multiple choice" items that we used to determine how well an exhibit met certain goals. The following describes how the scores were calculated. (See Appendix 3-2 for the complete yardstick we used to establish baseline metrics for the exhibits.)

Scoring Yes/No Items

- A "perfect" score in a section with Yes/No items is 100%; that is, a "yes" for every item in that area.
- Each item was weighted equally, so an exhibit's total score for an area is the average (arithmetic mean) of the points scored on all items in that area.

  For example, consider the section of the yardstick that addresses "How well does an exhibit directly support this program?" To address this question, we used the following yardstick items:

  - Does the exhibit and its signage (considered together):
    - Specifically mention the program?
    - Describe program goals/objectives from a customer perspective?
    - Describe program benefits from a customer perspective?
    - Point to appropriate program information sources?
  - Does collateral at or near the exhibit:
    - Specifically mention the program?
    - Describe program goals/objectives from a customer perspective?
    - Describe program benefits from a customer perspective?
    - Provide information on how to pursue program offerings?
    - Include contact info (URL, email, phone) for more information or next steps?

  For each of the above items, if the answer was "yes," the exhibit scored one (1) point for that item; if the answer was "no," the exhibit scored zero (0) for that item. For example,

  - If the answer was "yes" for each of the five items related to collateral above, the exhibit would score 100% for that section.
  - If the answer was "yes" for only three of the five items related to collateral above, that exhibit would score 60% (3/5) for that section.

Scoring "Multiple Choice" Items

- A "perfect" score in a section with "multiple choice" items is 100%; that is, a "true" for the item that has the highest point value.
- For "multiple choice" items, each answer option had a specific a point value (0 to 5) — with 0 being the value for the option that least supports the related goal and 5 being the value for the option that best supports the related goal.
  - If more than one of the multiple choice items were true, the exhibit scored the points associated with the highest true value.
  - For example, to address the question "How are the exhibits used in logically tied-in classes?" we used the following multiple choice items:

Item	*Value*
▪ Exhibit used directly in class to illustrate key concepts	5
▪ Tour including exhibit is included as a regularly scheduled part of class	4
▪ Tour including exhibit is offered as an option at end of class	2
▪ Exhibit referred to in class materials, but not used directly or included in tour	1
▪ Exhibit NOT used, included in tour, or referred to in class materials	0

If the exhibit is used directly in class, the exhibit scored 100% (5 points) for that item — even if the exhibit was also included in an optional tour at the end of class as well as being used directly in the class.

If the exhibit was included in a optional tour at the end of the class — but not used directly in the class or included in part of a tour that was a scheduled part of the class — it would score 40% (2/5).

Other Scoring Considerations

We used the yardstick to score an exhibit relative to each class, program, and customer segment with a tie-in to that exhibit.

- If there was no tie-in between an exhibit and a class, program, or customer segment, that class, program, or customer segment was marked "not applicable," and not considered in the exhibit's scoring in that area.

  For example, if an exhibit is tied-in to only one class, the exhibit's class-related scores would reflect how the exhibit does relative to that one class. If an exhibit is tied-in to three classes, the exhibit's class-related scores would reflect how it does relative to all three classes.

- Only classes that are offered at the exhibit's location were considered when determining tie-in level between an exhibit and a class. For example:
  - The Variable Speed Drive for Kitchen Exhaust Hoods exhibit is located at CTAC.
  - The class *Energy Efficiency Opportunities in Institutional Foodservice Facilities* is offered only at AgTAC.
  - There would be no tie-in between the exhibit and the class, even if the class addressed variable speed drives for kitchen exhaust hoods as a topic, because the exhibit (at CTAC) could not be used in the class (at AgTAC) or included in a class tour of exhibits.

    Classes offered only at locations other than where the exhibit is located are considered "not applicable" and do not affect scoring for the exhibit.

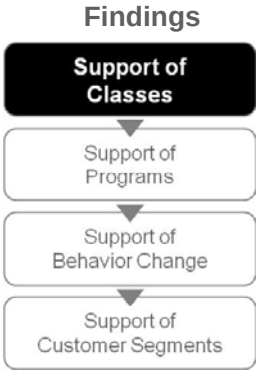
- We considered classes with high tie-in to an exhibit separately from classes with medium to low tie-in to that exhibit.

  We considered programs with high tie-in to an exhibit separately from programs with medium to low tie-in to that exhibit.

- The scores noted in this report relative to how well an exhibit supports classes and programs reflect the classes and programs with high tie-in to an exhibit.

  The scores for classes or programs with a medium to low tie-in were used for internal validation purposes (and possibly for future reference).

Support of Classes



Findings for exhibits' support of classes are grouped into three areas related directly to EC goals identified in the Program Theory documentation, summarized below.

- Tie-in to Classes
- Use with Classes
- Promotion of Classes

Tie-in to Classes

Tie-in to Classes addresses the question, "How many exhibits have a tie-in to one or more classes?" *Tie-in*, in this context, refers to the logical relationship between the technology or measure illustrated by an exhibit and the classes offered at the ECs.

- If approximately 25% or more of a class addresses technologies or measures demonstrated by the exhibit, we said there is a high tie-in between the exhibit and that class.
- If less than 25% of a class addresses technologies or measures demonstrated by the exhibit, we said there is a medium to low tie-in between the exhibit and that class.
- If a class does not address technologies or measures illustrated by the exhibit, or addresses only topics outside the scope of a given incentive or rebate program, we said there is no tie-in between the class and that program.

When assessing whether the exhibits had tie-in to classes, we considered all 32 exhibits on the short list, and we considered the full list of classes (the 56 classes that were the focus of Task 2, plus 93 other classes that came from the comprehensive list of classes provided by SCE).

- When class material was available for review, we based the tie-in level (high, medium to low, or none) on a review of those materials, as well as the class description and input from subject matter experts familiar with the classes and the exhibits.
- When class materials were unavailable, we based the tie-in level solely on the class description and input from experts familiar with the class and the exhibits.

(See Appendix 2-1 for the list of classes on the short list of classes considered in this project. See Appendix 3-1 for the short list of exhibits and the additional classes considered in this project)

EC goal: 100% of exhibits and displays are linked to seminars/classes

The exhibits at both AgTAC and CTAC meet the goal of 100% direct tie-in to classes.

Tie-in Between Exhibits and Classes	AgTAC	CTAC	All
Some tie-in	100%	100%	100%
High tie-in	88%	87%	88%

Table 3.1: Tie-in between exhibits and classes

The four exhibits that had only medium to low tie-in to one or more class are:

- High Volume Low Speed Fan (AgTAC)
- ICF (Insulated Concrete Form) Display (AgTAC)
- Auto Sash (CTAC)
- High Volume Low Speed Fan (CTAC)

It should be noted that while these exhibits are not a key focus of classes we considered in the exhibit's location, **all of the exhibits illustrate technologies of significant interest to a customer segment, or to a program, or both**.

Use with Classes

Use with Classes addresses "How are the exhibits used in tied-in classes?" The yardstick items in this area focus on whether an exhibit is used directly in classes, included in class-related tours, or not used in classes.

When addressing Use with Classes, we considered the short list of classes identified in Task 2. (See Appendix 2-1 for the short list of classes.)

EC goal: Illustrate technologies, measures, and concepts addressed in classes

Both ECs did an excellent job overall in using exhibits in classes. All but one of the exhibits is used directly in one or more class.

Percentage of Exhibits…	AgTAC	CTAC	All
Used directly in one or more high tie-in class	100%	92%	96%

Table 3.2: Percentage of Exhibits used directly in one or more high tie-in class

Overall score for… Use with Classes with High Tie-in	AgTAC	CTAC	All
Used directly in class	92%*	75%*	84%*
Included in tour (either integral part of class or optional)	8%	22%	14%
TOTAL	**100%**	**97%**	**99%**

* Less than 100% means that although the exhibit may have been used directly in one or more high tie-in class, there were other high tie-in classes in which it was not used directly — although it could have been.

Table 3.3: Overall scores for Use with Classes

- Twenty-six exhibits (14 at AgTAC, 12 at CTAC) were scored when addressing Use with Classes.

  The other six short list exhibits (three at AgTAC and three at CTAC) were considered NA because no short list high tie-in classes were offered at the exhibit's location.

Task 3: Baseline Metrics — Exhibits

Findings

- Information about an exhibit's use relative to classes was provided by SCE subject matter experts.
- Overall scoring is based on assigning points for an exhibit's use in a given class.

  5 Exhibit used directly in class to illustrate key concepts

  4 Tour including exhibit is included as a regularly scheduled part of class

  2 Tour including exhibit is offered as an option at end of class

  1 Exhibit referred to in class materials, but not used directly or included in tour

  0 Exhibit NOT used, included in tour, or referred to in class materials

- If an exhibit had more than one use for a given class (e.g., used directly in the class and included in an optional tour at the end of class), the highest score was used (e.g., 5).
- An exhibit's overall score was the mean (average) of the scores for each relevant class. Only classes with high tie-in to the exhibit were scored.

  For example, if an exhibit had a high tie-in to two classes, the highest possible points would be 10 (five for both classes). Let's say the exhibit was directly used in one class (5 points), and included in an optional tour at the end of the other class (2 points), that exhibit would score 70% (5 + 2)/10.

- The range of scores was:
  - Scoring 75 – 100%: 21 exhibits (81%)
  - Scoring 50 – 74%: 4 exhibits (15%)
  - Scoring 1 – 49%: 1 exhibit (4%)
  - Scoring 0%: 0 exhibits (0%)
- The five exhibits scoring **74% or lower** in Use with Classes are:
  - Heat Pump Split System Trainer (AgTAC) (60%)
    - Used directly in 1 class
    - Included in optional tour for 2 classes
  - 200 Ton Cutaway Chiller (CTAC) (70%)
    - Used directly in 1 class
    - Included in optional tour for 1 class
  - Heat Pump Demonstrator (CTAC) (47%)
    - Included in tour that is a regularly scheduled part of 1 class
    - Included in optional tour offered at the end of 1 class
    - Referred to in class materials, but not used directly or included in tour for 1 class
  - Heat Pump Split System Trainer (CTAC) (70%)
    - Used directly in 1 class
    - Included in optional tour for 1 class
  - Motors and Drives Display (CTAC) (70%)
    - Used directly in 1 class
    - Included in optional tour for 1 class
- The only exhibit that was not used directly in a high tie-in class, although it could have been:
  - Heat Pump Demonstrator (CTAC)

The details regarding Use with Classes:

Use with Classes with High Tie-in	AgTAC	CTAC	All
Used directly in class to illustrate key concepts	92%	75%	84%
Tour included as a regularly scheduled part of class	0%	5%	2%
Tour included as option after class	8%	17%	12%
Referred to in class, but not used directly or included in tour	0%	3%	1%
Exhibit NOT used, included in tour or referred to in class materials	0%	0%	0%

Table 3.4: Scores on each criterion for Use with Classes

Promotion of Classes

Promotion of Classes addresses "Are relevant classes promoted at the exhibits?" The yardstick item in this area focused on whether signage at an exhibit specifically mentions related classes, generally refers to classes being available, or in no way promotes classes.

The AgTAC exhibits scored significantly higher in Promotion of Classes because of AgTAC's use of "volatile" signage. They use acrylic glass stands at an exhibit to hold "slip sheets" that promote upcoming classes related to that exhibit.

EC goal: Encourage participation in related classes

Most exhibits at AgTAC used signage to promote related classes; few exhibits at CTAC directly promoted classes in exhibit signage.

Overall score for… Promoting classes	AgTAC	CTAC	All
Relevant classes mentioned in exhibit signage	92%	36%	64%

Table 3.5: Overall scores for Promotion of Classes

- Twenty-six exhibits (12 at AgTAC, 12 at CTAC) were scored when addressing Use with Classes. Only classes with high tie-in to the exhibit were considered in the scoring.
  - Six short list exhibits (three at AgTAC and three at CTAC) were considered NA because there were no short list high tie-in classes offered at the exhibit's location.
  - Another two exhibits (both at AgTAC) were considered NA because there was no signage at the exhibit due to special considerations.
    - The Lighting Design Room did not have class-related signage, but did have collateral promoting classes.
    - The Programmable Logic Controller was temporarily kept in a private location and used only in classes, and related classes were not promoted at the exhibit because they were already fully enrolled, and EC staff did not want to cause frustration by promoting classes that participants could not sign up for.

Task 3: Baseline Metrics — Exhibits

Findings

- We gave "full credit" to every AgTAC exhibit that had volatile signage promoting classes, even if some high tie-in classes were not mentioned. (We assumed the class would be mentioned if it were being offered in the relatively near future.)
- Overall scoring is based on assigning points as follows:

  5 Signage at exhibit specifically mentions class

  2 Signage at exhibit generally refers to relevant classes being available

  0 No mention of this class in exhibit signage

  NA Not applicable — no signage due to special considerations

  If more than one of the above statements was true (e.g., signage specifically mentioned the class and signage included a general reference to classes being available), the highest point value was used (e.g., 5).

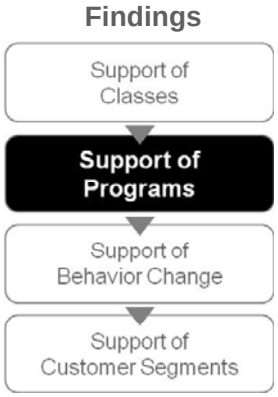
- The range of scores was:
  - Scoring 75 – 100%: 13 exhibits (54%) 11 of these exhibits at AgTAC
  - Scoring 50 – 74%: 4 exhibits (17%) all 4 of these exhibits at CTAC
  - Scoring 1 – 49%: 0 exhibits (0%)
  - Scoring 0%: 7 exhibits (29%) 6 of these exhibits at CTAC
- All but one of the applicable exhibits at AgTAC (92%) had signage directly promoting one or more relevant class.
  - Tunnel of Heat (AgTAC) did not have signage promoting any classes.
- Six of the applicable exhibits at CTAC (50%) had signage directly promoting one or more relevant class. The exhibits that did not have signage directly promoting related classes are:
  - 200 Ton Cutaway Chiller (CTAC)
  - 5 Ton Package Unit (CTAC)
  - Compressed Air Display (CTAC)
  - Energy Management System (EMS) (CTAC)
  - Motors and Drives Display (CTAC)
  - Tubular Skylighting Display (CTAC)

The details regarding Promotion of Classes:

Promotion of Classes with High Tie-in	AgTAC	CTAC	All
Signage at exhibit specifically mentions class	92%	36%	64%
Signage at exhibit generally refers to relevant classes being available	0%	0%	0%
No mention of this class in exhibit signage	7%	64%	33%
Not applicable — no signage due to special considerations	14%	0%	8%

Table 3.6: Scores on each criterion for Promotion of Classes

Support of Programs



Findings for exhibits' support of programs are grouped into two areas related directly to EC goals identified in the Program Theory documentation, summarized below.

- Tie-in to Programs
- Direct Support of Programs

Tie-in to Programs

Tie-in to Programs addresses the question, "How many exhibits have a tie-in to one or more program?" *Tie-in*, in this context, refers to the logical relationship between the technology or measures illustrated by an exhibit and the incentive and rebate programs offered through SCE.

- If an exhibit is an example of a technology or measure specified by a program that identifies specific acceptable technologies, we said there is a high tie-in.
- If an exhibit is an example of technologies or measures commonly proposed and accepted under a program that offers incentives based on calculated savings, we said there is a high tie-in.
- If an exhibit illustrated key concepts related to technologies encompassed by a program, but is not an example of the actual measures specified by the program, we said there is a medium to low tie-in. (For example, the Heat Pump Demonstrator illustrates concepts relevant to numerous program-related measures, but is not in itself a measure encompassed on our short list of programs.)
- If the technology or measure illustrated by the exhibit is unrelated to technologies or measures typically encompassed by a program, the exhibit was considered to have no tie-in to the program.

When answering this item, we considered all 32 short list exhibits and 16 short list programs.

(See Appendix 2-1 for the list of programs considered in this project.)

EC goal: 100% of exhibits are linked to incentive and rebate programs

The exhibits at both AgTAC and CTAC meet the goal of 100% tie-in to programs.

Tie-in Between Exhibits and Programs	AgTAC	CTAC	All
Some tie-in	100%	100%	100%
High tie-in	77%	87%	81%

Table 3.7: Tie-in Between Exhibits And Programs

The six exhibits that had only medium to low tie-in to one or more short list program are:

- Heat Pump Demonstrator (AgTAC)
- High Volume Low Speed Fan (AgTAC)
- ICF (Insulated Concrete Form) Display (AgTAC)
- Photovoltaic Canopy & Trackers (AgTAC)
- Heat Pump Demonstrator (CTAC)
- High Volume Low Speed Fan (CTAC)

Direct Support of Programs

Direct Support of Programs addresses "How well do the exhibits directly support the programs through signage and collateral specific to the program?" The yardstick items in this area focus on signage and collateral at the exhibit promote relevant programs by describing their benefits and referring to additional source of information.

When answering the yardstick items for each exhibit, we considered 25 exhibits (12 at AgTAC, 13 at CTAC) that had high tie-in to one or more program. The remaining seven exhibits were considered NA for various reasons:

- There were no short list programs with a high tie-in to the exhibit
- There was no signage at the exhibit due to special considerations
- There was no collateral at the exhibit due to special considerations (the exhibit was located outdoors)

EC goal: Encourage participation in related incentive and rebate programs

Most exhibits in both locations did poorly in promoting the programs. Program-specific information is not displayed at most exhibits, and it typically is difficult for an unassisted audience member to identify related programs.

Overall score for… Program-specific information	AgTAC	CTAC	All
Signage re. programs	6%	7%	7%
Collateral re. programs	32%	23%	27%

Table 3.8: Overall scores for Direct Support of Programs

The "three-feet rule" was used to identify collateral "at or near the exhibit." (See the note on page 105 for more information on the "three-feet rule.")

For signage supporting programs:

- Exhibits scoring 75% or higher:
  - Heat Pump Split System Trainer (AgTAC) (75%)
  - Heat Pump Split System Trainer (CTAC) (75%)
- The range of scores was:
  - Scoring 75 – 100%: 2 exhibits (8%)
  - Scoring 50 – 74%: 0 exhibits (0%)
  - Scoring 1 – 49%: 2 exhibits (8%)
  - Scoring 0%: 21 exhibits (84%)

For collateral supporting programs:

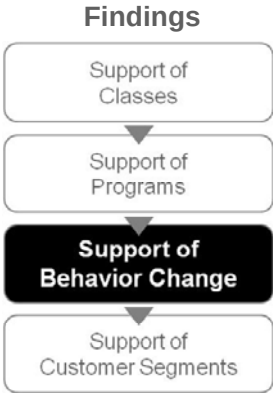
- Exhibits scoring 75% or higher:
  - Heat Pump Split System Trainer (AgTAC) (100%)
  - Electric Steam Equipment (CTAC) (100%)
  - Electric Ovens (CTAC) (100%)
  - Variable Speed Drive for Kitchen Exhaust Hoods (CTAC) (100%)
- The range of scores was:
  - Scoring 75 – 100%: 4 exhibits (16%)
  - Scoring 50 – 74%: 5 exhibits (20%)
  - Scoring 1 – 49%: 0 exhibits (0%)
  - Scoring 0%: 16 exhibits (64%)

The details regarding Direct Support of Programs:

Signage Supporting High Tie-in Programs	AgTAC	CTAC	All
Specifically mentions the program	8%	13%	11%
Describes program goals/objectives from customer perspective	0%	0%	0%
Describes program benefits from customer perspective	8%	7%	8%
Points to appropriate program information sources	8%	9%	9%
Collateral Supporting High Tie-in Programs			
Specifically mentions the program	32%	23%	27%
Describes program goals/objectives from customer perspective	32%	23%	27%
Describes program benefits from customer perspective	32%	23%	27%
Provides information on how to pursue program offerings	32%	23%	27%
Includes contact info (URL, email, phone) for more information	32%	23%	27%

Table 3.9: Scores on each criterion for Direct Support of Programs

Support of Behavior Change



Findings for exhibits' support of behavior change focus on whether signage and collateral at the exhibit provide information that will help effect "real world" change in the audience's decisions and actions on-the-job (or at-home).

The findings are grouped into four areas related to EC goals identified in the Program Theory documentation, summarized below.

- Conveying Technology Purpose, Use, and Benefits
- Supporting Hands-on Interaction
- Encouraging Action
- Helping Overcome Market Barriers

Conveying Technology Purpose, Use, and Benefits

Conveying Technology Purpose, Use, and Benefits addresses "How well do the exhibits — and associated signage and collateral — convey the purpose, use, and benefits of the technology?" The yardstick items in this area focus on whether there is signage and collateral at the exhibit and whether they convey benefit-oriented information about the technology or measure illustrated by the exhibit.

EC goal: Document customer benefits

At both AgTAC and CTAC, signage does an excellent job in summarizing high-level purpose, use and benefits — but typically did not refer the viewer to relevant collateral for more information when appropriate.

Collateral at AgTAC does fairly well in providing information on the purpose, use, and benefits of the exhibit's technology. Results were mixed at CTAC.

Overall score for… Conveying Technology Purpose, Use, and Benefits	AgTAC	CTAC	All
Signage re. purpose, use, benefits (high-level information)	67%*	66%*	70%*
Collateral re. purpose, use, benefits (more detailed information)	72%	50%**	67%

* Poor scores for referring to appropriate collateral significantly lowered the scores related to signage. See page 92 for more information.

** Exhibits that had no collateral at or near the exhibit were considered NA in the detailed scoring. This significantly raised the collateral-related score, especially for CTAC. See page 92 for more information.

Table 3.10: Overall scores for Conveying Purpose, Use, and Benefits

The "three-feet rule" was used to identify collateral "at or near the exhibit." (See the note on page 105 for more information on the "three-feet rule.") If there was no signage or no collateral at or near an exhibit, those exhibits were considered NA for the detailed scoring.

This means that the signage and collateral **scores were not lowered by exhibits that did not have signage or collateral**.

- For the more detailed scoring related to signage, 27 exhibits were scored. (Three exhibits at AgTAC and two exhibits at CTAC were NA.)
- For the more detailed scoring related to collateral, 17 exhibits were scored. (Four exhibits at AgTAC and 11 exhibits at CTAC were NA.)

For signage supporting conveying technology purpose, use, and benefits:

- Exhibits scoring **74% or lower**:
  - Low Pressure / SCADA Exhibit (AgTAC) (0%) (no signage)
  - 200 Ton Cutaway Chiller (CTAC) (50%)
  - 5 Ton Package Unit (CTAC) (50%)
  - Auto Sash (CTAC) (67%)
  - Motors and Drives Display (CTAC) (67%)
  - Electric Steam Equipment (CTAC) (67%)
  - Electric Ovens (CTAC) (0%) (no signage)
- The range of scores was:
  - Scoring 75 – 100%: 23 exhibits (77%)
  - Scoring 50 – 74%: 5 exhibits (17%)
  - Scoring 1 – 49%: 0 exhibits (0%)
  - Scoring 0%: 2 exhibits (7%)

For collateral supporting conveying technology purpose, use, and benefits:

- Exhibits scoring 75% or higher:
  - Heat Pump Split System Trainer (AgTAC) (100%)
  - Electric Steam Equipment (CTAC) (100%)
  - Electric Ovens (CTAC) (100%)
  - Variable Speed Drive for Kitchen Exhaust Hoods (CTAC) (100%)
- The range of scores was:
  - Scoring 75 – 100%: 4 exhibits (16%)
  - Scoring 50 – 74%: 5 exhibits (20%)
  - Scoring 1 – 49%: 0 exhibits (0%)
  - Scoring 0%: 16 exhibits (64%)

The details regarding Conveying Technology Purpose, Use, and Benefits:

Signage Conveying Purpose, Use, and Benefits	AgTAC	CTAC	All
Displayed at exhibit	93%	93%	93%
Describes purpose and use	100%	92%	96%
Notes key benefits	100%	79%	89%
Points to appropriate collateral for additional information	0%*	27%*	23%*

* This is an artificially low score due to the way NA items are scored.

For example, most of the exhibits at AgTAC already had collateral at or near the exhibit, so reference to collateral was considered NA. (There is no need to refer to collateral if it is directly available at the exhibit.) However two (outdoor) exhibits did not have collateral, so they were the only two exhibits considered for this item. Since their signage did not refer to collateral available in the center, they both scored 0.

If the NA items were given a positive score for the last item above (which would be reasonable — especially in the case of AgTAC, where the collateral was at the exhibit), the scores would have been:

Points to appropriate collateral for additional information	*82%*	*47%*	*69%*

Collateral Conveying Purpose, Use, and Benefits			
Easily identified (at or near)	87%	27%	57%
Describes purpose and use of exhibit application	77%*	50%*	71%*
Focuses audience's attention; calls out key points re. exhibit technology or application	69%*	50%*	65%*
Summarizes key benefits of relevant technology or application	69%*	50%*	65%*

* This is an artificially high score due to the way NA items are scored.

For example, most of the exhibits at CTAC did not have collateral at or near the exhibit, so the line items specific to collateral was considered NA.

If the NA items were scored for the items above, the scores would have been:

Describes purpose and use of exhibit application	*67%*	*13%*	*40%*
Focuses audience's attention; calls out key points re. exhibit technology or application	*60%*	*13%*	*37%*
Summarizes key benefits of relevant technology or application	*60%*	*13%*	*37%*

Table 3.11: Scores on each criterion for Conveying Purpose, Use, and Benefits

Supporting Hands-on Interaction

Supporting Hands-on Interaction addresses "How well do the exhibits — and associated signage and collateral — support both guided and independent hands-on interaction?"

Guided hands-on refers either to a demonstration by a knowledgeable, experienced individual (for example an instructor or leader of a scheduled tour) or to an audience member interacting with the exhibit based on direction provided by a knowledgeable, experienced individual.

Independent hands-on refers to a "novice" audience member interacting with the exhibit with no guidance other than that provided by the exhibit and associated signage.

Hands-on interaction with exhibits is considered important in that it actively engages learners — increasing interest, improving comprehension, and helping increase the likelihood of putting the energy efficiency concepts into action.

The yardstick items in this area focus on:

- For guided hands-on, the exhibit itself: ease of operation and demonstration of key points when operating or responding to the demonstrator's actions
- For independent hands-on, signage as well as the exhibit itself: inviting interaction and giving direction, calling attention to key points illustrated, ease of operation, and demonstration of key points in response

EC goal: Support hands-on demonstrations

Guided hands-on: **Most of the exhibits examined are intended for guided hands-on demonstrations; all of those did an excellent job of supporting it.**

Independent hands-on: **About a third of the exhibits examined are intended for independent hands-on demonstrations; most did very well in supporting it.**

Guided hands-on	AgTAC	CTAC	All
Designed to support	94%	80%	88%
How well supported	100%	100%	100%
Independent hands-on			
Designed to support	47%	27%	38%
How well supported	97%	50%	84%

Only those exhibits intended for guided or independent hands-on interaction were scored. Intended use was based solely on information provided by EC personnel.

For guided hands-on:

Twenty-eight exhibits were scored for guided hands-on (16 at AgTAC, 12 at CTAC).

All exhibits intended for guided hands-on scored 100%.

Task 3: Baseline Metrics — Exhibits

Findings

For independent hands-on:

Twelve exhibits were scored for independent hands-on (eight at AgTAC, four at CTAC).

- The range of scores was:
  - Scoring 75 – 100%: 9 exhibits (82%)
  - Scoring 50 – 74%: 0 exhibits (0%)
  - Scoring 1 – 49%: 0 exhibits (0%)
  - Scoring 0%: 2 exhibits (18%)
- The two exhibits scoring **less than 75%** in Supporting Hands-on Interaction are:
  - Fan Wheel Display (AgTAC) (0%)
  - Fan Wheel Display (CTAC) (0%)

The details regarding Supporting Hands-on Interaction:

Guided Hands-on	AgTAC	CTAC	All
How many intended for guided hands-on	94%	80%	88%
Criteria for Guided Hands-on			
The exhibit itself:			
Has switches, etc. within easy reach	100%	100%	100%
Overtly responds to action by operator	100%	100%	100%
Response clearly demonstrates key point(s)	100%	100%	100%
Independent Hands-On			
How many intended for independent hands-on	47%	27%	38%
Criteria for Independent Hands-on			
Signage at the exhibit:			
Encourages individuals to interact with the exhibit	88%	50%	75%
Provides clear direction on how to interact (what to press, etc.)	100%	50%	89%
Directs attention to "what to look for" as a result of the interactions	100%	100%	100%
Notes implications of what can be observed as a result of the interaction	100%	0%	71%
The exhibit itself:			
Has switches, etc. within easy reach	100%	100%	100%
Overtly responds to action by operator	88%	67%	82%
Response clearly demonstrates key point(s)	88%	67%	82%

Table 3.12: Scores on each criterion for Supporting Hands-on Interaction

Encouraging Action

Encouraging Action addresses "How well do the exhibits encourage action — helping people relate technologies or measures illustrated in the exhibit to their own environment and take appropriate steps to evaluate and implement the technologies or measures?"

The yardstick items in this area focus on whether an exhibit (and its signage and collateral) provided guidance on evaluating options, taking appropriate next steps, and getting additional information and support.

When answering the yardstick items for each exhibit, we considered all 32 short list exhibits, along with exhibit signage and collateral at or near the exhibit.

EC goal: Encourage action

A few (9%) of the exhibits did an excellent job of encouraging action. Most (81%) did very poorly (lower than 50%)

Overall score for…	AgTAC	CTAC	All
Encouraging Action	31%	16%	24%

Table 3.13: Overall scores for Encouraging Action

- 32 exhibits were scored when addressing Encouraging Action.

  No exhibits were considered NA. Associated signage and collateral at the exhibit also were considered when scoring the exhibit.

- The range of scores was:
  - Scoring 75 – 100%: 3 exhibits (9%)
  - Scoring 50 – 74%: 3 exhibits (9%)
  - Scoring 1 – 49%: 8 exhibits (25%)
  - Scoring 0%: 18 exhibits (56%)
- The three exhibits **scoring 75% or higher** in Encouraging Action are:
  - Lighting Design Room (AgTAC) (100%)
  - 5 Ton Package Unit (AgTAC) (100%)
  - Electric Ovens (CTAC) (100%)
- The three exhibits **scoring 50% to 74%** are:
  - Fan Wheel Display (AgTAC) (67%)
  - Heat Pump Split System Trainer (AgTAC) (67%)
  - Electric Steam Equipment (CTAC) (67%)

The details regarding Encouraging Action:

Encouraging Action (Exhibit, Signage, and Collateral)	AgTAC	CTAC	All
Includes job aids, checklists, worksheets to assist in analyzing options	24%	7%	16%
Includes job aids, checklists, worksheets to assist in taking action	24%	20%	22%
Includes info on where/how to get assistance in taking action	47%	20%	34%

Table 3.14: Scores on each criterion for Encouraging Action

Helping Overcome Market Barriers

Helping Overcome Market Barriers addresses "How well do the exhibits help overcome common market barriers, such as lack of information about application of technologies, financial and non-financial benefits, and risk assessment and mitigation?" The yardstick items in this area focus on whether an exhibit — and its associated signage and collateral at or near the exhibit — address common market barriers such as:

- Lack of technical knowledge regarding application of EE measures and practices
- Lack of clarity regarding economic benefits of EE measures and practices
- Lack of clarity regarding non-financial benefits
- Perception of high risk; uncertainty regarding risk assessment and mitigation

In general, AgTAC exhibits scored higher than the CTAC exhibits because:

- AgTAC exhibits typically have collateral at or near the exhibits, and the collateral addressed several of the items associated Helping Overcome Market Barriers.
- AgTAC signage occasionally had more information than similar signage at CTAC.

At both AgTAC and CTAC, the item regarding risk assessment and risk mitigation brought down the overall scores significantly (particularly for the AgTAC exhibits)

EC goal: Overcome market barriers

About half of the exhibits addressed application of relevant technologies.

Few described cost savings and non-financial benefits.

None addressed risk assessment and risk mitigation.

Overall score for… Helping Overcome Market Barriers	AgTAC	CTAC	All
Including item regarding risk assessment and mitigation	35%	9%	23%
Excluding item regarding risk assessment and mitigation	44%	12%	29%

Table 3.15: Overall scores for Helping Overcome Market Barriers

- 32 exhibits were scored when addressing Helping Overcome Market Barriers.

  No exhibits were considered NA. Associated signage and collateral at the exhibit also were considered when scoring the exhibit.

- The range of scores was:

Including risk-related item

- Scoring 75 – 100%: 0 exhibits (0%)
- Scoring 50 – 74%: 2 exhibits (6%)
- Scoring 1 – 49%: 8 exhibits (25%)
- Scoring 0%: 22 exhibits (69%)

Excluding risk-related item

- Scoring 75 – 100%: 5 exhibits (16%)
- Scoring 50 – 74%: 6 exhibits (19%)
- Scoring 1 – 49%: 8 exhibits (25%)
- Scoring 0%: 13 exhibits (41%)

- Exhibits scoring 75% or higher in Helping Overcome Market Barriers are:

  Including risk-related item:

  - No exhibits scored 75% or higher

  Excluding risk-related item:

  - Fan Wheel Display (AgTAC) (75%)
  - Ground Source Heat Pump Exhibit (AgTAC) (75%)
  - ICF (Insulated Concrete Form) Display (AgTAC) (75%)
  - Lighting Design Room (AgTAC) (100%)
  - 5 Ton Package Unit (AgTAC) (100%)

The details regarding Helping Overcome Market Barriers:

Criteria	AgTAC	CTAC	All
Provides info on application of relevant technologies	77%	33%	56%
Describes typical cost savings re. relevant technologies or practices	41%	7%	25%
Quantifies other typical financials (ROI, payback, etc.)	18%	0%	9%
Describes typical non-financial benefits	41%	7%	25%
Includes info on risk assessment and risk mitigation	0%	0%	0%

Table 3.16: Scores on each criterion for Helping Overcome Market Barriers

Support of Customer Segments

The evaluation of classes' Support of Customer Segments is related to the overarching EC goal of tapping into untapped markets. Findings for Support of Customer Segments are grouped into three areas related to EC goals identified in the Program Theory documentation, summarized below.

- Tie-in to Customer Segments
- Segment-specific Support
- Second-language Support

Tie-in to Customer Segments

Tie-in to Customer Segments addresses the question, "How many exhibits have a logical tie-in to one or more customer segment?" *Tie-in*, in this context, refers to the logical relationship between the technology or measure embodied by an exhibit and customer segments in the SCE marketplace.

- If an exhibit illustrates a technology or measure of significant relevance to a customer segment, we said there was a tie-in between the exhibit and that segment.
- If the technology or measure illustrated by an exhibit was rarely or never used by customers in a given segment, we said there was no tie-in between the exhibit and that segment.

Five main customer segments were considered:

- Commercial
- Industrial
- Agricultural
- Residential
- New Construction

In addition, we considered Market Actors (e.g., energy efficiency consultants, architects and designers, commercial property developers, government agencies, equipment designers and manufacturers) as a special category of customer segment.

EC goal: 100% of the exhibits and displays are linked to target customer segments

All exhibits were logically tied to one or more customer segment.

Tie-in between Exhibits and Customer Segments	AgTAC	CTAC	All
Tie-in between exhibit and one or more customer segment	100%	100%	100%

Table 3.17: Tie-in between exhibits and customer segments

- The vast majority of the exhibits at both AgTAC and CTAC had tie-in to three or more customer segments. The range of number of segments (excluding Market Actors) tied-in to exhibits was:
  - Five segments: 17 exhibits (53%)
  - Four segments: 6 exhibits (19%)
  - Three segments: 5 exhibits (16%)
  - Two segments: 2 exhibits (6%)
  - One segment: 2 exhibits (6%)
  - No segments: 0 exhibits (0%)

The exhibits targeted specifically to one or two segment's needs are:

- Low Pressure / SCADA Exhibit (AgTAC) — Agricultural and Industrial
- Electric Steam Equipment (CTAC) — Commercial
- Electric Ovens (CTAC) — Commercial
- Variable Speed Drive for Kitchen Exhaust Hoods (CTAC) — Commercial and New Construction

Segment-specific Support

Segment-specific Support addresses the question, "How well do the exhibits support segment-specific needs?" The yardstick items in this area focus on whether an exhibit:

- Addressed special considerations or concerns of groups within the customer segment
- Gave examples specific to a customer segment (typical benefits, customer success stories, and case studies)

When answering the yardstick items for each exhibit, we considered all 32 exhibits — along with the signage and collateral at the exhibit — and each customer segment that had a tie-in to that exhibit.

EC goal: Appeal to specific customer segments

Most (97%) exhibits did very poorly in overall support of specific customer segments

Overall score for…	AgTAC	CTAC	All
Segment-specific Support	5%	9%	7%

Table 3.18: Overall scores for Segment-specific Support

- The range of scores was:
  - Scoring 75 – 100%: 1 exhibit (3%)
  - Scoring 50 – 74%: 0 exhibits (0%)
  - Scoring 1 – 49%: 5 exhibits (16%)
  - Scoring 0%: 26 exhibits (81%)
- The one exhibit scoring **75% or higher** in Segment-specific Support is:
  - Electric Ovens (CTAC) (100%)

The details regarding Segment-specific Support:

Criteria	AgTAC	CTAC	All
Describes considerations for specific "sub-segments"	8%	10%	9%
Includes example of "typical" benefits realized from tech/apps in segment	4%	10%	7%
Includes success stories of actual customers in this segment	2%	7%	4%

Table 3.19: Scores on each criterion for Segment-specific Support

Second-language Support

Second-language Support addresses the question, "Are signage and collateral in a language other than English?" When answering the yardstick items for each exhibit, we considered:

- For signage, 28 exhibits (14 at AgTAC and 14 at CTAC) were considered. Four exhibits (three at AgTAC, one at CTAC) were considered NA because there was no signage at the exhibit.
- For collateral, 17 exhibits (13 at AgTAC and four at CTAC) were considered. Fifteen exhibits (four at AgTAC and 11 at CTAC) were considered NA because there was no collateral at or near the exhibit.
- Exhibits with second-language collateral available at or near the exhibit were:
  - Lighting Design Room (AgTAC)
  - Electric Steam Equipment (CTAC)
  - Electric Ovens (CTAC)
  - Variable Speed Drive for Kitchen Exhaust Hoods (CTAC)

EC goal: Provide in-language information

No exhibits had signage in a second language; very few had second-language collateral.

Scores for Second-language Support	AgTAC	CTAC	All
Signage in second language	0%	0%	0%
Collateral in second language	8%	75% *	23%

* This is an artificially high score because most CTAC exhibits did not have collateral at or near the exhibit, so were considered NA for scoring this item.

At CTAC only four exhibits were scored for this item; three of them (all in the Food Service area) had collateral in Spanish.

Table 3.20: Scores for Second-language Support

Recommendations

The following recommendations apply to both AgTAC and CTAC unless otherwise noted.

- Keep up the good work relative to tie-in between exhibits and programs and classes, continuing to ensure exhibits illustrate related concepts, technologies, and measures.
- To enhance support of classes at CTAC, consider using AgTAC's approach to "volatile" signage promoting classes directly at related exhibits. (See "Promotion of Classes" on page 85 for more information.)
- To enhance support of incentive and rebate programs:
  - Consider "volatile" signage to promote programs at the exhibits (similar to the approach AgTAC uses to promote upcoming classes).
  - Provide relevant program collateral at the exhibits.
- Better leverage exhibits with independent audiences. In addition to the above recommendations:
  - Enhance signage to invite people to interact and to highlight key points of the interaction. ("Do this and you'll see… And the implications of what you're seeing are…")
  - At CTAC, consider placing relevant collateral within three feet of most exhibits.
- Over time, refine the focus of exhibit signage and collateral focus to more directly encourage behavior change.
  - Emphasize benefits (financial and non-financial)
  - Focus attention on implications of technology options
  - Provide compelling examples of benefits realized by various customer segments
  - Clearly communicate how to begin taking action
  - Point to appropriate resources to learn more and get support
- **Identify/create one (or very few) "point person(s)" for basic program information** at CTAC and at AgTAC (or for both combined), encompassing all programs — or at least all "high-impact" incentive and rebate programs.

  This individual could be responsible for doing the following:
  - Be the go-to resource for the high-level summary of which programs are relevant to an exhibit and which common technologies do and do not apply to key programs
  - Facilitate (and expedite) development and approval of program-related content to be used at the exhibit (in signage or collateral)
  - Bring it to the exhibit "owner's" attention when program information addressed in the signage or exhibit needs to be updated

  NOTE: This recommendation also applies to Task 2: Baseline Metrics — Classes.

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Task 4: Baseline Metrics — Knowledge & Action

Background (Goals and Questions)

The principle goal for *Task 4: Baseline Metrics —Knowledge & Action* was to establish baseline metrics for participant responses to selected questions on the SCE event Exit Survey (also known as the Customer Satisfaction Survey). The questions on which we focused were those directly tied to anticipated (positive) behavior change — that is, those that addressed a participant's increase in knowledge and likelihood to take action.

The baseline established through Task 4 can be used in the future to determine the progress that the ECs are making toward the relevant goals over time.

The following summarizes the goals outlined in the program theory documentation (*SCE CTAC & AGTAC Energy Centers: Program Logic Diagram, Program Theory, Potential Indicators and Success Criteria*, September 2007) and the questions that guided the Task 4 evaluation effort.

EC Goals	Evaluation Questions
After attending workshops and seminars, 50% of participants show an increase in knowledge by one point	• How many attendees believe the class had a positive affect on their knowledge of the subject matter? • How did scores vary by class, location, technology area, and instructor?
50% of participants will agree that the information provided will increase the likelihood of taking EE (energy efficiency) actions in the future	• How many participants believed the event increased the likelihood EE (energy efficiency) purchases or practices? • When will they be making purchase decisions? • What kinds of equipment were they considering to add or upgrade? • How did scores vary by class, location, technology area, and instructor?
10% of participants will request referral to audit or rebate programs	• How many participants wanted SCE to tell them more about the Energy Audit Service? • How many wanted SCE to tell them more about Energy Efficiency Programs?

Approach

The graphic below summarizes the major activities the evaluation team completed during the assessment. Each activity is described below and on the following pages.

Collect Satisfaction Survey Data

SCE provided the evaluation team with customer satisfaction survey data from Exit Surveys collected at the end of all classes held in 2007 (January through December).

SCE extracted (to Excel) the data from their SQL database in which they enter all Exit Survey data. The data provided reflects:

- 230 unique events (See "Classes and Events" on page 105 for a discussion of the difference between an event and a class.)
- 5,101 individual Exit Surveys

Crunch the Data

After receiving the Excel file with the Exit Survey data from SCE, we imported the data into an Access database and summarized key findings relative to selected questions.

As mentioned earlier, we focused on the questions that were directly tied to anticipated (positive) behavior change — that is, those that addressed a participant's increase in knowledge and likelihood to take action.

- Question A: Knowledge level on subject matter before and after attending the class
- Question B: Increase in likelihood of taking EE actions
- Question C: Equipment purchase decision time frame
- Question D: Types of equipment in plans to upgrade or add
- Question E: Request for more information about the Energy Audit Service
- Question F: Request for more information about the EE programs

For each question for each event, we looked at responses by:

- Participant
- Class title
- Instructor
- Location
- Technology area

Findings

As noted on page 103, for the baseline metrics regarding knowledge and action (as indicated on the Exit Surveys), we focused on three main EC goal areas established in the Program Theory documentation (classes' affect on knowledge, likelihood of EE purchases or practices, and desire to have SCE follow up with more information or services).

The overview of findings relative to these goals begins on page 107 (immediately after the note below). The remaining pages in this section provide additional detail on the findings.

Note: Considerations re. Findings

All the findings presented in this section are derived from the Exit Survey (also known as the Customer Satisfaction Survey) data provided by SCE. This survey is distributed to participants at the end of an event and collected from participants before they leave.

SCE then enters the data from individual respondents into a database. SCE provided the evaluation team with the data from all respondents from 2007 (January through December).

Classes and Events

In this data, an "event" is a unique instance of a class. For example, let's say the *Adjustable Speed Drives* class was held six different times in 2007. We would call that one class, but six events. The surveys tabulated represent:

- Total number of classes: 106

  See Appendix 4-1 for a list of the classes for which Exit Survey information was collected.

- Total number events: 230

Respondents

We use the term "respondent" to refer to a participant who responded to a given question on the Exit Survey. The total number of respondents is less than the total number of Exit Surveys collected.

- Total number of respondents: 5,101 included in this analysis

  That is the total number of surveys collected and entered in SCE database.

- Actual number of respondents included in scoring: Varies by Exit Survey question

  For many of the items on the Exit Survey, the number of responses scored is lower than the number of surveys collected and entered in the SCE database. This is because not all participants answered all items, and some answers were "quirky" or otherwise non-responsive. Items for which we did not have appropriate responses were excluded from the scoring for that item.

  - For example, more than 1,300 participants did not answer Question C, a multiple-choice item regarding the time frame in which the company would make a purchase decision.
  - As another example, one person wrote in "on a consulting basis" in response to Question C, rather than selecting one of the multiple-choice options.

Note: Considerations re. Findings (continued)

Instructors

There were a total of 31 instructors represented in the Exit Survey results.

- Two of the "instructors" were identified as "guest."
- One of the "instructors" was "not available." (See below or more information regarding the "not available" category.)
- The remaining 28 instructors were identified by name.

  See Appendix 4-1 for a list of the instructors reflected in these findings.

Locations and Technology Areas

There were a total of 12 different locations (AgTAC, CTAC, and 10 others) represented in the Exit Survey results.

There were a total of 10 different technology areas represented in the Exit Survey results.

See Appendix 4-1 for a listing of the locations and technology areas reflected in these findings.

Unavailable Information

For some events, information regarding the event location or event instructor was not available in the data provided by SCE.

- For 14 events (encompassing 14 different class titles), we did not receive event locations.
- For 63 events (encompassing 47 different class titles), we did not receive instructor names.
- When reporting on the range of scores by location or by instructor, we grouped together all events for which the location or instructor data was unavailable.

  For example, when reporting on Increase in Knowledge by instructor, we considered "unavailable" as one instructor.

What Constitutes a "Perfect" Score

For each of the survey items, we calculated percentages based on the actual number of responses for the given item, not on the total number of possible responses (the number of surveys collected and entered into the database). For example:

- For Question B, 4,075 people answered the question, so 4,075 would be considered 100% for Question B.
- For Question C 3,779 people answered the question, so 3,779 would be considered 100% for Question C.

Overview of Findings

Findings re. Increase in Knowledge:

- Excellent in terms of participants' belief that the classes had a positive affect on their knowledge of the subject matter

  (Overall score of 85% compared to a Program Theory goal of 50%)

- Moderate variation in total average scores when considering different "views" (class title, instructor, location, and technology area)

Findings re. Likely Impact on EE Purchases or Practices:

- Good in terms of likely impact on EE purchase or practices

  (Overall score of 70% for likely impact compared to a Program Theory goal of 50%)

  - Almost half of the participants (48%) planned to purchase or upgrade equipment within the year.
  - Lighting and HVAC represent the majority (69%) of upgrades and additions planned.

- Moderate variation in total average scores when considering different "views" (class title, instructor, location, and technology area)

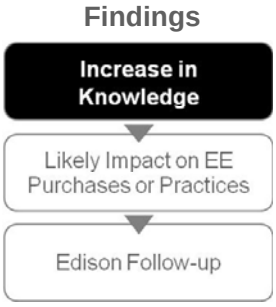
Findings re. Edison Follow-up

- Good in terms of participants' requests that SCE follow up with additional information

  Considering "full requests" (where the participant asked that SCE follow-up and provided contact information), SCE exceeding the 10% goal identified in the Program Theory:

  - About 12% for Energy Audit Service
  - About 15% for Energy Efficiency Programs

Increase in Knowledge



Findings for classes' effectiveness in increasing participants' knowledge are confined to one area:

- Impact on Subject Matter Knowledge

For this area, we considered the range of scores by key variables (class, instructor, location, and technology area).

Impact on Subject Matter Knowledge

The Exit Survey item that addresses Impact on Subject Matter Knowledge is:

> **Survey Question A:** *Please rate your knowledge level on the subject matter (On a scale of 1 to 5, 1=not at all knowledgeable, 5=very knowledgeable)*
>
> - *Before attending the class?*
> - *After attending the class?*

EC goal: After attending workshops and seminars, 50% of participants show an increase in knowledge by one point

SCE has exceeded this goal, with 85% of the class participants indicating they experienced an increase in subject matter knowledge by one point or more.

Participants' Responses to Impact on Knowledge Item in Exit Survey				
unchanged	1 point	2 points	3 points	4 points
14.9%	45.0%	31.7%	7.0%	1.4%

Table 4.1: Participants' responses to Impact on Knowledge item in Exit Survey

How This Item Was Scored

Scoring for Impact on Subject Matter Knowledge is based on the number of participants that show an increase in knowledge as a result of a class.

- For example, for a class in which 70% of the students said they knew more after the class than before, the class would score 70%.
- As another example, for an instructor for whom 70% of the instructor's students said they knew more after a class taught by the instructor than before, the instructor would score 70%.

It is important to note that some participants responded with a negative answer (showed one or more points **decrease** in knowledge as a result of the class). Because the question is essentially a two-part item administered only at the end of a class, the lower score associated with "after attending the class" likely is not a reflection of "before the class, they didn't realize how much they didn't know, but as a result of the class they understand how much they have to learn."

- Fourteen respondents (0.3%) gave a lower number for "after attending the class" than they gave for "before attending the class."
- These 14 responses to Question A were considered erroneous responses, and not considered in the scoring for this item.

The total number of responses considered in scoring for this item is 4,688 (4,702 responses out of 5,101 participants, but 14 of the responses were considered erroneous).

Score Ranges by Class (Question A)

There were a total of 106 classes. (See Appendix 4-1 for details.)

- None of the classes fell below the goal of 50%.
- Seven classes scored 100%:
  - *EnergyPro 4.0 - Lighting*
  - *eQuest Employee Training*
  - *Green Building Hype or Help?*
  - *Hands-On Programmable Logic Controllers (PLC) ControlLogix 5000*
  - *How to Get Started with an Energy Efficiency Survey*
  - *Introduction to Geothermal Heat Pump Systems*
  - *Sensor Placement and Optimization Tool*
- The range of scores by class is:
  - Scoring 75 – 100% 94 classes (89%)
  - Scoring 50 – 74% 13 classes (11%)
  - Scoring 1 – 49% 0 classes (0%)
  - Scoring 0% 0 classes (0%)

Score Ranges by Instructor (Question A)

There were a total of 31 instructors represented in the Exit Survey results.

- None of instructors fell below the goal of 50%.
- One instructor scored 100%; that instructor taught at only one event in the database (17 respondents).
- The range of scores by instructor is:
  - Scoring 75 – 100% 29 instructors (94%)
  - Scoring 50 – 74% 2 instructors (6%)
  - Scoring 1 – 49% 0 instructors (0%)
  - Scoring 0% 0 instructors (0%)

Score Ranges by Location (Question A)

There were a total of 12 different locations. (See Appendix 4-1 for details.)

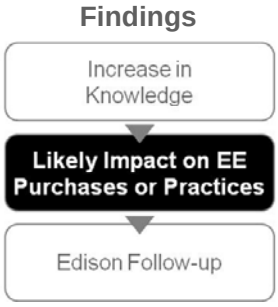
- None of the locations fell below the goal of 50%.
- Two locations scored 100%:
  - Palm Springs Service Center, Cathedral City (one event, 11 respondents)
  - Santa Monica (one event, 12 respondents)
- Scores by various location:
  - AgTAC 83%
  - CTAC 86%
  - Others 86%
  - Location not available 82%
- The range of scores by location is:
  - Scoring 75 – 100% 11 locations (92%)
  - Scoring 50 – 74% 1 locations (8%)
  - Scoring 1 – 49% 0 locations (0%)
  - Scoring 0% 0 locations (0%)

Score Ranges by Technology (Question A)

There were a total of 10 different technology areas. (See Appendix 4-1 for details.)

- None of technology areas fell below the goal of 50%.
- The range of scores by technology area is:
  - Scoring 75 – 100% 9 tech areas (90%)
  - Scoring 50 – 74% 1 tech area (10%)
  - Scoring 1 – 49% 0 tech areas (0%)
  - Scoring 0% 0 tech areas (0%)

Likely Impact on EE Purchases or Practices



Findings for classes' impact on EE purchases or practices are grouped into three areas, summarized below.

- Impact on Likelihood of EE Purchases or Practices
- Purchase Decision Time Frame
- Types of Equipment Considered

For each of these areas we considered the range of scores by key variables (class, instructor, location, and technology area).

Impact on Likelihood of EE Purchases or Practices

The Exit Survey item that addresses Impact on Likelihood of EE Purchases or Practices is:

> **Survey question B:** *Did attending the course increase the likelihood that you/your company will purchase energy efficient equipment or energy efficiency practices in the future?*
>
> *(On a scale of 1 to 5, 1=Very Unlikely, 5=Very Likely)*

EC goal: 50% of participants will agree that the information provided will increase the likelihood of taking EE actions in the future

SCE has exceeded this goal, with 69% of the class participants responding 4 or 5 (5 being "very likely").

Participants' Responses to Impact on Likelihood of EE Purchases or Practices				
Five	Four	Three	Two	One
37%	32%	21%	5%	4%
Assumed to mean moderate to high (positive) impact on likelihood			Assumed to mean little or no impact on likelihood	

Table 4.2: Participants' responses to Likelihood of EE Purchases or Practices item in Exit Survey

How This Item Was Scored

Note that the form of the question and answer options may make this item somewhat ambiguous.

- The question asks about the impact of the course, but the answer options seem to refer only to likelihood of taking action, rather than the impact that the course has had. (See above for question and answer options.)
  - An alternative approach to structuring the item would be to state the "question" as an assertion (e.g., "Attending this course has increased the likelihood…") and to phrase the answer options as ranging from "strongly disagree" to "strongly agree."
  - It also might be useful to split this question into two items: one specific to purchase and one specific to practices.

- For the purposes of this report we have assumed that the responses to the item as written can be interpreted as follows:

  Relative to the assertion that the class has increased the likelihood of the participant or participants' company purchasing EE equipment or implementing EE practices in the future:

  - A response of "4" means the participant agrees with the assertion.
  - A response of "5" means the participant strongly agrees with the assertion.

Scoring for Impact on Likelihood of EE Purchases or Practices is based on the number of participants that responded with a 4 or 5 (somewhat or very likely) in response to the question asking whether the class increased the likelihood of purchasing EE equipment or implementing EE practices.

- For example, a class in which 70% of the students responded with a 4 or 5, the class would score 70%.
- As another example, an instructor for whom 70% of the instructor's students responded with a 4 or 5, the instructor would score 70%.

The total number of responses considered in scoring for this item is 4,075 (out of 4,075 actual responses from a possible maximum of 5,101 participants).

Score Ranges by Class (Question B)

There were a total of 106 classes. (See Appendix 4-1 for details.)

- Seven of the classes fell below the goal of 50%:
  - *Benefits of Precision Farming*
  - *Grounding, Bonding, and Wiring*
  - *Hands-On Programmable Logic Controllers (PLC) ControlLogix 5000*
  - *Improving Energy Efficiency in Drip Irrigation*
  - *Introduction to Programmable Logic Controllers*
  - *Sensor Placement and Optimization Tool*
  - *Vons E.E. Refrigeration*
- Three classes scored 100%:
  - *eQuest Employee Training*
  - *Introduction to Geothermal Heat Pump Systems*
  - *Lighting 101*
- The range of scores by class is:
  - Scoring 75 – 100% 45 classes (42%)
  - Scoring 50 – 74% 52 classes (49%)
  - Scoring 1 – 49% 9 classes (8%)
  - Scoring 0% 0 classes (0%)

Score Ranges by Instructor (Question B)

There were a total of 31 instructors. (See Appendix 4-1 for details.)

- Two instructors fell below the goal of 50%. (One instructor's score was based on 15 respondents; the other's score was based on 19 respondents.)
- The range of scores by instructor is:
  - Scoring 75 – 100% 14 instructors (45%)
  - Scoring 50 – 74% 15 instructors (48%)
  - Scoring 1 – 49% 2 instructors (6%)
  - Scoring 0% 0 instructors (0%)

Score Ranges by Location (Question B)

There were a total of 12 different locations. (See Appendix 4-1 for details.)

- Two of locations fell below the goal of 50%:
  - Big Creek (two events, 24 respondents)
  - San Bernardino County Business Resource Center, Hesperia (one event, 13 respondents)
- Scores by different locations:
  - AgTAC 63%
  - CTAC 72%
  - Others 72%
  - Location not available 97%
- The range of scores by location is:
  - Scoring 75 – 100% 4 locations (33%)
  - Scoring 50 – 74% 6 locations (50%)
  - Scoring 1 – 49% 2 locations (17%)
  - Scoring 0% 0 locations (0%)

Score Ranges by Technology (Question B)

There were a total of 10 different technology areas. (See Appendix 4-1 for details.)

- None of the technology areas fell below the goal of 50%.
- The range of scores by technology area is:
  - Scoring 75 – 100% 3 tech areas (30%)
  - Scoring 50 – 74% 7 tech areas (70%)
  - Scoring 1 – 49% 0 tech areas (0%)
  - Scoring 0% 0 tech areas (0%)

Purchase Decision Time Frame

The Exit Survey item that addresses Purchase Decision Time Frame is:

> **Survey question C:** *Will you/your company be making equipment purchase decisions for your business facility in the near future? (Check one)*
>
> *Next 6 Months_____, 6-12 Months_____, 1-2 Years_____, Beyond 2 Years_____, Other (specify) _____, No _____*

EC goal: (No specific goal for Purchase Decision Timeframe indicated in Program Theory documentation.)

48% of the respondents indicated that they or their company would be making equipment purchase decisions within the year.

72% indicated they'd be making equipment purchase decisions over some period of time.

Participants' Responses to Purchase Decision Time Frame in Exit Survey					
Next 6 Months	6-12 Months	1-2 Years	Beyond 2 Years	No	Other
30%	18%	13%	7%	28%	3%

Table 4.3: Participants' responses to Purchase Decision Time Frame item in Exit Survey

How This Item Was Scored

Scoring for Purchase Decision Time Frame is based on the number of participants that indicated they or their company would be making equipment purchase decisions within the year (responded "Next 6 months" or "6-12 months").

- For example, for a class in which 70% of the respondents said they or their company would be making purchase decisions within the year, the class would score 70%.
- As another example, for an instructor for whom 70% of the instructor's students said they or their company would be making purchase decisions within the year, the class would score 70%.

The total number of responses considered in scoring for this item is 3,779 (out of a possible maximum of 5,101 participants).

Score Ranges by Class (Question C)

There were a total of 106 classes. (See Appendix 4-1 for details.)

- With respect to the respondents that indicated that they or their company would be making equipment purchase decisions within the year, the range of scores by class is:
  - Scoring 75 – 100% 5 classes (5%)
  - Scoring 50 – 74% 49 classes (46%)
  - Scoring 1 – 49% 51 classes (48%)
  - Scoring 0% 1 class (1%)

Score Ranges by Instructor (Question C)

There were a total of 31 instructors. (See Appendix 4-1 for details.)

- With respect to the respondents that indicated that they or their company would be making equipment purchase decisions within the year, the range of scores by instructor is:
  - Scoring 75 – 100% 1 instructor (3%)
  - Scoring 50 – 74% 15 instructors (48%)
  - Scoring 1 – 49% 15 instructors (48%)
  - Scoring 0% 0 instructors (0%)

Score Ranges by Location (Question C)

There were a total of 12 locations. (See Appendix 4-1 for details.)

- With respect to the respondents that indicated that they or their company would be making equipment purchase decisions within the year, the scores by different locations are:
  - AgTAC 43%
  - CTAC 49%
  - Others 52%
  - Location not available 64%
- With respect to the respondents that indicated that they or their company would be making equipment purchase decisions within the year, the range of scores by location is:
  - Scoring 75 – 100% 1 location (8%)
  - Scoring 50 – 74% 3 locations (25%)
  - Scoring 1 – 49% 7 locations (58%)
  - Scoring 0% 1 locations (8%)

Score Ranges by Technology (Question C)

There were a total of 10 technology areas. (See Appendix 4-1 for details.)

- With respect to the respondents that indicated that they or their company would be making equipment purchase decisions within the year, the range of scores by technology area is:
  - Scoring 75 – 100% 0 tech areas (0%)
  - Scoring 50 – 74% 4 tech area (40%)
  - Scoring 1 – 49% 6 tech areas (60%)
  - Scoring 0% 0 tech areas (0%)

Types of Equipment Considered

Survey question D: *Are you/your company planning to upgrade or add any of the following? (Check as many as appropriate)*

Lighting_____, HVAC_____, Industrial Processing_____, Pumping_____, Other_____, None _____

(specify) _____, No _____

EC goal: (No specific goal for Types of Equipment Considered indicated in Program Theory documentation.)

70% of the respondents indicated that they or their company were planning to upgrade or add one or more of the types of equipment listed on the Exit Survey.

Participants' Responses to Types of Equipment Considered for Add or Upgrade					
Lighting	**HVAC**	**Industrial Processing**	**Pumping**	**Other**	**None**
46%	44%	10%	21%	9%	30%
The above adds up to greater than 100% because some respondents selected more than one category of equipment.					

Table 4.4: Participants' responses to Types of Equipment Considered for Addition or Upgrade item in Exit Survey

There was a very rough correlation between the technology area a class focused on and the types of equipment that participants indicated were under consideration. For example, lighting and HVAC represent the majority of planned upgrades and additions — and roughly 45% of the classes had lighting or HVAC as a key subject matter area.

The general focus of the classes relative to the types of equipment listed on the Exit Survey was:

- Lighting 18%
- HVAC 13%
- Mixed* 13%
- Industrial 6%
- Pumping 4%
- Other 46%

* "Mixed" refers to classes that encompass a range of technologies, including lighting and HVAC — or that address a technology area that is related to lighting or HVAC. For example, *Managing Your Residential Energy Costs* addresses lighting and HVAC issues, and *Motor Efficiency* can be considered related to HVAC since motors and drives are significant components in an HVAC system.

How This Item Was Scored (Question D)

Scoring for Types of Equipment Considered is based on the number of participants that indicated they or their company was planning to upgrade or add one or more of the types of equipment listed on the Exit Survey.

- For example, for a class in which 70% of the students in the class said they or their company were planning to upgrade or add some kind of equipment, the class would score 70%.
- As another example, for an instructor for whom 70% of the instructor's students said they or their company were planning to upgrade or add some kind of equipment, the instructor would score 70%.

The total number of responses considered in scoring for this item is 4,929 (out of a possible maximum of 5,101 participants).

Score Ranges by Class (Question D)

There were a total of 106 classes. (See Appendix 4-1 for details.)

- With respect to participants whose company was planning to upgrade or add some kind of equipment 17 classes (16% of all classes) scored less than 50%:
  - *Assessing the Economics of Green Building and Energy Efficiency* (45%)
  - *Cook, Chill & Retherm Technologies for the Foodservice Industry* (37%)
  - *Daylighting for Buildings* (44%)
  - *Duct Testing* (46%)
  - *EnergyPro 4.0 – Envelope* (47%)
  - *EnergyPro 4.0 – Lighting* (41%)
  - *EnergyPro 4.0 – Mechanical* (33%)
  - *eQuest Employee Training* (25%)
  - *Green Building Hype or Help?* (44%)
  - *Introductory eQuest "Schematic Design"* (46%)
  - *LEED-NC Technical Review Workshop* (38%)
  - Lighting for the Electronic Office: Addressing the Issues of Quality & Quantity (33%)
  - *Managing Your Residential Energy Costs Workshop* (42%)
  - *Photovoltaic (PV) Site Analysis and System Sizing* (47%)
  - *Selling Energy Efficient and /or Green Building to Building Owners* (43%)
  - *Specifying Foodservice Lighting for Energy Efficiency* (43%)
  - *Title 24 Acceptance Training for Designers and Contractors* (46%)
- Four classes (4% of all classes) scored 100%:
  - *FSU-CIT Variable Frequency Drives (VFD) for Ag and Turf Irrigation Pumps*
  - *Lighting 101*
  - *New Technology for Energy Efficiency in Wastewater Aeration*
  - *Principles of Electric Motors*

- The range of scores by class is:
  - Scoring 75 – 100% 46 classes (43%)
  - Scoring 50 – 74% 43 classes (41%)
  - Scoring 1 – 49% 17 classes (16%)
  - Scoring 0% 0 classes (0%)

Score Ranges by Instructor (Question D)

There were a total of 31 instructors. (See Appendix 4-1 for details.)

- With respect to participants whose company was planning to upgrade or add some kind of equipment four of instructors (13% of all instructors) scored less than 50%.

  Although some of these instructors had relatively few participants responding to this question, together they represent a significant number of respondents.
  - One with 13 respondents
  - One with 14 respondents
  - One with 26 respondents
  - One with 103 respondents
- One instructor scored 100%. (There were eight respondents for that instructor.)
- The range of scores by instructor is:
  - Scoring 75 – 100% 15 instructors (468%)
  - Scoring 50 – 74% 12 instructors (39%)
  - Scoring 1 – 49% 4 instructors (13%)
  - Scoring 0% 0 instructors (0%)

Score Ranges by Location (Question D)

There were a total of 12 locations. (See Appendix 4-1 for details.)

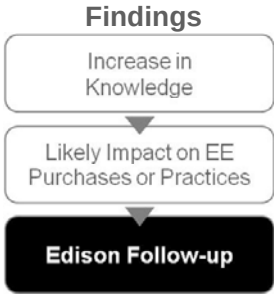
- With respect to participants whose company was planning to upgrade or add some kind of equipment none of the locations scored less than 50%.
- Scores by different locations:
  - AgTAC 69%
  - CTAC 70%
  - Others 76%
  - Location not available 68%
- The range of scores by location is:
  - Scoring 75 – 100% 6 locations (46%)
  - Scoring 50 – 74% 7 locations (54%)
  - Scoring 1 – 49% 0 locations (0%)
  - Scoring 0% 0 locations (0%)

Score Ranges by Technology (Question D)

There were a total of 10 technology areas. (See Appendix 4-1 for details.)

- With respect to participants whose company was planning to upgrade or add some kind of equipment one technology areas scored less than 50%:
  - PV and Solar technology
- The range of scores by technology area is:
  - Scoring 75 – 100% 2 tech areas (20%)
  - Scoring 50 – 74% 7 tech area (70%)
  - Scoring 1 – 49% 1 tech areas (10%)
  - Scoring 0% 0 tech areas (0%)

Edison Follow-up



Findings for class participants' request for Edison Follow-up are grouped into two areas related directly to EC goals identified in the Program Theory documentation, summarized below.

- Request for Information about the Energy Audit Service
- Request for Information about Energy Efficiency Programs

It is important to note that for both Questions E and F, many of the participants who indicated that they would like SCE to follow up with additional information did **not** include contact information (item G on the Exit Survey).

Request for Information about the Energy Audit Service

Survey Question E: *Would you like Southern California Edison to tell you more about our Energy Audit Service?*

EC goal: 10% of participants will request referral to audit or rebate programs

SCE has exceeded this goal, with 12% of the class participants providing a "full request" (a positive response and contact information) for information about the Energy Audit Service.

- **34% of the respondents indicated that they would like SCE to follow-up with additional information about the Energy Audit Service.**
- **Only 36% of those giving a positive response also provided contact information. (That is, 12% of the total respondents gave a "full request.")**

Requested additional information on…	Yes "Partial"	Yes "Full"	No	NA
Energy Audit Service	22%	12%	60%	6%

Table 4.5: Participants' Request for Additional Energy Audit Service in Exit Survey

How This Item Was Scored (Question E)

Scoring for Request for Information about Energy Audit Service is based on the number of participants that provided a positive answer to the question asking whether the participant would like SCE to provide more information about the Energy Audit Service.

There were two types of positive responses to Question E:

- "Partial request" for more information — If a participant:
  - Responded "Yes" (tell me more about the Energy Audit Service)
  - Did not provide contact information; that is, all "yes" answers are counted
- "Full request" for more information — If a participant:
  - Responded "Yes" (tell me more about the Energy Audit Service)
  - Provided contact information (phone number or email address or both)

Findings are included for two different categories:

- **All positive responses** — includes all respondents who answered "Yes" to Question E (both "partial requests" and "full requests" for more information about the Energy Audit Service)
- **Full requests only** — includes only those respondents who answered "Yes" to Question E and included either phone or email contact information

The total number of responses considered in scoring for this item is 4,702 (out of a possible maximum of 5,101 participants).

Score Ranges by Class (Question E)

There were a total of 106 classes. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses ("partial" and "full"), six classes (6%) fell below the goal of 10%:
  - *eQuest Employee Training* (0%)
  - *Green Building Hype or Help?* (9%)
  - *Introduction to Geothermal Heat Pump Systems* (0%)
  - *Lighting for the Electronic Office: Addressing the Issues of Quality & Quantity* (8%)
  - *Sensor Placement and Optimization Tool* (6%)
  - *Utility Power Quality and Mitigation* (8%)
- Considering only "full requests" (contact information included), 55 classes (52%) fell below the goal of 10%.

The "Highs"

- Considering all positive responses, 12 of the classes (11%) scored 50% or higher:
  - *Computer Energy Efficiency* (55%)
  - *Electrical Systems Analysis* (58%)
  - *Energy Policy Act of 2005* (61%)
  - *Hot Rebates and Cool Savings for Foodservice* (52%)
  - *Lighting 101* (67%)
  - *Lighting Fixture Maintenance* (62%)
  - *New Technology for Energy Efficiency in Wastewater Aeration* (50%)
  - *Principles of Electric Motors* (100%)
  - *Pump Efficiency* (Simultaneously in Spanish) (52%)
  - *Specifying Dishwashers and Water Heaters for Energy Efficiency* (53%)
  - *UC/CSU Green Campus Training* (69%)
  - *Vons E.E. Refrigeration* (60%)
- Considering only "full requests," 1 class (1%) scored 50% or higher:
  - *UC/CSU Green Campus Training* (54%)

The Range

- Considering all positive responses ("partial" and "full"), the range of scores by class is:
  - Scoring 50 – 100% 13 classes (12%)
  - Scoring 20 – 49% 70 classes (66%)
  - Scoring 19 – 10% 16 classes (15%)
  - Scoring 1 – 9% 5 classes (5%)
  - Scoring 0% 2 classes (2%)
- Considering only "full requests" (with contact information), the range of scores by class is:
  - Scoring 50 – 100% 1 class (1%)
  - Scoring 20 – 49% 17 classes (16%)
  - Scoring 19 – 10% 34 classes (32%)
  - Scoring 1 – 9% 35 classes (33%)
  - Scoring 0% 19 classes (18%)

Score Ranges by Instructor (Question E)

There were a total of 31 instructors. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, one instructor (2%) fell below the goal of 10%. (There were 17 respondents for that instructor.)
- Considering only "full requests," ten instructors (32%) fell below the goal of 10%.

The "Highs"

- Considering all positive responses, five instructors (16%) scored 50% or higher:
- Considering only "full requests," one instructor (3%) scored 50% or higher:

The Range

- Considering all positive responses, the range of scores by instructor is:
  - Scoring 50 – 100% 5 instructors (16%)
  - Scoring 20 – 49% 20 instructors (65%)
  - Scoring 19 – 10% 4 instructors (13%)
  - Scoring 1 – 9% 2 instructor (6%)
  - Scoring 0% 0 instructors (0%)
- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 1 instructor (3%)
  - Scoring 20 – 49% 5 instructors (16%)
  - Scoring 19 – 10% 16 instructors (52%)
  - Scoring 1 – 9% 5 instructors (16%)
  - Scoring 0% 4 instructors (13%)

Score Ranges by Location (Question E)

There were a total of 12 locations. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, no locations (0%) fell below the goal of 10%.
- Considering only "full requests," four locations (33%) fell below the goal of 10%:
  - AgTAC (8%) — (Would be 34% if all positive responses were considered.)
  - Big Creek (4%) — (Would be 22% if all positive responses were considered.)
  - San Bernardino County Business Resource Center, Hesperia (6%) — (Would be 12% if all positive responses were considered.)
  - Santa Monica (0%) — (Would be 42% if all positive responses were considered.)

The "Highs"

- Considering all positive responses, two locations (17%) scored 50% or higher:
  - Palm Desert Chamber of Commerce, Palm Desert (55%)
  - The Irvine Company (76%)
- Considering only "full requests," no location (0%) scored 50% or higher:

Scores by Different Locations:

- Considering all positive responses:
  - AgTAC 34%
  - CTAC 33%
  - Others 36%
  - Location not available 58%
- Considering only "full requests:"
  - AgTAC 8%
  - CTAC 13%
  - Others 15%
  - Location not available 24%

The Range

- Considering all positive responses, the range of scores by location is:
  - Scoring 50 – 100% 2 locations (17%)
  - Scoring 20 – 49% 8 locations (67%)
  - Scoring 19 – 10% 2 location (17%)
  - Scoring 1 – 9% 0 locations (0%)
  - Scoring 0% 0 locations (0%)

- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 0 locations (0%)
  - Scoring 20 – 49% 3 locations (25%)
  - Scoring 19 – 10% 5 locations (42%)
  - Scoring 1 – 9% 3 locations (25%)
  - Scoring 0% 1 location (8%)

Score Ranges by Technology (Question E)

There were a total of 10 technology areas. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, no technology areas (0%) fell below the goal of 10%.
- Considering only "full requests," three technology areas (30%) fell below the goal of 10%:
  - EMS & Electronic Controls (6%)
    (Would be 27% if all positive responses were considered.)
  - Motors and Drives (9%)
    (Would be 40% if all positive responses were considered.)
  - PV & Solar (4%)
    (Would be 26% if all positive responses were considered.)

The "Highs"

- Considering all positive responses, no technology area (0%) scored 50% or higher:
- Considering only "full requests," no technology area (0%) scored 50% or higher:

The Range

- Considering all positive responses, the range of scores by location is:
  - Scoring 50 – 100% 0 tech areas (0%)
  - Scoring 20 – 49% 10 tech areas (100%)
  - Scoring 19 – 10% 0 tech areas (0%)
  - Scoring 1 – 9% 0 tech areas (0%)
  - Scoring 0% 0 tech areas (0%)
- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 0 tech areas (0%)
  - Scoring 20 – 49% 0 tech areas (0%)
  - Scoring 19 – 10% 7 tech areas (70%)
  - Scoring 1 – 9% 3 tech areas (30%)
  - Scoring 0% 0 tech areas (0%)

Request for Information about Energy Efficiency Programs

Survey Question F: *Would you like Southern California Edison to tell you more about our Energy Efficiency programs?*

EC goal: 10% of participants will request referral to audit or rebate programs

SCE has exceeded this goal, with 15% of the class participants providing a "full request" (a positive response and contact information) for information about energy efficiency programs.

- **44% of the respondents indicated that they would like SCE to follow-up with additional information about energy efficiency programs.**
- **Only 35% of those giving a positive response also provided contact information. (That is, 15% of the total respondents gave a "full request.")**

Requested additional information on…	Yes "Partial"	Yes "Full"	No	NA
Energy Efficiency Programs	29%	15%	50%	6%

Table 4.6: Participants' requests for more information on EE programs in Exit Survey

How This Item Was Scored (Question F)

Scoring for Request for Information about Energy Efficiency Programs is based on the number of participants that provided a positive answer to the question asking whether the participant would like SCE to provide more information about the energy efficiency programs.

There were two types of positive responses to Question F:

- "Partial request" for more information — If a participant:
  - Responded "Yes" (tell me more about the EE programs)
  - Did not provide contact information; that is, all "yes" answers are counted
- "Full request" for more information — If a participant:
  - Responded "Yes" (tell me more about the EE programs)
  - Provided contact information (phone number or email address or both)

Findings are included for two different categories:

- **All positive responses** — includes all respondents who answered "Yes" to Question F (both "partial requests" and "full requests" for more information about EE programs)
- **Full requests only** — includes only those respondents who answered "Yes" to Question F and included either phone or email contact information

The total number of responses considered in scoring for this item is 4,702 (out of a possible maximum of 5,101 participants).

Score Ranges by Class (Question F)

There were a total of 106 classes. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses ("partial" and "full"), two classes (2%) fell below the goal of 10%:
  - *eQuest Employee Training (0%)*
  - *Introduction to Geothermal Heat Pump Systems (0%)*
- Considering only "full requests" (contact information included), 34 classes (32%) fell below the goal of 10%.

The "Highs"

- Considering all positive responses, 30 of the classes (29%) scored 50% or higher.
- Considering only "full requests," 1 class (1%) scored 50% or higher:
  - *UC/CSU Green Campus Training* (54%)

The Range

- Considering all positive responses ("partial" and "full"), the range of scores by class is:
  - Scoring 50 – 100% 30 classes (28%)
  - Scoring 20 – 49% 68 classes (64%)
  - Scoring 19 – 10% 6 classes (6%)
  - Scoring 1 – 9% 0 classes (0%)
  - Scoring 0% 2 classes (2%)
- Considering only "full requests" (contact information included), the range of scores by class is:
  - Scoring 50 – 100% 1 class (1%)
  - Scoring 20 – 49% 26 classes (25%)
  - Scoring 19 – 10% 46 classes (43%)
  - Scoring 1 – 9% 20 classes (19%)
  - Scoring 0% 13 classes (12%)

Score Ranges by Instructor (Question F)

There were a total of 31 instructors. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, no instructor (0%) fell below the goal of 10%.
- Considering only "full requests," six instructors (19%) fell below the goal of 10%.

The "Highs"

- Considering all positive responses, 10 instructors (32%) scored 50% or higher:
- Considering only "full requests," one instructor (3%) scored 50% or higher:

The Range

- Considering all positive responses, the range of scores by instructor is:
  - Scoring 50 – 100% 10 instructors (32%)
  - Scoring 20 – 49% 18 instructors (58%)
  - Scoring 19 – 10% 3 instructors (10%)
  - Scoring 1 – 9% 0 instructors (0%)
  - Scoring 0% 0 instructors (0%)
- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 1 instructor (3%)
  - Scoring 20 – 49% 8 instructors (26%)
  - Scoring 19 – 10% 16 instructors (52%)
  - Scoring 1 – 9% 4 instructors (13%)
  - Scoring 0% 2 instructors (6%)

Score Ranges by Location (Question F)

There were a total of 12 locations. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, no locations (0%) fell below the goal of 10%.
- Considering only "full requests," two locations (17%) fell below the goal of 10%:
  - Big Creek (4%)
    (Would be 37% if all positive responses were considered.)
  - Santa Monica (0%)
    (Would be 83% if all positive responses were considered.)

The "Highs"

- Considering all positive responses, four locations (33%) scored 50% or higher:
  - Palm Desert Chamber of Commerce, Palm Desert (60%)
  - Palm Springs Service Center, Cathedral City (73%)
  - Santa Monica (83%)

- The Irvine Company (86%)

- Considering only "full requests," no location (0%) scored 50% or higher:

Scores by Different Locations:

- Considering all positive responses:
  - AgTAC 45%
  - CTAC 43%
  - Others 51%
  - Location not available 67%
- Considering only "full requests:"
  - AgTAC 11%
  - CTAC 16%
  - Others 20%
  - Location not available 27%

The Range

- Considering all positive responses, the range of scores by location is:
  - Scoring 50 – 100% 4 locations (33%)
  - Scoring 20 – 49% 8 locations (67%)
  - Scoring 19 – 10% 0 locations (0%)
  - Scoring 1 – 9% 0 locations (0%)
  - Scoring 0% 0 locations (0%)
- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 0 locations (0%)
  - Scoring 20 – 49% 4 locations (33%)
  - Scoring 19 – 10% 6 locations (50%)
  - Scoring 1 – 9% 1 location (8%)
  - Scoring 0% 1 location (8%)

Score Ranges by Technology (Question G)

There were a total of 10 technology areas. (See Appendix 4-1 for details.)

The "Lows"

- Considering all positive responses, no technology areas (0%) fell below the goal of 10%.
- Considering only "full requests," two technology areas (20%) fell below the goal of 10%:
  - EMS & Electronic Controls (9%)

(Would be 36% if all positive responses were considered.)

- PV & Solar (4%)
  (Would be 30% if all positive responses were considered.)

The "Highs"

- Considering all positive responses, two technology areas (20%) scored 50% or higher:
  - Electricity (General) (52%)
  - Food Service (58%)
- Considering only "full requests," no technology area (0%) scored 50% or higher:

The Range

- Considering all positive responses, the range of scores by location is:
  - Scoring 50 – 100% 2 tech areas (20%)
  - Scoring 20 – 49% 8 tech areas (80%)
  - Scoring 19 – 10% 0 tech areas (0%)
  - Scoring 1 – 9% 0 tech areas (0%)
  - Scoring 0% 0 tech areas (0%)
- Considering only "full requests," the range of scores by class is:
  - Scoring 50 – 100% 0 tech areas (0%)
  - Scoring 20 – 49% 2 tech area (20%)
  - Scoring 19 – 10% 6 tech areas (60%)
  - Scoring 1 – 9% 2 tech areas (20%)
  - Scoring 0% 0 tech areas (0%)

Recommendations

Consider "Raising the Bar"

Since SCE met or exceeded all of the specific goals in this area established in the Program Theory documentation — and some of the specific goals were relatively low — it seems reasonable to consider "raising the bar" when the Program Theory is updated.

This likely would have the affect of further encouraging best practices in Energy Center events. Particular areas to consider are:

- Impact on Subject Matter Knowledge
  - Current goal: 50% with one or more point increase in knowledge
  - Current performance: 85%
  - Suggested new goal: 50% with **two** or more points increase in knowledge
- Likely Impact on EE Purchase or Practices
  - Current goal: 50% positive impact on EE purchase or practice likelihood
  - Current performance: 70%
  - Suggested new goal:
    - 65% for purchases (excluding participants who are not purchase decision makers or major influencers)
    - 80% for practices
- Request for Edison Follow-up
  - Current goal: 10% request referral to audit or rebate programs
  - Current performance
    - For the Energy Audit Service: 34% (12% "full responses")
    - For EE programs: 44% (15% "full responses")
  - Suggested new goals
    - For the Energy Audit Service: 25% "full responses"
    - For EE programs: 25% "full responses"

    (Redesigning the Exit Survey should help increase the number of "full responses" for these items.)

Refine the Exit Survey Instrument

As discussed in the Task 4 findings, numerous participants gave incomplete or erroneous responses to some of the Exit Survey items. In addition, the responses to some items were difficult to interpret due to phrasing of the question and answer options.

While it is important to maintain the perception that the survey is "fast and easy" (e.g., keep it on a single page), it also is important to ensure that the instrument provides the kind of information that can help the ECs focus their efforts and improve their performance relative to the end goal of changing customers' EE behavior.

Suggested refinements to consider during a redesign of the Exit Survey include:

- Rephrase Question B and its associated answer options. (See the first bullet under "
- How This Item Was Scored" on page 111 for a suggested rework of the item.)
- Split Question B into two separate questions:
  - One specific to purchases — and ask whether the participant is directly involved in purchase decisions
  - One specific to practices — and ask whether the participant is directly involved in decisions that would have an impact on EE practices.
  - Better target desired data
  - Reduce confusion and errors in responses
- Reformat the Exit Survey to reduce errors and non-responses.
- Consider adding a "magic wand" question so participants can freely suggest their ideas for improving the learning experience.
- To gather more targeted information regarding an event's impact on participants' knowledge and likelihood to take action, consider using a pre-class instrument (in addition to the Exit Survey) for a sample of classes.
  - The pre-class instrument could be simple self-assessment as is the current Exit Survey
  - Alternatively, the pre-class instrument could be a combination "pre-test" and self-assessment.
    - The "pre-test" portion would ask content-specific questions based on the class's learning objectives. (This would imply providing a "post-test" with comparable, objective-based questions.)
    - The self-assessment portion would ask participants to rate how likely they are to make EE purchases and implement EE practices. (These items would be directly parallel to the suggested refined items on the Exit Survey.)

Disseminate and Monitor Performance on All Key Metrics

Currently, the ECs actively monitor items 1 through 11 on the Exit Survey and distribute summary results to key stakeholders. (Items 1 through 11 address typical training-related "customer satisfaction" issues. See Appendix 4-3 to review all items on the Exit Survey.)

However, they typically do not monitor scores on items A through G on the Exit Survey. (Those are the items that we analyzed during Task 4 — those that have a direct relationship to likely "real world" change in EE-related behavior.)

We suggest that class managers actively track performance on these metrics and share the results with the instructors.

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Task 5: Energy Center Participants

Background (Goals and Questions)

Past evaluations of the SCE Energy Centers (ECs) have highlighted the fact that there are a substantial number of AgTAC and CTAC participants who come back many times each year. This raises such questions as whether some participants simply find it a pleasant experience to attend classes, and whether the program needs to expand its reach and include new participants. Past evaluations have suggested the need to do the latter. This study will address both questions. Perhaps the most important question would be: *Have the classes these frequent participants taken resulted in changes in energy efficiency attitudes and behavior?* This question will also be addressed in this study.

The suggestion to broaden the reach and appeal of the course offerings has also been made by past evaluators. There have been suggestions to offer more hands-on experiences, some shorter courses, sector-specific courses, and others. To get more information about the possible need for such improvements, studying one-time participants (sometimes abbreviated to "one-timers" in the following pages) could be very helpful. One reason for thinking so carefully about one-time participants is that they are the closest that we can get to those who have never participated. We can't get information from non-participants about the performance of the programs and where they can be improved.

Thus, the guiding questions for Task 5 are:

- What explains the very frequent attendance of some participants?
  - Where do they come from?
  - What classes do they take?
- What can we learn about one-time participants?
  - Where do they come from?
  - What are their needs?
  - Why don't they come back?
- What do one-time and frequent participants want in the future?
  - Do they want additional offerings?
  - What suggestions do they have for improvements?
- What is the impact of the classes on energy efficiency attitudes and behavior for these two groups?

Approach

We used two methods to address the questions that focused our Task 5 effort: 1) an analysis of the program databases for the two ECs, and 2) telephone interviews with class participants.

Database Analysis

SCE provided the evaluation team with two databases, one for AgTAC and one for CTAC covering the program years 2004-2007.

These databases track all participants' attendance across those four years, and include participant title, company name, course title, and course date for all courses attended.

We used these databases as the basis for determining attendance patterns and how they relate to participant characteristics.

- For these analyses, frequent participants were arbitrarily defined as those who had attended at least 10 classes over the four years of our study period.
- This group is referred to as ***10+ participants*** or ***frequent participants***, in the following pages.

Telephone Interviews

We interviewed four samples of participants, using a sample size of 50 for each segment:

- AgTAC frequent participants
- AgTAC one-time participants
- CTAC frequent participants
- CTAC one-time participants

A power analysis determined that a medium effect size, based on point estimates, would be detected 80% of the time, if present in the population, with a two-tailed test and an alpha of .01. It should be noted, however, that this study is not oriented to identifying statistically significant relations. It is entirely descriptive.

The power analysis was done to determine that the sample size would be sufficient to provide reasonable estimates of descriptive statistics, especially proportions.

The four samples of 50 result in a total sample size of 200. However, results are not presented combining the four segments because the sampling method does not support that approach. More important, the point of the study was not to characterize AgTAC or CTAC overall, or SCE ECs overall. The focus of this process evaluation was more pointed: Characterizing one-time participants and frequent participants for each EC toward helping each consider new approaches to add to the tried and true. The issues that each EC faces are inherently different, so combining results would not further their individual interests.

As mentioned earlier, the database analysis defined frequent participants as those who had attended at least 10 times over four years. However, that definition proved impractical for the interview samples since there were not enough participants in the 10+ category to yield 50 completed interviews in those categories. To get enough outgoing cases in the frequent participant groups, the criterion for qualifying as a frequent participant was lowered to 6 or more classes. Database analyses could have been altered to match the interview definition of frequent participant, but this was not done. The reason is that the different definitions matched the needs of each respective part of the study.

- The database analysis focused on discovering the patterns of extremely frequent participants. The desire was to understand what accounted for their extreme pattern. This was best accomplished using the 10+ criterion for defining frequent participants.
- The interview study, on the other hand, was more broadly focused, aiming to:
  - Understand why some participants do not return
  - Get ideas on what could be improved in the class offerings and how they are presented
  - Determine how much post-class energy efficiency behavior is affected by the classes

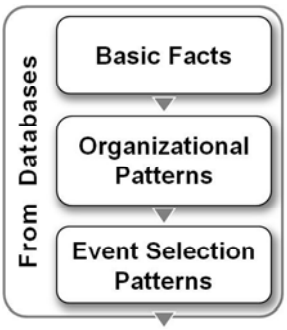
  None of these goals depends on an extreme definition of frequent participants, nor do they require that the two definitions match one another.

The interview protocol (Appendix 5-A) was short and very similar over the four groups. On average, the interviews took 10 to 15 minutes.

- One question focused on the perceived helpfulness of the classes taken, since past evaluations and the current Exit Survey have studied satisfaction thoroughly.
- Two questions determined whether the classes had resulted in installing energy efficiency equipment at home or at work.
- One question asked whether practices had been changed as a result of the class(es).
- One question was devoted to determining whether the class(es) had influenced them directly or indirectly to participate in an SCE rebate program.
- Two closed-ended questions ascertained whether the participants thought their knowledge of and attitudes toward energy efficiency had been changed in a positive direction.
- Four open-ended questions composed the heart of the survey. These questions asked:
  - Everyone about the main reasons for coming to the classes
  - Frequent participants what additional classes would be beneficial
  - One-time participants why they had not returned
  - Everyone for suggestions on the content and presentation of the classes
- The final question asked frequent participants whether they would be interested in a class or set of classes leading to energy efficiency certification.

Findings

Overview of Findings



Overview of Findings from Database Analysis

Findings re. Basic Facts:

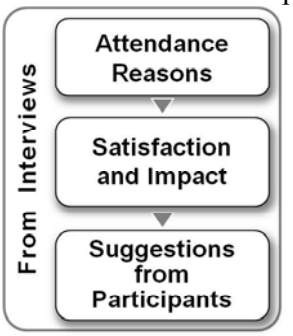
- A large percentage of total class attendance is accounted for by a relatively small number of participants: people who have attended 10 or more classes in four years.
- Most participants are first-time participants, and many of them did not return after the first class.

Findings re. Organizational Patterns

- Participants come mostly from Commercial, Industrial, and Government segments.
- SCE and Military represent the organizations with the most frequent participants.

Findings re. Event Selection Patterns

- One-timers tend to select classes with basic or narrow-focus topics.
- Frequent participants select a broad cross section of classes, including those that focus on more advanced topics.



Overview of Findings from Interviews

Findings re. Attendance Reasons:

- The most common reasons participants cite for coming to classes is to learn technical information and to keep current.
- The primary reasons that one-timers do not attend more classes are related to feasibility issues.

Findings re. Satisfaction and Impact

- Both one-timers and frequent participants report that classes have a positive impact on their knowledge and attitudes.
- Both groups report that classes have a positive impact on their actions — though the impact is greater for frequent participants.

Findings re. Suggestions from Participants

- For both AgTAC and CTAC, half or more of the participants said the classes were "great as is."
- At AgTAC, the most common suggestions for improvement focused on logistics (timing, location, etc.).
- At CTAC, the most common suggestions focused on student participation (hands-on, interaction, etc.).

Program Database Analyses

The questions that can be addressed using the program database are:

- What explains the very frequent attendance of some participants?
  - Where do they come from?
  - What classes do they take?
- What can we learn about one-time participants?
  - Where do they come from?

Before these questions are addressed directly, some context and general description of the EC basic facts for 2004-2007 are presented.

Basic Facts

Context

While the two ECs have similar mandates, AgTAC, being located in the central valley of California, offers more classes and events that are specific to agriculture, while CTAC does not.

This may be one reason that AgTAC offers more class titles than CTAC at 156 versus 91 for the four-year period covered by this study. (See Table 5.1 on page 138.)

The same table portrays the fact that, in spite of fewer class titles, somewhat more events are presented at CTAC (412 compared at CTAC to 321 at AgTAC). This is reflected in substantially more participants at CTAC (6,140 unique participants were served at CTAC compared to 2,374 at AgTAC).

To understand one set of figures in Table 5.1, we introduce a non-word: *attendances*.

Attendances refers to "person-courses" — that is, the number of events offered times the number of participants in each. Another way of thinking of it is the number of seats that have been filled over all classes. We use the word *attendances* to avoid the awkward term, *person-courses.*

It is instructive to know that 10+ participants account for:

- 38% of total CTAC attendances
- 51% of AgTAC attendances

So, of the total attendances, a very large percent is accounted for by a relatively small number of participants. This could be seen as an argument for broadening the reach and appeal of the ECs.

Some of the more important figures in this table are those representing the number of one-time participants at both ECs, defined here as participants who appear only once in the tracking system over the four-year period covered. At AgTAC about 25% appear only once, and at CTAC almost 35% fall into that category. This is one of the reasons that one-timers will be a focus of this study.

Some Basic Facts about Participants and Events	AgTAC		CTAC	
	Number	% or (std dev)	Number	% or (std dev)
Number of unique participants	2,374		6,140	
Maximum number of events attended per person	40		36	
Number of event IDs	321		412	
Number of class names	156		91	
Average events attended	2.2	(2.7)	1.9	(2.0)
Number of participants attending only one event during period covered	1,339	56.4%	3,973	64.7%
Number of participants attending 10 or more events during period covered	53	2.2%	85	1.4%
Attendances accounted for by 10+ participants		51%		38%

Table 5.1: Basic facts of AgTAC and CTAC participants and events (2004-2007)

First-time Participants

Related to the issue of one-time participants is first-time participants. For purposes of this analysis, we will define first-time participants as those who have not attended for at least 24 months.

The figures shown in Table 5.1 (e.g., 25.4% for AgTAC and 34.6% for CTAC) represent the percent of participants who appeared only once in the four-year period covered by the program database. Some of these are first-time participants, but others won't be.

For instance, if someone attended in 2004, we wouldn't know if that individual also attended in 2003 or 2002. This means we can't know if the 2004 attendance represents the first time in at least two years. We can know that only for the last two years of the tracking data analyzed: 2006 and 2007. For those years:

- 75% of individuals attending AgTAC in 2006 were first-time participants, compared to 80% in 2007.
- 85% of individuals attending CTAC in 2006 were first-time participants, compared to 84% in 2007.

See Table 5.2 below for these figures and the raw numbers.

About First-time Participants	AgTAC		CTAC	
	2006	2007	2006	2007
Number of first-time participants	554	727	1,619	1,918
Number of all participants in the year	736	913	1,897	2,271
Percent of all participants who are first-timers	75%	80%	85%	84%

Table 5.2: Number and percent of first-time participants 2006 and 2007

The high rate of first-time participants raises the question as to how many of these first-timers returned versus how many were one-timers. In other words, among the 75-85% of participants who attended in 2006 and 2007, but not during 2004 or 2005, how many did not come back?

Table 5.3 below shows that — depending on the EC and the program year — between 55% and 71% of first-time participants in 2006 and 2007 did not return during those years. These are very high numbers, though they do have to be interpreted in light of the fact that some participants in this group (e.g., those who first attended late in 2007) had very little time in which to become returners.

First-timers Who Are One-timers		
Center	Program Year 2006	Program Year 2007
AgTAC	55%	68%
CTAC	61%	71%

Table 5.3: Percent of first-time participants who are also one-time participants 2004-2007

Classes Offered

Table 5.4 on the following pages shows the class types offered by each EC. It does not show individual class titles since there are so many titles that represent very similar classes. The somewhat collapsed list of classes is presented for ease of viewing and analysis.

It can be seen that the majority of classes and events are offered by both ECs. The table is organized so that the most frequently attended classes appear at the top of the table. Fundamentals classes occupy many of the top positions for both.

- Predictably, the agriculture-specific classes are unique to AgTAC and are the second most attended classes.
- At CTAC, the most-attended classes, by far, are the fundamentals classes in lighting and air conditioning.

  Together, those two types account for 32% of all attendances. AgTAC has no such dominant categories.

Task 5: Energy Center Participants

Findings

Event Categories and Number of Participants				
Class Type Description	**AgTAC**		**CTAC**	
	Number	**%**	**Number**	**%**
Fundamental Lighting	406	7.7%	2,168	18.9%
Fundamental AC	385	7.3%	1,508	13.1%
Intermediate AC	205	3.9%	987	8.6%
Fundamental Energy Efficiency	297	5.6%	769	6.7%
Fundamental Motors	219	4.2%	521	4.5%
Title 24			559	4.9%
Refrigeration	159	3.0%	385	3.3%
Wet Cleaning			533	4.6%
EE software	129	2.4%	373	3.2%
Water Conf			484	4.2%
Logic Controllers	478	9.1%		
Technology update	301	5.7%	174	1.5%
Drives	198	3.8%	265	2.3%
Ag-Specific Classes	457	8.7%		
Electricity	434	8.2%		
Daylighting	6	0.1%	419	3.6%
Compressed Air	99	1.9%	269	2.3%
Advanced AC	61	1.2%	280	2.4%
Food Service	22	0.4%	288	2.5%
Advanced Lighting Technology			278	2.4%
EMS	21	0.4%	220	1.9%
Pump Energy Efficiency	162	3.1%	42	0.4%
Electricity Market	180	3.4%		
Life-cycle costing			170	1.5%
Photovoltaics	163	3.1%		
Maintenance	150	2.8%		
Cool Exteriors			129	1.1%
Managing Energy costs	8	0.2%	103	0.9%

Event Categories and Number of Participants				
Class Type Description	**AgTAC**		**CTAC**	
	Number	**%**	**Number**	**%**
Water Heating	100	1.9%		
Managing Residential Energy Costs	91	1.7%		
Water and Energy			85	0.7%
Evaporative Cooling			80	0.7%
Power Quality	78	1.5%		
Glass	3	0.1%	73	0.6%
Rebuild America			74	0.6%
Health Industry EE			63	0.5%
Intermediate Motors	56	1.1%		
Cooling Markets, Stores, Rest			54	0.5%
Adv Lighting Technology	52	1.0%		
Monitoring	44	0.8%		
HID	12	0.2%	31	0.3%
Current and Future Air Quality Issues - SJV	36	0.7%		
Merchandising and lighting			31	0.3%
Wireless Sensors			31	0.3%
Current and Future Water Quality Issues - SJV	28	0.5%		
Basic EMS Controls			27	0.2%
Demand Response Programs	24	0.5%		
Multi-family Design			21	0.2%
DOE Steam System Assessment	21	0.4%		
Whole Bldg E.E. Design	21	0.4%		
CCA Manual D - Duct Design	17	0.3%		
Fan System Performance Assessment	17	0.3%		
Cool Roofs: Code Requirements and Program Opportunities	16	0.3%		
Instrumentation and Sensors	16	0.3%		
Advanced ACCA Manual D	13	0.2%		
Tool Lending Library	13	0.2%		

Task 5: Energy Center Participants

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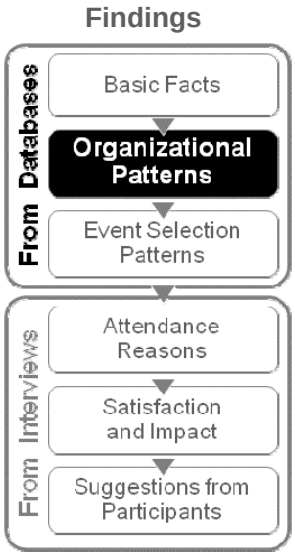
Event Categories and Number of Participants				
Class Type Description	**AgTAC**		**CTAC**	
	Number	**%**	**Number**	**%**
Green Building Hype or Help?	12	0.2%		
Overview of ACCA Quality Installation Standards	12	0.2%		
Equipment Sizing and Selection Using ACCA Manual J	11	0.2%		
Transport Energy: Motors, Fans and Pumps	10	0.2%		
Electric Forklifts	9	0.2%		
Intermediate energy efficiency	8	0.2%		
Residential-specific classes	7	0.1%		
Overcoming Objections to Energy Efficiency Investments	3	0.1%		
Advanced LEED			1	0%
Total	**5,270**	**100%**	**11,495**	**100%**

Table 5.4: Event categories and number of participants (ordered by total enrollments) 2004-2007



Organizational Patterns (Where Participants Come From)

The EC databases included the name of the organization each participant represented, unless they failed to provide the information.

These organization names provide the opportunity to glean some information about what kinds of organizations are currently highly represented in the classes of both ECs. Thus the names were coded into broad categories.

This can be useful, but the limitation is that many company names do not allow a judgment to be made, especially between commercial and industrial companies. Thus, the "Other" category is the most populated, as shown in Table 5.5.

This "Other" category contains almost entirely commercial and industrial businesses. Understandably, these businesses constitute a higher percentage of representation at CTAC than at AgTAC.

- Farms, ranches, and dairies account for 6.5% of AgTAC participants, but are not found at all in CTAC classes.
- Interestingly, employees of government agencies account for over 26% of participants at AgTAC, but only about 11% at CTAC.

One pattern that is clear for both ECs is that SCE employees constitute a substantial segment of participants. It likely comes as no surprise to program administrators and instructors that the ECs play an important training role for SCE representatives.

- The same theme is underscored by Table 5.6, which shows that the average number of classes attended is highest among SCE employees for both ECs at 17.0 for AgTAC and 7.3 for CTAC.
- This finding provides a possible hint about the answer to the question: *What accounts for that segment of participants that attend the ECs extremely frequently?*

  Clearly, SCE employees use EC classes to educate themselves on technologies covered by programs they administer.

In addition to SCE employees, members and/or employees of the military are very frequent participants. On average, participants from the military attended 10.4 aftac sessions and 4.9 CTAC sessions over the four years covered by this analysis.

After SCE employees and the military, the most frequent attendance sources differ between the two ECs.

- Schools, colleges and universities are important in CTAC (mean=3.8), while government agencies are important to AgTAC (mean=5.3).
- It is revealing that the average number of events attended for each category is higher at AgTAC than CTAC.

  Since AgTAC also has the highest percent of one-timers, two types of participants seem to dominate: one-time and extremely frequent participants.

Task 5: Energy Center Participants

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Participants from Different Organization Types				
Organization Type	**AgTAC**		**CTAC**	
	Number	**%**	**Number**	**%**
Other (Commercial and Industrial)	2,575	48.9%	7,168	62.4%
Government Agencies	1,384	26.3%	1,223	10.6%
SCE	337	6.4%	1,217	10.6%
Schools, Colleges, Universities	322	6.1%	1,053	9.2%
Utilities and Water Districts-non SCE	288	5.5%	727	6.3%
Military	23	0.4%	107	0.9%
Farms, Ranches, and Dairies	341	6.5%		
Total	**5,270**	**100%**	**11,495**	**100%**

Table 5.5: Number of participants representing selected organization types at events 2004-2007

Average (Mean) Number of Events that Participants Attended				
Organization Type	**AgTAC**		**CTAC**	
	Mean	**(Std Dev)**	**Mean**	**(Std Dev)**
SCE	17.0	(13.62)	7.3	(5.31)
Military	10.4	(6.46)	4.9	(5.49)
Other (Commercial and Industrial)	4.4	(5.93)	3.8	(4.78)
Schools, Colleges, Universities	4.7	(4.31)	3.8	(3.65)
Utilities and Water Districts-non SCE	3.6	(2.76)	2.8	(2.17)
Government Agencies	5.3	(3.95)	2.7	(2.15)
Farms, Ranches, and Dairies	4.2	(4.65)		
Total	**5.4**	**(6.77)**	**4.0**	**(4.58)**

Table 5.6: Mean number of events participants attended by organization type 2004-2007

Table 5.7 for AgTAC and Table 5.8 for CTAC emphasize again, that SCE employees very frequently occupy the 10+ category, especially at CTAC (28.8% of SCE Participants are in the 10+ group), and, AgTAC (63.8% of SCE Participants are in the 10+ group).

The other notable group tending toward very frequent attendance is the Military.

- In CTAC, 15.9% of military participants fall into the 10+ group.
- In AgTAC, that figure is 65.2%.

To make sense of these figures it is necessary to compare the percentages within organization types to the total percent in the 10+ group, which is 10% for CTAC, and 15.2% for AgTAC. So, while the overall percent of 10+ participants is 10% for CTAC, among Military participants 15.9% are 10+ participants. The comparison in AgTAC is a base rate of 15.2% compared to 65.2% of Military participants who fall into the 10+ group.

The meaning of these figures can be different for different purposes.

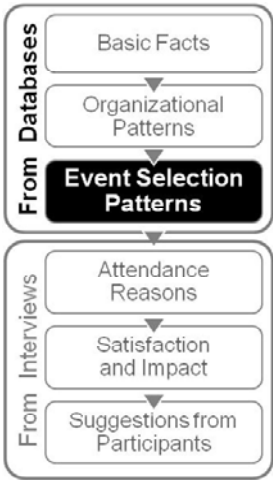
- For the purpose of giving us insight into why some participants attend very frequently, we can begin to see that these men and women are getting training for their jobs, and this will be highlighted more specifically in a future section.
- However, the figures can be viewed from a marketing perspective as well.
  - One can view the organization types that provide many *frequent* participants as fertile ground for further recruitment.
  - On the other hand, the organization types that provide fewer participants and more *one-time* participants can be seen as undeveloped potential.
    - At CTAC there are no organization types that are over-represented in the one-time group.
    - At AgTAC the farms, ranches, and dairies category is somewhat over represented (35.8%) as well as other Commercial and Industrial participants (31.3%).

Attendance at AgTAC by Participants' Organization Type						
Organization Type	**One Event**		**Two to Nine Events**		**Ten Plus Events**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Government Agencies	203	14.7%	973	70.3%	208	15.0%
Utilities and Water Districts-non SCE	77	26.7%	199	69.1%	12	4.2%
SCE	40	11.9%	82	24.3%	215	63.8%
Schools, Colleges and Universities	90	28.0%	172	53.4%	60	18.6%
Military	2	8.7%	6	26.1%	15	65.2%
Other (Commercial and Industrial)	805	31.3%	1,519	59.0%	251	9.7%
Farms, Ranches and Dairies	122	35.8%	178	52.2%	41	12.0%
Total	**1,339**	**25.4%**	**3,129**	**59.4%**	**802**	**15.2%**

Table 5.7: Percent of each organization type in each attendance category: AgTAC 2004-2007

Attendance at CTAC by Participants' Organization Type						
Organization Type	**One Event**		**Two to Nine Events**		**Ten Plus Events**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Government Agencies	472	38.6%	738	60.3%	13	1.11%
Utilities and Water Districts-non SCE	283	38.9%	433	59.6%	11	1.5%
SCE	150	12.3%	717	58.9%	350	28.8%
Schools, Colleges and Universities	343	32.6%	581	55.2%	129	12.3%
Military	34	31.8%	56	52.3%	17	15.9%
Other (Commercial and Industrial)	2,691	37.5%	3,846	53.7%	631	8.8%
Total	**3,973**	**34.6%**	**6,371**	**55.4%**	**1,151**	**10.0%**

Table 5.8: percent of each organization type in each attendance category: CTAC 2004-2007



Event Selection Patterns (Classes that One-time and Ten-plus Participants Take)

Learning what classes one-time participants take could be helpful in thinking about why the participants don't come back. It could be that they have need of only one class, or it could be that the classes of that type are not effective in bringing them back. Other explanations are possible as well, but a starting point is to look at what classes one-timers tend to take. Table 5.9 lists the classes that were taken more frequently by one-timers than by 10+ participants at AgTAC; Table 5.10 shows the classes that 10+ participants at AgTAC took; and Table 5.12 shows the same analysis for CTAC.

The point of portraying the participation rates of the 10+ participants for these classes is to show the difference in rates of attendance at these classes. At first blush, the rates look quite low for both groups. However, in interpreting the numbers it is important to think about how many classes there are, and therefore how many categories a limited group of people will be divided across. The classes were chosen for display that showed the greatest discrepancy between one-time and frequent participants. Because the percentages are so low in both groups, discrepancies are not and cannot be large. Still, the trends are worth examining.

AgTAC — Events More Likely To Be Attended by One-timers		
Event Type	**% One-Timers**	**% Frequent Participants**
Ag-Specific Classes	13%	4%
Electricity Market	7%	2%
Photovoltaics	6%	3%
Fundamental Energy Efficiency	7%	4%
Managing Residential Energy Costs	5%	2%

Table 5.9: Events types more likely to be attended by one-time participants compared to 10+ event participants: AgTAC 2004-2007

AgTAC — Events More Likely To Be Attended by Frequent Participants		
Event Type	**% Frequent Participants**	**% One-Timers**
Logic Controllers	8%	2%
Refrigeration	5%	2%
Fundamental Lighting	10%	7%
Fundamental AC	9%	6%

Table 5.10: Event types more likely to be attended by 10+ event participants compared to one-time participants: AgTAC 2004-2007

CTAC — Events More Likely To Be Attended by One-timers		
Event Type	**% One-Timers**	**% Frequent Participants**
Wet Cleaning	9%	0%
Fundamental AC	15%	8%
Water Conference	6%	2%
Title 24	6%	3%
Fundamental Lighting	19%	16%
Food Service	4%	1%

Table 5.11: Events types more likely to be attended by one-time participants compared to 10+ event participants: CTAC 2004-2007

CTAC — Events More Likely To Be Attended by Frequent Participants		
Event Type	**% Frequent Participants**	**% of One-Timers**
Intermediate AC	7%	3%
Refrigeration	6%	2%
Technology Update	3%	1%
Advanced Lighting Tech	4%	1%

Table 5.12: Event types more likely to be attended by 10+ event participants compared to one-time participants: CTAC 2004-2007

Task 5: Energy Center Participants

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Because the patterns are somewhat clearer at CTAC, the discussion of the above four tables will begin there with Table 5.10. The classes that are favored most by one-time participants (compared to 10+ participants) can be seen as falling into two categories:

- Highly specific class content that, when mastered, fulfills the needs of the participants
- Very fundamental content classes that apply to just about everyone and every type of organization.

In the former category are wet cleaning, water conferences, and food service. Falling into the second, widely applicable category, are air conditioning, lighting, and Title 24 classes. Highly specialized classes, pertinent to only a small segment of businesses, may be interpreted by participants as unique, and they may not be motivated to seek further energy efficiency education. It may be that this is the way these participants interpret the usefulness of this type of class, or it may be that these participants just haven't yet been convinced of the usefulness of other, more general energy efficiency classes.

The relative prevalence of one-time participants in the classes on fundamentals common to most people and organizations could point to those classes as gateway classes through which first-time participants could be converted to becoming multiple participants. Of course, much of the difference between one-timers' compared to 10+ participants' rates would be due to the fact that many of the very frequent participants may have already completed the fundamentals and have gone on to others. Still, it is clear that the basic lighting and air conditioning classes are gateway classes that could be used as such in thinking about broadening the reach of the ECs.

The perspective just described is furthered by inspection of Table 5.12, which focuses on the preferences of 10+ participants, again at CTAC. The classes that they are more likely to take than one-timers are the more advanced and specialized classes of intermediate air conditioning, advanced lighting technology, refrigeration, and technology updates.

Looking backward to Table 5.9 and to Table 5.10, we make a similar analysis for AgTAC participants; there the picture is somewhat different, although the classes can still be categorized as specialized versus common, fundamentals content. One-time participants are very likely to be among those taking agriculture-specific classes and photovoltaics, highly specialized classes. But they also take some very fundamental classes such as those about the general energy market, basic energy efficiency, and managing residential energy costs, content that is widely applicable, and may be less appealing to those who are embarked on a path to strong credentials in energy efficiency expertise. In other words, many of them may be well beyond this content. Program planners can think about whether agriculture-specific classes can be used to cultivate more frequent participants or whether those who take these classes really have little to gain from broadening their knowledge of energy efficiency.

Interestingly, the main difference between the CTAC analysis and the AgTAC analysis is in the frequent participants. While two of the classes that are frequented by the 10+ participants, logic controllers and refrigeration, are more advanced than some others, the other two classes favored by this group are the most basic of all classes: fundamental lighting and air conditioning.

One final analysis addresses the issue of why some participants return again and again such that they average several classes per year (between four and five classes per year for the 10+ Participants). The analysis is a simple one. It is a listing of five examples of class sequences from the 10+ group. The classes and the order in which they were taken are shown below. Examples of various types of jobs or functions are represented in this selection.

Example 1: City College Instructor

- *Fundamentals of Electricity and Energy Efficiency*
- *HVAC System Testing*
- *Motor Efficiency*
- *Adjustable Speed Drives*
- *Compressed Air System Efficiency*
- *Air Handling Systems*
- *Chilled Water Systems*
- *Cooling Tower Efficiency*
- *Efficiency Technologies for Commercial Refrigeration*
- *HVAC System Testing*
- *Industrial Refrigeration*
- *HVAC Direct Digital Control*

Example 2: University Operating Engineer

- *Motor Efficiency*
- *Package Unit Heating, Ventilation and Air Conditioning (HVAC)*
- *Adjustable Speed Drives*
- *Compressed Air System Efficiency*
- *Air Handling Systems*
- *Chilled Water Systems*
- *Cooling Tower Efficiency*
- *Efficiency Technologies for Commercial Refrigeration*
- *HVAC System Testing*
- *Fundamentals of Electricity and Energy Efficiency*
- *Comparing Motors and Engines as Prime Movers*

Example 3: Military Electrical Engineer

- *Lighting Controls for Energy Management*
- *Package HVAC*
- *Cool Roofs*
- *Air Handling Systems*
- *Lighting Retrofit Strategies*
- *Chilled Water Systems*
- *Energy Management Systems*
- *Design Strategies for High Performance Glass*
- *Implementing Energy Efficiency Projects*
- *Rebuild America*
- *2005 Title 24 Nonresidential Energy Efficiency Standards*
- *Compressed Air System Efficiency*
- *Evaporative Cooling for Commercial and Industrial Facilities*
- *Lighting Controls for Energy Management*
- *Daylighting Controls*
- *Motor Efficiency*
- *Package Unit Heating, Ventilation and Air Conditioning (HVAC)*

Example 4: Independent Architect

- *Lighting for Architecture and Interiors*
- *Advanced Lighting Technologies*
- *Lighting for Architecture and Interiors*
- *Daylighting for Buildings*
- *Advanced Lighting Technologies*
- *Intermediate eQuest "Detailed Design"*
- *Lighting for Architecture and Interiors*
- *Introduction to Life-Cycle Costing*
- *Specifying Foodservice Lighting for Energy Efficiency*
- *Outdoor Lighting Design and Compliance - 2005 Title 24 Standards*
- *Daylighting for Buildings*
- *Introduction to Life-Cycle Costing*
- *Lighting for Architecture and Interiors*
- *Lighting for the Electronic Office*
- *Daylighting for Buildings*
- *Successful Merchandising with Efficient Lighting*
- *Introduction to Life-Cycle Costing*

Example 5: SCE Account Executive

- *Lighting Controls for Energy Management*
- *Air Handling Systems*
- *Lighting Retrofit Strategies*
- *Equipment Specification for Foodservice*
- *Rebuild America*
- *Lighting Controls for Energy Management*
- *Advanced Lighting Technologies*
- *Cook, Chill and Retherm Technologies for the Foodservice Industry*
- *Energy Efficiency Opportunities for Rooftop Packaged Units*
- *Hot Rebates and Cool Savings for Foodservice*
- *Introduction to Life-Cycle Costing*
- *Specifying Refrigeration Equipment and Ice Makers for Energy Efficiency*
- *Daylighting Controls*
- *Advanced Lighting Technologies*

Several things can be gleaned from these representative examples of 10+ participants. First, it is easy to see from the job positions of these five participants that they have a need for broad education in many aspects of energy efficiency at many levels. Second, the courses taken reflect that broad coverage. Finally, in several cases, the same class has been repeated, sometimes multiple times. For instance, in Example 1, a city college instructor took a class in HVAC Testing early in the four-year period and again toward the end. In Example 4, an independent architect has focused his or her energy efficiency education largely on lighting. This includes four instances of Lighting for Architecture and Interiors. It is impossible to know from this type of archival data what the meaning of these repetitions is. It may be worth pursuing this question. It could mean that there is so much material that one session might not allow the participant to learn it adequately. Or, it could mean that the classes are slightly different in emphasis, so they may be repeated with significant learning occurring each time. There may be other explanations as well, but some have different policy implications than others, so understanding the reasons for these repetitions is important. Originally, the thought was that there was an error in the program database, and other examples were sought for presentation that did not contain this error. However, it was difficult to find cases where there were not repetitions. Thus, they were presented and interpretations considered.

The larger picture that these examples as well as the analyses prior to it portray is that the very frequent participants have obviously legitimate reasons for attending so many classes. The ECs seem to be providing a valuable educational service to SCE's own employees who work with a wide variety of customers, as well as to the wider community of professionals who can impact the energy decisions of many. Further insights into some of the questions considered here can be found in the interviews, and will be pointed out when appropriate.

Analysis of Interview Data

The questions that were addressed through interviews are:

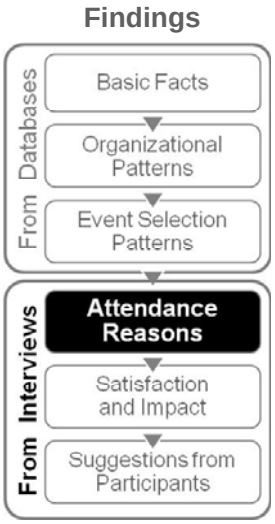
- What can we learn about one-time participants?
  - What are their needs?
  - Why don't they come back?
- What do both one-time and frequent participants want in the future?
  - Do they want additional offerings?
  - What suggestions do they have for improvements?
- What is the impact of the classes on energy efficiency attitudes and behavior for these two groups?

While all of the questions above will be addressed in this section, they won't be addressed in order or in separate sections for one-time and 6+ participants as several questions pertain to both groups, and the tables are more efficiently presented with all four groups. As noted before, the groups are not combined, as neither the sampling method nor the study goals support this. The combined figures would have no meaning.

As mentioned in the "Approach" section, the heart of the interview was in the four open-ended questions. The questions asked:

- What were participants' reasons for taking classes?
- Why haven't (one-timers) taken more classes?
- What further classes would frequent participants benefit from?
- What suggestions would both groups make for content and presentation of classes?

Each question was coded into categories to facilitate presentation and understanding of patterns. When participants provided multiple answers, each was recorded and included in the analyses. The open-ended format has plusses and minuses. The advantages are the ability to get less biased information from the interviewee and to tap into what is most on their minds. In addition, their responses will not be constrained by what the researchers expected and built into the response categories of a closed-ended format. The disadvantages are the labor involved in coding the information, and the fact that interviewees may not think of everything that they would find relevant if reminded. The open-ended format was chosen for this particular study because we wanted to tap into what the participants were most interested in without pre-conceived constraints.



Attendance Reasons (Motivations)

The answers to the question of what reasons participants had for taking classes at the ECs are summarized in Table 5.13. It will be noted that the categories in the table are not mutually exclusive and indeed have considerable overlap.

Searching for technical learning and wanting to keep current with technology and standards can both be true for one person, and in fact may be indistinguishable in some. Nevertheless, the distinction was made because there was clearly more emphasis on one over the other in many cases.

In order to preserve the emphasis of the interviewees, separate categories were maintained and reported. The category of technical learning was distinguished from keeping current with standards mainly by the more basic nature of the desire for technical information compared to the more advanced nature of keeping up with trends and standards, which assumes some prior knowledge. Similarly, the desire to learn more about energy efficiency involves technical learning, but has a focus on the efficiency aspects of technology rather than just understanding how equipment works in general.

Reason for Taking Classes	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
To keep current with technology and standards	12	24.0%	16	32.0%	8	16.0%	20	40.0%
Technical learning	26	52.0%	32	64.0%	32	64.0%	22	44.0%
Learn more about energy efficiency	11	22.0%	8	16.0%	10	20.0%	16	32.0%
Develop better skills, improve job performance, professional development	8	16.0%	13	26.0%	13	26.0%	14	28.0%
Classes are free	0	0.0%	5	10.0%	1	2.0%	2	4.0%
To network	0	0.0%	0	0.0%	3	6.0%	5	10.0%
Other	5	10.0%	3	6.0%	8	16.0%	9	18.0%
Total	**50**		**50**		**50**		**50**	

Table 5.13: Reasons for taking classes

Finally, while the intent to develop skills, improve job performance, or to pursue professional development also involves technical learning, it was clear that some participants were most focused on their own development. To maintain these shades of meaning, these categories are

examined individually. It should be noted that in all tables involving open-ended responses, there are more responses than interviewees since all of the responses were coded and used. The percentages in the tables represent what percent of the sample mentioned that reason; they are not percentages of responses.

Overall, EC participants of all four groups were most likely to indicate a focus on technical learning in attending these events. They were most interested in general education about equipment and processes. This statement is true of all four groups, but is least true for the CTAC frequent participants. This may reflect a need for more advanced information in this group. Keeping current with technology and standards was also a popular reason for attending classes, especially for the frequent participants, continuing with the theme that the one-timers seem to have relatively narrow interests and they are more likely to stay with more fundamental or more specific knowledge.

Learning about energy efficiency is also an interest of all four groups, especially those frequent participants at CTAC. Professional development or increasing job skills is a category of interest for all groups, but at a much lower level among one-timers at AgTAC. This is reminiscent of the analysis above, shown in Table 5.9 where it was seen that one-time participants were much more likely than frequent participants to go to agriculture-specific classes. The customers who attend these classes seem to be quite focused on that one area of events offered. However, frequent participants at AgTAC are just as interested in professional development as CTAC participants.

The fact that classes are free was of sufficient interest to a few participants in both ECs to mention spontaneously, though it is clearly not a major factor for most. Likewise, a few participants, only among CTAC participants, are interested in the networking possibilities provided by the classes. The clear pattern in this table is the interest by all groups in learning about technologies, keeping up to date, and improving their own job performance in these areas.

A logical next step to the identification of reasons for attending classes is to determine why some participants do not return. The one-timers were asked this question and their answers were coded into the categories shown in Table 5.14. Overwhelmingly, the answers to this question are that the participant has considered it infeasible to come back again. This is most true of the CTAC participants.

The “Not Feasible” category was divided into two subcategories because each has different policy implications. Some reasons for finding a return to EC classes infeasible are highly personal and could not reasonably be addressed by program planners. However, the larger category of infeasibility consisted of reasons that could possibly be addressed. For instance, some of the high-frequency reasons within this subcategory are:

- Too Busy (AgTAC: 49%, CTAC: 52%)
- I Haven’t Received Notices (AgTAC: 4%, CTAC: 14%)
- Facility Too Far Away (AgTAC: 12%, CTAC: 10%,).

Not receiving notices about the scheduled classes is most true of CTAC, and is presumably the most easily addressed. The driving distance to the facilities is a barrier and could possibly be overcome by adding classes to satellite locations, or possibly by offering online learning or DVDs.

Why One-Timers Don't Return				
Reason	**AgTAC**		**CTAC**	
	Number	**%**	**Number**	**%**
Lack of need	6	12.0%	4	8.0%
Remaining classes don't meet my needs	14	28.0%	11	22.0%
Not feasible-Personal reasons	11	22.0%	9	18.0%
Not feasible-Addressable reasons	34	68.0%	42	84.0%
I thought I had (returned)	1	2.0%	1	2.0%
Other	5	10.0%	3	6.0%
Total	**50**		**50**	

Table 5.14: Why haven't one-timers taken more classes?

Finally, the most frequent reason within the non-feasibility category is being "too busy." On the face of it, this doesn't seem addressable by the program. However, being too busy could be another way of saying, 1) it is too far to drive to a class, 2) the classes are too long, or 3) what is offered isn't a high-enough priority for me. The first two possible interpretations could be addressed by means mentioned above in response to the "facility too far away" reason. Classes could be offered at satellite locations, in shorter formats, and possibly in evening and weekend hours to accommodate busy schedules. Of course, an entirely different approach is implied if the underlying reason of being "too busy" is that the classes just don't offer enough to these individuals to make them a high priority. To address this issue, though, we would need to know more: Is this the reason? What classes would make attending a higher priority?

There are two other reasons that one-timers give for not returning related to classes not meeting their needs—lack of need, and classes don't meet my needs. Together, these two categories account for a substantial percentage of participants from both ECs. The question immediately arises, "What classes *would* meet the needs of these participants?" These are questions well worth considering in an effort to bring one-time participants back.

Satisfaction and Impact of Classes

As discussed earlier, our telephone interviews included a series of questions that addressed the possible effects the classes taken had on knowledge, attitudes, and behaviors. Specifically, we asked about classes' affect on:

- Participants' knowledge and attitudes
- Behavior regarding measures and practices
- Participation in SCE rebate programs

In addition, we looked at how classes impacted on the installation of measures at clients/employers varied by organization type. We did this by analyzing the results from the interviews in combination with database data.

Overall, the easier it is to change the behavior, the more the impact the classes had on that behavior.

- The classes had the least impact on measure installation by clients/employers, ranging from 16% to 48% installations credited directly to classes.
- There was more influence credited to the classes for changes in practices (38% to 78%).
- Still more influence was credited to the classes for changes made at home (42% to 86%).
- The strongest influence was on frequent participants, and on CTAC participants.

Participants' Knowledge and Attitudes

Table 5.15 shows the results from three questions about the classes' impact on the interviewees' thinking. The means and standard deviations are shown for each question for each of the four sample groups. Following the table is a brief discussion relative to each of these questions.

Responses re. Knowledge and Attitude	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Mean	(Std Dev)	Mean	(Std Dev)	Mean	(Std Dev)	Mean	(Std Dev)
Overall classes were helpful	5.9	(1.26)	6.5	(0.68)	6.2	(0.91)	6.5	(0.71)
Classes improved my knowledge	5.7	(1.71)	6.4	(1.06)	5.9	(1.28)	6.7	(0.54)
Classes changed my attitudes re. energy efficiency in a positive direction	5.2	(1.81)	6.0	(1.32)	5.3	(1.48)	6.2	(1.25)

Table 5.15: Effect of classes on knowledge and attitudes: mean ratings (1-7)

Overall Helpfulness of the Class

The first question in the series about knowledge and attitudes makes an assessment of overall perceived helpfulness of the class. On the whole, the participants found the experience quite helpful, with mean scores above 6 on a 7-point scale. The one-time AgTAC participants averaged somewhat lower ratings, and showed a higher level of variability (M=5.9, SD=1.26)

Impact on Knowledge

Most of the people we interviewed also agreed that the classes had improved their knowledge, with means close to or a little over 6 on the 1-7 scale. The frequent participants felt most strongly that they had improved their knowledge. The most variability in ratings was again seen in the AgTAC one-timers. The highest mean score with the least variability is found in the frequent participants at CTAC.

Impact on Attitudes

Participants were slightly less convinced that their participation had changed attitudes in a positive direction, although the difference is not large. On the whole, participants were more likely to have changed opinions in a positive direction than not, as evidenced by the fact that the means are definitely above the midpoint of 4 on the scale. To the extent that there are differences (they are not large) the tendency is for the frequent participants to acknowledge changes in attitudes more.

Impact on Behavior re. Measures and Practices

Three questions address changes in behavior, focusing on:

- Installation of measures at client/employer
- Energy efficiency practices at client/employer
- Energy efficiency practices at home

Below is a brief discussion relative to each of these questions.

Installation of Measures at Client/Employer

Table 5.16 shows the results to the query as to whether the classes had resulted in the participants' clients or employers installing measures.

Responses re. Impact on Installing Measures at Client/Employer	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
Yes, responsible for at least one	8	16.0%	18	36.0%	15	30.0%	24	48.0%
Yes, partially responsible	7	14.0%	13	26.0%	8	16.0%	12	24.0%
No, but more aware of possibilities	19	38.0%	15	30.0%	15	30.0%	7	14.0%
No, not the point of going	10	20.0%	2	4.0%	11	22.0%	4	8.0%
Other	5	10.0%	2	4.0%	1	2.0%	3	6.0%
Don't Know	1	2.0%	0	0.0%	0	0.0%	0	0.0%
Total	**50**		**50**		**50**		**50**	

Table 5.16: Classes result in client/employer installing measures?

The first response category ("Yes, responsible for at least one") is the only one that expresses unequivocally that the classes have been responsible for at least one such installation.

In both ECs, the frequent participants were most likely (36% for AgTAC, 48% for CTAC) to choose this response option. Similarly, those two groups were most likely to attribute partial responsibility to classes (26% for AgTAC, 24% for CTAC,).

Cumulatively, 62% of AgTAC 6+ and 72% of CTAC 6+ participants reported at least partial responsibility for measures installed. Understandably, one-timers were less likely to report this (30% at AgTAC, 46% at CTAC).

In a common pattern that we have seen before, one-time participants at AgTAC show somewhat less positive responses than other groups. This might be attributed to the more narrow interests among participants in the agricultural sector that comes from agricultural participants. However, inspection of the participants with company names that allowed categorization as farms, ranches, and dairies shows that this is apparently not the case. There were only six such participants in the interview sample, and 33% of them (analysis not shown) indicated that the classes they took were responsible for at least one measure installation. So, the rather low rate of impact is likely to be coming from other organization types.

Energy Efficiency Practices at Client/Employer

Answers to a question about whether classes resulted in clients and/or employers changing energy efficiency practices are shown in Table 5.17, which shows the usual pattern.

Responses re. Impact on Client/Employer Energy Efficiency Practices	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
Yes	19	38.0	31	62.0	23	46.0	39	78.0
No	28	56.0	11	22.0	24	48.0	6	12.0
Not Sure	2	4.0	6	12.0	3	6.0	4	8.0
Don't Know	1	2.0	2	4.0	0	0.0	1	2.0
Total	**50**		**50**		**50**		**50**	**50**

Table 5.17: Classes result in client/employer changing energy efficiency practices?

The frequent participants are most likely to answer positively (62% for AgTAC, 78% for CTAC), and the CTAC participants were somewhat more likely to report a positive influence from classes.

Energy Efficiency Practices at Home

We also asked whether the classes had resulted in participants making energy efficiency changes at home. Table 5.18 shows the answers to that question.

Responses re. Impact on Energy Efficiency Changes at Home	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
Yes	27	54.0	38	76.0	21	42.0	43	86.0
No	22	44.0	9	18.0	28	56.0	6	12.0
Partial Responsibility	1	2.0	2	4.0	1	2.0	1	2.0
Don't Know	0	0.0	1	2.0	0	0.0	0	0.0
Total		**50**		**50**		**50**		**50**

Table 5.18: Made changes at home as a result of class learning?

The results are in a similar pattern to other tables, but perhaps more striking:

- Among AgTAC frequent participants 76%% indicated that they had made changes at home resulting from attendance, and 86% of CTAC frequent participants.
- One-timers are much less likely to report this (54% for AgTAC, 42% for CTAC), and in this case, AgTAC one-timers respond a bit more positively than corresponding participants in CTAC.

Participation in SCE Rebate Programs

The final question in the series focusing on satisfaction and the impact of the training asked participants whether they had participated in an SCE rebate program as a result of classes. The results are displayed in Table 5.19.

Responses re. Impact on Participation in Rebate Programs	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
Yes, direct result	6	12.0	13	26.0	10	20.0	17	34.0
Yes, indirect result	7	14.0	9	18.0	9	18.0	7	14.0
No, they already participated	19	38.0	12	24.0	12	24.0	14	28.0
No, but may in future	14	28.0	10	20.0	10	20.0	8	16.0
No, and not likely to	2	4.0	3	6.0	4	8.0	3	6.0
Don't Know	2	4.0	3	6.0	5	10.0	1	2.0
Total	**50**		**50**		**50**		**50**	

Table 5.19: Participated in SCE rebate program as a result of classes?

Only a small minority gave an unequivocally positive answer, with the frequent participants being more likely to do so. A similar percentage indicate the classes had an indirect effect. One reason for these low responses is that they had apparently already participated in rebate programs before participating in classes (between 24% and 38%).

Interestingly, the usual pattern of one-timers at AgTAC showing less positive responses continues in the question of whether participation in SCE rebate programs was a result of the class, but is offset by the fact that those participants report that their employers/clients had *already* received a rebate.

Follow-Up Question: Impact by Organization Type

Several analyses reported in prior sections, especially one based on Table 5.16, showed that AgTAC participants, especially one-time participants, gave less positive responses to questions about the impact of the classes on subsequent behavior.

This observation led to an investigation of the rate of installation among interviewees who were from farms, dairies, or ranches to see if the low rates might be attributed to that sector. As noted earlier, this small group of participants in the interviewed sample had a 33% installation rate that was attributed directly to classes, putting them in line with other groups reported in that table.

This endeavor produced a table of installation attributions by organization type, made possible by merging the company information from the program database onto the corresponding dataset for the interviewees. In fact it would be possible to relate all interview questions to organization type. However, to have enough cases for such an analysis, the EC and participation frequency groups would have to be collapsed, which, as we have indicated earlier, would not be a legitimate thing to do. As a result, we are not presenting an entire analysis of organization categories.

However, one table of this type will be shown here as it does provide provocative information about what types of organizations have responded most to the classes. (See Table 5.20 on the following page.)

Task 5: Energy Center Participants

Findings

Impact on Installation of Measures by Organization Type	Organization Type											
	Government Agencies		Utilities and Water Districts — non-SCE		SCE		Schools, Colleges, Universities		Other		Farms, Ranches, Dairies	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Yes, responsible for at least one	5	15.6%	4	57.1%	11	47.8%	6	42.9%	41	32.3%	2	33.3%
Yes, partially responsible	7	21.9%	1	14.3%	5	21.7%	4	28.6%	24	18.9%	1	16.7%
No, but more aware of possibilities	16	50.0%	1	14.3%	3	13.0%	3	21.4%	32	25.2%	3	50.0%
No, not the point of going	3	9.4%	0	0.0%	3	13.0%	1	7.1%	21	16.5%	0	0.0%
Other	1	3.1%	1	14.3%	1	4.3%	0	0.0%	8	6.3%	0	0.0%
Total	**32**	**100.0%**	**7**	**100.0%**	**23**	**100.0%**	**14**	**100.0%**	**127**	**100.0%**	**6**	**100.0%**

Table 5.20: Classes resulted in client/employer installing measures by organization type

Note: Do not take the figures in these tables to represent all participants in both ECs. The table is suggestive only.

That being said, there are some clear patterns in the table that are quite interesting:

- Government agencies are clearly the most difficult to influence to purchase energy efficiency hardware and install it
- Utilities and water districts are the most influenced, followed by schools, colleges, and universities.
- All businesses — commercial, industrial (represented by the "Other" category) and agricultural — show a similar rate of class influence (32% to 33%).

Suggestions from Participants

We asked participants open-ended questions that solicited their suggestions for:

- Improving the content and presentation of classes
- Class topics

Analyzing responses to these questions can provide some clues to what one-timers might be looking for, although it can't provide a complete answer.

In addition, we asked frequent participants their level of interest in classes leading to energy efficiency certification.

Suggestions for Improving Content and Presentation

The most striking feature of Table 5.21 is the very large percentage of participants who had no suggestions because they thought everything was great as is. Interestingly, the frequent participants at AgTAC are least likely to say this. They are more likely to have suggestions for improvement than the other groups. Starting with that group, the suggestions that are clearly the most common fall into the category of presentation and classroom issues.

The individual suggestions, shown by category can be found in Appendix 5-B. Some examples of the more frequent comments from the AgTAC 6+ group are:

- Make classes more hands-on
- Make classes more interactive
- Pace the class when there is a lot of material to cover

Suggestion	AgTAC				CTAC			
	One-Time Participants		Six+ Participants		One-Time Participants		Six+ Participants	
	Number	%	Number	%	Number	%	Number	%
None — Everything was great	34	68.0	25	50.0	29	58.0	30	60.0
Overall logistics and scheduling issues	5	10.0	5	10.0	5	10.0	9	18.0
Core Content Suggestions	4	8.0	8	16.0	5	10.0	5	10.0
Class Materials Suggestions	1	2.0	0	0.0	3	6.0	1	2.0
Presentation and Classroom Issues	2	4.0	11	22.0	7	14.0	7	14.0
Issues Tied to Core Content	2	4.0	3	6.0	4	8.0	4	8.0
Other	6	12.0	2	4.0	2	4.0	0	0.0
Total	**50**		**50**		**50**		**50**	

Table 5.21: Suggestions for content and presentation of classes

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Findings

Frequent participants have the most experience on which to base their suggestions, however, we may want to listen closely to the one-time group if we are interested in enticing them to return or to work on recruiting and keeping other participants. The most frequent category of suggestions for the AgTAC one-time group is "Other."

All the relevant comments that were made in "Other" category, most of which came from the AgTAC groups, are:

- Don't get carried away with things that aren't pertinent
- Explain better how much they will pay a small farmer to change a pump
- Hit people hard with what they can do to save energy and money
- We go for customer rebates not education
- Use budget to get info out to general public, not just businesses

These comments reflect the variation in motivation for attending EC events. Some go strictly for SCE rebate information ("Explain better how much they will pay…" and "We go for customer rebates…") Some are focused entirely on getting information on saving energy out to the broader world ("Hit people hard with what they can do…" and "Use budget to get info out to general public…"). One comment was strictly about presentation ("Don't get carried away…"). Apparently that person felt the instructor was diverted from the main content of the class.

The next most frequent type of suggestion fell into the overall logistics and scheduling issues category. Ten percent of both one-time and frequent participants at AgTAC made suggestions of this type. Examples of these comments from AgTAC are:

- Spread over multiple days when necessary
- Classes too far away
- Start classes later for those coming from a distance
- Add evening classes
- Provide a better course description
- Promote classes to contractors more

Turning to CTAC, the one-timers and frequent participants were very similar in their types of suggestions. The frequent participants did provide more suggestions than the other group in the category of overall logistics and scheduling issues. Examples from that category are:

- Offer more satellite classes
- Classes too far away
- Spread classes over multiple days when necessary
- Offer 6 hour classes
- Offer some classes for less than a day
- Condense classes where possible
- Offer more classes

The suggestions above were either from frequent participants or both types of participants. Suggestions of this type coming only from the one-time participants were:

- Schedule on weekends
- Send notices close to class date
- Provide better course description

In equal numbers, one-timers and 6+ groups made presentation and classroom issues types of suggestions:

- More hands-on
- Include field trips
- More question and answer time
- More visual presentations
- Make more interactive

There were also suggestions about core content and issues tied to core content. Examples of each, starting with core content are:

- More advanced, in-depth courses (all of these came from frequent participants)
- Devote entire class to emerging technologies (from frequent participant)

One-timers offered these suggestions for core content:

- More for residential customers
- More on alternative energy
- Class on short circuit analysis
- Class on system analysis
- Make more basic

Suggestions for issues tied to core content include:

- Tie classes to rebate programs
- Get plant operators more involved in demonstrations
- Show examples of results of changes
- Have business owners or reps present experiences

A listing of all responses by all categories can be seen in Appendix 5-B.

Suggestions for Class Topics

An open-ended question asked frequent participants what additional classes they would benefit from. Table 5.22 shows the types of requests made together with the number of times it was suggested, and the percent of participants who suggested it.

The results are shown by EC. These answers were also collapsed into categories. (The full list of detailed responses are shown in Appendix 5-C.)

Suggested Class Topics	AgTAC		CTAC	
Course Ideas	Number	%	Number	%
Basics — Pumps	5	10.0%	3	6.0%
Basics — AC	11	22.0%	17	34.0%
Basics — Lighting	4	8.0%	12	24.0%
Basics — Other	14	28.0%	11	22.0%
Beyond the Basics	1	2.0%	6	12.0%
SCE Programs	4	8.0%	5	10.0%
Certifications	0	0.0%	4	8.0%
Expanding Sectors	9	18.0%	1	2.0%
Modeling and Monitoring — Non-Hardware	5	10.0%	8	16.0%
Control Systems — Hardware	6	12.0%	4	8.0%
Energy Management Systems	2	4.0%	3	6.0%
Green Learning	18	36.0%	12	24.0%
Title 24 and Codes	3	6.0%	6	12.0%
Other	9	18.0%	7	14.0%
Total	**50**		**50**	

Table 5.22: What classes would frequent participants benefit from?

One of the interesting aspects of these responses is the number of classes suggested that actually are already offered. We can't know exactly how to interpret that:

- Did the interviewees just want these classes to be offered more often?
- Did they simply provide an answer about what they intended to take next?
- Did they not know these classes were already offered (unlikely since these participants had already attended at least six classes)?

The results are presented anyway for your interpretation. Of course, not all suggestions are for existing classes.

Considering both ECs, the single most-suggested category of classes are those concerned with Green Learning (36% from AgTAC, 24% from CTAC,). Some examples of the most common suggestions from this category are:

- Green building
- Green technologies
- Emergent technologies for energy efficiency
- Photocells
- Solar, existing and new

The most suggested class category from CTAC participants is air conditioning basics (34% of interviewees). It is also one of the more frequent suggestions from AgTAC (22%).

Two remaining more common suggestions from CTAC frequent participants were lighting basics and other basics, the latter being popular among AgTAC participants as well.

Finally, one area where AgTAC suggestions stood out from CTAC is in the suggestion that they would like to see courses dealing with the residential sector.

There was a substantial level of interest in taking classes on modeling and monitoring-non hardware. Some specifics in this category:

- Computerized systems for factory managers
- Cost management
- Energy efficiency software applications for regulations
- Energy modeling
- PLC classes that help market products

In short, many participants are interested in classes that are already frequently offered, and have provided suggestions for expanding the coverage of the ECs. Both ECs are similar in their rates of interest in most classes, but there are a few differences that may be of interest to program planners.

Level of Interest in Classes Leading to Energy Efficiency Certification

One question about the interest of participants in additional classes was of particular importance, so a specific question was included in the interview. This question asked for a rating between 0 and 7 for the level of interest in taking one or more courses that would lead to energy efficiency certification.

Table 5.23 shows the results of that closed-ended question. The full range of responses is shown to get the full picture of the level of interest in this potential service. Over 65% of CTAC frequent participants would be extremely interested in this offering, and 49% of the AgTAC group. About 90% of CTAC interviewees chose responses above the midpoint of the scale, and about 82% of the AgTAC group did so.

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Findings

Level of Interest	AgTAC		CTAC	
	Number	%	Number	%
0 No Interest	1	2.0	1	2.0
1	2	4.1	2	4.1
2	2	4.1	0	0.0
3	4	8.2	1	2.0
4	2	4.1	5	10.2
5	10	20.4	4	8.2
6	4	8.2	4	8.2
7 Extremely Interested	24	49.0	32	65.3

Table 5.23: How interested are frequent participants in course(s) leading to energy efficiency certification?

Summary

General

- One-timers (those who attended only once during 2004-2007) make up 25% of AgTAC unique participants and 35% of CTAC unique participants.
- One-time participants account for 5% of total AgTAC attendances and 9% of total CTAC attendances.
- 10+ participants make up 15% of AgTAC and 10% of CTAC participants (see Table 5.1).
- 10+ participants comprise 51% of attendances (person-courses) for AgTAC and 38% for CTAC (see Table 5.1).
- 75% to 85% of 2006 and 2007 participants are first-time offenders. Of those, 55% to 71% do not return in the same period (see Table 5.2 and Table 5.3).
- CTAC offerings and attendances are dominated by fundamentals (43%), but not AgTAC (25%). See Table 5.4.
- Commercial/industrial participants make up 49% of AgTAC and 62% of CTAC attendances (see Table 5.5).
- SCE and other utilities are important components of participants in both ECs (see Table 5.5).
- For AgTAC, SCE, and the military are the over-represented groups in the 10+ category (see Table 5.6).
- For CTAC, SCE is the only group over-represented in the 10+ group (see Table 5.6).

One-time participants

- One-timers (those who attended only once during the 2004-2007 period) tend to take either very specialized classes or very fundamental ones (see Table 5.9 and Table 5.10).
- The main reasons one-timers don't come back (see Table 5.14):
  - They are too busy
  - They live too far away
  - They don't get notices of offerings
  - These kinds of reasons were given by 68% of AgTAC interviewees and 84% of CTAC
- Suggestions one-timers make about classes (see Table 5.21):
  - Make descriptions more accurate
  - Focus on energy savings and rebates
  - Offer classes in the residential sector
  - Make classes more hands-on, more visual, more interactive
  - Use field trips
  - Address alternative energy
  - Offer more basic classes
  - Make classes easier to attend (e.g., weekend, evening, shorter, offer at satellite locations or online)

Frequent Participants

Patterns indicate 10+ participants are educating themselves in a broad range of energy efficiency knowledge appropriate to their positions.

- 10+ participants tend to take more advanced classes than one-time participants (see Table 5.10 and Table 5.12).
- 10+ participants tend to repeat classes multiple times.
- Suggestions 6+ participants make about classes (see Table 5.21):
  - Make classes easier to attend (e.g., More satellite classes, shorter, condense, 6-hour classes, start classes later)
  - Make classes more hands-on, interactive
  - Offer some more advanced, in-depth courses
  - Offer an entire class on emerging technologies
- Classes 6+ participants want (see Table 5.22):
  - Green learning
  - Basic-air conditioning
  - Basic-other
  - Modeling, monitoring, software
  - EMS
- 6+ participants are very interested in a class or classes leading to energy efficiency certification — 65% from CTAC and 49% from AgTAC are extremely interested (see Table 5.23).

Motivations

- Reasons interviewees give for taking classes—the reasons are mostly the same regardless of sample segment (Table 5.13):
  - Straight technical learning
  - Keeping current (less true for one-timers)
  - Knowledge of energy efficiency
  - Professional development (less true for one-timers at AgTAC)

Impact

- Participants report that classes are helpful. The mean helpfulness ratings were: 5.9 to 6.5 on 1-7 scale (see Table 5.15).
- Participants attribute an increase in knowledge to classes; means: 5.7 to 6.7 on 1-7 scale (see Table 5.15).
- Classes are reported to change attitudes in a positive direction; means: 5.2 to 6.2 on 1-7 scale (see Table 5.15).

- Installations by employers/clients are tied directly to classes by 16% to 48% of participants; 4% to 22% said installations weren't done and wouldn't be in the future, as this wasn't the point of going (Table 5.16).
- Practices are more influenced by classes; 38% to 78% are directly tied to classes (see Table 5.17).
- Changes in the home are even more influenced by classes; 42%-86% are directly tied to classes (see Table 5.18).
- Few participants (12%-34%) participated in SCE rebate programs as a result of classes; but 24%-38% already had participated in these programs (see Table 5.19).
- Government agencies are hardest to influence to install measures as a result of classes (16%), and businesses are next hardest, at 32-33% (see Table 5.20).

Recommendations

- Almost all participants take fundamental classes early in their history with the ECs. Therefore, consider using the fundamentals classes as gateways to additional ones by building in reasons for participants to come back for other classes.
- Motivate participants to make energy efficiency changes. Tie the content to rebates, show direct monetary value to participants, and tie class content to other classes.
- Make classes easier to attend for very busy people and those who live far away:
  - More satellite classes
  - Make value more evident in descriptions
  - Offer some shorter classes
  - Offer evening and weekend classes
  - Offer online classes or DVDs and develop a library of classes
  - Offer more evening and weekend classes
- Expand classes to the residential sector.
- Make class descriptions clear and accurate and make the value of the class apparent in the descriptions; get the notices out to relevant customers, especially as the time for the class is approaching.
- Make classes more hands-on, interactive, visual, and include demonstrations.
- Build on known motivations for attending in marketing materials and class content: for frequent participants, straight technical learning, keeping current, knowledge of energy efficiency, and professional development. For one-time participants: straight technical learning and knowledge of energy efficiency.
- Since it is clear that actual implementation due to classes is quite low for bureaucracies, offer more classes aimed at overcoming bureaucratic barriers.
- There is a great deal of interest in certification courses. Consider pursuing the paths (e.g., with colleges and universities) that would allow them to be offered.
- There are unanswered questions about first-time, one-time, and frequent participants, including why frequent participants repeat so many classes. Consider doing more research on these groups.

Literature Review re. Attitudes and Behavior

Introduction

This section of the report provides a short, focused review of the literature on attitudes and behavior in efforts to promote energy-efficient behavior. The purpose of this discussion is to re-consider the use of the "AKA" model of attitudes and attitude formation in common use in the energy efficiency field, and their prediction of behavior in light of the relevant and current academic literature. The AKA model is sometimes attributed to Lavidge & Steiner (1961). The version of that model that many of the evaluations of California utility energy efficiency programs posit is that a pattern of behavior is preceded by relevant attitudes (attitudes toward selected targets, such as energy-efficient behaviors) which are affected by knowledge about the attitude target. Further, knowledge about the target is preceded by awareness of it. Thus, the model is symbolized by the AKA designation, for Awareness, Knowledge, and Attitude, the sequence of these concepts reflecting the temporal sequence of their real-life experience. The question is, is this model adequate to our needs, and does it reflect current thinking in the social psychological literature?

It should be said at this point that as we got into this literature the implications of it for our field, it became clear that these issues go far beyond this one process evaluation. To do full justice to the topic, more work needs to be done by a larger project. Nevertheless, enough work was completed on this review, that it warrants inclusion in this report. Thus, it should not be considered the final word on this topic, a great deal was learned that can be applied to planning of the energy centers programs and to their evaluation.

Attitude theory has a very long history in social psychology (McGuire, 1986) and also in the field of market research (Lilien, Kotler, & Moorthy, 1992). The latter research has been considered relevant to the area of energy-efficient purchases. However, for the last two decades, attitude theory has increasingly been the basis of research in the area of the environment in general and, to a lesser extent, energy-efficiency. Since these areas are now well researched and are more relevant to our needs than general consumer marketing, this review focuses almost exclusively on this more recent and more targeted literature. The overall conclusion of this review is that the AKA model is still useful to us, but we should elaborate the model further based on the current literature. There are two ways that such elaboration would be fruitful: by being more explicit about what we do and don't mean by each of the AKA terms, and by adding several new variables to our models. In order to understand what elaborations are needed, a review of the extant theories of attitude and behavior change pertinent to our work is in order. Following that, a model will be developed that shows an integration of our existing approach with others that are also fruitful.

Attitude-Behavior Theories and Research

Some description of a larger context for this discussion will help to focus it. It is safe to say that our interest in attitudes is largely driven by interest in changing people's environmental and energy-efficiency behavior. Thus, the connection of attitudes to behavior is crucial.

The relation between attitudes and corresponding behavior has been moderate at best. For example, Tarrant and Cordell (1997) related five prominent environmental attitude scales to self-reported environmental behaviors. The variance in self-reported behavior explained by the attitude scales ranged from 19% to 23%. Corraliza and Berenguer (2000) summarized the problems in research on environmental attitudes and behavior. The first problem (citing Stern, 1992) was the low importance given to situational variables in predicting environmental behavior. A second problem was the level of measurement of environmental attitudes being too abstract, especially when trying to predict specific behaviors (citing Wall, 1995). Finally, both of these factors contributed to the low percentages of explained variance, as noted above. A good deal of theory and research over the past decade has been devoted to improving this situation. A later section of this paper will be devoted to listing and explaining reasons that have been given for the somewhat attenuated connection between attitudes and behavior.

Before beginning a review of some pertinent theories, which is the focus of this paper, please note the addendum at the end of this chapter lists the variables that have been shown to predict environmental behavior and another list that summarizes what researchers have found moderate the relation between attitudes and behavior in the same realm. In reading the description and analysis of the theories, it is easy to wonder how important some variables are in empirical terms. Why bother with it in theory if there is no empirical basis for it? The reader who is distracted by this issue while reading the immediately following sections is directed to the addendum.

Behavioral Theories

Theories that focus on behavior and its immediate antecedents and results should be mentioned here, although they specifically remove internal cognitions such as attitudes from study. In the context of environmental behavior, they would study the effect of incentives on environmentally-related behavior, as well as the immediate consequences of it. However, it was soon realized that such models were inadequate for changing behavior over the long term, since the behaviors concerned would likely revert back to their original status when incentives or immediate rewards are removed (Dwyer, Leeming, Cobern, Porter & Jackson, 1993). Removing cognitions from behavior change efforts leaves the change agent with little ability to create long lasting change. Thus, attitudes or other cognitions are an important component of efforts to change behavior, and of research attempting to document change.

Reasoned Action or Expectancy-Value Theories

Fishbein and Ajzen (1975) are the founders of a line of theory and research that focuses on attitudes and subjective norms in predicting behavioral intentions. Attitudes are defined by the magnitude of the value of the attitude target as well as the probability that the value will be realized. Subjective norms can be thought of as the actor's perception of what the relevant people in his/her life think should be done. In this case, the attitude target would be the behavior under study, and could include energy-efficient behavior.

The reasoned action theories add to the value of behavioral theories by including cognition in the change process, and by considering the import of reference groups. However, the affective (emotional) components of behavior change are largely absent. This becomes particularly important when dealing with environmental/energy-efficiency behaviors. While many energy-efficiency behaviors can be justified on rational-economic bases, there is an altruistic component involved as well, at least for some. Recognition of this important factor led researchers into other directions.

Norm Activation Theory

A large body of theorizing and research has been based on norm activation theory, beginning with Schwartz (1977). The "norm" in this theory is referred to as a personal norm (PN), and can be described as a valuing of something such as the environment's (or another person's, or your own) well-being. Norm activation occurs when a threat to the object of the personal norm is perceived. In this situation, the personal norm is experienced as a moral obligation to protect what is threatened. In the case of personal norms concerning the well-being of the environment, a perceived threat to its well-being would lead to environmentally protective behaviors.

An important element of this line of theory is the ascription of responsibility to the self that is inherent in the activation of a personal norm. Given the personal valuing of the object of the norm, the perceived threat to it, and the sense of obligation to protect the object, the person's feeling of responsibility naturally arises. While "ascription of responsibility" (AR) to oneself arises naturally out of the activation of the personal norm, AR is an important construct to highlight and attend to in planning interventions and in researching what predicts behavior change in the context of areas that have an altruistic aspect.

Further elaboration of the Schwartz (1977) theory is VBN theory (Dietz, Fitzgerald, & Shwom, 2005). Values, Beliefs and Norms are the focus. In this framework, basic values are seen to influence beliefs about consequences of behaviors toward what is valued (or not). The fundamental nature of values causes them to be regarded as the hardest to change by intervention, but changes in them are considered the best way to achieve long-lasting change.

According to this model, behavior is triggered by beliefs about consequences and about personal responsibility for taking action. The most common phrasing for beliefs about consequences is "awareness of consequences" (AC) and it is a commonly-researched concept in the field. Beliefs about personal responsibility, as seen in the Norm Activation model, is equivalent to "ascription of responsibility" (AR), described above.

The theorists working in this framework identify three types of values that are most relevant to environmental behaviors: humanistic altruism, biospheric altruism, and egoism (self-interest). While this review does not conclude that research in the utility industry should add the study of values to program design and evaluation, these three areas of values are translated into the categorization of attitudes; hence they are introduced here.

One of the developments that have emerged from the norm activation and VBN-oriented research is the concept of the New Environmental Paradigm (NEP) (Dunlap & Van Liere, 1978). The NEP is defined against the Dominant Social Paradigm (DSP), which is characterized by belief in development, economic growth, science, technology, etc. This paradigm is generally associated with hostility toward environmentalism. In contrast, the NEP represents a "new" worldview that includes a belief in the limits of growth and the preservation of resources and the environment; it takes into account beliefs about the effects human activity have on the biosphere. Naturally, this worldview tends to lead to pro-environmental attitudes, beliefs, and behavior. This theoretical

stance (including the values of humanistic altruism, biospheric altruism, and egoism described above) was the basis for an attitude scale that embodies these values and beliefs. It is referred to as the NEP scale, but has since been modified to the New Ecological Paradigm (also NEP) and a corresponding scale (Dunlap, Van Liere, Mertig, & Jones 2000). The concepts underlying the newer scale are the same as those for the original. However, it was updated for contemporary terminology, and was made more balanced. The original had substantially more statements that were phrased in the direction of the NEP rather than the DSP. The scale is in the public domain and is reproduced in the addendum of this paper.

Social-Ecological Theory

Kurt Lewin famously said that it is easier to change people within groups than as individuals (Lewin, 1947, 1948). Baron & Misovich (1993) take this statement and show its limits and some specific ways in which it is true, using writings from Gibson (1978) and Vygotsky (1979). Specifically, Baron & Misovich (1993) develop the idea that individuals and groups outside the actor have to be taken into account when explaining behavior change. They don't apply this to the field of environmental behavior, but Kurz (2002) does. The central concepts of this theoretical perspective are: Affordances, Attunements and Effectivities, terms that are rather academic, not to say, stilted. It would have been nice to translate these words into more user-friendly ones. However, all of their alternatives seemed to be phrases, thus making writing about them even more awkward. So, with apologies, we continue with the original terms. Affordances are the potential utilities of attitude objects; this includes both positive and negative utilities, i.e., they are what may be expected from the "object." An "object" in this context is not necessarily a physical object. It can be a behavior pattern or a circumstance, or anything else toward which one can have an attitude. Thus, one can ask, "what does this object afford?" In environmental terms, one could ask what the affordances of installing a CFL would be. There is a long potential list of CFL affordances, some negative, and some positive.

Attunement is the perceptual ability of the actor to recognize some or all of the affordances of an object. This concept could be thought of as a combination of awareness and knowledge of an object and its affordances. An individual may or may not be "attuned" to the possibility of the energy savings affordances of certain clothes washers, but will certainly be attuned to the immediate utilitarian affordances of the machine. Someone purchasing a clothes washer will certainly be attuned to the functional aspects of the washer, but may or may not be attuned to its environmental affordances. (See Kurz, 2007; Fazio & Williams, 1986; and Fazio, 2007, for analyses of what attitudes are most and least easily retrieved at the point of decision). This is an area where the operation of groups on individuals becomes important. A person may not be attuned to all clothes washer affordances, but his association with a group or set of individuals may rectify that. If the group is environmentally oriented, the person may become most attuned to the positive affordances of energy-efficient clothes washers, and the group would help to sustain that change.

Effectivities represent the skills and abilities a person has to make use of the affordances to which he is attuned. A person may be aware of energy- and money-saving affordances of CFLs but may not know how to acquire them or install them (as a simple-minded example). Or, a person may be very attuned to the affordances of old-growth forests, but not know how to act on that knowledge in order to preserve the forests. The individual-group interaction comes into play here as well. In addition to the fact that some groups or individuals can help the person learn the skills and abilities to preserve forests, the group can give the person a sense that he can achieve more through the group than he could on his own. In this way, he becomes more motivated to pursue these behaviors.

The description so far has used examples that emphasize organized groups that can educate individuals who join them, and can give the individual power to act and sustain the behaviors that act on affordances. It should be emphasized, however, that the influence of others is not limited to organized groups, but can include one's reference group(s), or a collection of individuals, family, friends, colleagues, or associates. Specifically, the whole idea of attunements, effectivities and acting on affordances should be thought of as embedded in the social environment, not simply influenced by it. This is not the same thing as "situational factors" that affect the attitude-behavior connection. Social networks will be both influential for and influenced by the individual actors in the area of affordances, attunements, and effectivities.

A final note on the ways in which groups or collectivities influence and are influenced by individuals could be important in how we think of studying environmental or energy-efficiency behaviors. Affordances, attunements and effectivities can be communicated by observation or modeling and by conversation or verbal communication. To a large extent public behaviors can only be communicated through modeling, while private behaviors can primarily be communicated verbally or by public media. This implies different strategies for influencing and studying private behaviors such as setting a water heater thermostat or taking a shower than for public behaviors such as lawn watering or the car one drives.

The importance of this theoretical framework lies, I believe, in two things. First, it sensitizes us to the fact that people can be attuned to different aspects of the consequences of objects, overlooking some. In particular at the point of decision, the attunements that come to mind are likely to be those associated with the functionality of the object that the person has experienced in the past, not the more long-term results of environmental damage. Second, the importance of social networks in promulgating and sustaining pro-environment attunements and effectivities is very much highlighted in this way of thinking.

While Kurz (2002) proposes this framework as an all-encompassing one that subsumes all of the others, it doesn't really appear to be able to work alone. A major missing piece is the strength of the actor's affect as a contributor to predicting behavior or behavior change. In other words, one can be aware of an object's affordances, but not care very much. Another missing component is the important concept of AR. Ascribing to oneself responsibility for behaving in an energy-efficient way does not happen automatically with knowledge of affordances.

Summary and Synthesis

Each of the theoretical frameworks discussed here has value in forming our approach to program planning and to evaluating the programs' effects. The behavioral approach is involved in the use of rebates as a means to influence behavior toward energy efficiency. But the reasoned action theories attune us to the fact that there is an important cognitive aspect to the change process that is critical to sustaining behavior changes. Norm activation theories remind us to include the affective components involved in altruistic behaviors. (Certainly much theory and research about attitudes includes an affective as well as a cognitive component to that construct. However, emotion was not found to be an explicit part of the theories in the environmental behavior literature reviewed here, except in the norm activation perspective.) Finally, social-ecological theory makes clear the importance of the social network aspects of behavior change.

Figure RL.1 illustrates a way of incorporating the various theoretical approaches with the traditional AKA view of behavior. Following is a description of each box in the diagram that leads directly or indirectly to Behavioral Intent or Behavior.

Awareness

Traditionally, when evaluating energy-efficiency programs we have thought of awareness in terms of the awareness of specific programs such as EnergyStar. The question is, simply, are you aware of the program? However, we can also use this concept, which is at the front end of the AKA sequence, to consider whether consumers are aware of certain environmental issues, in general. The theories discussed above don't speak of this beginning level, but rather assume there is some level of awareness, or they include it in the Knowledge category. In some programs or issues it may be reasonable to assume awareness, but for others, if we want to track the effect of the program, we must start from the beginning. It could be that the major effect of the program is to improve awareness. Or it may be to move the participant from Awareness to Knowledge.

Knowledge

The questions that are typically addressed in evaluations of programs under the heading of "Knowledge" in the AKA sequence, have to do with knowledge that certain program-promoted technologies are energy efficient and cost effective. However, Attunements and Awareness of Consequences also falls into this category and we are reminded that there are other Affordances of programs, measures, and practices that may be critical to decision making. We will be well-served to consider them systematically and focus our programming and evaluation efforts on those that are crucial.

Attitude

Here, we generally consider direction and strength of attitude, and we usually measure it at a general level, e.g., attitudes toward the environment versus attitude toward using pesticides in your garden. The literature reviewed alerts us to the fact that it matters at what level we measure attitude when we are expecting to predict behavior with it. On one hand, prediction is much better when the level of abstraction is the same for the attitude and the behavior. On the other hand, specific attitudes, when concerning environmental issues, are correlated, implying that we should be able to ask fairly general questions and capture essentially the same variance that we would capture by asking more specific questions. Decisions can be made about how to measure attitudes favoring one principle over another, and can be justified. What is important is to be aware of the issues and make reasoned decisions.

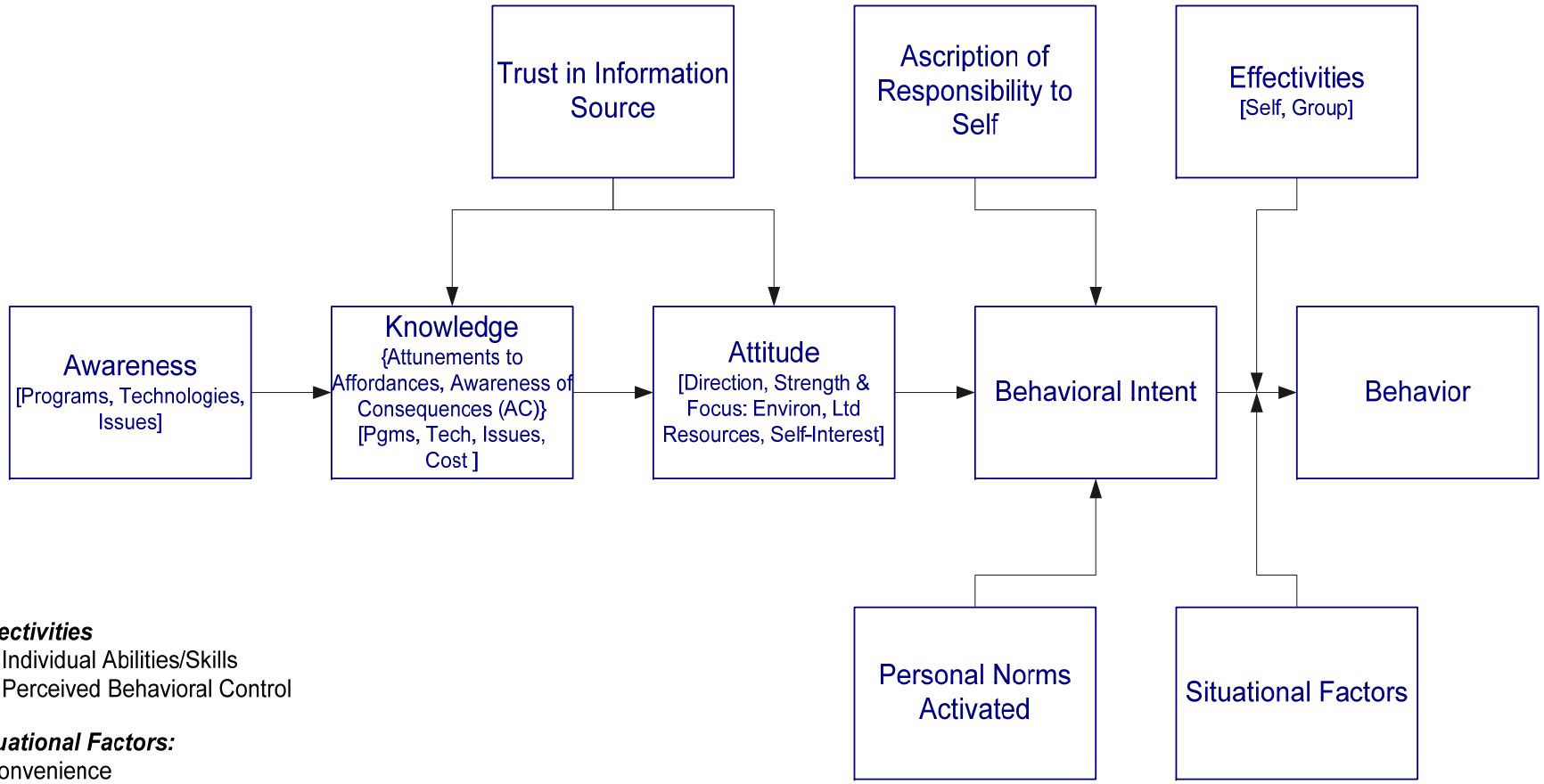

Figure L.1: A synthesis of theory and research on changing environmental attitudes and behaviors

Trust in Information Source

Knowledge and Attitudes come from information received or sought, and there are many sources of this information. It goes without saying that some sources are more trustworthy than others, and different people make different judgments about which is which. Thus, trust is a critical part of the AKA sequence.

The possibilities for the content of attitude measures are vast. The VBN model considers three groups of values, which have expression in beliefs as well: humanistic altruism, biospheric altruism, and egoism. This can be roughly translated into the three clusters of attitudes underlying the NEP scale: limits to growth, balance of nature, and human dominion over nature (i.e., using nature for our own interests).

These categories are oriented to general environmental beliefs and behaviors, and our focus is more specific: energy-efficient behaviors, although attitudes about the former are highly relevant to the latter. Still, the categories can be fairly easily used to structure questions more specific to energy-efficiency. Certainly the limited resources category has direct application to energy efficiency. Egoism or self-interest can be rather closely tied to economic interests such as cost-benefit, first-cost concerns, etc. Thus, even if one considers the NEP to be too far removed from our interest in evaluating energy-efficiency programs, (it wouldn't always be too far removed), the underlying categories can still guide us in developing measures of attitudes. Programs that are oriented to businesses may focus more on self-interest measures as they are likely to be a stronger (though not exclusive) focus for businesses. For programs oriented to residential customers, self-interest/costs are, of course important, but altruism may have more relevance for them than for businesses.

Personal Norms Activated

This construct is a combination of two others: Personal Norms (PN) and threat. It is when personal norms are threatened that they are activated. The idea of PN is very close to Attitudes, and one could make an argument that PN and Attitudes should have been combined in the diagram. Activation of PN is kept separate because the idea of activation by threats, general or specific, is important to highlight as an extra element of attitudes. Some programs have the opportunity to point out threats to personal norms, and we may benefit from attending specifically to that entry point in program design and in measuring program impacts. This construct is pictured as influencing Behavioral Intent. One could easily argue that it predicts Behavior at least as well. Or it could account for the difference between Behavior and Behavioral Intent.

Ascription of Responsibility to Self

If we are to predict behavior from attitudes, it is necessary to consider the issue of who is responsible for taking action consistent with expressed attitudes. One may hold a strong attitude or belief in favor of protecting the environment but consider larger entities as responsible for making changes rather than oneself. AR may come about in various ways, including that some people naturally feel self-efficacious. However, it is easy to imagine that AR may also arise naturally if a PN is threatened. This could be conceived as one element of a program theory and, therefore an element to measure for effectiveness. This construct as well as the one above is shown as influencing Behavioral Intent rather than Behavior directly. This placement is based on its close association with the Attitude construct and is therefore treated similarly.

Effectivities

One way to think of effectivities is the self-perceived ability to act effectively on relevant attitudes. It is shown in Figure 1 to influence the relation between Behavioral Intent and Behavior. It could also be imagined to predict Behavioral Intent, or Behavior. It is an empirical question where it best fits. The Self and Group components of Effectivities are also pictured in the Figure to remind us of the embeddedness of the construct in social networks, and the bi-directional nature of the relations. Measuring the customer's sense of knowing how to take action and where that sense came from could be an important part of explaining participant (and non-participant) behavior.

Situational Factors

The addition of this category is a result of the fact that there is considerable research that situational factors are very important in determining how closely attitudes and behavior are aligned, but do not fit neatly into other theoretical constructs. They could be considered personal market barriers. Examples include the convenience of the relevant behavior, the ease of it, the cost, and the strength of the norms surrounding the issue or behavior. The strength is likely more important than the direction of the norm, since strong norms will make individual attitudes or intentions less powerfully connected to actual behavior. Where norms are strongly in favor of acting on the attitude, the behavior is likely regardless of attitude strength. On the other hand, when norms are strongly against acting on the behavior, it is very difficult for an individual to overcome even if s/he feels somewhat strongly about it. It is when norms are not strong that the individual attitude is most likely to be realized in behavior.

Conclusions

The short answer to the original question that guided this review is, yes, we can continue to use the AKA-B (Awareness, Knowledge, Attitude, Behavior) framework to guide program design and evaluation, but we could also do more. Doing more would help maximize program impact and/or allow evaluation research to explain a larger amount of variance in behavior with attitudes. Two levels of use of this information could be implemented.

Level 1

First, we should all be aware that AKA can be addressed at the program level, the technology level, or at the environmental/energy-efficiency level. A conscious decision should be made about what level is most important, or whether all are important. Based on that decision, program planning and marketing materials can be aimed at the chosen level(s), because these concepts apply equally to program theory, design, and evaluation, and if these phases aren't aligned, results will be compromised. For example, if an energy center has a goal of affecting attendees' attitudes toward energy-efficiency and its value to the environment, but its classes and displays are focused only on the technological aspects of energy-efficiency measures, the goal of changing attitudes is much less likely to be achieved. Further, any evaluation of the program that focuses on the stated goal of attitude change would likely find the program falling short of its goals.

Second, attitudes and motivations for behavior in the area of energy-efficiency/environmental behaviors generally fall into three categories: environmental concern, concern about limited resources, and self-interest. Considering the most appropriate or all of these categories in program planning could help increase effectiveness; making the choices explicit will also help align evaluations with programs, which will benefit the outcome as well. Business-oriented programs, such as energy center training programs, may well elect to focus on self-interest, translated to business interests. However, it should be remembered that businesses have a human element as well, such that individuals can make or influence decisions and their personal motivations can come into play. So, it might not be wise to completely ignore individual altruistic motivations even in this setting. Residential-oriented programs will naturally want to address all categories of attitude/motivation.

Finally, measuring behavioral intentions as well as actual post-program behavior would be wise. If desired behaviors are not ultimately executed, this outcome can be compared to the original intentions and will help focus investigations about what went wrong that could be improved in the next program cycle.

Level 2

In addition to implementing at Level 1, we can look more deeply into the social ecology theories of behavior change, together with the supporting empirical research, and improve program planning further. For instance, the idea of the "affordances" of different technologies can be analyze systematically and this more complete listing of the potential results of installing measures or changing behavior can be targeted in training, marketing, and evaluation.

Concepts such as trust, ascription of responsibility to self, and situational factors also can be addressed directly in training and marketing. In addition, including them in evaluation research can provide a much more rich and complete picture of what was and was not accomplished by

the program. For example, if we know that trust in a source of information is important in changing attitudes and behaviors, programs can make an effort to increase the trust factor, with potentially improved results. Of course many of the situational factors that are cited as important to the attitude-behavior link could be considered personal market barriers, such as social pressures for or against the promoted behavior, or the ease with which the behavior could be enacted, and could be addressed in the program.

The key to using these ideas successfully is to use them systematically as guides to program design, delivery, and evaluation.

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Appendices

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Appendix 1-1: Two Models of Adult Education

Two Models of Adult Education

Expert Presenter

There are two models of adult education. The first model is the formal instructional approach that is found on most college campuses: an educational expert presents his or her wisdom and experience. The learners come to be educated by the expert, so they expect to listen while the expert talks. The focus is on the expert. We will refer to this model as the Expert Presenter.

Expert Presenter	
Approach	Expert presents wisdom and experience
Role of learner	Listen and absorb
Learner's prior experience	Limited source of information
Learning	A passive process of being educated
Focus	The expert

Table 1-1.A: Characteristics of "Expert Presenter" approach

The CTAC and AgTAC instructors that we audited were **masterful Expert Presenters**. They:

- Were highly competent and credible, extremely knowledgeable, and clearly committed to their subject areas
- Exhibited a great generosity of spirit and were anxious to share everything they knew with their audiences
- Brought huge amounts of reference information for the learners to take back with them
- Provided Power Point visuals to clarify concepts
- Were excellent storytellers, able to verbally create imaginative and realistic scenarios that brought concepts alive and engaged their listeners
- Provided examples that were effective and useful
- Established a positive rapport with their audiences through their credentials, personalities, humorous anecdotes, and responses to questions
- Except in one case, did most of the talking, rather than the learners

  They did occasionally involve their audiences by posing questions and scenarios, and four of the instructors rewarded respondents with prizes

Learning Facilitator

The second model of adult instruction is a more informal adult learning approach that is found in many organizations: the instructor facilitates opportunities for the learners to discover and then practice new skills. The learners are active participants in their own learning, so they expect to offer information and demonstrate what they have learned. The focus is on the learner. We will refer to this model as the Learning Facilitator.

Learning Facilitator	
Approach	Learners discover and practice new skills
Role of learner	Offer information and demonstrate learning
Learner's prior experience	Source of information and meaning
Learning	An active process of involvement
Focus	The learner

Table 1-1.B: Characteristics of "Learning Facilitator" approach

Learning Facilitators must also be highly competent and credible. However, they are aware that adults can learn only so much information at one time, so they focus in on key concepts and skills. They also make sure that these concepts are understood before moving on to the next topic area. Although they provide reference materials, they are generally incorporated into the participants' workbooks, which also contain worksheets for learning activities. They recognize that Power Point is an audiovisual aid intended only to supplement but not replace the learning materials or activities.

Learning Facilitators need excellent presentation skills, so they are also masterful storytellers. However, they often call on participants to share their stories, because they know that will keep everyone more engaged.

They also realize that learners have different learning styles, so they make sure there is a variety of learning activities that will satisfy the aural, the visual, and the kinesthetic learner (who needs to move physically in order to learn).

The key focus is on enabling the learners to actively discover what they need to learn. So the learners do most of the talking, rather than the Learning Facilitator. This does not mean that the learners control the class. The Learning Facilitator knows when to assign activities, how to debrief them, and how to handle questions that arise so they don't pull the content off track.

Which Model is Better?

Is one model of adult instruction better than the other? It depends on what the desired learning outcome is. There are six progressive levels, or building blocks, of learning:

- **Knowledge**—The first level of learning is knowledge, which can be transmitted through lecture and audiovisual aids. If the program's desired outcome is an awareness of and exposure to new knowledge, the instructional methods of the Expert Presenter can achieve that goal. However, knowledge is meaningless without comprehension. Comprehension is also essential for affecting attitudinal change. That is why the second level of learning is comprehension. If the desired outcome is new learning or a change in attitude or behavior, lecture alone cannot accomplish this. A good story can engage the senses, but the learners still need to do something to demonstrate their understanding.
- **Comprehension**—To achieve comprehension, the instructional methods of the Learning Facilitator will be necessary. The Learning Facilitator will use case studies or role plays or games (methods that involve as many senses as possible) to enable the learners to experience, articulate or demonstrate their new learning.
- **Application**—The third level of learning is application, which is essential for building new skills and changing behavior. The Learning Facilitator will use hands on, problem solving, or simulation activities (again, methods that involve as many senses as possible) to enable the learners to practice what they have learned.
- **Analysis**—The fourth level is analysis, where the learners can break down what they have learned and sort it into subcategories.
- **Synthesis**—The fifth level is synthesis, where the learners create something entirely new.
- **Evaluation**—The sixth level is evaluation, where the learners apply criteria to make judgments.

The Learning Facilitator will use hands on, problem solving and simulation activities that are increasingly more complex to help the learners achieve, practice, and demonstrate these higher levels of learning. Active practice is the only way that learners will develop confidence in their new competence. Their confidence will increase the probability that the learners will use their new skills outside of the classroom.

The Science behind Adult Learning Principles

The Learning Facilitator educational model is derived from Adult Learning Principles that brain studies have proven to increase the likelihood of learning and retention.

Focus on Key Information

Brain studies have revealed that adults can learn approximately 5 new things within a training segment if those things are familiar and meaningful. If the new items to be learned are unfamiliar, adults can learn only 2-3 of them at a time.

The training segment may be 10 minutes, 30 minutes, an hour or more. It depends upon the complexity of the items to be learned. This is why it is so important to limit the amount of information taught at one time, as well as to ensure that it is as meaningful as possible. Teach only what is essential to achieving the learning goals.

A task analysis will identify the essential learning that must occur during a training session. The task analysis is used to create the specific, observable and measurable learning objectives. These learning objectives identify what the learners will do to learn and to demonstrate their learning.

Meet the Needs of Different Learning Styles

Just as brain studies have shown that individuals have different personality types, they have also revealed that people learn differently. One of the simplest models identifies three different learning styles: aural, visual, and kinesthetic. The aural learner learns best by listening. The visual learner learns best by seeing. The kinesthetic learner learns best by moving.

That is why a training program must have a variety of learning activities that are rich enough to simultaneously meet the needs of all three learning styles. A workbook in which the learners can write, audiovisuals that highlight or exemplify key points, active discussions in which the learners move to work with one another or write on a flipchart or pop out of their chairs to answer a question, or hands on activities that provide application practice- will all ensure the different learning style needs are met.

Teach the Rule and Its Exceptions at Different Times

In addition, brain studies have determined that teaching a rule with its exception at the same time nullifies learning either the rule or the exception. It is necessary to teach the rule and make sure it has been firmly learned before ever mentioning exceptions.

Give Regular Breaks

Brain studies have also revealed that adult brains become saturated after approximately 50 minutes. Adults need at least 10 minutes to relax and absorb what they have learned before they begin the next training segment. This is why it is so important to take regularly scheduled breaks every 50 minutes. Otherwise, the adult brain will become fatigued and overloaded, limiting learning and retention. Another reason to give breaks is that the prime time for learning occurs at the very beginning and ending of every training segment. Each time a break is given, it increases the amount of prime learning time.

Appendix 2-1: Classes, Programs, Customer Segments, and Technologies

Classes on "Short List"

The "short list" of classes that we considered for both Tasks 2 and 3 is summarized below.

NOTE: In Task 3, we also considered sixty-four additional classes. These titles are listed in Appendix 3-A.

Class Title	Materials Reviewed							
	Work-book	Hand-outs	Welcome Package	Pres. (PPT)	Instruct. Guide	Objec-tives	Agenda	Other
1. Adjustable Speed Drives	YES	na	na	YES	na	YES	na	na
2. Advanced EnergyPro	na	na	na	na	na	na	na	na
3. Advanced Lighting Technologies	na	na	na	YES	na	YES	na	na
4. Basic Heating, Ventilation & Air Conditioning (HVAC)	na	na	na	YES	na	YES	na	na
5. Chilled Water System Efficiency	YES	na	na	YES	na	na	na	na
6. Compressed Air System Efficiency	YES	YES	na	YES	na	na	na	na
7. Daylighting for Buildings	na	na	YES	YES	na	na	na	na
8. Demand Response Programs: What They Are and How Participants Can't Lose	YES	na	YES	YES	na	na	na	na
9. DOE (CEC) Fan System Assessment Training	YES	na	na	na	na	YES	YES	na
10. DOE Motor Systems Management	YES	YES	na	YES	na	na	na	na
11. DOE Pumping System Assessment Training (PSAT)	YES	na	na	YES	na	na	na	na
12. Efficiency Technologies for Commercial Refrigeration	YES	na	na	YES	na	na	na	na
13. Energy Efficiency Treatment of Dairy Lagoons and Wastewater Management	YES	na	na	YES	na	na	na	na
14. Energy-Efficient Refrigeration Equipment & Ice Makers	na	na	na	na	na	na	na	na
15. EnergyPro Nonresidential Software for Beginners	na	na	na	na	na	na	na	na
16. Foodservice Equipment Performance – Measuring, Optimizing and Specifying	na	na	na	na	na	na	na	na
17. Fundamentals of Electricity and Energy Efficiency	YES	na	na	YES	na	na	na	na
18. Generating Electrical Energy from Dairy Cow Waste	YES	na	na	YES	na	na	YES	na
19. Groundwater Wells and Pumps	na	na	na	YES	na	na	na	na
20. HID Outdoor and Indoor Lighting Applications	YES	na	na	YES	na	na	na	na

Appendix 2-1: Classes, Programs, Customer Segments, and Technologies

Class Title	Materials Reviewed							
	Work-book	Hand-outs	Welcome Package	Pres. (PPT)	Instruct. Guide	Objec-tives	Agenda	Other
21. Hot Rebates & Cool Savings for Foodservice	na	na	na	YES	na	na	na	na
22. HVAC Direct Digital Control (DDC) -- The Emergence of Open Systems	na	na	na	na	na	na	na	na
23. HVAC Quality Installation	YES	na	na	na	na	na	na	na
24. HVAC System Air Flow and Static Pressure Diagnostics	YES	na	na	YES	na	YES	YES	na
25. Improving Energy Efficiency in Drip irrigation	YES	na	na	YES	na	YES	na	na
26. Improving Pump Plant Efficiency to Lower Energy Cost	na	na	na	YES	na	YES	na	na
27. Industrial Refrigeration	YES	na	na	YES	na	na	na	na
28. Insulate Right!	na	na	na	na	na	na	na	na
29. Introduction to Life-Cycle Costing	YES	na	na	YES	na	YES	na	na
30. Introduction to the California Solar Initiative	na	na	na	na	na	na	na	na
31. Introductory eQUEST: "Schematic Design"	YES	na	na	na	na	na	na	na
32. Keys to Home Comfort and Performance	YES	YES	na	YES	na	YES	na	na
33. Lighting Fixture Maintenance Workshop	na	na	na	YES	na	na	na	na
34. Lighting for Architecture and Interiors	na	na	na	YES	na	na	na	na
35. Maximizing Energy Efficiency for LEED Certification—Leadership in Energy & Environmental Design	na	na	na	na	na	na	na	na
36. Metal Halide VS Fluorescent – 10 Rounds in the Hibay Arena	na	na	na	YES	na	na	na	na
37. Motors Starters	YES	na	na	YES	na	YES	YES	na
38. On-Farm SCADA	YES	na	na	YES	na	na	na	na
39. Overcoming Objections to Energy Efficiency Investments	na	na	na	YES	na	YES	YES	na
40. Package Unit Heating, Ventilation & Air Conditioning (HVAC)	YES	na	na	YES	YES	YES	na	na
41. Principles of Lighting	YES	na	na	YES	na	na	na	na
42. Programmable Logic Controllers – Energy-Efficient Applications	na	na	na	YES	na	YES	YES	na
43. Putting the “V” in Residential HVAC	YES	na	na	YES	YES	YES	na	na
44. Save Energy, Save Money	YES	YES	YES	YES	YES	YES	YES	na
45. Schools – Pass the Test on Energy Efficient & Effective Lighting	na	na	na	na	na	na	na	na
46. Selling Energy Efficiency and / or Green Building to Building Owners	na	na	na	na	na	na	na	na
47. Specifying Foodservice Lighting for Energy Efficiency	na	na	na	YES	na	na	na	na

Appendix 2-1: Classes, Programs, Customer Segments, and Technologies

Class Title	Materials Reviewed							
	Work-book	Hand-outs	Welcome Package	Pres. (PPT)	Instruct. Guide	Objec-tives	Agenda	Other
48. Technology Update	**YES**	na	na	**YES**	na	na	na	na
49. Title 24 - Acceptance Training for Designers and Contractors	na	na	na	**YES**	na	na	na	na
50. Title 24 (2005) Energy Standards for Nonresidential Buildings	na	na	na	**YES**	na	**YES**	na	na
51. Title 24 Duct Leakage Testing	**YES**	**YES**	na	**YES**	na	na	na	na
52. Title 24 Energy Efficiency Standards: A Seminar for Plan Checkers & Inspectors	na	na	na	**YES**	na	na	na	na
53. Title 24 Nonresidential Energy Efficiency Standards – Envelope & Mechanical	na	na	na	**YES**	na	**YES**	na	na
54. Title 24 Nonresidential Energy Efficiency Standards – Lighting	na	na	na	na	na	na	na	na
55. Tool Lending Library	**YES**	na	na	**YES**	na	na	**YES**	na
56. Wet Cleaning Demonstration	na	na	na	na	na	na	na	Na

"YES" = materials available and reviewed; "na" = not available (either because none have been developed or the instructor has not provided SCE with a copy)

Table 2-1.A: "Short List" of classes and materials reviewed

Programs on "Short List"

The "short list" of programs used for both Tasks 2 and 3 comprises 16 programs identified as high-impact programs.

These 16 programs, which account for 93% of all impact program budget and over 73% of kWh savings and 63% of kW savings. (See Table 2-1.B for details on figures and calculation used to identify the "short list" of programs.)

- Express Efficiency
- Standard Performance Contract
- Non Residential Audit
- Direct Install
- Package AC Systems
- Savings by Design
- Industrial EE
- Agricultural EE
- Retro Commissioning
- CA Community College
- CA New Home
- Multifamily EE
- Residential Lighting
- Residential Non Lighting
- Appliance Recycling
- Home EE Survey

Figures and Calculation Used to Identify Program "Short List"

	Program	Segment	Classification	Budget	MWh	MW	TRC	PC
1.	Business Incentive & Services (Express, SPC, Non-res Audit)	Non-residential	Statewide	$113,999,715	1,156,755	387.44	3.91	5.84
2.	Residential Energy Efficiency Incentive Program (Lighting & Non-Lighting)	Residential	Statewide	$66,886,222	805,072	113.71	4.38	6.75
3.	Non-Residential Direct Install Program	Non-residential	Local	$49,642,987	303,970	55.11	3.47	3.38
4.	Appliances Recycling Program	Residential / Non-residential	Statewide	$39,893,411	177,323	30.82	6.07	2.52
5.	Comprehensive Packaged Air Conditionning System	Residential / Non-residential	Local	$59,149,186	161,885	89.10	1.04	2.46
6.	Industrial Energy Efficiency Program	Non-residential	Local	$37,360,338	159,333	30.04	2.34	3.39
7.	Agriculture Energy Efficiency Program	Agriculture	Statewide	$37,292,557	129,368	36.10	1.49	2.95
8.	Savings by Design	Non-residential New Construction	Statewide	$28,458,461	128,617	26.32	2.81	3.95
9.	Multi-family Energy Efficiency Rebate Program	Residential	Statewide	$53,023,116	125,741	14.54	2.27	1.39
10.	Retro-Commissioning Program	Non-residential	Local	$11,626,203	39,040	9.60	1.47	2.11
11.	California Community College	School / Colleges	Statewide	$8,985,167	24,426	5.15	2.39	2.32
12.	Home Energy Efficiency Survey	Residential	Statewide / Local	$6,112,567	18,011	6.52	0.73	0.75
13.	CA New Home Program	Residential New Construction	Local	$18,294,211	12,766	8.72	0.42	0.80
14.	Local Government Energy Action Resource	Crosscutting	Local	$5,420,032	8,385	1.77	0.58	0.81
15.	County of Los Angeles Partnership	Non-residential	Local	$4,743,598	1,156,755	387.44	3.91	5.84
16.	Sustainable Community	Crosscutting	Local	$4,284,084	8,212	21.10	3.85	4.49

	Program	Segment	Classification	Budget	MWh	MW	TRC	PC
17.	California Department of Correction & Rehabilitation	Prison and Rehabilitation Facilities	Statewide	$2,898,675	6,912	1.46	1.98	2.01
18.	Community Energy Partnership	Crosscutting	SCE Territory	$2,316,943	6,605	0.70	1.60	1.60
19.	Ventura County Partnership	Crosscutting	Local	$2,201,099	5,700	1.24	2.43	1.56
20.	Bakesfield and Kern County Energy Watch	Residential, Small Commercial, Government Facilities	Local	$1,737,709	3,508	0.46	1.37	1.24
21.	Integrated School-Based Program	Residential / Non-residential	Local	$5,003,583	3,093	0.99	0.30	0.31
22.	San Gabriel Valley Energy Efficiency Parnership	Residential / Non-residential	Local	$1,737,709	2,701	0.84	1.35	1.23
23.	County of Riverside Partnership	Non-residential	Local	$995,550	2,596	0.55	2.18	2.22
24.	UC/CSU/IOU Energy Efficiency Partnership	Schools and Colleges	Statewide	$6,830,972	2,596	0.55	2.18	2.22
			Sum of rows 1 through 24	$568,894,095	$4,449,370	$1,230		
			Sum of rows 1 through 13	**$530,724,141**	**$3,242,307**	**$813**		
				93%	**73%**	**66%**		

Rows 1 through 13 represent the 16 programs considered for Tasks 2 and 3 of this project.

- We considered Row 1 as representing three incentive programs: *Express Efficiency, Standard Performance Contract,* and *Non-residential Audit*.
- We considered Row 2 as representing two incentive programs: *Residential Lighting* and *Residential Non-lighting.*

Table 2-1.B: Figures and calculation used to identify "short list" of programs for Tasks 2 and 3

Customer segments

In both Tasks 2 and 3, we focused on five customer segments:

- Commercial
- Industrial
- Agricultural
- Residential
- New Construction

In addition, we considered the special segment of "Market Actors" — that is, groups or individuals who are in positions to have significant impact on others' EE measures and practices. For example, this would include: Energy Efficiency Consultant, Architect or Designer, Commercial Property Developer, Government, and Equipment Designer or Manufacturer.

Technologies

The following lists the categories of technologies we considered and notes the number of "short-list" classes and exhibits that were considered to have tie-in to each technology.

Technology	# Classes with Tie-in	# Exhibits with Tie-in
Bldg/Title 24	35	16
Compressed Air	7	3
Dairy	21	4
EMS	21	13
Food Service	8	4
HVAC	31	21
Industrial	26	11
Lighting	25	4
Motors and Drives	25	4
Pumping	13	3
Refrigeration	18	9
SCADA	18	3
Solar PV	6	1
Other Technology	13	0

Table 2-1.C: Number of classes and exhibits with tie-in to technologies considered

Appendix 2-2: Class Yardstick

The content below is based directly on the actual "yardstick" we used during the Task 2 evaluation of classes. Since the "yardstick" tool was based on an Excel spreadsheet (one yardstick worksheet completed for each class), we have modified the format and organization for the purpose of this appendix. The actual evaluation items and scoring approach remain unchanged.

General Information

Materials Reviewed	**1 = Reviewed; 0 = Not available**
Workbook	☐
Handouts	☐
Welcome Pkg	☐
Presentation Material	☐
Instructor Guide	☐
Objectives	☐
Agenda	☐
Other class materials	☐ ***(Fill in)*** _____

Class Locations	**1 = Offered at location; 0 = Not offered at location**
CTAC	☐
AgTAC	☐
Other	☐ ***(Fill in)*** _____

Class's Technology Focus	**2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in**
Bldg/Title 24	☐
Compressed Air	☐
Dairy	☐
EMS	☐
Food Service	☐
HVAC	☐
Industrial	☐
Lighting	☐
Motors and Drives	☐
Pumping	☐
Refrigeration	☐
SCADA	☐
Solar PV	☐
Other Technology	☐ ***(Fill in)*** _____

Comments

SCE team ***(Fill in)*** _____

_____

Eval Team ***(Fill in)*** _____

_____

Support of Programs

Tie-in to Programs

Programs	2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in
Express Efficiency	☐
SPC	☐
Non Residential Audit	☐
Direct Install	☐
Package AC System	☐
Savings by Design	☐
Industrial EE	☐
Agricultural EE	☐
Retro Commissioning	☐
CA Community College	☐
CA New Home	☐
Multi-family EE Rebate	☐
Residential Lighting	☐
Residential Non-lighting	☐
Appliance Recycling	☐
Home EE Survey	☐
Other	☐ ***(Fill in)*** _____

Direct Support of Programs

Y/N column and NA column are mutually exclusive. That is, if there is a 1 in the NA box, the corresponding Y/N box is considered blank (not counted).

Closely Tied Programs	Y/N	NA
_____ *(Program Title)*		
Program-Specific Information		
Describes program goals/objectives (from target customer perspective)	☐	☐
Describes program features	☐	☐
Describes program benefits to participants	☐	☐
Provides information on how to pursue program offerings	☐	☐
Includes recommended next steps to pursue program offerings	☐	☐
Includes contact information (URL, email, phone) for more info or next steps	☐	☐
Has scheduled presentation by program mgr or account exec on program(s)	☐	☐
Comments:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.
Repeat all items below for each program with high tie-in to this class

(Fill in) _____

(Loosely tied programs — i.e., those with medium to low tie-into the class — were scored but, for the sake of simplicity, were not discussed in this report.)

Loosely Tied Programs	Y/N	NA
_____ *(Program Title)*		
Program-Specific Information		
Describes program goals/objectives (from target customer perspective)	☐	☐
Describes program features	☐	☐
Describes program benefits to participants	☐	☐
Provides information on how to pursue program offerings	☐	☐
Includes recommended next steps to pursue program offerings	☐	☐
Includes contact information (URL, email, phone) for more info or next steps	☐	☐
Has scheduled presentation by program mgr or account exec on program(s)	☐	☐
Comments:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.
Repeat all items below for each program with high tie-in to this class

(Fill in) _____

Appendix 2-2: Class Yardstick

Indirect Support of Programs

Y/N column and NA column are mutually exclusive. That is, if there is a 1 in the NA box, the corresponding Y/N box is considered blank (not counted).

Closely Tied Programs	Y/N	NA
_____ *(Program Title)*		
Technology Information Related to Program		
Includes content on program-relevant technologies or measures	☐	☐
Describes benefits of program-relevant technologies or measures	☐	☐
Includes considerations for implementing relevant technologies or measures	☐	☐
Provides specific guidance for implementing technology or measure	☐	☐
Distinguished between tech. variations that are and are not incl. by program	☐	☐
Comments:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.
Repeat all items below for each program with high tie-in to this class

(Fill in) _____

(Loosely tied programs — i.e., those with medium to low tie-into the class — were scored but, for the sake of simplicity, were not discussed in this report.)

Loosely Tied Programs	Y/N	NA
_____ *(Program Title)*		
Technology Information Related to Program		
Includes content on program-relevant technologies or measures	☐	☐
Describes benefits of program-relevant technologies or measures	☐	☐
Includes considerations for implementing relevant technologies or measures	☐	☐
Provides specific guidance for implementing technology or measure	☐	☐
Distinguished between tech. variations that are and are not incl. by program	☐	☐
Comments:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.
Repeat all items below for each program with high tie-in to this class

(Fill in) _____

Support of Behavior Change

Encouraging Action

Encouraging Action	Y/N	NA
Includes specific calls to action / specific next steps	☐	☐
Supports development of individualized action plan	☐	☐
Includes job aids / worksheets to assist in assessing / analyzing options	☐	☐
Includes job aids / checklists to assist in taking action	☐	☐
Includes info on where/how to get assistance in taking action	☐	☐

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Comments: ***(Fill in)***

Helping Overcome Market Barriers

Mkt Barriers	Y/N	NA
Provides info on application of EE measures	☐	☐
Describes typical cost savings re. EE measures	☐	☐
Quantifies other typical financials (ROI, payback, etc.) typical in segment	☐	☐
Describes typical non-financial benefits	☐	☐
Includes info on risk assessment and risk mitigation	☐	☐

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Comments: ***(Fill in)***

Appendix 2-2: Class Yardstick

Support of Customer Segments

Tie-in to Customer Segments

Relevant Customer Segments	**1 = Tie-in; 0 = No tie-in**
Primary Customer Segments	
Commercial	☐
Industrial	☐
Agricultural	☐
Residential	☐
New Construction	☐
Other Customer Segment	☐ ***(Fill in)*** _____
Market Actors	
Energy Efficiency Consultant	☐
Architect or Designer	☐
Commercial Property Developer	☐
Government	☐
Equip Designer & Manufac	☐
Other Market Actors	☐ ***(Fill in)*** _____

Segment-specific Support

Segment-Specific	Y/N	NA	**In Y/N column, 1 = Yes; 0 = No. In NA column 1= Not applicable; 0 or blank = applicable.**
_____ *(Segment Name)*			
Describes considerations for specific "sub-segments"	☐	☐	
Includes example of "typical" benefits realized through EEM in segment	☐	☐	
Includes EEM success stories of actual customers in this segment	☐	☐	
Includes detailed case study of actual implementations in this segment	☐	☐	
Comments:			***(Fill in)*** _____

Second-language Support

Second Language	**1 = Non-English version available; 0 = No second language**
Spanish	☐
Korean	☐
TBD A	☐
TBD B	☐
Other	☐ ***(Fill in)*** _____

Appendix 2-3: Calculation of Scores "All Classes"

In Task 2, the "All ECs" score is not an average of the individual AgTAC and CTAC scores. This is because some classes are AgTAC only, some are CTAC only, and some are offered in both locations.

- The score for AgTAC includes classes unique to AgTAC and "dual location" classes (offered at both locations).

  The score for CTAC includes classes unique CTAC and "dual location" classes.

- Averaging the AgTAC score and the CTAC score would, in effect, "double count" the "dual location" classes. Instead, for the "All" score, we averaged the scores of all classes.

- For example, let's say there were a total of three classes:
  - One class is unique to AgTAC. That class scored 0%.
  - One class is unique to CTAC. That class scored 0%.
  - One class is offered at both AgTAC and at CTAC. That class scored 100%.

Location	Score	Calculation	Notes
AgTAC	50%	(0 + 100) / 2	Score for AgTAC-unique class (0%) PLUS score for dual-location class (100%) DIVIDED BY total number of classes (2)
CTAC	50%	(0 + 100) / 2	Score for CTAC-unique class (0%) PLUS score for dual-location class (100%) DIVIDED BY total number of classes (2)
Combined	33%	(0 + 0 + 100) / 3	Score for AgTAC-unique class (0%) PLUS score for CTAC-unique class (0%) PLUS score for dual-location class (100%) DIVIDED BY total number of classes (3)

Appendix 3-1: Exhibits and Additional Classes

Exhibits on short list

The exhibits considered during this evaluation are listed below. Note that there are some exhibits with the same name at two locations. They were evaluated separately, and are distinguished by the exhibit EC location in parentheses after the exhibit name.

AgTAC

- Compressed Air Display (AgTAC)
- Fan Wheel Display (AgTAC)
- Ground Source Heat Pump Exhibit
- Heat Pump Demonstrator (AgTAC)
- Insulated Concrete Form Display
- High Volume Low Speed Fan (AgTAC)
- Insulation Demonstration Display
- Lighting Design Room
- Lighting Energy Management Display
- Low Pressure / SCADA Exhibit
- 5 Ton Package Unit (AgTAC)
- Photovoltaic Canopy & Trackers
- Programmable Logic Controller Display
- Heat Pump Split System Trainer (AgTAC)
- Tubular Skylighting Display (AgTAC)
- Tunnel of Heat

CTAC

- 200 Ton Cutaway Chiller
- 5 Ton Package Unit (CTAC)
- Auto Sash
- Chilled Water System display
- Compressed Air Display (CTAC)
- Energy Management System
- Fan Wheels Display (CTAC)
- Heat Pump Demonstrator (CTAC)
- Heat Pump Split System Trainer (CTAC)
- High Volume Low Speed Fan (CTAC)
- Motors and Drives Display
- Tubular Skylighting Display (CTAC)
- Electric Steam Equipment
- Electric Ovens
- Variable Speed Drive for Kitchen Exhaust Hoods

Additional Classes Considered

The following lists the classes that were considered in addition to the "short list" of classes when determining whether an exhibit had tie-in to one or more classes.

1. Advanced Foodservice Refrigeration
2. Advanced Hands-On Programmable Logic Controllers
3. Advanced Outdoor Lighting Technologies
4. Advanced Programmable Logic Controllers
5. Air Handling Systems Efficiency
6. Assessing the Economics of Green Building and Energy Efficiency
7. Basics of Photovoltaic (PV) Systems for Residential Grid-tied Applications
8. Benefits of Precision Farming
9. Commercial Energy Efficiency Surveys
10. Comparing Motors and Engines as Prime Movers
11. Cook, Chill & Re-therm Technologies for the Foodservice Industry
12. Cool Coatings for Exterior HVAC Systems
13. Cool Solutions in Large Supermarkets
14. Cool Solutions: Refrigeration for Grocery Stores and Delis
15. Cool Solutions: Refrigeration for Grocery Stores and Restaurants
16. Cooling Tower Efficiency
17. Daylighting Controls
18. Displacement Ventilation
19. DOE Fundamentals of Compressed Air Systems
20. DOE Process Heating Assessment
21. DOE Steam Assessment Improvement
22. Electric and Magnetic Field (EMF) Workshop
23. Electrical Safety Seminar
24. Electrical Systems Analysis
25. Energy Assessments of Data Centers
26. Energy Efficiency Opportunities for Rooftop Air Conditioners
27. Energy Efficiency Opportunities in Institutional Foodservice Facilities
28. Energy Efficiency Strategies in Cold Storage
29. Energy Management Systems (EMS)
30. Energy Principles
31. Energy Pro 4.0 – Envelope
32. Energy Pro 4.0 – Lighting
33. Energy Pro 4.0 – Mechanical
34. Energy Pro 4.0 Update for 2005 Title 24 Standards
35. Energy-Efficient Supermarket Refrigeration
36. Evaporative Cooling for Commercial & Industrial Facilities
37. Fertigation
38. FSU-CIT Pump Efficiency and Chemigation
39. FSU-CIT Pump Energy Efficiency and Water Source Protection
40. Fundamentals of Energy Efficiency in Foodservice
41. Gap Between Marketing Hype and Best Practice
42. Green Building: Hype or Help?
43. Grounding, Bonding, and Wiring
44. Heat Pump Water Heating for Commercial & Industrial Facilities
45. HERS Rater Training & Certification
46. How to Partner with SCE for Your Building Projects
47. HVAC System Testing
48. Implementing Energy Efficiency Projects
49. Incorporating Green Building into Energy Efficient Design
50. Industrial Maintenance
51. Intermediate eQUEST: "Detailed Design"
52. Introduction to Lighting
53. Introduction to Programmable Logic Controllers
54. Irrigation District SCADA Electronic Monitoring and Control (New Class)
55. Lamp and Ballast Basics
56. Irrigation District SCADA Electronic Monitoring and Control (New Class)

57. Lamp and Ballast Basics
58. LEED-NC Technical Review Workshop
59. Lightfair Report 2006: Introducing New Innovative Lighting Technologies
60. Lighting 101
61. Lighting Controls for Energy Management
62. Lighting for the Electronic Office
63. Lighting Hype and Best Practices
64. Lighting Retrofit Strategies & Project Management Techniques
65. Managing Your Energy Systems
66. Motor Efficiency (Was Premium Efficiency Motors)
67. New Flow Measurement Technologies
68. On-Farm SCADA Electronic Monitoring and Control
69. Outdoor Lighting Design & Compliance - 2005 Title 24 Standards
70. Power Quality Fundamentals
71. Power Quality Grounding and Wiring
72. Premium Efficiency Motors and Adjustable Speed Drives
73. Cns128 removed from list; was redundant with Cns066
74. Principles of Electric Motors
75. Proper Procedures for Charging Air Conditioners & Heat Pumps
76. Residential Lighting Design Guide
77. Skylighting for Commercial & Industrial Buildings
78. Skylighting for Title 24
79. Skylighting in Big Buildings and Beyond: New in 2005 Title 24
80. So Watt If I Already Have T8s
81. Soil Moisture Sensing
82. Solar Hot Water Systems
83. Specifying Dishwashers & Water Heaters for Energy Efficiency
84. Successful Merchandising with Efficient Lighting
85. Tankless Water Heaters
86. Title 24 Duct Design
87. Title 24 Duct Installation Standards
88. Title 24 Equipment Sizing & Selection (Computer-based training)
89. Title 24 In-Depth Review of the Energy Standards Compliance Documentation
90. Title 24 Outdoor Lighting Design & Compliance Standards
91. Title 24 Zoning Design
92. Utility Power Quality and Mitigation
93. Water, Some Like it Hot — Some Want it Now!

Appendix 3-2: Exhibit Yardstick

The content below is based directly on the actual "yardstick" we used during the Task 3 evaluation of exhibits. Since the "yardstick" tool was based on an Excel spreadsheet (one yardstick worksheet completed for each exhibit), we have modified the format and organization for the purpose of this appendix. The actual evaluation items and approach remain unchanged.

General Information

Location

EC ☐ AgTAC ☐ CTAC

Bldg ***(Fill in)*** _____

Room ***(Fill in)*** _____

Mobility ☐ Fixed ☐ Mobile

Intended Use

Select as many as apply

Class	☐
Tour	☐
Consultation	☐
Guided Hands-on	☐
Independent Hands-on	☐
General	☐
Other Use (Specify)	☐

Exhibit's Technology Focus

2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in

Bldg/Title 24	☐
Compressed Air	☐
Dairy	☐
EMS	☐
Food Service	☐
HVAC	☐
Industrial	☐
Lighting	☐
Motors and Drives	☐
Pumping	☐
Refrigeration	☐
SCADA	☐
Solar PV	☐
Other Technology	☐ ***(Fill in)*** _____

Comments

SCE team ***(Fill in)*** _____

_____

Eval Team ***(Fill in)*** _____

_____

Support of Classes

Tie-in to Classes

Short-list Classes	**2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in**
Class title ☐	All 56 short-list classes were considered. However, for the sake of simplicity, we have not listed them here.
Class title ☐	
Class title… (for all 56 classes on "short list") ☐	See 'Classes on "Short List"' on page A-6 for the list classes considered here.

Other Classes	**2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in**
Class title ☐	*Ninety-three classes in addition to the "short list" of classes when determining whether an exhibit had tie-in to one or more classes.*
Class title ☐	
Class title… (for all 93 classes not on "short list") ☐	*See "Additional Classes Considered" on page A-21 for the list classes considered here.*

Use with Classes

Closely Tied Classes	**1 = True; 0 = False** **Score based on True statement with highest point value.**
_____ *(Class Title)*	**Repeat all items below for each class with high tie-in to this exhibit**
Exhibit used directly in class to illustrate key concepts ☐	5 points
Tour including exhibit is included as a regularly scheduled part of class ☐	4 points
Tour including exhibit is offered as an option at end of class ☐	2 points
Exhibit referred to in class materials, but not used directly or included in tour ☐	1 point
Exhibit NOT used, included in tour or referred to in class materials ☐	0 points
Comments:	***(Fill in)*** _____

(Loosely tied classes — i.e., those with medium to low tie-in — were scored but, for the sake of simplicity, were not discussed in this report.)

Loosely Tied Classes	**1 = True; 0 = False** **Score based on True statement with highest point value.**
_____ *(Class Title)*	**Repeat all items below for each class with low-in to this exhibit**
Exhibit used directly in class to illustrate key concepts ☐	5 points
Tour including exhibit is included as a regularly scheduled part of class ☐	5 points
Tour including exhibit is offered as an option at end of class ☐	4 points
Exhibit referred to in class materials, but not used directly or included in tour ☐	3 points
Exhibit NOT used, included in tour or referred to in class materials ☐	0 points
Comments:	***(Fill in)*** _____

Promotion of Classes

Closely Tied Classes	**1 = True; 0 = False** **Score based on True statement with highest point value.**
_____ *(Class Title)*	**Repeat all items below for each class with low-in to this exhibit**
Signage at exhibit specifically mentions class	☐ 5 points
Signage at exhibit generally refers to relevant classes being available	☐ 2 points
No mention of this class in exhibit signage	☐ 0 points
Not applicable — no signage by design	☐ NA
Comments:	***(Fill in)*** _____

Support of Programs

Tie-in to Programs

Programs	**2 = High tie-in; 1 = Medium to low tie-in; 0 = No tie-in**
Express Efficiency	☐
SPC	☐
Non Residential Audit	☐
Direct Install	☐
Package AC System	☐
Savings by Design	☐
Industrial EE	☐
Agricultural EE	☐
Retro Commissioning	☐
CA Community College	☐
CA New Home	☐
Multi-family EE Rebate	☐
Residential Lighting	☐
Residential Non-lighting	☐
Appliance Recycling	☐
Home EE Survey	☐
Other	☐ ***(Fill in)*** _____

Appendix 3-2: Exhibit Yardstick

Direct Support of Programs

Y/N column and NA column are mutually exclusive. That is, if there is a 1 in the NA box, the corresponding Y/N box is considered blank (not counted).

Closely Tied Programs	Y/N	NA	**In Y/N column, 1 = Yes; 0 = No. In NA column 1= Not applicable; 0 or blank = applicable.**
_____ *(Program Title)*			**Repeat all items below for each program with high tie-in to this exhibit**
Exhibit and Signage			
Specifically mentions the program	☐	☐	
Describes program goals/objectives from customer perspective	☐	☐	
Describes program benefits from customer perspective	☐	☐	
Points to appropriate program information sources	☐	☐	
Comments:			***(Fill in)*** _____
Collateral at or near the exhibit			
Specifically mentions the program	☐	☐	
Describes program goals/objectives from customer perspective	☐	☐	
Describes program benefits from customer perspective	☐	☐	
Provides information on how to pursue program offerings	☐	☐	
Includes contact info (URL, email, phone) for more info or next steps	☐	☐	
Comments:			***(Fill in)*** _____

(Loosely tied programs — i.e., those with medium to low tie-into the exhibit — were scored but, for the sake of simplicity, were not discussed in this report.)

Loosely Tied Programs	Y/N	NA	**In Y/N column, 1 = Yes; 0 = No. In NA column 1= Not applicable; 0 or blank = applicable.**
_____ *(Program Title)*			**Repeat all items below for each program with medium to low tie-in to this exhibit**
Exhibit and Signage			
Specifically mentions the program	☐	☐	
Describes program goals/objectives from customer perspective	☐	☐	
Describes program benefits from customer perspective	☐	☐	
Points to appropriate program information sources	☐	☐	
Comments:			***(Fill in)*** _____
Collateral at or near the exhibit			
Specifically mentions the program	☐	☐	

Loosely Tied Programs	Y/N	NA
_____ *(Program Title)*		
Describes program goals/objectives from customer perspective	☐	☐
Describes program benefits from customer perspective	☐	☐
Provides information on how to pursue program offerings	☐	☐
Includes contact info (URL, email, phone) for more info or next steps	☐	☐
Comments:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Repeat all items below for each program with medium to low tie-in to this exhibit

(Fill in) _____

Support of Behavior Change

Conveying Technology Purpose, Use, and Benefits

Supporting Info	Y/N	NA
Signage		
Is displayed at exhibit	☐	☐
Describes purpose and use of the technology or application	☐	☐
Notes key benefits of technology or application	☐	☐
Points to appropriate collateral for additional information	☐	☐
Comments:		***(Fill in)***
Collateral		
Is prominently displayed at exhibit	☐	☐
OR		
Is obviously available within exhibit's general location	☐	☐
Describes purpose and use of exhibit application	☐	☐
Focuses audience's attention; calls out key points re. exhibit tech or app	☐	☐
Summarizes key benefits of relevant technology or application	☐	☐
Comments:		***(Fill in)***

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Supporting Hands-on Interaction

Guided Hands-On	Y/N	NA
The exhibit:		
Has switches, etc. within easy reach	☐	☐
Overtly responds to action by operator	☐	☐
Responds in a manner that clearly demonstrates key point(s)	☐	☐
Comments:		***(Fill in)***
Independent Hands-On		
Signage at the exhibit:		
Encourages individuals to interact with the exhibit	☐	☐
Provides clear direction on how to interact (what to press, click, etc.)	☐	☐
Directs attention to "what to look for" as a result of interactions	☐	☐
Notes implications of what can be observed as a result of interaction	☐	☐
Comments:		***(Fill in)***
The exhibit:		

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Has switches, etc. within easy reach	☐	☐
Overtly responds to action by individual	☐	☐
Responds in a manner that clearly demonstrates key point(s)	☐	☐

Comments: ***(Fill in)***

Encouraging Action

Encouraging Action	Y/N	NA
Includes job aids, checklists, worksheets to assist in analyzing options	☐	☐
Includes job aids, checklists, worksheets to assist in taking action	☐	☐
Includes info on where/how to get assistance in taking action	☐	☐

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Comments: ***(Fill in)***

Helping Overcome Market Barriers

Mkt Barriers	Y/N	NA
Provides info on application of relevant technologies	☐	☐
Describes typical cost savings re. relevant measures	☐	☐
Quantifies other typical financials (ROI, payback, etc.)	☐	☐
Describes typical non-financial benefits	☐	☐
Includes info on risk assessment and risk mitigation	☐	☐

In Y/N column, 1 = Yes; 0 = No.
In NA column 1= Not applicable; 0 or blank = applicable.

Comments: ***(Fill in)***

Appendix 3-2: Exhibit Yardstick

Support of Customer Segments

Tie-in to Customer Segments

Relevant Customer Segments	**1 = Tie-in; 0 = No tie-in**
Primary Customer Segments	
Commercial	☐
Industrial	☐
Agricultural	☐
Residential	☐
New Construction	☐
Other Customer Segment	☐ ***(Fill in)*** _____
Market Actors	
Energy Efficiency Consultant	☐
Architect or Designer	☐
Commercial Property Developer	☐
Government	☐
Equip Designer & Manufac	☐
Other Market Actors	☐ ***(Fill in)*** _____

Segment-specific Support

Segment-Specific	Y/N	NA	**In Y/N column, 1 = Yes; 0 = No. In NA column 1= Not applicable; 0 or blank = applicable.**
_____ *(Segment Name)*			
Describes considerations for specific "sub-segments"	☐	☐	
Includes example of "typical" benefits realized from tech/apps in segment	☐	☐	
Includes success stories of actual customers in this segment	☐	☐	
Comments:			***(Fill in)*** _____

Second-language Support

Signage	**1 = Non-English version available; 0 = No second language**
Spanish	☐
Korean	☐
TBD A	☐
TBD B	☐
Other	☐ ***(Fill in)*** _____

Collateral	**1 = Non-English version available; 0 = No second language**
Spanish	☐
Korean	☐
TBD A	☐
TBD B	☐
Other	☐ ***(Fill in)*** _____

Appendix 3-3: Exhibit Background Information

Much of the following is based on an interview with the SCE Center Designer (located at CTAC, but responsible for both AgTAC and CTAC design).

The Energy Centers' (ECs') focus and goals have evolved over the years. For example, founded in 1989 and opening in January 1990, CTAC originally focused on research and emerging technologies. In response to customer feedback, in the fall of 1992, CTAC adopted a new strategy, focusing on technologies and measures that were directly related to Air Quality Management District (AQMD) issues. At that time, there were separate commercial and industrial centers. Today, CTAC's commercial and industrial centers are combined, meeting space requirements have increased, and CTAC's approach to developing exhibits and presentations have evolved, now with a more emphasis on audio-visual application.

Currently, CTAC is a 51,000 square foot facility that houses eight technology centers, three classrooms, a computer lab, a 103-person theater-style conference center, and multiple conference rooms. Primarily targeting business customers, CTAC is a source of information about energy management and efficiency, intended to:

- Disseminate information about efficient technologies and practices to electric, natural gas, and water utility customers in order to help these customers:
  - Reduce energy and water usage
  - Lower their bills
  - Reduce operation and maintenance costs
  - Improve productivity
- Provide services to a variety of midstream and upstream market actors (e.g., architects, engineers, distributors, contractors, etc.) who use information and tools to design more efficient buildings or processes and to conduct efficient energy system retrofits and renovations

Exhibit and Display Design Intent

Supporting the classes offered by the EC is a major role of the exhibits. In the words of one of the leaders in the EC exhibit design and development arena, exhibits are "eye candy" that make people want to enroll in classes. In addition, many exhibits are used directly in classes to illustrate key concepts.

The latest remodel at CTAC incorporated numerous design points that are intended to engage the audience in a positive manner. Some examples include:

- Accommodation of attended and unattended visitors

  The exhibits and displays at both AgTAC and CTAC accommodate visitors who are on a guided tour (conducted by a Center subject matter expert or class instructor), and those who independently explore the exhibits (during class breaks or on a wholly *ad hoc* basis).

  Many of the exhibits are intended for both types of visitors, though some are intended solely for "guided" demonstrations and discussions — either on a tour or in the context of a class.

- Incorporation of more interactive exhibits to meet the desires of today's more hands-on oriented audience

  Interactive exhibits fall into two general categories: those that are used for hands-on demonstrations conducted (or guided) by a subject matter expert and those that may be used for independent hands-on interaction (without expert guidance).

- Use of color to visually "invite" people into the exhibit areas

  Cool colors (shades of green) predominate at the main entry. Further into the building, toward display areas, warmer colors (e.g., red, gold, orange) rule. This effectively draws the viewer into the exhibit areas.

- Careful positioning of the exhibits to maximize positive viewer responses

  For example, exhibits are designed within the "visual strike zone," positioning key elements at the height where people tend to look; not too high or too low.

  As another example, most exhibits are raised on legs or stands. This creates visual "free space" that helps make the area appear less crowded and more inviting than it would otherwise.

Why CTAC Uses a Centralized Approach for Displaying Collateral

As mentioned in the body of this report, when our exhibit evaluation criteria asked about collateral "at or near the exhibit," we used a "three-feet (arm's length) rule" to determine whether the collateral should be considered. We established this guideline based the **target audience's perspective**. That is, would a typical independent observer (e.g., a class participant on break, informally touring the exhibits) readily see the relationship between a given exhibit and collateral that supports that exhibit?

CTAC has made a conscious design decision to aggregate collateral in relatively centralized areas, so most exhibits at CTAC did not have collateral "at or near the exhibit." Several factors went into this decision to centralize collateral. These considerations include:

- **The tradeshow effect** — Some visitors may collect literature out of a perceived sense of courtesy or simply because they believe it to be the appropriate behavior.

  This means that they may take brochures displayed at an exhibit they are viewing, even if they're not interested in the technology — and may, in fact never read the information presented in the literature.

  This, in turn, drives up print production costs with little if any return in terms of customer education or motivation.

- **Housekeeping issues** — It is much easier and less time-consuming to ensure that displays of literature in centralized locations "never run out."

  EC staff members are busy with numerous duties, and may not be able to keep at-exhibit displays appropriately stocked. Empty display pockets can have a negative impact on viewers' perceptions of the facility.

- **Approval cycle issues** — It often is a challenge to get timely approval of new text and photographs for signs, collateral, and other display content.

  In some instances, exhibits have been specifically designed to support display of collateral at the exhibit, but approval for brochure content was seriously delayed. This resulted in an empty brochure area at the exhibit, which can have a negative impact on viewers' perceptions.

- **Aesthetic issues** — Placing collateral at an exhibit can result in the area looking messy or cluttered, especially if the exhibit was not originally designed to support collateral displays.

Appendix 4-1: Exit Survey Classes, Instructors, Locations, Technologies

Classes

The following lists the classes from the 2007 Exit Survey database that were included in the analysis of Exit Survey results.

1. 14th Annual Water Conference
2. Adjustable Speed Drives
3. Advanced Lighting Technologies
4. Advanced Programmable Logic Controllers
5. Air Handling Systems
6. Assessing the Economics of Green Building and Energy Efficiency
7. Basic Heating, Ventilation and Air Conditioning (HVAC)
8. Benefits of Precision Farming
9. Build IT Green
10. Chilled Water Systems
11. Comparing Motors and Engines as Prime Movers
12. Compressed Air System Efficiency
13. Computer Energy Efficiency
14. Cook, Chill & Retherm Technologies for the Foodservice Industry
15. Cool Coatings for Exterior HVAC Systems
16. Cooling Tower Efficiency
17. Dairy Energy Management Seminar
18. Daylighting Controls
19. Daylighting for Buildings
20. Demand Response Training
21. Duct Testing
22. Efficient Technologies for Commercial Refrigeration
23. Electrical Safety Seminar
24. Electrical Systems Analysis
25. Energy Assessments of Data Centers
26. Energy Management Systems
27. Energy Policy Act of 2005
28. EnergyPro 4.0 - Envelope
29. EnergyPro 4.0 - Lighting
30. EnergyPro 4.0 - Mechanical
31. EnergyPro Nonresidential Software for Beginners
32. eQuest Employee Training
33. Evaporative Cooling for Commercial and Industrial Facilities
34. Food for Thought
35. FSU-CIT Pump Energy Efficiency and Water Source Protection
36. FSU-CIT Variable Frequency Drives (VFD) for Ag and Turf Irrigation Pumps
37. Fundamentals of Electricity and Energy Efficiency
38. Green Building Hype or Help?
39. Ground Source Heat Pump
40. Grounding, Bonding, and Wiring
41. Hands-On Programmable Logic Controllers (PLC) ControlLogix 5000
42. HID Outdoor and Indoor Lighting Applications
43. Highlights of Lightfair 2007
44. Hospital & Healthcare Facilities - Ten Prescriptions for Energy Savings
45. Hot Rebates and Cool Savings for Foodservice
46. How to Get Started with an Energy Efficiency Survey
47. How to Manage Your Business' Energy Costs
48. HVAC Direct Digital Control
49. HVAC System Testing
50. Implementing Energy Efficiency Projects
51. Improving Energy Efficiency in Drip Irrigation
52. Improving Pump Plant Efficiency to Lower Energy Cost
53. Incorporating Green Building into Energy Efficient Design
54. Indoor and Outdoor HID Lighting Applications Workshop
55. Industrial Fans and Fan Duct Systems
56. Industrial Maintenance

Appendix 4-1: Exit Survey Classes, Instructors, Locations, Technologies

57. Industrial Refrigeration
58. Intermediate eQuest "Detailed Design"
59. Introduction to Energy Savings and Incentives
60. Introduction to Geothermal Heat Pump Systems
61. Introduction to Life-Cycle Costing
62. Introduction to Lighting
63. Introduction to Programmable Logic Controllers
64. Introductory eQuest "Schematic Design"
65. Lamp and Ballast Basics
66. LEED-NC Technical Review Workshop
67. Lighting 101
68. Lighting Controls for Energy Management
69. Lighting Fixture Maintenance
70. Lighting for Architecture and Interiors
71. Lighting for the Electronic Office: Addressing the Issues of Quality & Quantity
72. Lighting Retrofit Strategies & Project Management Techniques
73. Managing Energy in Water and Wastewater Facilities
74. Managing Your Residential Energy Costs Workshop
75. Motor Efficiency
76. Motors and Starters
77. New Technology for Energy Efficiency in Wastewater Aeration
78. Overcoming Objections to Energy Efficiency Investments
79. Package Unit Heating, Ventilation & Air Conditioning (HVAC)
80. Photovoltaic (PV) Site Analysis and System Sizing
81. Power Quality Fundamentals
82. Power Quality Grounding and Wiring
83. Premium Efficiency Motors and Adjustable Speed Drives
84. Prime Movers
85. Principles of Electric Motors
86. Principles of Lighting
87. Pump Efficiency (Simultaneously in Spanish)
88. RetroCommissioning In Practice
89. Selling Energy Efficient and /or Green Building to Building Owners
90. Sensor Placement and Optimization Tool
91. So Watt If I Already Have T-8s
92. Specifying Dishwashers and Water Heaters for Energy Efficiency
93. Specifying Foodservice Lighting for Energy Efficiency
94. Steam Boilers and Water Heating Efficiency
95. Successful Merchandising with Efficient Lighting
96. Technology Update
97. The Basics of LED Technology
98. Title 24 Acceptance Training for Designers and Contractors
99. Title 24 Energy Efficiency Standards for Residential and Commercial
100. Title 24 Energy Efficiency Standards: A Seminar for Plan Checkers & Inspectors
101. Title 24 Skylighting in Big Box Buildings and Beyond
102. Title24 Residential and Nonresidential EE Standards
103. Transport Energy: Motors, Fans and Pumps
104. UC/CSU Green Campus Training
105. Utility Power Quality and Mitigation
106. Vons E.E. Refrigeration

Instructors

The following lists the instructor information from the 2007 Exit Survey database that was included in the analysis of Exit Survey results.

- Addison
- Akbari/Wray
- Avery
- Beaman
- CEC
- D. Price
- Dodd
- Faramarzi
- Fitch
- Green
- Haiad
- J. McHugh
- Jackson
- Larson
- M. Dodd
- Menendez
- Paschke
- Peake
- R.Young/Gary Klein
- Rogers
- Shadpour
- Sharp
- Sharp/Peake
- Sharp/R. Young
- Sharp/Sherman
- Sherman
- Toda
- Wylie
- 5 guests
- Guest
- Instructor data not available

Locations

The following lists the locations from the 2007 Exit Survey database that were included in the analysis of Exit Survey results.

- AgTAC
- CTAC
- Big Creek
- Courtyard Marriott Oxnard
- Palm Desert Chamber of Commerce, Palm Desert
- Palm Springs Sevice Center, Cathedral City
- San Bernardino County Business Resource Center, Hesperia
- Santa Barbara
- Santa Monica
- SCE Antelope Valley Service Center / Lancaster
- Temecula Valley Chamber of Commerce, Temecula
- Location data not available

Technologies (Survey)

The following lists the technologies from the 2007 Exit Survey database that were included in the analysis of Exit Survey results.

- Bldg/Title 24
- EE General (Assessments, Measures)
- Electricity (General)
- EMS & Electronic Controls
- Food Service
- HVAC
- Lighting
- Motors and Drives
- PV & Solar
- Other

Appendix 4-2: Unavailable Information re. Exit Surveys

Location Data Unavailable

The following lists the classes for which location data was unavailable in the 2007 Exit Survey database.

Event ID	Class Title
705091	ACCA Manual D - Duct Design
705301	Advanced ACCA Manual D
706051	Advanced Lighting Technologies
705011	Basics of Photovoltaic (PV) for Grid-Tied Applications
706061	Cool Roofs: Code Requirements and Program Opportunities
704121	Equipment Sizing and Selection Using ACCA Manual J
712121	Field Verification & Diagnostic Testing of Photovoltaic Systems
18731	Food for Thought
704181	HVAC System Air Flow and Static Pressure Diagnostics
704032	Overview of ACCA Quality Installation Standards
710041	Solar Water Heating Systems
18046	South Bay Partnership
711151	Title 24 Duct Installation Standards and Diagnostic Testing
710182	Title 24 HVAC Systems Change Outs

Instructor Data Unavailable

The following lists the classes for which instructor name data was unavailable in the 2007 Exit Survey database.

Event IDs	Class Title
17490	14th Annual Water Conference
702061, 704031, 707101, 709252, 711061	Advanced Programmable Logic Controllers
712062	Benefits of Precision Farming
18533	Computer Energy Efficiency
17898	CSI Training Program
709062	Dairy Energy Management Seminar
701181, 707251, 16051, 16052	Electrical Safety Seminar
703131, 709261	Electrical Systems Analysis
18216	Energy Assessments of Data Centers
17965	Energy Policy Act of 2005
706281, 709051	Energy Savings 101
701241	EnergyPro 4.0 - Envelope
701242	EnergyPro 4.0 - Lighting
701251	EnergyPro 4.0 - Mechanical
17677	eQuest Employee Training
712121	Field Verification & Diagnostic Testing of Photovoltaic Systems
702131	FSU-CIT Pump Energy Efficiency and Water Source Protection
705241	FSU-CIT Variable Frequency Drives (VFD) for Ag and Turf Irrigation Pumps
710091	Green Building Hype or Help?
707181	Ground Source Heat Pump
710311	Grounding, Bonding, and Wiring
711274	Hands-On Programmable Logic Controllers (PLC) ControlLogix 5000

Appendix 4-2: Unavailable Information re. Exit Surveys

708071	How to Get Started with an Energy Efficiency Survey
702141, 704122	Improving Energy Efficiency in Drip Irrigation
703141, 707261	Industrial Maintenance
710111	Introduction to Geothermal Heat Pump Systems
702051, 704021, 707091, 709241, 711051	Introduction to Programmable Logic Controllers
704171	Lamp and Ballast Basics
707191	Lighting 101
711142	Lighting Hype and Best Practices
707122	Managing Your Residential Energy Costs Workshop
703291, 710161	Motors and Starters
711011	Photovoltaic (PV) Site Analysis and System Sizing
711273	Principles of Electric Motors
702271	Principles of Lighting
712111	Pump Efficiency (Simultaneously in Spanish)
17746	RetroCommissioning In Practice
709201	So Watt If I Already Have T-8s
710041	Solar Water Heating Systems
18046	South Bay Partnership
711291	Steam Boilers and Water Heating Efficiency
711151	Title 24 Duct Installation Standards and Diagnostic Testing
710182	Title 24 HVAC Systems Change Outs
17596	Title 24 Skylighting in Big Box Buildings and Beyond
17592	Title24 Residential and Nonresidential EE Standards
708081	Transport Energy: Motors, Fans and Pumps
16547	Utility Power Quality and Mitigation

Appendix 4-3: Exit Survey

EDISON AGTAC®

SOUTHERN CALIFORNIA EDISON®

Event #:_____

Date:_____

SEMINAR:_____

Please check the appropriate response. Your feedback is important and will be used to evaluate our instructors, design future courses and improve current seminars.

Please rate the extent to which you disagree or agree with the following statements:

	Strongly Disagree (1)	(2)	(3)	(4)	Strongly Agree (5)
1. The registration process was user friendly.	☐	☐	☐	☐	☐
2. The overall quality of this seminar was excellent.	☐	☐	☐	☐	☐
3. The instructor was an effective communicator.	☐	☐	☐	☐	☐
4. The instructor was knowledgeable on this subject.	☐	☐	☐	☐	☐
5. The course material covered was well organized and easy to understand.	☐	☐	☐	☐	☐
6. The material covered in the seminar was relevant to my job.	☐	☐	☐	☐	☐
7. The handouts will be helpful to me as reference material.	☐	☐	☐	☐	☐
8. There was an appropriate mix between presentation and group involvement.	☐	☐	☐	☐	☐
9. The classroom supported a comfortable learning experience.	☐	☐	☐	☐	☐
10. If used, the center's exhibits or displays complemented the course material and enhanced the seminar/class. (Skip,	☐	☐	☐	☐	☐
11. if not applicable)					
12. I am completely satisfied with my total experience at the Energy Center.	☐	☐	☐	☐	☐

A. Please rate your knowledge level on the subject matter (On a scale of 1 to 5, 1=not at all knowledgeable, 5=very knowledgeable)

Before attending the class? 1☐ 2☐ 3☐ 4☐ 5☐

After attending the class? 1☐ 2☐ 3☐ 4☐ 5☐

B. To what extent do you think this course information will increase the likelihood that you/your company will purchase energy efficient equipment or energy efficiency practices in the future? (On a scale of 1 to 5, 1=Very Unlikely, 5=Very Likely)

1☐ 2☐ 3☐ 4☐ 5☐

C. Will you/your company be making equipment purchase decisions for your business facility in the near future? (Check one)

Next 6-months_____, 6-12 Months_____, 1-2 Years_____, Beyond 2 Years_____, Other (specify) _____, No _____

D. Are you/your company planning to upgrade or add any of the following? (Check as many as appropriate)

Lighting_____, HVAC_____, Industrial Processing_____, Pumping_____, Other_____, None _____

E. Would you like Southern California Edison to tell you more about our Energy Audit Service? ☐ Yes ☐ No

F. Would you like Southern California Edison to tell you more about our Energy Efficiency Programs? ☐ Yes ☐ No

G. If you requested additional information, please provide your contact information: (Name, Phone# & email address)

_____

H. What other services or seminars should the Energy Centers provide? _____

_____

I. How did you hear about this seminar?

☐Mailed Flier ☐Calendar ☐Email ☐Website ☐Radio ☐Billboard ☐My Supervisor, ☐My Edison Representative, Other (specify) _____

J. Do you have any other comments?

ENERGY CENTER USE ONLY

Contacted By:

_____

Comments:

_____

Appendix 4-3: Exit Survey

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Appendix 5-1: Telephone Interview Questionnaire

Telephone Interview: CTAC/AgTAC Process Evaluation

Sample type:

- *Sample 1: CTAC 1 Class (one-timers)*
- *Sample 3: AgTAC 1 Class (one-timers)*
- *Sample 2: CTAC 6+ Classes (frequent participants)*
- *Sample 4: AgTAC 6+ Classes (frequent participants)*

May I please speak with _____?

IF SAMPLE 2 OR 4:
Hello, my name is _____ calling from CSRS. I am calling you about the classes you have taken between 2004 and 2007 at Southern California Edison's **[INSERT FROM SAMPLE: "Customer Technology Application Center (CTAC)" or "Agricultural Technology Application Center (AgTAC)".]** Would you be willing to answer a few short questions about your experience there?

IF SAMPLE 1 OR 3:
Hello, my name is _____ calling from CSRS. I am calling you about a class you took in **[INSERT FROM SAMPLE: MONTH/YEAR]** at Southern California Edison's **[INSERT FROM SAMPLE: "Customer Technology Application Center (CTAC)" or "Agricultural Technology Application Center (AgTAC)".]** Would you be willing to answer a few short questions about your experience there?

1 YES
2 NO → THANK AND TERMINATE, CODE AS INITIAL REFUSAL

IF SAMPLE 1 OR 3:
1. Do you recall the class you took in **[INSERT FROM SAMPLE: MONTH/YEAR] titled [INSERT FROM SAMPLE: CLASS NAME]**?

1 YES → CONTINUE
2 NO → THANK AND TERMINATE, CODE AS NQ.Q1
3 SOMEWHAT → CONTINUE
8 DON'T KNOW → THANK AND TERMINATE, CODE AS INITIAL REFUSAL
9 REFUSED → THANK AND TERMINATE, CODE AS INITIAL REFUSAL

2. Please rate your agreement or disagreement with the following statement on a scale of 1 to 7 with 1 meaning Strongly Disagree and 7 meaning Strongly Agree: [**IF SAMPLE 2 OR 4:** *Overall, the classes I have taken have been helpful*. **IF SAMPLE 1 OR 3:** *Overall, the class I took was helpful.]*

_____ 8 = DON'T KNOW 9 = REFUSED

3. **IF SAMPLE 2 OR 4:** What have been your main reasons for coming to [**INSERT FROM SAMPLE:** "CTAC/AgTAC"] classes? (PROBE AND CLARIFY FULLY)

IF SAMPLE 1 OR 3: What were your main reasons for coming to the class? (PROBE AND CLARIFY FULLY)

_____

_____

_____

4. **IF SAMPLE 2 OR 4:** Have the classes resulted in your employer/client(s) installing energy-efficiency measures? (READ LIST)

IF SAMPLE 1 OR 3: Did the class result in your employer/client(s) installing energy-efficiency measures? (READ LIST)

1 Yes, one or more measures were installed as a direct result of what I learned in [**INSERT IF SAMPLE 1 OR 3:** "class" **INSERT IF SAMPLE 2 OR 4:** "the classes".]
2 The [**INSERT IF SAMPLE 1 OR 3:** "class" **INSERT IF SAMPLE 2 OR 4:** "classes"] were partially responsible for at least one installation
3 No, but I am more aware of the possibilities as a result of taking the [**INSERT IF SAMPLE 1 OR 3**: "class" **INSERT IF SAMPLE 2 OR 4:** "classes"]
4 No, that wasn't the point of going to any of the [**INSERT IF SAMPLE 1 OR 3:** "class" **INSERT IF SAMPLE 2 OR 4:** "classes"]
5 Other
8 DON'T KNOW
9 REFUSED

5. Please rate your agreement or disagreement with the following statement on a scale of 1 to 7 with 1 meaning Strongly Disagree and 7 meaning Strongly Agree: [**IF SAMPLE 2 OR 4:** *The classes improved my knowledge of energy efficiency*. **IF SAMPLE 1 OR 3:** *The class improved my knowledge of energy efficiency*.]

_____ 8 = DON'T KNOW 9 = REFUSED

6. **IF SAMPLE 2 OR 4:** Please rate your agreement or disagreement with the following statement on a scale of 1 to 7 with 1 meaning Strongly Disagree and 7 meaning Strongly Agree: *The classes changed my attitudes about energy-efficiency in a positive direction*.

IF SAMPLE 1 OR 3: Please rate your agreement or disagreement with the following statement on a scale of 1 to 7 with 1 meaning Strongly Disagree and 7 meaning Strongly Agree: *The class changed my attitudes about energy-efficiency in a positive direction*.

_____ 8 = DON'T KNOW 9 = REFUSED

7. **IF SAMPLE 2 OR 4:** Have the classes resulted in your employer/client(s) changing their energy-using practices?

IF SAMPLE 1 OR 3: Did the class result in your employer/client(s) changing their energy-using practices?

1 YES
2 NO
3 NOT SURE

8 DON'T KNOW
9 REFUSED

8. **IF SAMPLE 2 OR 4:** Have you made changes at home as a result of what you learned in the classes?

IF SAMPLE 1 OR 3: Have you made changes at home as a result of what you learned in the class?

1 YES
2 NO
3 THE CLASS/CLASSES MAY BE PARTIALLY RESPONSIBLE FOR CHANGES
8 DON'T KNOW
9 REFUSED

9. **IF SAMPLE 2 OR 4:** Have you or your employer/client(s) participated in any SCE rebate programs as a result of taking the classes? (READ LIST)

IF SAMPLE 1 OR 3: Have you or your employer/client(s) participated in any SCE rebate programs as a result of taking the class? (READ LIST)

1 Yes, as a direct result
2 Yes, as an indirect result
3 No, my employer/client(s) already participate in these programs
4 No, but they may in the future
5 No, and they are not likely to in the future
8 DON'T KNOW
9 REFUSED

10. **IF SAMPLE 2 OR 4:** What classes would you benefit from in the future? (PROBE AND CLARIFY FULLY)

_____

_____

_____

11. **IF SAMPLE 1 OR 3:** Why have you not taken other classes since this one? (PROBE AND CLARIFY FULLY)

_____

_____

_____

12. What suggestions would you make for the content and presentation of the [**INSERT FROM SAMPLE:** "CTAC/AgTAC" classes? (PROBE AND CLARIFY FULLY)

_____

_____

_____

13. **IF SAMPLE 2 OR 4:** If a course or set of courses were offered toward energy-efficiency certification, please rate your level of interest in this possibility from 0 to 7, with 0 meaning no interest, and 7 meaning extremely interested.

_____ 8 = DON'T KNOW 9 = REFUSED

ENDING: Those are all the questions I have. I want to thank you very much for your time. Have a good day!

Appendix 5-2: Participant Suggestions for Content and Presentation of EC Classes

Complete Answers to Open-Ended Question on Suggestions for Content and Presentation of Energy Center Classes

No Suggestions

- Everything was great

Overall Logistical and Scheduling Issues

- Spread over multiple days when necessary
- Classes too far away
- Provide better course description
- Offer more satellite classes
- Offer some classes for less than 1 day
- Provide a lunch to go for half-day classes
- Make place easier to find
- Offer 6 hour classes
- Add evening classes
- Condense classes where possible
- Offer more classes
- Cancel classes w 3 or less
- Schedule on weekends
- Send notices close to class date
- Promote classes more to contractors
- Start classes for those coming from a distance
- Smaller classes

Core Content Suggestions

- More advanced-in depth classes'
- More for residential customers
- App of energy saving methods in project drawings
- Devote entire class to emerging techs
- Offer more PLC classes
- More classes for Agricultural community and concerns
- More on devices people use unconsciously
- More solar classes
- More on alternative energy
- Class on short circuit analysis
- Class on system analysis
- Make more basic
- More T24-comm and residential
- Class on trouble-shooting electrical sys
- Class on efficient use of test equipment
- Class on house envelopes
- Classes for homeowners
- Classes geared to agriculture and e-e not my interest

Issues Tied to Core Content

- Tie classes to rebate programs
- Get plant ops more involved
- Show examples of results of changes
- Have bus owners or reps present experiences
- Include more program information
- Show cost-benefit examples
- Address maintenance more
- Be sure SCE program info accurate
- Focus more on environ reasons for energy efficiency

Appendix 5-2: Participant Suggestions **for Content and Presentation of EC Classes**

Presentation and Classroom Issues

- More hands-on
- Make more interactive
- Pace the class when a lot of material
- Include field trips
- More energy from speaker
- Turn classroom temp down
- More visual presentations
- Provide internet access in classrooms
- Include more calc methods
- Water Conference: Have people write questions and pass to speaker
- More question and answer time
- Make graphics in color

Class Materials Suggestions

- Provide more handouts or DVDs
- Provide giveaway items with logo and phone #
- Provide more than an outline
- Water: provide kits for kids to read and pass to parents

Other

- Ask these questions sooner after the class
- Explain better how much they will pay a small farmer
- Hit people hard with what they can do to save energy and money
- We go for customer rebates not education
- Use budget to get info out to general public
- I don't understand very well, my English is not the best

Appendix 5-3: Participant Suggestions for Classes at Energy Centers

Complete Answers to Open-Ended Question to Frequent Participants on What Classes they Would Benefit From

Basics-Pumps & Pumping

- Centrifugal pump technology
- Deep well pumps
- Drip irrigation
- Industrial pumping
- Pump efficiency
- Water piping issues

Basics-Air Conditioning

- Chillers
- Compressors
- Cooling towers
- Direct insulation
- Economizers
- Fans & fan efficiency
- HVAC

Basics-Lighting

- Fundamentals of lighting usage
- LED technology
- Lighting/lighting efficiency
- T-8, T-5 lamps

Basics-Other

- Air compressing
- Boiler technology
- Commercial energy efficiency
- Electronics
- Fundamentals on electricity & energy efficiency
- More electrical knowledge
- More methods to save energy and costs
- Premium efficient motors
- Refrigeration service
- Transformers
- Variable speed drives
- Cold storage
- Energy-efficient building

Beyond the Basics

- Bearings running on air cushion
- Changes in “arc-fault”-longer class
- Electric motor rewinding
- Electrical grounding systems
- Energy management for mechanical systems
- Magnetic bearing compressors
- Power quality classes

SCE Programs

- Program roll-out classes at AgTAC
- Refrigerators & rebates
- Technologies SCE plans to promote in future

Certifications

- LEED Certification
- Building operator engineer certification

Expanding Sectors

- A/C in residential
- Classes aimed at residential energy efficiency
- Classes for kids
- Residential design
- Solar-residential

Modeling, monitoring & software-non-hardware

- Computerized systems for facility managers
- Cost management
- Energy efficiency software applications/also for regulations
- Energy modeling
- Energy monitoring
- HVAC controls & load calculating
- Ladder logic
- Life cycle costing
- More software classes like Equest
- Timing calibration
- Use of software to calculate energy costs while designing buildings

Control systems-hardware

- Automated controls
- DDC class
- Allen Bradley PLC classes
- PLC classes that help market the product
- SCADA systems

Energy Management Systems

- Integrated devices
- Motion control systems
- New EMS systems
- Using schematics in systems that are not integrated
- Power management

Green Learning

- Emerging lighting technologies
- Energy-efficient landscaping
- Green building
- Green technology
- New environmental products
- New/emergent technologies for e-e
- Photo cells/photovoltaics
- Renewable energy
- Solar-existing & new
- Wind power generation

Title 24 & Codes

- Application of energy requirements of T24 & Codes generally
- Code updates

Other

- More sections of classes that fill fast
- Don't Know

Appendix 6-1: Addendum to Review of Literature re. Attitudes, Behavior

Summary of Empirical Findings

The tables in this addendum are meant to act as a brief reference for the empirical results from the studies reviewed for the main document, which is theoretical in orientation. The articles reviewed were not selected to reflect systematically the entire empirical literature on the attitude-behavior relation for eco-friendly actions by consumers. At the same time, there are enough of them that they reveal some patterns. Also, they are the articles on which the theoretical analysis was based, plus some extras that were surveyed for their use of certain concepts and scales.

The following tables summarize the surveyed literature on the variables that predict eco-friendly behavior or behavior intentions. The focus was on variables related to environmental attitudes. The information in the first two tables is exactly the same; the tables differ only in the organization of the information. In the first table, the information is sorted by the predictors in the models that pertained to this project. The second table is sorted by the criterion variables involved in the same models. The term "criterion variable" is what is sometimes called the dependent variable, or the variable being predicted by the independent variables or "predictors." "Independent variable" and "dependent variable" are terms usually reserved for experimental designs, a category for which none of the studies reviewed qualified.

Effect sizes are numerical representations of how strongly two or more variables are related to each other. What constitutes an effect size is different for different methods of analysis. Thus, the studies surveyed reported a variety of statistics that represent effect sizes. They are not directly comparable. Experienced researchers will recognize the symbols shown in the table under Effect Sizes; however, lay readers are less likely to recognize them or know how to interpret them. For this reason, each is characterized as Small, Medium, or Large to facilitate interpretation by all readers. These three categories were developed by Cohen (1988) based on a systematic review of the social science literature. Readers experienced in statistics will know that some of the statistics shown here are not the exact one discussed by Cohen. However, each can be roughly interpreted in his terms. If this were a meta-analysis, a much more precise job of translating the statistics reported into comparable units would have been developed. However, that would have been substantially beyond the scope of this small project. It is hoped that what has been represented here will give the reader an idea of what kinds of relations to expect when trying to predict eco-friendly behavior in general, and energy-efficient behavior in particular, though very few of the studies address purchase of energy-efficient equipment specifically.

The last of the three tables in this addendum attempts to summarize the variables that "moderate" or interact with predictors to change the relation between predictor and criterion, depending on the value of the moderator. As mentioned in the text of this review, researchers in this field have found that the relation between attitudes and behavior can be very different depending on situational and other variables. The ways in which these analyses were completed and reported varied considerably, and summarizing the results is difficult. This is the table that will be most difficult for the lay reader to understand. Still, efforts were made to make it possible to get some general ideas of what the important moderators are at this stage of the development of this field of study.

It is perhaps worth mentioning that most of the variables listed represent scales, and they were accompanied by reliability statistics and showed adequate to excellent reliability. Their predictive validities were demonstrated by significant correlations with important variables that would be expected to be correlated with them. Almost none of the variables listed represent single questionnaire items.

Variables that Predict Behavior or Behavioral Intent — Sorted by Predictor

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Barr 2007	AC	Behavior intention, Recycle	β=.21	Small to Medium
Barr 2007	AC	Behavior, recycle	β=.19	Small to medium
Guagnano, et al. 1995	AC	Recycle	r=.121 (r^2=.01)	Low
Stern, et al. 1995	AC	Willingness to pay tax, forest	r=.225 (r^2=.05)	Small to Medium
Stern, et al. 1995	AC	Willingness to pay tax, gas	r=.244 (r^2=.06)	Small to Medium
Stern, et al. 1995	AC	Write letter, forest	r=.531 (r^2=.28)	Large
Stern, et al. 1995	AC	Write letter, gas	r=.563 (r^2=.32)	Large
Stern, et al. 1993	AC	Willing to pay tax, gas	R^2=.08	Medium
Stern, et al. 1993	AC	Willing to pay tax, income	R^2=.12	Medium
Stern, et al. 1993	AC	Political action	R^2=.46	Large
Stern, et al. 1995	AC	Political action	r=.672 (r^2=.45)	Large
Barr 2007	AC (Environmental knowledge)	Behavior intention, Reduce-reuse	β=.07	Small
Kaiser, et al. 1999	AC (Environmental knowledge)	Environmental behavior intentions	β=.33	Medium
Kaiser, et al. 1999	AC (Environmental knowledge)	Environmental behavior intentions	β=.07	Small
Soonthonsmai 2001	AC (General knowledge)	Behavior intention, purchase green products	r=.184 (r^2=.03)	Small
Norlund & Garvill 2002	AC (i.e., Problem awareness)	Environmental behavior	r=.33 (r^2=.11)	Medium
Soonthonsmai 2001	AC (Specific knowledge)	Behavior intention, purchase green products	r=.164 (r^2=.03)	Small
Dietz, et al. 2007	AC*	Support for climate change policies	β=.25	Small to Medium
Barr 2007	Active concern	Behavior intention, Recycle	β=.20	Small to Medium
Barr 2007	Active concern	Behavior intention, Reduce-reuse	β=.25	Small to Medium
Davies, et al. 2002	Affect	Behavior intention, recycling	r=.194 (r^2=.04)	Small
Davies, et al. 2002	Affect	Behavior, recycling	r=.025 (r^2=.001)	Small
Barr 2007	Age	Behavior, recycle	β=.07	Small
Barr 2007	Age	Behavior, Reduce	β=.16	Small
Dietz, et al. 2007	Altruism*	Support for climate change policies	β=.24	Small to Medium
DeGroot & Steg 2008	Altruistic values	Behavior Intention, E-Donating	β=.41	Medium to Large
Guagnano, et al. 1995	AR	Recycle	r=.286 (r^2=.08)	Medium
Barr 2007	AR (citizenship)	Behavior intention, Reduce-reuse	β=.11	Small
Berenguer, et al. 2005	AR (Moral obligation)	Conservation behavior	β=.359	Medium
Berenguer, et al. 2005	AR (Moral obligation)	Environmental behavior, index	β=.525	Large
Berenguer, et al. 2005	AR (Moral obligation)	Pollution behavior	β=.391	Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Barr 2007	AR (motivation to respond)	Behavior, Reuse	β=.20	Small to Medium
Kaiser, et al. 1999	AR (Responsibility Feelings)	Environmental behavior intentions	β=.26	Medium
Kaiser, et al. 1999	AR (Responsibility Feelings)	Environmental behavior intentions	β=.59	Large
Hassan et al. 2007	AR (Responsible thinking)	Behavior intention, smoking cessation	β=.61	Large
Kaiser, et al. 1999	AR, AC, EV	Environmental behavior intentions	R^2=.45	Large
Kaiser, et al. 1999	AR, AC, EV	Environmental behavior intentions	R^2=.50	Large
Berenguer, et al. 2005	AR, EC	Environmental behavior, index	R^2=.391	Large
Berenguer, et al. 2005	AR, EC, Urban	Pollution behavior	R^2=.242	Large
Berenguer, et al. 2005	AR, Urban	Conservation behavior	R^2=.172	Medium to Large
Bamberg & Schmidt 2003	Attitude	Behavioral intention, car use	β=.32	Medium
Davies, et al. 2002	Attitude	Behavior intention, recycling	r=.388 (r^2=.15)	Medium
Davies, et al. 2002	Attitude	Behavior, recycling	r=.096 (r^2=.01)	Small
Wallace, et al. 2005	Attitude	Behavior	β=.36 to .42	Medium
Wall et al., 2007	Attitude, PBC, SN	Behavioral intention, car use	R^2=.233	Large
Thogersen 2002	Attitude, specific	Chose organic wine (non-org=1, org=0)	β=-.37	Medium
Bamberg & Schmidt 2003	Attitude, Subj norm, PBC	Behavioral intention, car use	R^2=.60	Large
Soonthonsmai 2001	Behavior intention (purchase green products)	Behavior, purchase green products	r=.164 (r^2=.03)	Small
Barr 2007	Behavior intention, Recycle	Behavior, Recycle	r=.33 (r^2=.11)	Medium
Barr 2007	Behavior intention, Reduce-reuse	Behavior, Reduce	r=.29 (r^2=.08)	Medium
Barr 2007	Behavior intention, Reduce-reuse	Behavior, Reuse	r=.27 (r^2=.07)	Medium
Bamberg & Schmidt 2003	Behavioral intention, car use	Behavior, car use	β=.60	Large
Guagnano, et al. 1995	Bin provided	Recycle	r=.383 (r^2=.15)	Medium to Large
Guagnano, et al. 1995	Bin provided, PC, AC, AR	Recycle	R^2=.25	Large
DeGroot & Steg 2008	Biospheric values	Behavior Intention, E-Donating	β=-.54	Large
Stern, et al. 1995	Biospheric values	Political action	r=.570 (r^2=.32)	Large
Stern, et al. 1995	Biospheric values	Willingness to pay tax, gas	r=.208 (r^2=.04)	Small to Medium
Stern, et al. 1995	Biospheric values	Write letter, forest	r=.473 (r^2=.22)	Large
Stern, et al. 1995	Biospheric values	Write letter, gas	r=.488 (r^2=.24)	Large
DeGroot & Steg 2008	Biospheric, altruistic, egoistic	Behavior Intention, E-Donating	R^2=.23	Large
Barr 2007	Community/Democracy	Behavior, Reduce	β=.13	Small

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Barr 2007	Convenience	Behavior intention, Recycle	β=-.20	Small to Medium
Barr 2007	Convenience	Behavior, recycle	β=.28	Medium
Barr 2007	Convenience	Behavior, Reuse	β=.15	Small
Saphores, et al. 2006	Convenience	Willingness to recycle e-waste	Baseline p=.188 Conv p=.607	Large
Berenguer, et al. 2005	EC	Environmental behavior, index	β=.192	Small
Berenguer, et al. 2005	EC	Pollution behavior	β=.202	Small to Medium
Diekman & Preisendorfer 2003	EC	Behavior, buy eco label products	r=.17, γ=.21, Logit effect=.11	Small
Diekman & Preisendorfer 2003	EC	Behavior, buy refill bottles	r=.13, γ=.16, Logit effect=.09	Small
Diekman & Preisendorfer 2003	EC	Behavior, buy seasonal foods	r=.15, γ=.19, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, energy-saving bulbs	r=.09, γ=.12, Logit effect=.10	Small
Diekman & Preisendorfer 2003	EC	Behavior, glass recycling	r=.14, γ=.23, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, holiday w/o car or plane	r=-.05, γ=-.06, Logit effect=-.01	Small
Diekman & Preisendorfer 2003	EC	Behavior, install water saving measures	r=.09, γ=.11, Logit effect=.07	Small
Diekman & Preisendorfer 2003	EC	Behavior, leave pkg in store	r=.17, γ=.22, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, no car in household	r=-.01, γ=-.01, Logit effect=.01	Small
Diekman & Preisendorfer 2003	EC	Behavior, paper recycling	r=.14, γ=.24, Logit effect=.12	Small
Diekman & Preisendorfer 2003	EC	Behavior, plastic recycling	r=.14, γ=.19, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, recycle organics	r=.12, γ=.14, Logit effect=.11	Small
Diekman & Preisendorfer 2003	EC	Behavior, reduce shower water	r=.14, γ=.17, Logit effect=.08	Small
Diekman & Preisendorfer 2003	EC	Behavior, shop w/o car	r=.05, γ=.06, Logit effect=.03	Small
Diekman & Preisendorfer 2003	EC	Behavior, switch off lights	r=.10, γ=.12, Logit effect=.09	Small
Diekman & Preisendorfer 2003	EC	Behavior, weekend trip w/o car	r=.01, γ=.02, Logit effect=.02	Small
Weigel & Weigel 1978	EC	Behavior scale of petition plus recycling	r=.62 (r^2=.38)	Large
Norlund & Garvill 2002	Eco values	Environmental behavior	r=.33 (r^2=.11)	Medium
DeGroot & Steg 2008	Egoistic values	Behavior Intention, E-Donating	β=.04	Small
Lee & Holden 1999	Empathy	High-cost consumer behaviors	r=.26 (r^2=.07)	Medium
Lee & Holden 1999	Empathy	Low-cost behaviors	r=.22 (r^2=.05)	Small to Medium
Lee & Holden 1999	Empathy	Regulatory support	r=.10 (r^2=.01)	Small
Lee & Holden 1999	Empathy	Willingness to pay	r=.21 (r^2=.04)	Small to Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	High-cost consumer behaviors	R^2=.29	Large
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Low-cost consumer behaviors	R^2=.30	Large
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Regulatory support	R^2=.32	Large
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Willingness to pay	R^2=.26	Large
Lee & Holden 1999	Environmental Attitude	High-cost consumer behaviors	r=.19 (r^2=.04)	Small
Lee & Holden 1999	Environmental Attitude	Low-cost behaviors	r=.33 (r^2=.11)	Medium
Lee & Holden 1999	Environmental Attitude	Regulatory support	r=.54 (r^2=.29)	Large
Lee & Holden 1999	Environmental Attitude	Willingness to pay	r=.37 (r^2=.14)	Medium
Kaiser, et al. 1999	Environmental beh intentions	Environmental behavior	r^2=.76	Large
Kaiser, et al. 1999	Environmental beh intentions	Environmental behavior	r^2=.94	Large
Lee & Holden 1999	Environmental Distress	High-cost consumer behaviors	r=.31 (r^2=.10)	Medium
Lee & Holden 1999	Environmental Distress	Low-cost behaviors	r=.37 (r^2=.14)	Medium
Lee & Holden 1999	Environmental Distress	Regulatory support	r=.18 (r^2=.03)	Small
Lee & Holden 1999	Environmental Distress	Willingness to pay	r=.19 (r^2=.04)	Small
Kaiser, et al. 1999	EV	Environmental behavior intentions	β=.20	Small to Medium
Kaiser, et al. 1999	EV	Environmental behavior intentions	β=.14	Small
Lee & Holden 1999	FIO	High-cost consumer behaviors	r=-.13 (r^2=.02)	Small
Lee & Holden 1999	FIO	Low-cost behaviors	r=.07 (r^2=.005)	Small
Lee & Holden 1999	FIO	Regulatory support	r=.00 (r^2=.00)	None
Lee & Holden 1999	FIO	Willingness to pay	r=.21 (r^2=.04)	Small to Medium
Dietz, et al. 2007	Future Orientation*	Support for climate change policies	β=.25	Medium
Barr 2007	Gender	Behavior intention, Reduce-reuse	β=.07	Small
Barr 2007	Gender	Behavior, Reduce	β=.11	Small
Stern, et al. 1993	Gender	Political action	r=.51 (r^2=.26)	Large
Stern, et al. 1993	Gender	Willing to pay tax, gas	r=.43 (r^2=.18)	Medium to Large
Stern, et al. 1993	Gender	Willing to pay tax, income	r=.74 (r^2=.55)	Large
Barr 2007	House type	Behavior intention, Recycle	β=.10	Small
Barr 2007	Human priority	Behavior intention, Reduce-reuse	β=.13	Small
Barr 2007	Human priority	Behavior, recycle	β=.05	Small
Barr 2007	Human priority	Behavior, Reduce	β=.13	Small
Barr 2007	Human priority, Imp nature, Active concern, Prob & threat, PN, AR, Gender, AC, Past Beh	Behavior intention, Reduce-reuse	R^2=.50	Large

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Barr 2007	Human priority, Imp nature, Com/Dem, Age, Gender, Policy know, Knowledge sources	Behavior, Reduce	R^2=.43	Large
Barr 2007	Human priority, Imp nature, Social norm, PN, Age, AC, Convenience	Behavior, Recycle	R^2=.79	Large
Barr 2007	Imp nature, Convenience, Active concern, PN, House type, AC, Knowledge sources	Behavior intention, Recycle	R^2=.53	Large
Barr 2007	Imp nature, Convenience, AR, PN, Past beh	Behavior, Reuse	R^2=.31	Large
Barr 2007	Importance of nature	Behavior intention, Recycle	β=-.06	Small
Barr 2007	Importance of nature	Behavior intention, Reduce-reuse	β=.11	Small
Barr 2007	Importance of nature	Behavior, recycle	β=.20	Small to Medium
Barr 2007	Importance of nature	Behavior, Reduce	β=-.06	Small
Barr 2007	Importance of nature	Behavior, Reuse	β=.10	Small
Barr 2007	Knowledge sources	Behavior intention, Recycle	β=.08	Small
Barr 2007	Knowledge sources	Behavior, Reduce	β=.15	Small
Dietz, et al. 2007	Liberal*	Support for climate change policies	β=.24	Small to Medium
Dietz, et al. 2007	NEP	Support for climate change policies	β=.21	Small to Medium
Stern, et al. 1995	NEP	Political action	r=.623 (r^2=.39)	Large
Stern, et al. 1995	NEP	Willingness to pay tax. forest	r=.266 (r^2=.07)	Medium
Stern, et al. 1995	NEP	Write letter, forest	r=.455 (r^2=.21)	Large
Stern, et al. 1995	NEP	Write letter, gas	r=.438 (r^2=.19)	Medium to Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Political action	R^2=.512 w/o AC R^2=.512 w/o NEP	Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Willing to pay tax, forest	R^2=.124 w/o AC R^2=.086 w/o NEP	Medium
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Willing to pay tax, gas	R^2=.080 w/o AC R^2=.089 w/o NEP	Medium
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Write letter, forest	R^2=.215 w/o AC R^2=.268 w/o NEP	Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Write letter, gas	R^2=.226 w/o AC R^2=.299 w/o NEP	Large
Hunecke, et al. 2001	No cost	Behavior, Subway use	β=.20	Small to Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Stern, et al. 1995	Openness to new experience	Political action	r=.201 (r^2=.04)	Small to Medium
Stern, et al. 1995	Openness to new experience	Write letter, forest	r=.267 (r^2=.07)	Medium
Stern, et al. 1995	Openness to new experience	Write letter, gas	r=.289 (r^2=.08)	Medium
Barr 2007	Past Behavior	Behavior intention, Reduce-reuse	β=.16	Small
Barr 2007	Past behavior	Behavior, Reuse	β=.04	Small
Davies, et al. 2002	Past Behavior	Behavior intention, recycling	r=.197 (r^2=.04)	Small
Davies, et al. 2002	Past Behavior	Behavior, recycling	r=.027 (r^2=.001)	Small
Thogersen 2002	Past behavior	Chose organic wine (non-org=1, org=0)	β=-.31	Medium
Bamberg & Schmidt 2003	PBC	Behavioral intention, car use	β=.25	Medium
Davies, et al. 2002	PBC	Behavior intention, recycling	r=.252 (r^2=.04)	Medium
Davies, et al. 2002	PBC	Behavior, recycling	r=.008 (r^2=.000)	Small
Oom de Valle, et al. 2005	PBC	Behavior, Recycle	β=.772	Large
Lee & Holden 1999	PCE	High-cost consumer behaviors	r=.34 (r^2=.12)	Medium
Lee & Holden 1999	PCE	Low-cost behaviors	r=.13 (r^2=.02)	Small
Lee & Holden 1999	PCE	Regulatory support	r=-.12 (r^2=.01)	Small
Lee & Holden 1999	PCE	Willingness to pay	r=.15 (r^2=.02)	Small
Guagnano, et al. 1995	Personal Costs	Recycle	r=.189 (r^2=.04)	Small
Black, et al. 1985	PN	EE capital investment	β=.00	None
Black, et al. 1985	PN	Low-cost EE improvements	β=.20	Small to Medium
Black, et al. 1985	PN	Minor curtailments	β=.30	Medium
Black, et al. 1985	PN	T-stat setting	β=-.31	Medium
Hunecke, et al. 2001	PN	Behavior, Subway use	β=.22	Small to Medium
Norlund & Garvill 2002	PN	Environmental behavior	r=.47 (r^2=.22)	Large
Oom de Valle, et al. 2005	PN	Behavior, Recycle	β=.30	Medium
Thogersen 2002	PN	Chose organic wine (non-org=1, org=0)	β=-.15	Small
Barr 2007	PN (acceptance of norm)	Behavior intention, Recycle	β=.24	Small to Medium
Barr 2007	PN (acceptance of norm)	Behavior, recycle	β=-.07	Small
Barr 2007	PN (acceptance of norm)	Behavior, Reuse	β=-.08	Small
Soonthonsmai 2001	PN (Normative beliefs)	Behavior intention, purchase green products	r=.372 (r^2=.14)	Medium
Davies, et al. 2002	PN (Personal norm)	Behavior intention, recycling	r=.380 (r^2=.14)	Medium
Davies, et al. 2002	PN (Personal norm)	Behavior, recycling	r=.119 (r^2=.01)	Small
Barr 2007	PN (subjective norm)	Behavior intention, Reduce-reuse	β=.07	Small
Davies, et al. 2002	PN (Subjective norm)	Behavior intention, recycling	r=.162 (r^2=.03)	Small
Davies, et al. 2002	PN (Subjective norm)	Behavior, recycling	r=.087 (r^2=.01)	Small

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Descript.**
Soonthonsmai 2001	PN (Subjective norm)	Behavior intention, purchase green products	r=.374 (r^2=.14)	Medium
Soonthonsmai 2001	PN (Subjective norm)	Behavior, purchase green products	r=.106 (r^2=.01)	Small
Wall, et al. 2007	PN PBC	Behavioral intention, car use	R^2=.368	Large
Thogersen 2002	PN x Past behavior	Chose organic wine (non-org=1, org=0)	β=-.17	Small
Wall, et al. 2007	PN, AC	Behavioral intention, car use	R^2=.328	Large
Hunecke, et al. 2001	PN, No cost	Behavior, Subway use	R^2=.17	Medium
Oom de Valle, et al. 2005	PN, Subj norm, PBC	Behavior, Recycle	R^2=.718	Large
Barr 2007	Policy knowledge	Behavior, Reduce	β=.11	Small
Barr 2007	Problem & threat	Behavior intention, Reduce-reuse	β=.17	Small
Norlund & Garvill 2002	Self-enhancement	Environmental behavior	r=-.09 (r^2=.01)	Small
Norlund & Garvill 2002	Self-transcendence	Environmental behavior	r=.29 (r^2=.08)	Medium
Thogersen 2002	Social Norm	Chose organic wine (non-org=1, org=0)	β=.02	Small
Barr 2007	Social norm (awareness of norm)	Behavior, recycle	β=.10	Small
Thogersen 2002	Spec att, soc norm, PN, past beh, PN x past beh	Chose organic wine (non-org=1, org=0)	R^2=.50	Large
Bamberg & Schmidt 2003	Subjective norm	Behavioral intention, car use	β=.40	Medium to Large
Oom de Valle, et al. 2005	Subjective norm	Behavior, Recycle	β=.10	Small
Dietz, et al. 2007	Traditional*	Support for climate change policies	β=-.13	Small
Stern, et al. 1995	Traditionalism	Write letter, gas	r=.200 (r^2=.04)	Small to Large
Dietz, et al. 2007	Trust in Environ Orgs	Support for climate change policies	β=.37	Medium
Dietz, et al. 2007	Trust in Industry	Support for climate change policies	β=-.29	Medium

FIO=Faith in Others
PBC=Perceived Behavioral Control
SN=Social Norm
NEP=New Ecological Paradigm scale
EV=Environmental Values
EC=Environmental Concern

* Collinear with NEP

** Based roughly on Cohen's standard effect sizes (Cohen, 1988)

Table 6-1.A: Variables that predict behavior or behavioral intent — sorted by predictor

Variables that Predict Behavior or Behavioral Intent — Sorted by Criterion

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Wallace, et al. 2005	Attitude	Behavior	β=.36 to .42	Medium
DeGroot & Steg 2008	Altruistic values	Behavior Intention, E-Donating	β=.41	Medium to Large
DeGroot & Steg 2008	Biospheric values	Behavior Intention, E-Donating	β=-.54	Large
DeGroot & Steg 2008	Biospheric, altruistic, egoistic	Behavior Intention, E-Donating	R^2=.23	Large
DeGroot & Steg 2008	Egoistic values	Behavior Intention, E-Donating	β=.04	Small
Soonthonsmai 2001	AC (General knowledge)	Behavior intention, purchase green products	r=.184 (r^2=.03)	Small
Soonthonsmai 2001	AC (Specific knowledge)	Behavior intention, purchase green products	r=.164 (r^2=.03)	Small
Soonthonsmai 2001	PN (Normative beliefs)	Behavior intention, purchase green products	r=.372 (r^2=.14)	Medium
Soonthonsmai 2001	PN (Subjective norm)	Behavior intention, purchase green products	r=.374 (r^2=.14)	Medium
Barr 2007	AC	Behavior intention, Recycle	β=.21	Small to Medium
Barr 2007	Active concern	Behavior intention, Recycle	β=.20	Small to Medium
Barr 2007	Convenience	Behavior intention, Recycle	β=-.20	Small to Medium
Barr 2007	House type	Behavior intention, Recycle	β=.10	Small
Barr 2007	Imp nature, Convenience, Active concern, PN, House type, AC, Knowledge sources	Behavior intention, Recycle	R^2=.53	Large
Barr 2007	Importance of nature	Behavior intention, Recycle	β=-.06	Small
Barr 2007	Knowledge sources	Behavior intention, Recycle	β=.08	Small
Barr 2007	PN (acceptance of norm)	Behavior intention, Recycle	β=.24	Small to Medium
Davies, et al. 2002	Affect	Behavior intention, recycling	r=.194 (r^2=.04)	Small
Davies, et al. 2002	Attitude	Behavior intention, recycling	r=.388 (r^2=.15)	Medium
Davies, et al. 2002	Past Behavior	Behavior intention, recycling	r=.197 (r^2=.04)	Small
Davies, et al. 2002	PBC	Behavior intention, recycling	r=.252 (r^2=.04)	Medium
Davies, et al. 2002	PN (Personal norm)	Behavior intention, recycling	r=.380 (r^2=.14)	Medium
Davies, et al. 2002	PN (Subjective norm)	Behavior intention, recycling	r=.162 (r^2=.03)	Small
Barr 2007	AC (Environmental knowledge)	Behavior intention, Reduce-reuse	β=.07	Small
Barr 2007	Active concern	Behavior intention, Reduce-reuse	β=.25	Small to Medium
Barr 2007	AR (citizenship)	Behavior intention, Reduce-reuse	β=.11	Small
Barr 2007	Gender	Behavior intention, Reduce-reuse	β=.07	Small
Barr 2007	Human priority	Behavior intention, Reduce-reuse	β=.13	Small

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Barr 2007	Human priority, Imp nature, Active concern, Prob & threat, PN, AR, Gender, AC, Past Beh	Behavior intention, Reduce-reuse	R^2=.50	Large
Barr 2007	Importance of nature	Behavior intention, Reduce-reuse	β=.11	Small
Barr 2007	Past Behavior	Behavior intention, Reduce-reuse	β=.16	Small
Barr 2007	PN (subjective norm)	Behavior intention, Reduce-reuse	β=.07	Small
Barr 2007	Problem & threat	Behavior intention, Reduce-reuse	β=.17	Small
Hassan, et al. 2007	AR (Responsible thinking)	Behavior intention, smoking cessation	β=.61	Large
Weigel & Weigel 1978	EC	Behavior scale of petition plus recycling	r=.62 (r^2=.38)	Large
Diekman & Preisendorfer 2003	EC	Behavior, buy eco label products	r=.17, γ=.21, Logit effect=.11	Small
Diekman & Preisendorfer 2003	EC	Behavior, buy refill bottles	r=.13, γ=.16, Logit effect=.09	Small
Diekman & Preisendorfer 2003	EC	Behavior, buy seasonal foods	r=.15, γ=.19, Logit effect=.13	Small
Bamberg & Schmidt 2003	Behavioral intention, car use	Behavior, car use	β=.60	Large
Diekman & Preisendorfer 2003	EC	Behavior, energy-saving bulbs	r=.09, γ=.12, Logit effect=.10	Small
Diekman & Preisendorfer 2003	EC	Behavior, glass recycling	r=.14, γ=.23, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, holiday w/o car or plane	r=-.05, γ=-.06, Logit effect=-.01	Small
Diekman & Preisendorfer 2003	EC	Behavior, install water saving measures	r=.09, γ=.11, Logit effect=.07	Small
Diekman & Preisendorfer 2003	EC	Behavior, leave pkg in store	r=.17, γ=.22, Logit effect=.13	Small
Diekman & Preisendorfer 2003	EC	Behavior, no car in household	r=-.01, γ=-.01, Logit effect=.01	Small
Diekman & Preisendorfer 2003	EC	Behavior, paper recycling	r=.14, γ=.24, Logit effect=.12	Small
Diekman & Preisendorfer 2003	EC	Behavior, plastic recycling	r=.14, γ=.19, Logit effect=.13	Small
Soonthonsmai 2001	Behavior intention (purchase green products)	Behavior, purchase green products	r=.164 (r^2=.03)	Small
Soonthonsmai 2001	PN (Subjective norm)	Behavior, purchase green products	r=.106 (r^2=.01)	Small
Barr 2007	AC	Behavior, recycle	β=.19	Small to medium
Barr 2007	Age	Behavior, recycle	β=.07	Small
Barr 2007	Behavior intention, Recycle	Behavior, Recycle	r=.33 (r^2=.11)	Medium
Barr 2007	Convenience	Behavior, recycle	β=.28	Medium
Barr 2007	Human priority	Behavior, recycle	β=.05	Small

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Barr 2007	Human priority, Imp nature, Social norm, PN, Age, AC, Convenience	Behavior, Recycle	R^2=.79	Large
Barr 2007	Importance of nature	Behavior, recycle	β=.20	Small to Medium
Barr 2007	PN (acceptance of norm)	Behavior, recycle	β=-.07	Small
Barr 2007	Social norm (awareness of norm)	Behavior, recycle	β=.10	Small
Oom de Valle, et al. 2005	PBC	Behavior, Recycle	β=.772	Large
Oom de Valle, et al. 2005	PN	Behavior, Recycle	β=.30	Medium
Oom de Valle, et al. 2005	PN, Subj norm, PBC	Behavior, Recycle	R^2=.718	Large
Oom de Valle, et al. 2005	Subjective norm	Behavior, Recycle	β=.10	Small
Diekman & Preisendorfer 2003	EC	Behavior, recycle organics	r=.12, γ=.14, Logit effect=.11	Small
Davies, et al. 2002	Affect	Behavior, recycling	r=.025 (r^2=.001)	Small
Davies, et al. 2002	Attitude	Behavior, recycling	r=.096 (r^2=.01)	Small
Davies, et al. 2002	Past Behavior	Behavior, recycling	r=.027 (r^2=.001)	Small
Davies, et al. 2002	PBC	Behavior, recycling	r=.008 (r^2=.000)	Small
Davies, et al. 2002	PN (Personal norm)	Behavior, recycling	r=.119 (r^2=.01)	Small
Davies, et al. 2002	PN (Subjective norm)	Behavior, recycling	r=.087 (r^2=.01)	Small
Barr 2007	Age	Behavior, Reduce	β=.16	Small
Barr 2007	Behavior intention, Reduce-reuse	Behavior, Reduce	r=.29 (r^2=.08)	Medium
Barr 2007	Community/Democracy	Behavior, Reduce	β=.13	Small
Barr 2007	Gender	Behavior, Reduce	β=.11	Small
Barr 2007	Human priority	Behavior, Reduce	β=.13	Small
Barr 2007	Human priority, Imp nature, Com/Dem, Age, Gender, Policy know, Knowledge sources	Behavior, Reduce	R^2=.43	Large
Barr 2007	Importance of nature	Behavior, Reduce	β=-.06	Small
Barr 2007	Knowledge sources	Behavior, Reduce	β=.15	Small
Barr 2007	Policy knowledge	Behavior, Reduce	β=.11	Small
Diekman & Preisendorfer 2003	EC	Behavior, reduce shower water	r=.14, γ=.17, Logit effect=.08	Small
Barr 2007	AR (motivation to respond)	Behavior, Reuse	β=.20	Small to Medium
Barr 2007	Behavior intention, Reduce-reuse	Behavior, Reuse	r=.27 (r^2=.07)	Medium
Barr 2007	Convenience	Behavior, Reuse	β=.15	Small
Barr 2007	Imp nature, Convenience, AR, PN, Past beh	Behavior, Reuse	R^2=.31	Large
Barr 2007	Importance of nature	Behavior, Reuse	β=.10	Small
Barr 2007	Past behavior	Behavior, Reuse	β=.04	Small
Barr 2007	PN (acceptance of norm)	Behavior, Reuse	β=-.08	Small

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Diekman & Preisendorfer 2003	EC	Behavior, shop w/o car	r=.05, γ=.06, Logit effect=.03	Small
Hunecke, et al. 2001	No cost	Behavior, Subway use	β=.20	Small to Medium
Hunecke, et al. 2001	PN	Behavior, Subway use	β=.22	Small to Medium
Hunecke, et al. 2001	PN, No cost	Behavior, Subway use	R^2=.17	Medium
Diekman & Preisendorfer 2003	EC	Behavior, switch off lights	r=.10, γ=.12, Logit effect=.09	Small
Diekman & Preisendorfer 2003	EC	Behavior, weekend trip w/o car	r=.01, γ=.02, Logit effect=.02	Small
Bamberg & Schmidt 2003	Attitude	Behavioral intention, car use	β=.32	Medium
Bamberg & Schmidt 2003	Attitude, Subj norm, PBC	Behavioral intention, car use	R^2=.60	Large
Bamberg & Schmidt 2003	PBC	Behavioral intention, car use	β=.25	Medium
Bamberg & Schmidt 2003	Subjective norm	Behavioral intention, car use	β=.40	Medium to Large
Wall, et al. 2007	Attitude, PBC, SN	Behavioral intention, car use	R^2=.233	Large
Wall, et al. 2007	PN PBC	Behavioral intention, car use	R^2=.368	Large
Wall, et al. 2007	PN, AC	Behavioral intention, car use	R^2=.328	Large
Thogersen 2002	Attitude, specific	Chose organic wine (non-org=1, org=0)	β=-.37	Medium
Thogersen 2002	Past behavior	Chose organic wine (non-org=1, org=0)	β=-.31	Medium
Thogersen 2002	PN	Chose organic wine (non-org=1, org=0)	β=-.15	Small
Thogersen 2002	PN x Past behavior	Chose organic wine (non-org=1, org=0)	β=-.17	Small
Thogersen 2002	Social Norm	Chose organic wine (non-org=1, org=0)	β=.02	Small
Thogersen 2002	Spec att, soc norm, PN, past beh, PN x past beh	Chose organic wine (non-org=1, org=0)	R^2=.50	Large
Berenguer, et al. 2005	AR (Moral obligation)	Conservation behavior	β=.359	Medium
Berenguer, et al. 2005	AR, Urban	Conservation behavior	R^2=.172	Medium to Large
Black, et al. 1985	PN	EE capital investment	β=.00	None
Kaiser, et al. 1999	Environmental beh intentions	Environmental behavior	r^2=.76	Large
Kaiser, et al. 1999	Environmental beh intentions	Environmental behavior	r^2=.94	Large
Norlund & Garvill 2002	AC (i.e., Problem awareness)	Environmental behavior	r=.33 (r^2=.11)	Medium
Norlund & Garvill 2002	Eco values	Environmental behavior	r=.33 (r^2=.11)	Medium
Norlund & Garvill 2002	PN	Environmental behavior	r=.47 (r^2=.22)	Large
Norlund & Garvill 2002	Self-enhancement	Environmental behavior	r=-.09 (r^2=.01)	Small
Norlund & Garvill 2002	Self-transcendence	Environmental behavior	r=.29 (r^2=.08)	Medium
Kaiser, et al. 1999	AC (Environmental knowledge)	Environmental behavior intentions	β=.33	Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Kaiser, et al. 1999	AC (Environmental knowledge)	Environmental behavior intentions	β=.07	Small
Kaiser, et al. 1999	AR (Responsibility Feelings)	Environmental behavior intentions	β=.26	Medium
Kaiser, et al. 1999	AR (Responsibility Feelings)	Environmental behavior intentions	β=.59	Large
Kaiser, et al. 1999	AR, AC, EV	Environmental behavior intentions	R^2=.45	Large
Kaiser, et al. 1999	AR, AC, EV	Environmental behavior intentions	R^2=.50	Large
Kaiser, et al. 1999	EV	Environmental behavior intentions	β=.20	Small to Medium
Kaiser, et al. 1999	EV	Environmental behavior intentions	β=.14	Small
Berenguer, et al. 2005	AR (Moral obligation)	Environmental behavior, index	β=.525	Large
Berenguer, et al. 2005	AR, EC	Environmental behavior, index	R^2=.391	Large
Berenguer, et al. 2005	EC	Environmental behavior, index	β=.192	Small
Lee & Holden 1999	Empathy	High-cost consumer behaviors	r=.26 (r^2=.07)	Medium
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	High-cost consumer behaviors	R^2=.29	Large
Lee & Holden 1999	Environmental Attitude	High-cost consumer behaviors	r=.19 (r^2=.04)	Small
Lee & Holden 1999	Environmental Distress	High-cost consumer behaviors	r=.31 (r^2=.10)	Medium
Lee & Holden 1999	FIO	High-cost consumer behaviors	r=-.13 (r^2=.02)	Small
Lee & Holden 1999	PCE	High-cost consumer behaviors	r=.34 (r^2=.12)	Medium
Lee & Holden 1999	Empathy	Low-cost behaviors	r=.22 (r^2=.05)	Small to Medium
Lee & Holden 1999	Environmental Attitude	Low-cost behaviors	r=.33 (r^2=.11)	Medium
Lee & Holden 1999	Environmental Distress	Low-cost behaviors	r=.37 (r^2=.14)	Medium
Lee & Holden 1999	FIO	Low-cost behaviors	r=.07 (r^2=.005)	Small
Lee & Holden 1999	PCE	Low-cost behaviors	r=.13 (r^2=.02)	Small
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Low-cost consumer behaviors	R^2=.30	Large
Black, et al. 1985	PN	Low-cost EE improvements	β=.20	Small to Medium
Black, et al. 1985	PN	Minor curtailments	β=.30	Medium
Stern, et al. 1995	Biospheric values	Political action	r=.570 (r^2=.32)	Large
Stern, et al. 1995	NEP	Political action	r=.623 (r^2=.39)	Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Political action	R^2=.512 w/o AC R^2=.512 w/o NEP	Large
Stern, et al. 1995	Openness to new experience	Political action	r=.201 (r^2=.04)	Small to Medium
Stern, et al. 1993	Gender	Political action	r=.51 (r^2=.26)	Large
Stern, et al. 1993	AC	Political action	R^2=.46	Large
Stern, et al. 1995	AC	Political action	r=.672 (r^2=.45)	Large
Berenguer, et al. 2005	AR (Moral obligation)	Pollution behavior	β=.391	Medium
Berenguer, et al. 2005	AR, EC, Urban	Pollution behavior	R^2=.242	Large
Berenguer, et al. 2005	EC	Pollution behavior	β=.202	Small to Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Guagnano, et al. 1995	AR	Recycle	r=.286 (r^2=.08)	Medium
Guagnano, et al. 1995	Bin provided	Recycle	r=.383 (r^2=.15)	Medium to Large
Guagnano, et al. 1995	Bin provided, PC, AC, AR	Recycle	R^2=.25	Large
Guagnano, et al. 1995	Personal Costs	Recycle	r=.189 (r^2=.04)	Small
Guagnano, et al. 1995	AC	Recycle	r=.121 (r^2=.01)	Low
Lee & Holden 1999	Empathy	Regulatory support	r=.10 (r^2=.01)	Small
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Regulatory support	R^2=.32	Large
Lee & Holden 1999	Environmental Attitude	Regulatory support	r=.54 (r^2=.29)	Large
Lee & Holden 1999	Environmental Distress	Regulatory support	r=.18 (r^2=.03)	Small
Lee & Holden 1999	FIO	Regulatory support	r=.00 (r^2=.00)	None
Lee & Holden 1999	PCE	Regulatory support	r=-.12 (r^2=.01)	Small
Dietz, et al. 2007	AC*	Support for climate change policies	β=.25	Small to Medium
Dietz, et al. 2007	Altruism*	Support for climate change policies	β=.24	Small to Medium
Dietz, et al. 2007	Future Orientation*	Support for climate change policies	β=.25	Medium
Dietz, et al. 2007	Liberal*	Support for climate change policies	β=.24	Small to Medium
Dietz, et al. 2007	NEP	Support for climate change policies	β=.21	Small to Medium
Dietz, et al. 2007	Traditional*	Support for climate change policies	β=-.13	Small
Dietz, et al. 2007	Trust in Environ Orgs	Support for climate change policies	β=.37	Medium
Dietz, et al. 2007	Trust in Industry	Support for climate change policies	β=-.29	Medium
Black, et al. 1985	PN	T-stat setting	β=-.31	Medium
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Willing to pay tax, forest	R^2=.124 w/o AC R^2=.086 w/o NEP	Medium
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Willing to pay tax, gas	R^2=.080 w/o AC R^2=.089 w/o NEP	Medium
Stern, et al. 1993	AC	Willing to pay tax, gas	R^2=.08	Medium
Stern, et al. 1993	Gender	Willing to pay tax, gas	r=.43 (r^2=.18)	Medium to Large
Stern, et al. 1993	AC	Willing to pay tax, income	R^2=.12	Medium
Stern, et al. 1993	Gender	Willing to pay tax, income	r=.74 (r^2=.55)	Large
Lee & Holden 1999	Empathy	Willingness to pay	r=.21 (r^2=.04)	Small Medium
Lee & Holden 1999	Env att, env distress, empathy, PCE, FIO	Willingness to pay	R^2=.26	Large
Lee & Holden 1999	Environmental Attitude	Willingness to pay	r=.37 (r^2=.14)	Medium
Lee & Holden 1999	Environmental Distress	Willingness to pay	r=.19 (r^2=.04)	Small
Lee & Holden 1999	FIO	Willingness to pay	r=.21 (r^2=.04)	Small to Medium

Author	Predictor	Criterion	Effect Sizes (where available)	Effect Size Description**
Lee & Holden 1999	PCE	Willingness to pay	r=.15 (r^2=.02)	Small
Stern, et al. 1995	AC	Willingness to pay tax, forest	r=.225 (r^2=.05)	Small to Medium
Stern, et al. 1995	AC	Willingness to pay tax, gas	r=.244 (r^2=.06)	Small to Medium
Stern, et al. 1995	Biospheric values	Willingness to pay tax, gas	r=.208 (r^2=.04)	Small to Medium
Stern, et al. 1995	NEP	Willingness to pay tax. forest	r=.266 (r^2=.07)	Medium
Saphores, et al. 2006	Convenience	Willingness to recycle e-waste	Baseline p=.188 Conv p=.607	Large
Stern, et al. 1995	AC	Write letter, forest	r=.531 (r^2=.28)	Large
Stern, et al. 1995	Biospheric values	Write letter, forest	r=.473 (r^2=.22)	Large
Stern, et al. 1995	NEP	Write letter, forest	r=.455 (r^2=.21)	Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Write letter, forest	R^2=.215 w/o AC R^2=.268 w/o NEP	Large
Stern, et al. 1995	Openness to new experience	Write letter, forest	r=.267 (r^2=.07)	Medium
Stern, et al. 1995	AC	Write letter, gas	r=.563 (r^2=.32)	Large
Stern, et al. 1995	Biospheric values	Write letter, gas	r=.488 (r^2=.24)	Large
Stern, et al. 1995	NEP	Write letter, gas	r=.438 (r^2=.19)	Medium to Large
Stern, et al. 1995	NEP, AC, Bios, Open, Trad, Age, Female	Write letter, gas	R^2=.226 w/o AC R^2=.299 w/o NEP	Large
Stern, et al. 1995	Openness to new experience	Write letter, gas	r=.289 (r^2=.08)	Medium
Stern, et al. 1995	Traditionalism	Write letter, gas	r=.200 (r^2=.04)	Small to Large

AC=Awareness of Consequences
PBC=Perceived Behavioral Control
PN=Personal Norm
SN=Social Norm
AR=Ascription of Responsibility to Self
NEP=New Ecological Paradigm scale
PCE=Perceived Consumer Effectiveness
EV=Environmental Values
FIO=Faith in Others
EC=Environmental Concern

* Collinear with NEP

** Based roughly on Cohen's standard effect sizes (Cohen, 1988)

Table 6-1.B: Variables that predict behavior or behavioral intent — sorted by criterion

Moderating Relations/Interactions in Predicting Behavior from Attitudes

Author	Predictor	Criterion	Main Effect	Condition 1 & Effect	Condition 2 & Effect
Black, et al. 1985	PN			Low-cost EE improvements β=.20	
Black, et al. 1985	PN			T-stat setting (lo cost) β=-.31	
Black, et al. 1985	PN			EE capital investment (hi cost) β=.00	
Black, et al. 1985	PN			Minor curtailments (lo cost) β=.30	
Diekmann, et al. 2003	Environmental concern	Recycling paper	r=.14	Low cost r=.22	High cost r=.12
Fazio & Williams 1986	Attitude	Behavior		Strong attitudes r=reduced	
Hassan, et al. 2007	Responsible thinking (AR)	Smoking cessation	β=.61	Incorrect attribution of message to private companies β=.37	Attribution of message to EU β=.99
Lee & Holden 1999	Attitude	Behavior		Low cost r=.33	High cost r=.19
Oskamp, et al. 1991	Attitude	Behavior		Perception that others who should be responsible aren't r=reduced	Delayed rewards r=reduced
Oskamp, et al. 1991	Attitude	Behavior		Lack of social reinforcement r=reduced	Lack of information or skills r=reduced
Oskamp, et al. 1991	Attitude	Behavior		Mismatched level of measurement r=reduced	
Saphores, et al. 2006		Behavior, recycle e-waste	Baseline probability=.188	Convenient condition probability=.607	
Tarrant & Cordell 1997	Attitude	Behavior		Mismatched level of measurement r=reduced	
Thogersen 2002	PN, Past Beh	Behavior, purch organic wine	PN β=.15 PB β=.31	PN x PB β=.17	
Wallace, et al. 2005	Attitude (meta-analysis)	Behavior	Mean r=.41	Social pressure (in favor) Mean r=reduced	Action difficult Mean r=reduced
Wallace, et al. 2005	Attitude	Behavior	Mean r=.41	Subjective norms against behavior r=reduced	Lack of perceived behavior control r=reduced

Table 6-1.C: Moderating relations/interactions in predicting behavior from attitudes

The New Ecological Paradigm Attitude Measure

1. We are approaching the limit of the number of people the earth can support.
2. Humans have the right to modify the natural environment to suite their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do NOT make the earth unlivable.
5. Humans are severely abusing the environment.
6. The earth has plenty of natural resources if we just learn how to develop them.
7. Plans and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities humans are still subject to the laws of nature.
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
11. The earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

Responses: Strongly Agree, Mildly Agree, Unsure, Mildly Disagree, Strongly Disagree.

The analysis suggests that the total scale is most appropriate rather than the 3-4 subscales.

Source: Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000).

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